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**D. A. Baimukanov[1], A. Baimukanov[2], O. Alikhanov[1],
D. A. Doshanov[1], K. Zh. Iskhan[3], D. S. Sarsenbai[3]**

[1]Scientific research institute "Problems of the agroindustrial complex and water resources"
of the South Kazakhstan State University named after M. Auezov, Shymkent, Kazakhstan,
[2]FAO, International Commission on Genetic Resources for Farm Animals and Birds, Rome, Italy,
[3]Kazakh National Agrarian University, Almaty, Kazakhstan

GENETICS OF THE PRODUCTIVE PROFILE OF CAMELS OF DIFFERENT GENOTYPES OF THE KAZAKHSTAN POPULATION

Abstract. For the first time, camels of hybrid origin of F_2 (25%td, 25%kb, 50%kd), F_3 (12.5%td, 62.5%kb, 25%kd), F_4 (56.25%td, 31.25%kb, 12.5%kd), F_5 (28.1%td, 15.6%kb, 56.2%kd), pure Kazakh bactrian of the South Kazakhstan type and Mangistau population, arvana - Turkmen dromedary, Kazakh dromedary, bred in South Kazakhstan and Mangistau regions of the Republic of Kazakhstan, were studied in comparative aspect.

The genetic profile of live weight, dairy productivity, wool cutting, body measurements of the studied groups of camels is established. The results of the study showed the efficiency of breeding hybrid camel dams of the dromedary group for the production of camel milk, in view of the optimal ratio of milk fat and protein.

The phenotypic profile of camels of the Kazakh dromedary of the Arada F_5 type (28.1%td, 15.6%kb, 56.2%kd), is suitable for breeding "in itself". Camels have one compact hump of medium size - 2/3 of the oblique body length. Head profile is hook-nosed. The profile of the neck from the base of the neck to the head without bends is straight. The main color of the fleece (wool) is brown and sandy, without additional coloring. The main color of the covering hair is brown and sandy, there is an additional color that does not exceed 10% of the total livestock.

Keywords: Genetics, milk yield, Kazakh bactrian, arvana, Kazakh dromedary, hybrids.

Introduction. Kazakhstan is the only world center on the Eurasian continent, where it is possible to breed two species of camel dromedary (Camelus*dromedarius*) and two-humped bactrians (camelus *bactrianus*) of the Camelus genus [1].

It has been established that when mating camels of the Kazakh Bactrian breed bred in different conditions and belonging to different populations, the effect of intra-breed heterosisis is possible, which is more often manifested in heterogeneous selection [2]. That is, one of the effective options for obtaining high-yielding Kazakh Bactrians is the use of heterogeneous selection for intra-breed mating [3].

The presence of vast territories of semi-desert and desert pastures, high camel fitness allow intensive development of camel breeding in a productive direction [4].

In the practice of domestic camel breeding, along with thoroughbred breeding of Kazakh bactrians, two methods of breeding heterotic animals were widely spread: inter-species crossing between Kazakh bactrian and Turkmen dromedary, and interbreeding between Kazakh and Kalmyk bactrians.

One of the features of the manifestation of heterosis is the greatest degree of severity only in the first generation in hybrid Kazakh-Kalmyk bactrians [5] and hybrid camels [6]. Then the heterosis in subsequent generations fades out.

Interspecific crossing of camels of bactrians and dromedaries is practiced with the aim of breeding hybrids of the first generation, the so-called nars [7]. When breeding hybrids of the first generation "in themselves", the effect of heterosis in the second generation completely disappears. Preservation of heterosis in subsequent generations of interspecific hybrids of camels is an actual problem in the theory and practice of domestic camel husbandry. In this regard, the accumulation cross breeding of hybrids of the first generation of nars with the original parental forms, using traditional methods of interspecific hybridization, did not yield the expected results [8, 9].

One of the reserves to increase the production of camel meat is the increase in the number of camels of Kazakh bactrian breed and the Kazakh dromedary, which is a specialized meat breed of the combined direction of productivity. Further increase in the production of camel and improving its quality is associated with the rational use of the gene pool of the domestic breed of camels of Kazakh bactrian and dromedary of the Turkmen breed, as well as camels of different genotypes.

It should be noted that Kazakh bactrians, in comparison with interspecific camel hybrids, are low-yield [10]. In this regard, to improve the dairy, meat and wool productivity of Kazakh bactrians of different types and populations, it is necessary to develop effective zootechnicalselection parameters, based on the use of the coefficients of milking capacity, production of wool, etc.

In zootechnic science, hybridization refers to the crossing of animals belonging to different species. Hybridization as one of the methods of breeding includes the crossing of hybrids with other ones of different and identical origin. According to V.F. Krasot, et al. [11]: "The main task of this very difficult method of crossing is involving in the material culture of human of new valuable wild and semi-wild forms of animals.Depending on the ability or inability of hybrids to give offspring, hybridization is distinguished, which is widespread and gives us useful animals, and the hybridization used to create new breeds and species of animals. In connection with this, four types of hybridization of animals are distinguished: industrial, absorbent, introductory and reproductive".

"One of the promising and effective methods for further improving meat production is industrial crossbreeding and hybridization. They have become widespread in the meat cattle breeding in the user (commodity) herds in the production of crossbreds for fattening, as well as in the creation of new breeds and types of beef cattle" [12].

In the camel breeding, interspecific hybridization between the Bactrians of the Kazakh breed and the Dromedares of the Turkmen Arvana breed was widespread [13].

Hybridization according to Soviet scientists is a system of crossbreeding, based on the mating of individuals representing two (or more) genetically originated groups, and opposite to related crosses [14].

Breeders have long known that hybrids in relation to many signs, including economically important, in their values exceed both the original parental forms.

A. Baimukanov [15] proposed to take into account the weight at birth and at weaning when studying the growth rate of camels. B.S. Turumbetov [16] believes that it is still necessary to study and measure the body at birth, at weaning, at reaching puberty. Z.M. Musaev [17], while studying the growth and development of thoroughbred Kazakh bactrians, took into account the live weight and body measurements at birth, at one-year-old age, at the age of two and three years old.

That is, in camel husbandry the study of growth and development of camels is given special attention. This is due to the fact that the intensive growth of camels in the first months of post-embryonic development to some extent positively affects the formation of the direction of productivity. In particular, according to D.A. Baimukanov [18], intensive growth and development of throughbred Kazakh bactrians in the first three and six months of postembryonic development positively influence the formation of the dairy direction of productivity.

K.B. Saparov [19] considers that partial milking of female camels of the Turkmen Arvana breed with proper organization does not harm the development of the young stock.

D.A. Baimukanov [20] in his monograph indicates that the growth of camels of thoroughbred Kazakh Bactrians is the greatest in the first periods of postembryonic development. To ensure the appropriate growth factor, the correct organization of milking of female camels is necessary. However, the author is limited to data at birth, at three months and six months.

The need for the correct organization of feeding and maintenance of adult camels and young stock is noted in the recommendations on the development of camel breeding [21] and in the collection "Problems of the development of camel breeding in Kazakhstan" [22].

D.A. Baimukanov [23] says that: "The heterogeneity of the nars is caused by polygenic factors...". Further: "Hybrids of the first generation with both methods of crossing are similar in appearance to the dromedaries - single-horned, but the hump is more stretched from front to back. The shape of the head, neck, and fringe of the hybrid is similar to that of the Bactrian. Inheritance of dairy and wool productivity is intermediate. By massiveness, working qualities and endurance, hybrids exceed the original parent species".

In Kazakhstan conditions, hybrid camels of kospak are of particular value, which, depending on the Bactrian's blood, are divided into bal-kospak (75% of Bactrian), myrza-kospak (87.5% of Bactrian) and nar-kospak (93.75% of Bactrian) [23].

Of the interspecific hybrid camels, the nar-maya (F_1), iner-maya (F_1), kospak 1 (F_2), kez-nar 1 (F_3), kurt-nar (F_3) are well studied.

However, up to now, data on the patterns of postembryonic development of hybrids of kospak 2 (F_3), kospak 3 (F_4), kez-nar 2 (F_4), kez-nar 3 (F_3), kurt-nar (F_4) and their biological characteristics of the formation of productivity are insufficiently described. In addition, it should be noted that without certain knowledge about dairy, meat, wool productivity, scientifically grounded experiments and the obtained results, it is premature to assert the superiority of one or another genotype of interspecific hybrids.

Camel meat is used for the production of meat products in accordance with the "Halal" standard , traditionally used in the Islamic world. This is due to the fact that camel fat is a substitute for pork fat, traditionally used in the manufacture of sausage products [24]. In this aspect, according to the UN, Kazakhstan can become a leader in the short term in the production of camel milk and meat in the world market of meat and dairy industry.

According to A. Baimukanov [22], long-term high-productive cultural pastures and hayfields, which are based on the natural flora of deserts and semi-deserts, play an important role in creating a solid fodder base for desert animal husbandry.

A.Tastanov [25] believes that one of the reserves of rapid lifting of camel milking capacity is the hybridization of the Kazakh Bactrian with the Turkmen dromedary. In particular, milk yield for six months of lactation from hybrid camels of kez-nar and kurt-nar is 1700-1750 liters of milk, taking into account sucked milk by young camels. Further crossing of hybrid camels kez-nar and kurt-nar with producers of hybrid origin of the camel breeding department of the Kazakh scientific research institute of karakul breeding (Shymkent)kurt III and kurt IV is a promising direction for improving interspecific hybridization in camel breeding.

In camel hasbundry, animals selected for breeding compose pairs in such a way that selection and assortment complement each other and, together with the targeted breeding of young stock, they were effective methods of improving the breeds.

Aim of the work. Determination of the genetic profile of the productivity of camels of Kazakh Bactrian, Arvana, Kazakh dromedary and interspecific hybrids in the Republic of Kazakhstan.

Methods of research. The studies were conducted in the 2015–2018 period.

The objects of the research is thoroughbred camels of the Kazakh bactrian breed (kb), Arvanadromedar (td), Kazakh dromedary (kd) and hybrid camels - dromedary from rotary crossing, bred in the conditions of LLP "Taushyk" of Tupkaragan district, Mangistau region, PF "Usenov N" and "Gulmaira" of Otrar district, PF "Nurbol" of Suzak district and PF "Dauren-N" of Arys district of South-Kazakhstan region.

The production of wool was set during the spring cutting by individually weighed shorn wool in 20 kg scales with an accuracy of 0.1 kg. Subsequently, shorn wool was classified into four classes. According to the results of the analysis of wool, effective variants of selection and assortment of thoroughbred Kazakh bactrians of the western population and their interspecific hybrids were determined.

Formation of camel experimental herds during feeding was carried out at the request of the Pre-patent of the Republic of Kazakhstan No.16227 [26].

The live weight of camels was determined in two ways: the first - by individual weighing on stationary monophonic scales with an accuracy of 1.0 kg; the second - at the request of the Pre-patent of the Republic of Kazakhstan No.15886 [27].

Dairy productivity was determined based on the results of the control milkings for two adjacent days on the 3rd and 4th months of lactation, according to the Instruction for bonitation of camels. The monthly

milk yield was determined by carrying out the control milkings for two adjacent days (on the 21st, 22nd of each month). In the first two months of lactation, the monthly yield of the thrown camels was determined by the absolute increase in the live weight of their camels. When assessing dairy productivity, the extent of the usefulness of lactation was determined additionally upon request of the Provisional patent of the Republic of Kazakhstan No.16226 [28].

The content of fat and protein in milk was determined by the standard method, using the "Laktan 3" device (Russia).

Measurements of the body were measured on demand of the Instructions for bonitation of camels [29, 30].

Morphofunctional features of the udder of camels were determined by the method of A. Baimukanov [31].

Meat productivity of camels was studied according to the generally accepted method in the modification ofprofessor A. Baimukanov, et al. [32].

The main indicators of control slaughter of male camels of different genotypes were determined at the age of 30 months.

Biometric processing of digital materials was conducted according to N.A. Plokhinsky [33], E.K. Merkurieva and G.N. Shangin-Berezovsky[34].

The blood for the study was taken from the jugular vein in the morning from the unfed animals in the pen. The number of formed elements - erythrocytes and leukocytes was determined according to the conventional method in Goryaev's chamber, hemoglobin concentration in the Sali hemometer, total white blood - by refractometric method [20].

Results of the research.

1. Selective-genetic and productive profile of camelsF_2 (25%td, 25%kb, 50%kd). The object of the research was the Kazakh bactrians of the Mangistau population, Arvana - the Turkmen dromedary, the Kazakh dromedary, the second generation hybrids F_2 Aidaramir - arada and Baishin from the camel breeding farm of Taushyk LLP in the Tupkaragan region of Mangistau region (tables 1, 2).

Arvana is the Turkmen dromedary, a transboundary breed. In the conditions of the Caspian Despression, the Erben breed type of Arvana became widespread.

Kazakh Bactrians of the Mangistau populations are the main planned breed in the Mangistau region. It has become widespread in the Caspian Depression.

Table 1 – Genetic parameters of the productivity of experimental camels

Breed	Number of heads	Live weight, kg	Milk yield for 240 days of lactation	Fat	Protein
Kazakh bactrian	12	551.8±11.3	1182.3±18.7	5.42±0.08	3.40±0.02
Arvana	12	478.3±9.7	2645.7±28.3	3.23±0.07	3.12±0.04
Kazakh dromedary	12	485.6±7.8	2191.2±21.5	4.42±0.07	3.53±0.04
«Aidaramir - arada» F_2 (25%td, 25%kb, 50%kd)	12	613.4±12.6	2139.2±31.3	4.29±0.07	3.53±0.03
«Baishin» F_2 (25%td, 25%kb, 50%kd)	12	584.1±9.7	1837.3±41.2	4.32±0.06	3.53±0.04

Table 2 – Results of control slaughter of 30-month-old males of experimental groups of camels

Breed	Number of heads	Production live weight, kg	Removable live weight, kg	Preslaughter live weight, kg	Slaughter live weight, kg/Slaughter output, %
Kazakh bactrian	5	225.9±15.1	338.3±9.3	308.6±7.4	163.9±5.1/53.1±0.3
Turkmen dromedary Arvana	5	322.5±18.4	431.9±11.2	392.1±10.5	193.3±8.4/49.3±0.9
Kazakh dromedary	5	242.3±13.8	427.6±14.6	395.4±6.9	219.1±3.6/55.4±0.5
«Aidaramir - arada» F_2 (25%td, 25%kb, 50%kd)	5	261.7±19.2	457.8±22.4	418.5±9.1	231.0±6.3/55.2±0.8
«Baishin» F_2 (25%td, 25%kb, 50%kd)	5	256.4±12.9	429.2±18.7	403.7±7.7	224.4±7.1/55.6±0.4

The Kazakh dromedary of the Mangistau population is a unique breed group that has got widespread in the Mangistau region.

Baishin(F_2 d)is a group of hybrid camels of the second generation (50% of blood of the Kazakh dromedary, 25% of the Kazakh bactrian's blood, and 25% of the Turkmen dromedary's blood) obtained by crossing the hybrid females of the first generation of Iner-maya (F_1) with the producers of the Kazakh dromedary.

Aidaramir - arada(F_2 d) – is a group of hybrid camels of the second generation (50% of blood of the Kazakh dromedary, 25% of the Kazakh bactrian, 25% of the Turkmen dromedary) obtained by crossing hybrid females of the first generation of Nar-maya (F_1) with the producers of the Kazakh dromedary.

*Dairy productivity.*The study of dairy productivity is one of the most difficult in genetics and selection of camels. In the conducted studies, milk yield was studied for 240 days of lactation, the average content of fat and protein in milk during 240 days of lactation (table 1).

It was established that the hybrid camels of the Aidaramir group significantly exceed the Kazakh Bactrians by milk yield (P≤0.001), but they are inferior to fat content in milk and are not inferior to the mass fraction of protein in milk (table 1).

On the live weight, the effect of heterosisis observed. All the second generation female camels of "Aidaramir" and "Baishin" exceed their thoroughbred herdmates in terms of live weight (P≤0.001).

*Early ripeness and meat productivity.*Preslaughter live weight in 2.5 year old young males F2 (25%td, 25%kb, 50%kd) averages 403.7-418.5 kg. The slaughter yield in males F2 (25%td, 25%kb, 50%kd) averages 55.4% (table 2), due to the influence of the genes of the Kazakh dromedary.

2. Selective - genetic and productive profile of camels F_3 (12.5%td, 62.5%kb, 25%kd). The object of the research was the Kazakh bactrians of the South Kazakhstan type, the Arvana - the Turkmen dromedary, the Kazakh dromedary, the hybrid camels of the third generation F_3 Aidaramir - nar and Baikazhy from the Usenov N farm and the Gulmaira farm of Otrar district, the Nurbol farm of the Suzak district and the Dauren-N farm of the Arys district of the South-Kazakhstan region.

The Kazakh Bactrians of the South Kazakhstan type is a planned breed of camels in the South Kazakhstan region.

Arvana - the Turkmen dromedary is represented by the Sakarchagin breed type.

The Kazakh dromedary of the South Kazakhstan population is a limited local breed group.

Aidaramir - narF $_3$is a group of hybrid camels of the third generation (12.5% of Arvana, 62.5% of Kazakh bactrian, 25% of Kazakh dromedary) obtained by absorbing crossing of females - hybrids of the second generation of Aidaramir-arada with males-Kazakh bactrians.

Baikazhy F $_3$is a group of hybrid camels of the third generation (12.5% of Arvana, 62.5% of Kazakh Bactrian, 25% of Kazakh dromedary) obtained by absorbing crossing of Baishin females - hybrids of the second generation with males - Kazakh bactrians.

Dairy productivity.It was established that the hybrid camels of the Aidaramir - nar group significantly exceed the Kazakh bactrian, the Turkmen dromedary and the Kazakh dromedary in live weight (P≤0.01). A similar superiority is observed in hybrid camels "Baikazhy" (table 3).

Milk yield in hybrid camels of the third generation is significantly higher in comparison with the herdmates of Kazakh bactrian (P≤0,001), but lower in comparison with dromedary.

It was not possible to reveal general patterns in the inheritance of fat content in milk in hybrid camels of the third generation, but an intermediate type of inheritance of fat content in milk should be noted.

Table 3 – Zootechnical parameters of dairy productivity of experimental camels

Breed	Number of heads	Live weight, kg	Milk yield for 240 days of lactation	Fat	Protein
Kazakh bactrian	15	587.4±22.1	944.1±45.2	5.61±0.07	3.52±0.04
Turkmen dromedary Arvana	15	535.1±13.6	2921.7±25.9	3.17±0.05	2.99±0.02
Kazakh dromedary	15	551.9±16.4	2468.2±31.1	4.45±0.07	3.51±0.05
«Aidaramir-nar» F_3 (12.5%td, 62.5%kb, 25%kd)	15	628.2±17.2	1764.9±23.8	4.37±0.06	3.51±0.05
«Baikazhy» F_3 (12.5%td, 62.5%kb, 25%kd)	15	612.4±14.3	1543.4±28.4	4.46±0.07	3.51±0.04

Concerning the inheritance of the mass fraction of protein in milk in hybrid camels, the greater influence of the Kazakh dromedary is traced.

Thus, the Aidaramir-nar F_3 (12.5%td, 62.5%kb, 25%kd) has a live weight of 628.2 kg, a milk yield for 240 days of lactation of 1,764.9 kg, a fat content in milk of 4.37%, milk protein content 3.51%. Hybrid camels "Baikazhy" F_3 (12.5%td, 62.5%kb, 25%kd) were 612.4 kg, 1543.4 kg, 4.46% and 3.51% respectively.

3. Selective-genetic and productive profile of camels F_4 (56,25%td, 31,25%kb, 12,5%kd). The object of the reseach was the Kazakh bactrians of the South Kazakhstan type, the Arvana – the Turkmen dromedary, the Kazakh dromedary, the hybrid camels of the third generation F_4 of Aidaramir - kurt and Ardas from the Usenov N farm and Gulmaira farm of the Otrar district, the Nurbol farm of the Suzak district and the Dauren-N farm of the Arys district of the South-Kazakhstan region.

Aidaramir - kurt (F_4) – is a group of fourth-generation hybrid camels (56.25% of the Turkmen dromedary's blood, 31.25% of the Kazakh bactrian's blood, 12.5% of the Kazakh dromedary) obtained by crossing of third-generation hybrid females of Aidaramir-nar (F_3) with Turkmen dromedary producers.

Ardas (F_4) is a group of fourth-generation hybrid camels (56.25% of the Turkmen dromedary's blood, 31.25% of the Kazakh Bactrian's blood, 12.5% of the Kazakh dromedary) obtained by crossing of third-generation hybrid females of Baikazhy (F_3) with Turkmen dromedary producers.

*Genetics of postembryonal growth and development of camels.*The results of the study of the dynamics of the age variability of the live weight of females of experimental camels of the Kazakh dromedary type F_4 (56.25%td, 31.25%kb, 12.5%kd) from 15 days to 2.5 years old are given in table 4.

Table 4 – Age variability of live weight of experimental female camels, kg

Age	Group	unitofmeasurement		
		$X \pm m_x$	Cv	δ
15 days	Kazakh bactrian	32.5±1.8	12.4	3.7
	Arvana	36.9±2.1	9.8	2.4
	Kazakh dromedary	42.4±1.5	6.5	3.3
	«Aidaramir-kurt» F_4	44.2±2.4	7.7	4.1
	«Ardas» F_4	43.1±2.7	7.1	3.8
6 months	Kazakh bactrian	142.4±4.3	9.2	5.6
	Arvana	151.2±5.1	8.7	11.2
	Kazakh dromedary	148.6±4.8	8.5	9.1
	«Aidaramir-kurt» F_4	154.9±6.3	9.5	10.2
	«Ardas» F_4	161.7±5.9	7.9	12.7
18 months	Kazakh bactrian	233.8±5.8	6.2	12.7
	Arvana	263.2±4.4	9.3	8.2
	Kazakh dromedary	257.5±6.1	5.8	12.8
	«Aidaramir-kurt» F_4	278.4±6.3	6.4	14.3
	«Ardas» F_4	295.8±7.1	6.9	11.9
30 months (2.5 years)	Kazakh bactrian	327.3±5.7	5.2	9.6
	Arvana	355.2±8.2	7.4	18.1
	Kazakh dromedary	328.7±6.5	6.5	15.3
	«Aidaramir-kurt» F_4	389.5±10.1	9.3	17.5
	«Ardas» F_4	397.1±7.2	8.7	14.7

At the age of 15 days, the young camels - females of the Kazakh Dromedary type F_4 have an average live weight of 43.1-44.2 kg, which corresponds to the indices of the Kazakh dromedary (42.4 ± 1.5 kg), but significantly higher in comparison with herdmates of the Kazakh Bactrian (32.5 ± 1.8 kg) and Arvana (36.9 ± 2.1 kg).

When the six-month age is reached, the young female camels of the Kazakh Dromedary type F_4 exceed all experimental groups in terms of live weight. This superiority is associated with the effect of heterosis from the three-breed rotational cross.

In further age periods, the superiority in the live weight in females of the Kazakh dromedary type significantly increases in comparison with the thoroughbred herdmates.

At the age of 18 months, the live weight of the Kazakh Bactrian females reaches 233.8±5.8 kg, Arvana 257.5±6.1 kg, the Kazakh dromedary 257.5±6.1 kg, Aidaramir-kurt F_4 278.4±6.3 kg and Ardas F_4 295.8±7.1 kg.

At the age of 2.5 years, females of the Kazakh type Ardas F_4 exceed authentically in the live weight of the Kazakh bactrianherdmates by 69.8 kg or by 21.3% ($P<0.001$), arvana - by 41.9 kg or 11.7 % ($P<0.01$).

The live weight of 2.5 year old females of "Aidaramir-kurt" F_4 averages 389.5±10.1 kg, "Ardas" F_4 - 397.1±7.2 kg, which is significantly higher in comparison with the live weight of Kazakh bactrian (327.3±5.7 kg), arvana (355.2±8.2 kg) and the Kazakh dromedary (328.7±6.5 kg).

Table 5 shows the results of the study of the age dynamics of body measurements in experimental groups of male camels from birth to 18 months old. Young male camels of the Dromedary group of the

Table 5 – Age dynamics of body measurements of young male camels, cm

Species belonging	Age	Bodymeasurements			
		heightatwithers	oblique body length	chestcircumference	metacarpuscircumference
Bactrian (n=10)	atbirth	109.7±2.1	72.6±3.3	95.2±3.1	11.1±0.3
	3 months old	128.5±2.4	92.4±3.9	120.9±4.5	12.8±0.3
	6 months old	141.3±2.7	103.5±3.5	144.7±4.2	15.3±0.4
	9 months old	145.8±3.1	107.7±3.8	155.7±5.3	16.8±0.3
	12 months old	151.7±4.1	112.7±4.7	170.8±4.9	18.2±0.3
	18 months old	156.8±4.6	118.7±3.9	185.1±4.6	18.7±0.3
Arvana (n=10)	atbirth	112.3±1.4	71.4±2.5	102.92±4.2	12.1±0.2
	3 months old	131.9±2.7	95.3±3.1	140.12±3.7	12.7±0.3
	6 months old	147.4±3.2	114.4±2.7	155.80±4.2	13.5±0.4
	9 months old	152.7±3.9	119.2±3.2	160.7±4.1	14.2±0.3
	12 months old	163.5±2.6	123.1±3.9	172.5±2.8	14.5±0.3
	18 months old	169.1±2.8	128.3±3.5	176.2±5.4	15.8±0.2
Kazakh dromedary (n=10)	atbirth	111.4±1.6	65.7±3.2	87.8±4.5	11.6±0.3
	3 months old	132.1±1.2	83.1±3.3	124.1±3.4	13.2±0.4
	6 months old	144.2±3.5	99.2±3.7	147.6±4.7	14.1±0.3
	9 months old	148.1±3.7	109.1±3.4	153.5±4.2	14.5±0.4
	12 months old	159.3±3.2	117.4±3.1	167.4±3.2	15.2±0.3
	18 months old	167.4±2.5	121.4±3.7	171.3±3.4	15.5±0.5
Aidaramir-kurt» F_4 (n=10)	atbirth	114.2±2.4	70.2±3.1	97.2±3.9	11.6±0.2
	3 months old	135.3±4.3	93.5±3.6	127.5±4.4	13.1±0.3
	6 months old	142.9±4.8	106.2±3.4	150.71±3.9	15.9±0.3
	9 months old	154.7±3.7	115.3±4.3	155.9±4.0	16.6±0.4
	12 months old	166.8±4.1	120.2±2.8	173.4±3.1	17.2±0.3
	18 months old	169.7±3.7	121.1±2.7	188.7±3.6	17.5±0.4
«Ardas» F_4 (n=10)	atbirth	114.7±3.2	72.9±2.2	93.3±3.6	11.9±0.3
	3 months old	133.5±3.5	91.8±3.9	126.1±3.5	12.8±0.4
	6 months old	144.1±3.1	103.4±3.3	146.50±3.8	15.8±0.4
	9 months old	155.4±2.3	115.7±3.8	152.1±4.0	16.5±0.3
	12 months old	164.6±3.2	119.4±3.1	172.1±3.5	16.9±0.4
	18 months old	172.2±2.6	123.2±3.4	183.7±4.2	17.1±0.4

Kazakh type F_4 exceed in all measurements of the body of the herdmates of the Kazakh bactrian, arvana and the Kazakh dromedary.

In view of the high dairy productivity in camels of arvana, the Kazakh dromedary and dromedary of the Kazakh type F_4, there is a more intensive increase in height at the withers, oblique body length and chest circumference in their young camels in dairy period in comparison with the Kazakh Bactrian.

The established parameters of body measurements are recommended to be used as a standard for determining the intensity of growth and development from birth to 18-months-old age under various technologies of breeding and nursery of young camels in the milking and post-milking periods of ontogenesis.

*Genetics of blood and fertility of camels.*Morphobiochemical blood indices are characterized by hematological and biochemical studies. In connection with this, we carried out studies of the content of erythrocytes, leukocytes, hemoglobin in the blood, as well as the peculiarities of the protein blood coefficient in the experimental camels (table 6).

Table 6 – Hematological and biochemical parameters of blood of experimental camels (n = 40; Σ_n = 200)

Characteristics	Group				
	Kazakh Bactrian	Arvana	Kazakh dromedary	«Aidaramir–kurt» F_4	«Ardas» F_4
Erythrocytes, mln/ml	14.2±0.3	11.5±0.2	12.7±0.2	13.4±0.3	14.1±0.2
Leukocytesthous/ml	16.2±0.2	14.9±0.3	16.7±0.2	17.5±0.2	16.5±0.1
Hemoglobin, g/%	15.5±0.4	12.8±0.3	13.5±0.3	14.3±0.3	14.8±0.2
Thrombocytes, thous/ml	540.2±40.1	468.7±32.5	625.9±52.6	569.1±25.3	608.4±38.3
Totalprotein, g/%	6.8±0.09	6.2±0.07	6.5±0.08	6.4±0.06	6.5±0.05
Albumen, %	62.9±0.02	59.4±0.03	62.3±0.03	60.9±0.03	59.9±0.05
Globulin, %	37.1±0.03	40.6±0.03	37.7±0.03	39.1±0.02	40.1±0.02
Proteinratio, A/G	1.70±0.04	1.46±0.03	1.65±0.03	1.56±0.04	1.49±0.01

In arvana thoroughbred camels the blood contains erythrocytes of 11.5 million/ml, leukocytes of 14.9 thousand/mm and hemoglobin 12.8 g/%.

It was established that camels of the Dromedary group of the Kazakh type F_4 exceed Arvana in the content of erythrocytes and leukocytes, the concentration of hemoglobin, albumin in the total blood protein.

The concentration of thrombocytes in camels of the Dromedary group of the Kazakh type F_4 (569.1-608.4 thousand/ml) is significantly higher than in Arvana (468.7 thousand/ml) ($P<0.001$), but lower in comparison with the Kazakh dromedary (625.9 thousand/ml).

Protein coefficient of blood was 1.70 in female camels of the Kazakh Bactrian, 1.46 in Arvana, 1.65 in the Kazakh Dromedary, 1.56 in Aidaramir and 1.49 in Ardas.

In general, all blood values in the experimental camels corresponded to the physiological number. The observed fluctuations between the groups were probably due to inter-breed differences.

Female camels of the group dromedary F_4 of the new generation "Aidaramir-kurt" and "Ardas" have a fruit bearing duration from 405 days to 442 days, and the average duration is 421.1-422.5 days. The Kazakh Bactrians have an average fruit bearing duration of 442.4 ± 5.1 days. Arvana have a fruit bearing duration from 412 days to 442 days, an average of 425.1±3.9 days. The Kazakh dromedaries are characterized by a fruit bearing duration of 395-432 days, an average of 417.2±3.1 days (table 7).

Table 7 – Fruit bearing duration of camels, in days (n=40, Σ_n=200)

Breed	$X \pm m_x$	δ	Lim
Kazakh Bactrian	442.4±5.1	4.9	435-458
Arvana	425.1±3.9	3.2	412-442
Kazakh dromedary	417.2±3.1	3.5	395-432
«Aidaramir-kurt» F_4	422.5±3.2	4.5	405-442
«Ardas» F_4	421.1±2.8	4.5	409-439

The obtained data on the duration of fruit bearing are in keeping with previous studies.

Thus, the F_4 female camels (56.25%td, 31.25%kb, 12.5%kd) are closer to Arvana and the Kazakh dromedaryin fruit bearing duration.

Genetics of dairy productivity of camels. The live weight of the female camels of the dromedary group F_4 (56.25%td, 31.25%kb, 12.5%kd) was 579.7 - 584.5 kg, which was higher than the Kazakh bactrian (554.8 kg), arvana (561.2 kg) and the Kazakh dromedary (517.1 kg) (table 8).

Table 8 – Productivity of experimental camels (n=40, Σ_n=200)

Breed	Live weight, kg	Production of wool, kg	Milk yield for 270 days of lactation	Fat	Protein
Kazakh Bactrian	554.8±9.2	6.7±0.4	1481.4±30.8	5.31±0.08	3.38±0.03
Arvana	561.2±12.8	2.9±0.3	2911.7±24.6	3.28±0.07	3.09±0.04
Kazakh dromedary	517.1±7.3	3.7±0.3	2474.2±18.2	4.42±0.06	3.48±0.04
«Aidaramir-kurt» F_4	584.5±16.1	4.2±0.3	2399.1±21.5	4.25±0.08	3.48±0.03
«Ardas» F_4	579.7±14.9	4.3±0.2	2226.5±28.9	4.21±0.07	3.48±0.02

The milk yield for 270 days of lactation was composed in female camels of the Kazakh bactrian breed of the South Kazakhstan type - 1481.4±30.8 kg, Arvana - 2911.7±24.6 kg, the Kazakh dromedary - 2474.2±18.2 kg, "Aidaramir - kurt" F_4 - 2399.1±21.5 kg, "Ardas" F_4 - 2226.5±28.9 kg.

According to the protein content in the milk, camels of the new generation of the dromedary F_4 group are closer to the Kazakh dromedary, and the fat content in milk occupies an intermediate position between the arvana and the Kazakh dromedary.

By the production of wool, the female camels of the new generation of the dromedary group F_4 significantly exceed Arvana and the Kazakh dromedary ($P<0.01$). Female camels of the Kazakh Bactrian have an average shorn wool -6.7±0.4 kg, Arvana - 2.9±0.3 kg, the Kazakh dromedary - 3.7±0.3 kg, "Aidaramir-kurt" F_4 4.2±0.3 kg and "Ardas" F_4 - 4.3±0.2 kg.

Table 9 shows the results of a study of the dynamics of daily milk yield in experimental camels within six months of lactation.

Table 9 – Dynamics of daily milk yield of experimental camels (n=40, Σ_n=200), kg

Months	Group				
	Kazakh Bactrian	Arvana	Kazakh dromedary	«Aidaramir-kurt» F_4	«Ardas» F_4
April	5.2±0.19	8.8±0.21	9.2±0.15	7.9±0.19	8.3±0.25
May	5.6±0.21	9.3±0.24	9.5±0.18	8.2±0.19	8.6±0.23
June	5.9±0.23	11.9±0.22	10.7±0.21	8.5±0.20	8.8±0.23
July	6.0±0.22	12.5±0.23	11.5±0.21	9.2±0.20	8.9±0.23
August	5.4±0.25	11.6±0.24	11.1±0.21	8.9±0.22	8.7±0.23
September	5.7±0.22	12.1±0.24	11.4±0.21	9.1±0.20	8.9±0.23
Average	5.6±0.22	11.0±0.23	10.5±0.19	8.6±0.20	8.7±0.23

It was established that the female camels of the Dromedary group of the Kazakh type F_4 produce 8.6-8.7 kg on average per day during the six months of lactation, which is significantly higher in comparison with the camels of the Kazakh bactrian breed (5.6±0.22), but lower in comparison with Arvana (11.0±0.23 kg) and the Kazakh dromedary (10.5±0.19 kg).

Table 10 shows the results of research of the average daily milk yield and the fat content in milk, depending on the shape of the udder. The feale camels were divided into five groups according to the shape of the udder: cup-shaped, rounded, lobular, and primitive. For each experimental group, subgroups were formed according to the shape of the udder. In each subgroup, 10 heads of milking female camels were studied.

Table 10 – Average daily milk yield and fat content in milk for female camels depending on the shape of the udder

Group of animals	Indicators	Shapeoftheudder			
		cup-shaped	rounded	lobular	primitive
Kazakh Bactrian (n=10, Σ_n=40)	dailymilkyield, kg	6.5±0.15	5.8±0.14	4.3±0.17	3.3±0.22
	fat, %	5.34±0.07	5.32±0.06	5.31±0.08	5.31±0.11
	protein, %	3.39±0.03	3.39±0.03	3.38±0.04	3.38±0.04
Arvana (n=10, Σ_n=40)	dailymilkyield, kg	12.2±0.11	10.3±0.16	8.5±0.24	7.1±0.25
	fat, %	3.3±0.07	3.3±0.07	3.28±0.09	3.26±0.09
	protein, %	3.1±0.04	3.1±0.04	3.09±0.05	3.07±0.05
Kazakh dromedary (n=10, Σ_n=40)	dailymilkyield, kg	11.8±0.12	10.5±0.19	8.8±0.21	6.7±0.28
	fat, %	4.43±0.06	4.43±0.06	4.42±0.04	4.39±0.07
	protein, %	3.48±0.04	3.48±0.04	3.48±0.03	3.47±0.03
«Aidaramir-kurt» F_4 (n=10, Σ_n=40)	dailymilkyield, kg	10.2±0.19	9.7±0.21	7.1±0.26	6.3±0.31
	fat, %	4.27±0.08	4.27±0.08	4.25±0.08	4.22±0.08
	protein, %	3.51±0.05	3.50±0.04	3.48±0.03	3.46±0.03
«Ardas» F_4 (n=10, Σ_n=40)	dailymilkyield, kg	10.8±0.22	9.4±0.21	8.2±0.27	5.9±0.33
	fat, %	4.21±0.07	4.21±0.07	4.21±0.08	4.21±0.08
	protein, %	3.50±0.05	3.48±0.04	3.48±0.02	3.46±0.02

It was established that the female camels in all the experimental groups with the cup-shaped form of the udder significantly exceed the individuals with rounded ($P < 0.01$), lobular ($P < 0.01$) and primitive ($P < 0.01$) udders according to the average daily milk yield.

The parameters of the variation in fat content, protein in milk, depending on the shape of the udder, are insignificant. Therefore, it is necessary to strengthen breeding and stock work on the purposeful acquisition of milking herds of camels with cup-shaped and rounded udders.

Due to the fact that in all camel breeding farms in the south of Kazakhstan, 210 day milking is mainly practiced, we analyzed the dairy productivity of the female camels of the experimental groups with cup-shaped, round, lobular and primitive forms of the udder (table 11).

Table 11 – Dairy productivity of female camels with different shapes of the udderfor 210 days of lactation

Group of animals	Indicators	Shapeoftheudder			
		cup-shaped	rounded	lobular	primitive
Kazakh Bactrian (n=10, Σ_n=40)	X ± mx	1185.7±27.2	821.2±21.7	698.1±18.9	394.5±28.1
	%	100	67.7	51.8	27.9
Arvana (n=10, Σ_n=40)	X ± mx	2271.4±35.6	1968.8±29.3	1475.3±27.1	1052.1±31.5
	%	100	77.8	64.8	54.0
Kazakh dromedary (n=10, Σ_n=40)	X ± mx	1869.2±23.9	1711.7±28.1	1592.3±29.8	1385.6±27.9
	%	100	88.9	65.6	42.7
«Aidaramir-kurt» F_4 (n=10, Σ_n=40)	X ± mx	1745.3±29.1	1634.2±25.4	1514.6±29.5	1405.8±33.8
	%	100	88.6	63.5	38.4
«Ardas» F_4 (n=10, Σ_n=40)	X ± mx	1806.8±32.3	1618.5±30.1	1485.3±38.2	1374.7±41.2
	%	100	915	57.8	45.6

Camels with cup-shaped udders produce 8.5 to 32.3% more milk compared to individuals with rounded udder forms, 44.2 to 48.2% more compared to individuals with lobular udders, 46.0 to 72.9% more in comparison with herdmates with the primitive forms of the udder.

Based on the conducted studies, we consider it necessary to complete a herd of female camels for industrial production of milk with cup-shaped and round forms of the udder.

Female camels of the Dromedary group of the Kazakh type F_4 exceed the thoroughbred herdmates in height at the withers, oblique body length, metacarpus circumference. In the Kazakh bactrian camels, the height between the humps was 172.4 cm, the oblique body lenght was 158.8 cm, the chest circumference was 231.5 cm, and the metacarpus circumference was 21.2 cm (table 12).

Table 12 – Body measurements of the experimental female camels (n=40, Σ_n=200), cm

Group	height at withers	oblique body length	chest circumference	metacarpus circumference
Kazakh Bactrian	172.4±2.5	158.8±1.3	231.5±2.8	21.2±0.1
Arvana	185.3±2.3	156.5±1.7	215.9±2.5	19.5±0.2
Kazakh dromedary	182.2±1.5	152.7±1.4	218.2±2.9	20.0±0.1
«Aidaramir-kurt» F_4	186.1±2.1	160.0±1.1	234.5±2.1	20.5±0.2
«Ardas» F_4	188.7±1.8	159.4±1.6	239.3±1.9	20.5±0.1

Body measurements in Arvana camels were 185.3-156.5-215.9-19.5 cm, the Kazakh dromedary - 182.2-152.7-218.2-20.0 cm, Aidaramir-kurt F_4 - 186.1 -160.9-234.5-20.5 cm, Ardas F4 - 188.7-159.4-239.3-20.5 cm.

*Meatproductivity.*At the 30-month-old age, the control slaughter of the experimental male camels was carried out (table 13).

Table 13 – Results of control slaughter of experimental male camels aged 2.5 years old (n=5; Σ_n=25)

Characteristics	Group				
	Kazakh Bactrian	Arvana	Kazakh dromedary	«Aidaramir–kurt» F_4	«Ardas» F_4
Preslaughterliveweight, kg	343.2±8.1	362.7±6.4	335.9±7.3	394.8±8.5	412.3±9.1
Hotcarcassweight, kg	162.0±3.8	169.7±3.4	159.5±3.1	192.3±4.2	199.1±3.7
Hotcarcassoutput, %	47.2	46.8	47.5	48.7	48.3
Weight of hump fat, kg	15.4±0.3	17.3±0.4	13.5±0.3	16.6±0.3	17.2±0.3
Output ofhump fat, %	4.48	4.76	4.01	4.20	4.17

The results of the research showed that the slaughter yield of carcass without the index of hump fat is 47.2% for the Kazakh bactrians, 46.2% for arvana, 47.5% for the Kazakh dromedary, 48.7% for Aida-ramir-kurt and 48.% for Ardas F_4. The output of the hump fat varies from 4.01% to 4.76%. According to the degree of accumulation of hump fat, the camels of the dromedary group F_4 are inferior to arvana, and occupy an intermediate indicator between the Kazakh Bactrian and the Kazakh dromedary.

4. Selective-genetic and productive profile of camels F_5 (28.1%td, 15.6%kb, 56.2%kd). The object of the study was the fifth-generation hybrid camels F_5 Sannak and Aidaramir from the camel breedng farm of Taushyk LLP in the Tupkaragan district of Mangistau region.

Sannak $F_5$is a group of hybrid camels of the fifth generation F_5 (28.1% of the Turkmen dromedary's blood, 15.6% of the Kazakh Bactrian's blood, and 56.2% of the Kazakh dromedary's blood), obtained by the absorbing crossing of the fourth-generation hybrid of Ardas F_4 with themales of the Kazakh dromedary.

Aidaramir F_5 – is a group of hybrid camels of the fifth generation F_5 (28.1% of the Turkmen dromedary's blood, 15.6% of the Kazakh Bactrian's blood, and 56.2% of the Kazakh dromedary's blood), obtained by absorbing crossing of the fourth-generation female hybrids of Aidaramir-kurt F_4 with males of the Kazakh dromedary.

Table 14 shows the zootechnical characteristics of camels-producers of the dromedary groupF_5 (28.1%td, 15.6%kb, 56.2%kd).

Lek producers F_5 (28.1%td, 15.6%kb, 56.2%kd)are characterized by live weight of 616.6 kg average, wool shorn - 5.7 kg, output of pure fiber - 93.3%, height at the withers - 195.5 cm, oblique body length - 167.7 cm, chest circumference - 224.6 cm, Metacarpus circumference - 25.1 cm.

FemalecamelsF$_5$ (28.1%td, 15.6%kb, 56.2%kd) have an average live weight of 550.2±19.3 kg, wool shorn of 3.3±0.09 kg, a pure fiber output of 93.8±0.1%. Body measurements averaged 188.8 - 164.5 - 217.2 - 19.5 cm (table 15).

Table 14 – Zootechnical characteristics of the camels-producers

Indicators	F_5 (28.1%td, 15.6%kb, 56.2%kd)		
	«Sannak»	«Aidaramir»	Average
Number of heads	5	5	10
Live weigt, кг	620.8±9.3	612.4±8.5	616.6±17.9
Production of wool, kg	5.5±0.2	5.9±0.3	5.7±0.2
Outputofpurefiber, %	93.5±0.3	93.1±0.3	93.3±0.2
Heightatwithers, cm	195.7±1.6	195.3±1.8	195.5±2.1
Obliquebodylength, cm	168.8±1.2	166.7±1.4	167.7±1.3
Chestcircumference, cm	223.5±3.7	225.7±3.3	224.6±3.2
Metacarpus circumference, cm	24.8±0.12	25.3±0.11	25.1±0.1

Table 15 - Zootechnical characteristics of the female camels

Characteristics	F_5 (28.1%td, 15.6%kb, 56.2%kd)		
	«Sannak»	«Aidaramir»	Average
Number of heads	50	50	100
Live weigt, кг	565.5±22.1	534.9±16.7	550.2±19.3
Production of wool, kg	3.1±0.1	3.5±0.06	3.3±0.09
Outputofpurefiber, %	93.4±0.2	94.2±0.1	93.8±0.1
Heightatwithers, cm	188.6±1.6	189.0±1.4	188.8±1.2
Obliquebodylength, cm	163.4±1.2	165.6±1.1	164.5±1.3
Chestcircumference, cm	220.1±2.5	214.3±2.1	217.2±2.3
Metacarpus circumference, cm	19.8±0.2	19.3±0.1	19.5±0.1

From there, we began to practice breeding of the Kazakh-type dromedary F_5 (28.1%td, 15.6%kb, 56.2%kd) in itself.

*Dairy productivity.*The process of formation of dairy productivity in camels of different breeds has its own characteristics (table 16).

Table 16 – Parameters of dairy productivity of the experimental camels

Breed	Number of heads	Live weight, kg	Milk yield for 240 days of lactation	Fat	Protein
Kazakh bactrian	20	548.2±14.5	1371.9±25.4	5.43±0.08	3.41±0.02
Turkmen dromedary Arvana	20	482.6±7.1	2762.5±37.6	3.22±0.07	3.11±0.04
Kazakh dromedary	20	491.9±9.5	2293.7±29.2	4.41±0.06	3.54±0.04
«Sannak» F_5	20	552.5±11.3	1991.4±27.5	4.32±0.07	3.52±0.03
«Aidaramir» F_5	20	548.9±9.1	2217.2±19.1	4.32±0.07	3.51±0.03

In the live weight, the effect of heterosisis observed. All fifth-generation female camels of "Sannak" and "Aidaramir" exceed their thoroughbred herdmates in terms of live weight ($P \leq 0.001$). Female camels "Sannak" F_5 have an average live weight of 552.5±11.3 kg, and "Aidaramir" F_5 shows 548.9±9.1 kg. Camels of the Kazakh bactrian produce more fatty milk. Milking female camels of the Arvana breed give milk with less fat and protein.

Kazakh dromedaries, as well as female camels F_5 (28.1%td, 15.6%kb, 56.2%kd) produce milk with high protein content.

The "Sannak" F_5 female camels (28.1%td, 15.6%kb, 56.2%kd) for 240 days gave 1991.4±27.5 kg, with an average fat content of 4.32±0.07% and protein in milk 3.52±0.03%.

From the female camels of Aidaramir F5 (28.1%td, 15.6%kb, 56.2%kd) for 240 days of lactation 2217.2±19,1 kg were received.

*Meat productivity.*The production live weight was 328.2 kg for the Sannak males, 325.4 kg for the Aidaramir, and on the average for the Kazakh dromedary type F_5 (28.1%td, 15.6%kb, 56.2%kd) of 326.3±11.5 kg (table 17).

Table 17 – Results of control slaughter of 30-month-old male dromedaryF_5 (28.1%td, 15.6%kb, 56.2%kd)

Characteristics	F_5 (28.1%td, 15.6%kb, 56.2%kd)		
	«Sannak»	«Aidaramir»	Average
Production live weight	328.2±12.6	325.4±9.9	326.3±11.5
Removableliveweight, kg	432.1±9.5	413.5±7.7	422.8±11.9
Preslaughterliveweight, kg	419.5±8.2	388.3±6.8	403.9±6.4
Slaughterweight, kg	226.9±5.1	210.8±4.2	218.9±4.7
Slaughter output, %	54.1±0.3	54.3±0.3	54.2±0.2

After fattening, the live weight significantly increases in Sannak to 432.1 kg, in Aidaramir to 413.5 kg. After starvation, the live weight decreases on average by 6-8%, in particular in males of "Sannak" to 419.5 kg, "Aidaramir" to 388.3 kg. The slaughter output is on average 54.2±0.25.

Discussion. The development of stock and productive camel breeding is one promising direction for the development of free-range animal husbandry, as it involves an increase in the production of ecologically friendly and curative dairy products, camel wool and leather raw materials with high export potential [35-37].

Currently, according to the Statistics Committee of the Ministry of the National Economy of the Republic of Kazakhstan, as of January 1, 2017, the number of camels in all categories of farms exceeds 175 thousand heads, of which 70.8% are concentrated in personal subsidiary farmings. The share of the breeding stock of camels in the overall structure does not exceed 2.5%, while world experience shows that satisfying the demand for camel and dairy products in sufficient volume is impossible without the development of the breeding stock. It is necessary in the next 20 years to increase the share of brood camels to 50%.

The use of new achievements in genetics and selection in camel breeding will allow to develop the effective methods of selection and assortment of animals, with the further formation of unique herds of milking camels of the dromedary and bactrian group, with a stable genotype and high genetic potential [38-40].

Kazakhstan is a unique center on the Eurasian continent where it is possible to breed dromedary (single-humped camels), bactrian (two-humped camels) by thoroughbred breeding, and also to practice interbreeding and interspecific hybridization.

Kazakhstan is the birthplace of a unique breed of camels - the Kazakh Bactrian, which is considered to be the national property of the whole nation. The genetic diversity of camels in Kazakhstan creates all the prerequisites for the successful development of both stock and productive camel breeding. By means of interspecific hybridization of camels, a unique collection is created, including 30 generations, which has no analogues in the world. Some generations of interspecific hybrids are able to produce "a similar offspring".

A purposeful selection of camels aiming at increasing the protein coefficient is carried out [41-43]. Studies are continuing to improve the technology of camel maintenance and feeding, taking into account food resources and natural and climatic zones of Kazakhstan [44-47].

The use of new achievements in genetics and breeding in camel husbandry will allow to form the unique herds of milking female camels of the group dromedaries and bactrians, with a stable genotype and a high genetic potential [48-50].

A promising direction is the creation of new assortments and names of dairy products, taking into account the requirements of the EAEU, the needs of the population and the export potential of each region of Kazakhstan.

Camel hasbundryis mistakenly considered as a low-cost sub-sector of productive free-range animal husbandry, so the state support is minimized, in comparison with dairy and meat cattle breeding, as well as sheep breeding. To increase the production of camel breeding for a wide range of consumers, it is necessary to create prerequisites for increasing the number of stock highly milking and meat and dairy camels to 350,000 in the coming years. In the long-term future, to bring the number of camels to 1 million. It should be noted that without the State support in the form of subsidizing stock camel breeding for the production of a unit of milk, meat and wool products, it is impossible to interest every inhabitant of the village, head of farm, cooperative and LLP, to maintain camels, to conduct systematic breeding and stock work to increase the genetic potential and productivity, implementation of developments of domestic scientists.

Thus, Kazakhstan's camel breeding needs to be developed, relying on the genetic resources of the highly productive breeds and camel genotypes [51].

In the world community, for the production of fermented milk products, cow milk is often used, and in Kazakhstan camel milk may become the main raw material in dietetics for the coming years.

Conclusions. For the first time, camels of hybrid origin F_2 (25%td, 25%kb, 50%kd), F_3 (12.5%td, 62.5%kb, 25%kd), F_4 (56.25%td , 31.25%kb, 12.5%kd), F_5 (28.1%td, 15.6%kb, 56.2%kd), the thoroughbred Kazakh bactrians of the South Kazakhstan type and Mangistau population, arvana - the Turkmen dromedary, the Kazakh dromedary, bred in South Kazakhstan and Mangistau regions of the Republic of Kazakhstan.

The genetic potential of live weight and dairy productivity is established. The results of the research showed the efficiency of breeding hybrid camels for the production of camel milk, in view of the optimal ratio of milk fat and protein.

Camels of the Kazakh dromedary and hybrid origin F_2 (25%td, 25%kb, 50%kd), F_3 (12.5%td, 62.5%kb, 25%kd), F_4 (56.25%td, 31.25%kb, 12.5%kd), F5 (28.1%td, 15.6%kb, 56.2%kd) of the meat and milk production direction have one compact hump of medium size - 2/3 of the oblique body length. Head profile is hook-nosed. The profile of the neck from the base of the neck to the head without bends is straight. The main color of the fleece (wool) is brown and sandy, without additional coloring.The main color of the covering hair is brown and sandy, there is an additional color that does not exceed 10% of the total population. The thickness of the skin is generally thick of 5-7 mm. The length of the mane is short to 25 cm. The fringe is medium-sized, 2/3 of the oblique body length. The yield of pure wool fiber is 90-94%. The bang on the head s shortened. There is a fringe of wool on the forearm, the so-called breeches, lenght of up to 5 cm (short). There is a mane on the neck, length of 12-17 cm (classified as short to 15 cm, average 15-25 cm). There is a fringe of wool on the shoulder blade, the so-called epaulet, 3-5 cm long.

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Д. А. Баймұқанов[1], А. Баймұқанов[2], О. Алиханов[1],
Д. А. Дошанов[1], К. Ж. Исхан[3], Д. С. Сарсенбай[3]

[1]«Агроөнеркәсіптік кешені және су ресурстары мәселелері» ғылыми-зерттеу институты,
М. Әуезов атындағы Оңтүстік Қазақстан мемлекеттік университеті, Шымкент, Қазақстан,
[2]ФАО, Фермадағы жануарлар мен құстарға арналған генетикалық ресурстар жөніндегі
халықаралық комиссия, Рим, Италия,
[3]Қазақ ұлттық аграрлық университеті, Алматы, Қазақстан

ҚАЗАҚСТАНДЫҚ ПОПУЛЯЦИЯДАҒЫ ӨНІМДІ БЕЙІМДЕГІ ӘРТҮРЛІ ГЕНОТИПТІ ТҮЙЕЛЕРДІҢ ГЕНЕТИКАСЫ

Аннотация. Салыстырмалы аспектте түйелердің гибридтік шығу тегі F_2 (25%td, 25%kb, 50%kd), F_3 (12,5% td, 62,5% kb, 25% kd), F_4 (56,25% td, 31,25% kb, 12,5% kd), F_5 (28,1% td, 15,6% kb, 56,2% kd) алғаш зерттелген. Оңтүстіктік Қазақстандық типтегі Маңғыстаулық популяциядағы таза тұқымды қазақтың бактриандары, түркмен дромедары – арвана, қазақтың драмедары Қазақстан Республикасының Оңтүстік Қазақстан және Маңғыстау облысында өсіріледі.

Түйе топтарының генетикалық профилі анықталған, тірілей салмағы, сүт өнімділігі, жүн қырқымы, дене өлшемдері зерттелген. Зерттеудің нәтижесі көрсеткендей, өсіріліп жатқан гибритті драмедар түйе тобының аналықтарынан сүт өндіргенде сүттің майлылығы мен ақуыз арақатынасы тиімді.

Өсіруге жарамды Арада F_5 (28,1% td, 15,6% kb, 56,2% kd) қазақтың дромедар типті түйелерінің фенотиптік профилі анықталды. Тұлғасының қиғаш ұзындығының 2/3 бөлігін шағын өркеш алып жатыр түйенің. Түйе басының пішіні дөңмұрын. Мойынның пішіні, мойынның негізінен басына дейін иілмеген түзу келеді. Негізгі түсі жабағы (шудасы) жүннің қара қоңыр және сұр, және жалпы бастың 10% аспайтыны қосымша түстер.

Түйін сөздер: генетика, сүт өнімділігі, қазақтың бактриандары, арван, қазақтың драмедары, гибриттер.

Д. А. Баймуканов[1], А. Баймуканов[2], О. Алиханов[1],
Д. А. Дошанов[1], К. Ж. Исхан[3], Д. С. Сарсенбай[3]

[1]Научно-исследовательский институт «Проблем агропромышленного комплекса и водных ресурсов» Южно-Казахстанского государственного университета им. М. Ауэзова, Шымкент, Казахстан,
[2]ФАО, Международная комиссия по генетическим ресурсам сельскохозяйственных животных и птиц, Рим, Италия,
[3]Казахский национальный аграрный университет, Алматы, Казахстан

ГЕНЕТИКА ПРОДУКТИВНОГО ПРОФИЛЯ ВЕРБЛЮДОВ РАЗНЫХ ГЕНОТИПОВ КАЗАХСТАНСКОЙ ПОПУЛЯЦИИ

Аннотация. Впервые изучены, в сравнительном аспекте верблюды гибридного происхождения F_2 (25%td, 25%kb, 50%kd), F_3 (12,5%td, 62,5%kb, 25%kd), F_4(56,25%td, 31,25%kb, 12,5%kd), F_5 (28,1%td, 15,6%kb, 56,2%kd), чистопродные казахские бактрианы южно-казахстанского типа и мангистауской популяции, арвана – туркменский дромедар, казахский дромедар, разводимые в Южно-Казахстанской и Мангистауской областях Республики Казахстан.

Установлен генетический профиль живой массы, молочной продуктивности, настрига шерсти, промеров тела изученных групп верблюдов. Результаты исследования показали, эффективность разведения гибридных верблюдоматок группы дромедар для производства верблюжьего молока, в виду оптимального соотношения молочного жира и белока.

Определен фенотипический профиль веблюдов казахских дромедаров типа Арада F_5 (28,1%td, 15,6%kb, 56,2%kd), пригодные к разведению « в себе».У верблюдов один компактный горб средней величины – 2/3 косой длины туловища. Профиль головы горбоносый. Профиль шеи от основания шеи до головы без изгибов – прямой. Основная масть руна (шерсти) бурая и песчаная, без дополнительной окраски. Основная окраска кроющего волоса – бурая и песчаная, имеется дополнительная окраска, не превышающая 10% от общего поголовья.

Ключевые слова: генетика, удой молока, казахский бактриан, арвана, казахский дромедар, гибриды.

About the authors:

Baimukanov Dastanbek Asylbekovich – corresponding member of NAS RK, Doctor of Agricultural Sciences, associate professor, Head of the Department of Animal Husbandry of the "Scientific Research Institute for the Problems of the Agroindustrial Complex and Water Resources" of the South Kazakhstan State University named after M. Auezov, Shymkent, Kazakhstan

Baimukanov Asylbek – International Expertof FAO, Doctor of Agricultural Sciences, Professor, Rome, Italy

Alikhanov Oralbek – Candidate of Agricultural Sciences, Leading researcher of the Department of Animal Husbandry of the "Scientific Research Institute forthe Problems of the Agroindustrial Complex and Water Resources" of the South Kazakhstan State University named after M. Auezov, Shymkent, Kazakhstan

Doshanov Daulet Askarovich – Candidate of Agricultural Sciences, Seior researcher of Animal Husbandry of the "Scientific Research Institute forthe Problems of the Agroindustrial Complex and Water Resources" of the South Kazakhstan State University named after M. Auezov, Shymkent, Kazakhstan

Iskhan Kairat Zhalelovich – Candidate of Agricultural Sciences, associate professor of the department of the "Technology of production of livestock products" of the non-commercial joint-stock company "Kazakh National Agrarian University", Almaty, Kazakhstan

Sarsenbai Dauletbai Sarsenbaiuly – masterdegree's student of the department of the "Technology of production of livestock products" of the non-commercial joint-stock company "Kazakh National Agrarian University", Almaty, Kazakhstan

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R. K. Niyazbekova[1], A. M. Yessirkepova[2], Zh. T. Aliyeva[3], Monika Jaworska[4]

[1]Doctor of Economics, Professor, Director of the ShPCDE
Karaganda Economic University Kazconsumption union, Shymkent, Kazakhstan,
[2]Doctor of Economics, professor, director of the Institute for Regional Economy
of the M. Auezov South Kazakhstan State University, Shymkent, Kazakhstan,
[3]Candidate of Economics, associate professor, JSC "Narxoz University", Almaty, Kazakhstan,
[4]PhD, Regional Director of the Public Academy of Sciences in Lodz –
Faculty of Applied Sciences in Cracow, Poland.
E-mail: essirkepova@mail.ru

TYPOLOGY OF SMALL CITIES IN THE SOUTH KAZAKHSTAN REGION

Abstract. Small towns' structure, typology, functionality, development prospects studies occupy leading positions in the world community. Regional displacement system significance in new economic conditions, industrial potential formation processes in the organizational-economic management structure at local level specify this position. The need to develop innovative management models for towns' development led to search for new analytical methods of the situation. These methods consider budget supportability, related to the most important territorial socio-economic development indicators. However the most important conditions capable to solve towns' socio-economic problems should include transformations in intergovernmental relations considering territorial development features. For SKR, as territorial integrity, it is necessary to identify and specify local and regional market needs. The analysis was carried out from towns' socio-economic development position, considering their territorial economic-geographical features. Based on these positions, the methodology of the study in the article was constructed. Particularly, regional towns' development prospects were identified. Attention was focused on towns' problems from the local economic mainstay position. The further local self-government system formation led to revision of towns' strategic orientations, led to search for ways to increase their potential.Regional towns' socio-economic development problems solution was constrained by several factors, such as inadequacy in the study degree of town's economic potential structure formation, and possibilities for its further development. The article assessesSKO cities and districts social-economic sphere development level. Such areas as education, medicine, culture, sports were accepted as basic indicators for analysis. The analysis revealed that weak industrial-agricultural diversification and underdeveloped infrastructure are characteristic for these districts. The influence has the fact that many settlements are significantly remote from the main transport highways. Based on the data obtained, SKO territorial units' typology was developed according to the resettlement type. Based on needs and available capacity, this typology can further provide opportunity develop effective development strategy for these areas.

Keywords: small cities, classification of small towns, typology, city potential, strategy, regulatory principles, management of small towns.

Introduction. Small town is a settlement, which is the lowest level of organization of urban settlements [1]. The criteria that distinguish a city from a non-urban settlement, small from other types of cities, are not limited to the number of inhabitants. Other parameters of socio-economic and socio-cultural nature are also used. You can conduct lengthy discussions about the circle of necessary and sufficient parameters, but the conceptual solution of the problem lies in finding an approach that expresses the holistic characteristics of a small city [2]. An approach is needed that considers a small city as a form of joint life for people. Having investigated the modern small cities of Kazakhstan, it is useful to pay attention to such a notable feature. In large and medium-sized cities, the foundations of their daily life, history and pros-

pects are formed by several significant factors, their combinations. In small towns, one or two factors often stand out and prevail. And it turns out that in small towns the composition of problems, their severity and methods of solution depend not only and even not so much because these cities are small, but also on a small number of dominant features [3].

Among the small cities of modern Kazakhstan there are several types depending on how the following dominant attributes are combined in their past and present destiny:

– the presence of an industrial enterprise, which employs the majority of the population of this small city;

– the presence of not just an industrial enterprise, but the head enterprise of a research and production association, usually a defense or space complex;

– proximity to a very large city;

– absence of the first three signs, that is, the situation when the city exists long ago and develops little by little the century after the century without much shock. These signs (most often the first three) are combined, although they are also found in pure form. In addition, in multinational countries there are small cities, where the national factor plays a significant role (we do not consider it here).

The functions performed by small cities make it possible to attribute them to the corresponding types in settlement systems, the main of which are:

– industrial small towns associated with extractive industries, with manufacturing enterprises, which, in turn, are divided into two subgroups - associated with the local raw materials base and included in large territorial industrial complexes, subsidiary industries, branches, shops located in small towns and the like.

– small cities of scientific specialization, whose population is engaged in mainly scientific wines of activity or their service;

– small cities recreational profile. Most of the population of these cities is engaged in recreation, treatment, tourism. These cities are characterized by the presence of a temporary population in them, so they need to develop the appropriate infrastructure and, correspondingly, a significant part of the population employed in it;

– small cities with transport functions, many of which had large transport enterprises for the repair of rolling stock, maintenance of the road network. Often such enterprises had not only local, but also regional and even republican importance; without exaggeration it can be said that the most important function of most small towns has been and continues to be the performance of administrative functions. Up to 65% of small towns were in Soviet times district centers [4].

Methods. From the point of view of settlement systems, this function of small towns is extremely important, since it is the small towns that have been and still are the centers of rural population service. In small towns of district centers, a significant place is occupied by the types of activities related to the service of the rural population. The infrastructure of small towns (schools, hospitals, centers of culture and sports, etc.) was calculated on the basis of the needs of the people living in the small town of rural settlements. Transport networks took into account, to varying degrees, the needs and requirements of the rural population. Enterprises engaged in the processing of agricultural products, its storage, transshipment, and repair of agricultural machinery also concentrated mainly in small towns.

The South-Kazakhstan region is located in the southern part of the Republic and borders on the east with the Zhambyl region, in the north with the Karaganda region, in the west with the Kyzylorda region and in the south with Uzbekistan. It is the largest in the territory of the republic, which occupies an area of 117.3 thousand square kilometers, which is 4.3% of the territory of Kazakhstan, is located on a very favorable transport (rail and road) intersection between the Republic of Uzbekistan and the southern and western regions Kazakhstan [5].

The regional center is located on the axis of the international highway Orenburg-Tashkent and the Turkestan-Siberian Railway. In addition, there are convenient connections on the highways Tashkent-Shymkent-Taraz-Almaty and Tashkent-Turkestan-Samara.The subsoil of the region is rich in minerals - polymetallic and iron ore, brown coal, gypsum, limestone, marble, refractory and other building materials.The region is located in a zone of sharply continental climate. Fertile soils, abundance of sunlight, extensive pastures create great opportunities for the development in this region of a variety of branches of agriculture, primarily irrigated agriculture and pasture sheep breeding. High yields yield crops of cotton, rice, as well as gardens and vineyards.

In the region of 12 rural areas and 4 cities of regional importance, 7 cities (except Shymkent), 11 settlements, 868 settlements.

The administrative center is the city of Shymkent. In agroclimatic terms, the city is located in a very arid foothill zone. To date, the city of Shymkent is a large industrial-industrial, scientific, economic and cultural center. In the city there are 65 large industrial enterprises engaged in the production of petroleum products, chemical, metallurgical, food industries, machine building and the production of building materials.There is a developed infrastructure, airport, railway station. There are 6 large universities in the city.

South-Kazakhstan region has a high potential for tourism development: in the region there is a resort-protected zone, historical and architectural monuments. On the territory of the region there are natural areas with medicinal waters. These include the mineral waters of the sanatorium "Saryagash", mineral thermal waters in the foothills of Karatau, in the valley of the river. Steps, 20 km to the south of Kentau, thermal springs near the village of Temirlanovka. Favorable areas for recreation are the territories adjacent to the Aksu-Zhabagly Reserve, the area to the southeast of Shymkent and the valleys of the Arys, Mashat, Sayramsu, Syrdarya, Aksu, Badam, Ancient Towns of Otyrar, Sairam, Syganak, Sauran, Sozak , Turkestan, mausoleums of Khoja Ahmed Yassawi, Karashash An, Ibrahim Ata, Arystan Bab, Baydibekata, Domalak-ana and others are objects of tourism. The second largest city in the South Kazakhstan is one of the oldest cities in Kazakhstan - the city of Turkestan with a population of 197.7 thousand people. The city's landmark is the mausoleum of AhmetYasawi, built in the late 15th century.

Industrial enterprises of the city of Kentau are the only producers in the field of concentrates, excavators, transformers.

It is possible to single out the following general development trends, considering the dynamics of indices of industrial development in the context of cities and regions in the South-Kazakhstan region. The increase in the volume of industrial output is accompanied by an increase in the number of industrial enterprises and a decrease in the index of the physical volume of industrial products, while the share of the city / region in the regional output remains unchanged.

The increase in the volume of industrial production and the index of the physical volume of industrial output is accompanied by a decrease in the number of enterprises and the share of the city / region in the regional volume of production. In the Maktaral region, the state of industry is accompanied by an increase in the index of the physical volume of industrial output and a decrease in the number of industrial enterprises, the volume of industrial production, and the share of the city/region in the regional volume of production.

There is a decline in such indicators as the number of enterprises and the index of the physical volume of industrial output, along with the increase in the volume of industrial products and the share of the city/district in the total volume of production.

In the Shardara region, a positive factor in the development of industry is the increase the number of industrial enterprises, in Saryagash district - the volume of industrial output with a decrease in the physical volume index and the city/district share in total production.

The South-Kazakhstan region belongs to the densely populated regions with a high birth rate. Over the past ten years (2006–2016), the population increased by 607.7 thousand people or 27.2% and was 2841.307 thousand people [5].

The territory of the South-Kazakhstan region is 117.3 thousand square kilometers.

The route network of the South Kazakhstan region today consists of 470 routes, including: 148 routes are intraurban (98 routes to Shymkent), 167 intra-district, and 155 intercity and inter-district routes. Currently, there are no settlements in the region that are not covered by the route network, except where there are no highways.In the region, 66 carriers of private ownership are engaged in the transportation of passengers and luggage. There are 31 bus stations and bus stations in the region, of which 6 bus stations are located in Shymkent.

On the territory of the region, there are 28 building organizations with a population of 1324 people and construction equipment of 520 units in the road sector. There are 17 factories producing asphalt-concrete in the region's territories and a total production capacity of 2,105 tons/hour, quarries for the extraction of building materials with a total capacity of 2,493,000 m^3/year. Also in the territory of the region there are 2 shops for the production of road signs, barrier fencing, and also for the production of

iron-concrete products. The administrative-territorial division of the South-Kazakhstan region as of 01.01.2016 is represented by:

– 8 cities and urban settlements, of which 4 have the status of a regional settlement, and 4 are district;

– 11 districts.

The process of urbanization in SKR has much in common with similar processes in other regions of Kazakhstan, the main features that formed during the planned economy and the industrial principles of spatial development. Due to the rich history of the settlement of the territory of the South Kazakhstan Oblast, which is several thousand years old, the urbanization of the SKO has its own peculiarities, which must also be taken into account in its socio-economic development.

Table 1 – Characteristics of settlements in the South Kazakhstan region from the point of view of the forms of urban concentration by the criterion of the population

Cities	Characteristic	Classification	Quantitative parameters	Symptoms of the form
Shymkent	A lot of functional cities	Large	Morethan 250 thousand people	More than 90% of possible economic activities
Arys	Narrowly-specialized cities	Average	From 100 to 50 thousand people.	The basic branch of specialization and the prevalence of urban development and lifestyle
Kentau		Average	From 100 to 50 thousand people.	
Turkistan		Big	From 250 thousand people to 100 thousand people.	
Saryagash	Mono functional cities	Small	From 50 to 10 thousand people	One branch of specialization and a mixed form of urban development with a predominance of rural lifestyles
Shardara				
Zhetysai				
Lenger				
Auly 868 items	Rural settlements	Villages	Less than 3 thousand people	Rural development and way of life

The city of Shymkent is an administrative, socio-economic, scientific, educational and cultural center of the SKR. This city is characterized by a functional diversity of the economy, multilateral potential, favorable economic and geographical location. The combination of all these qualities makes Shymkent the locomotive of development and the generator of innovations throughout the South Kazakhstan region.

Other cities of the SKR did not reach the population of large cities, and the urban concentration received a peculiar expression in these cities.

Narrowly specialized cities have, as a rule, one branch (Arys and Turkestan - processing of agricultural products, Kentau - electrical equipment). Narrow specialization suggests that the cities have not yet had the opportunity to develop other functions, they have not realized the potential built into them. Objects of culture and recreation are poorly developed in these cities.

The monofunctional structure of a small city corresponds, as a rule, to a simple planning structure: one industrial or agro-industrial zone. The city looks both externally and essentially as an annex to the enterprise. The urban infrastructure is poorly developed, in this connection the rural features are strongly expressed. Rural features are manifested in the planning of construction sites, architecture and lifestyle of the population. In the SKR there are 4 such cities, with a population of 50 to 10 thousand people.

South Kazakhstan traditionally differs from other regions of Kazakhstan in that the majority of the population lives in rural areas. In the region there are 868 auls, where about 55% of the total population of the region lives.

The regional center of the South Kazakhstan region Shymkent is a densely populated city, it occupies 0.3% of the territory of the region, has the highest population density: 1890 people/km^2. It is a large industrial and industrial center. The development of industry contributed to the formation of transport routes that connect the region with other regions of Kazakhstan and with neighboring foreign states (Uzbekistan), as well as the formation of a transit corridor for Asian and European countries.

The city of Turkestan is a cultural and historical center, mainly pilgrim tourism develops here, and there are objects of culture and education of international importance. It is the center of major international forums and conferences. In this regard, great importance is attached to the transformation of the architectural appearance of the city, which, in turn, contributes to the development of the construction complex. There are enterprises of light and food industries.

The cities of Shymkent and Turkestan have an agglomeration type of settlement and are the spokesmen of urban concentration.

The cities of Lenger and Arys (29 and 100 km respectively) are closest to the city of Shymkent. The remaining 5 cities are very distant from each other, which hinders effective economic interaction between them.

Lenger is most closely located to the regional center, surrounded by developed large areas such as Sayramsky and Tyulkubas; it is nevertheless one of the most depressed cities in the South Kazakhstan region. Although the city has potential for the development of enterprises in the machine-building and mining industries, nevertheless there is no large-scale industrial production. The small business on processing of agricultural products is mainly developing.

The territory of the city of Arys is 6,3 thousand square kilometers. The city administration occupies 5.4% of the territory of the region.The second typology includes the cities of Arys and Kentau. The city of Arys is a major nodal railway station and the only producers in the field of railroad sleepers. The distance from the regional center to the town of Arys is 100 km.

The territory of the city of Kentau is equal to 0,6 thousand square kilometers and occupies 0,5% of the territory of the region. Kentau, among other small towns in the South-Kazakhstan region, despite its narrowly specialized, is the most industrially developed city. Here there are large enterprises, such as transformer, excavator plants. In recent years, the process of urbanization is intensifying due to the transformation of rural settlements into urban settlements (3 urban-type settlements - Achisay, Khantagi, and Kushata). The form of the urban concentration represents a conglomerate of the city and towns with separate enterprises of the extractive industry.

The third types of regions are the Makhtaaral, Sairam and Saryagash, which are the largest regions with a population of more than 200 thousand people each.

The territory of the Makhtaaral district is 1.8 thousand square kilometers and occupies 1.5% of the territory of the region. The rural population of the region accounts for 89.4%. The administrative center of the district is the city of Zhetysay. The distance from the regional center is 232 km. The region specializes in the cultivation of raw cotton, the production of vegetable oil and the development of livestock, melons and bug farming.The territory of Sairam district is 1,7 thousand square kilometers and occupies 1,4% of the territory of the region. The administrative center of the district is the village of Ak-Su, the distance from the regional center is 30 km.

Currently, one of the main activities of the region's enterprises is the production of vegetable refined oil. In agriculture, the district specializes in meat and dairy cattle breeding, pig farming and poultry farming, considerable areas under crops for wheat, barley, safflower, potatoes, vegetables and melons, fruit and berry and vine plantations.The territory of the Saryagash district is 7.7 thousand square kilometers, occupying 6.6% of the region. The administrative center of the district is the city of Saryagash. The distance from Shymkent to Saryagash is 110 km.

Saryagash district is a major health resort of the republican value, due to the availability of medicinal mineral springs on the territory of the region. In this regard, the district accounts for 65.0% of the production of drinking mineral water.

In agriculture, grain production, viticulture, production of vegetables and melons and gourds, develop livestock.

These three regions are the largest in the South Kazakhstan region and refer to a spatially uniform, rural type of settlement. The population growth rate is one of the highest, and the natural increase in the region tends to increase. The regions have a high population density of about 150 people / km2. The share of the urban population is not significant and amounts to 14.8%. The areas mainly specialize in agriculture. The region has an advantageous geographical location, for example, the Sairam district is part of the Shymkent city agglomeration, while the Maktaral and Saryagash districts border Uzbekistan.The fourth type of district includes Ordabasinsky, Kazygurt, and Tyulkubas. The territory of Ordabasinsky district is

2,7 thousand square kilometers, it occupies 2,3% of the territory of the region. Ordabasinsky district is an industrialized area, it accounts for 51.7% of the production of building bricks from ceramics, the development of external and internal tourism. Also, processing of agricultural products, cultivation of elite livestock and fodder production, creation of a greenhouse farm are developed.

Kazygurt district occupies 3.5% of the region and is 4.1 thousand square kilometers. The district is classified as highly specialized and is based on growing grain and leguminous crops.

The territory of the Tyulkubas district is 2.3 thousand square kilometers and occupies 2.0% of the territory of the region. The region is distinguished by a great variety of agricultural production.

Agricultural commodity producers, mainly, are engaged in the cultivation of grain and legumes, technical and fodder crops, processing of agricultural products (canning plant in the village of Tylkubas). The main branches of livestock production are meat and dairy cattle breeding and fine-wool sheep breeding.Ordabasinsky, Kazygurt and Tulkubas districts are a focal type of settlement centered on cities with a predominance of economically undeveloped territories. Demographic potential is above average. The natural increase is positive; the average population density is 25-42 people/km^2.

The fifth type of regions includes Tolebiand Shardara. The area of Tolley district is 3.1 thousand square kilometers. Mostly small and medium-sized business is developing on the production of flour-milling products, vegetable oil, processing of agricultural products. Agriculture specializes in growing wheat and raising cattle.The territory of Shardara region is 13.0 thousand square kilometers, the population of the region is 77.3 thousand people. The administrative center of the district is the city of Shardara; the distance from the regional center is 300 km.

The region has developed a light industry for the production of garments and textiles. Agriculture specializes in the cultivation of cotton fiber, the cultivation of cattle.

Table 2 – Typology of territorial units of the South Kazakhstan region by type of resettlement

Region	№	Type of settlement	Demographic potential	Features geo-economic
Citiesof Shymkent, Turkistan	1	Agglomeration	Shymkent is tall, Turkestan is above average; the natural increase is positive and is 2% -2.5% a year in both cities, but the population density in Turkestan is 27 people/km^2, which is 8 times less than in Shymkent	The nucleus of the agglomeration, the supporting cities of the region, the node of the support frame structure of the settlement. Turkestan has a high historical value.
Cities of Kentau, Arys	2	Uniform small-town network and a network of urban settlements	Kentau is average, Arys is below average. The average annual rate of population growth in both cities is 0.8% -0.88%. But the population density in Arys is only 10.3 people/km^2.	Urbanized zone adjacent to the Shymkent urban agglomeration (SHGA). In Arys there is a nodal railway interchange.
Makaatar, Saryagash, Sairam districts	3	Spatially-uniform, rural type of settlement	Tall. The population increases and the natural increase tends to increase. The districts have a high population density of about 150 people/km^2.	On the territory of Sayram district there are ShGA, Maktaral and Saryagash districts bordering Uzbekistan
Ordabasy, Kazygurt, Tyulkubas districts	4	Focal type of settlement centered around cities with prevalence of economically undeveloped territories	Above average. The natural increase is positive, the average population density is 25-42 people/km^2.	Ordabasy, Kazygurt, Tyulkubas districts are adjacent to the ShGA.
Tolebi, Shardara	5	Point-focal type, uneven In Tolebi region in the eastern part, and in the Shardara region in the western part a high percentage of economically undeveloped territories	Average. The natural increase is positive and the tendency to increase in population dynamics	The Tolebi district is closely adjoined to the ShGA. Shardarinsky district borders on Uzbekistan.
Suzak, Otrar, Baidybek districts	6	Spatially uneven prevailing rural type settling	Below the average. Areas with a low population density from 1.3 to 7.7 people/km^2. Although natural population growth is positive, there is no evidence of a growth in population growth rates	The considerable distance between the Suzak and Otrar Regions from the ShGA

Such districts (6 types of districts) as Sozak, Otyrarsky and Baidibeksky differ in the absence of urban population. Relate to the spatially uneven prevailing rural type of settlement. The demographic potential is below the average, with a low population density of 1.3 to 7.7 people/km^2. Although the natural increase in the population is positive, there are no dynamics of increasing population growth rates.

These areas are characterized by a weak diversification of industry and agriculture. Accordingly, the infrastructure is poorly developed; many settlements are far from the main transport highways. The level of socio-economic development is higher than in other areas from this typology of settlement due to mining of uranium ore.By combining the natural and mechanical movement of the population, six types of relationships of the components of population dynamics are distinguished, which determine the direction of the changes (table 2).

Results. Population grows in all areas of the South-Kazakhstan region for the period. According to this criterion, three groups can be distinguished:

1) the population growth rate is higher than the average for the region, due to natural population growth and the positive balance of migration: the cities of Shymkent and Turkestan;

2) population growth is almost entirely due to natural population growth: Arys, Kentau, Kazygurt, Maktaaral, Ordabasy, Sairam, Saryagash, Tolebi, Tyulkubas and Shardara regions;

3) population growth is practically non-existent, because the natural increase in the population is offset by the negative balance of migration: Otyrar, Suzak and Baidybek districts. By population density, the areas of SKR can be grouped into four groups: 1 – areas of high density (about 1800 people/km^2): Shymkent; 2 – areas of high density (about 150 people/km^2): Kentau, Sairam and Maktaaral districts; 3 – medium density areas (20-40 people/km^2): Turkestan, Kazigurt, Ordabasy, Saryagash, Tolebi and Tulkubas districts; 4 – areas with low density (below 10 people/km^2): Arys, Baidybek, Otyrar, Suzak and Shardara districts.

Conclusion. Thus, proceeding from the foregoing, the following conclusions can be drawn:

1. A small city is an important element of the regional system of resettlement in the new economic conditions, independently performing the functions of management, organizational and economic management and cultural and community services at the local level;

2. The need to manage the development processes of small towns required the development of new methods for analyzing the situation, taking into account budgetary security, which is the main indicator of social and economic development of the territory;

3. The change in intergovernmental fiscal relations is an important condition for solving the social and economic problems of small towns, taking into account territorial, developmental features;

4. Directions of social and economic development of small towns SKR should be determined, first of all, by the use of local and regional markets, taking into account the economic and geographical features of the territory.

5. The most unfavorable situation in the demographic terms is formed in the regions simultaneously with low density and low population growth, namely: Arys, Suzak, Otyrar and Baidybek districts.

6. The evaluation of the social sphere of cities and regions of the South Kazakhstan region in terms of such indicators as education, culture and sports was carried out in a comprehensive manner in terms of such indicators: education - by number of facilities, number of students, number of places in educational institutions, by types of educational institutions without universities; culture - by the number of visits; sport - by the amount of services.

7. The results of a comprehensive assessment of the social sphere of cities and regions of the South Kazakhstan region in terms of high development indicators can be noted in Shymkent, Saryagash and Maktaaral districts, and the lowest level of social sphere development was registered in Arys, Shardara region.

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Р. К. Ниязбекова[1], А. М. Есиркепова[2], Ж. Т. Алиева[3], Моника Яворска[4]

[1]Экономика ғылымдарының докторы, профессор, Қашықтықтан оқыту орталығының Шымкент өкілдігінің директоры, Қазтұтынуодағы Қарағанды экономикалық университеті, Шымкент, Қазақстан,
[2]Экономика ғылымдарының докторы, профессор, Аймақтық экономика мәселелері ҒЗИ директоры, М. Әуезов атындағы Оңтүстік Қазақстан мемлекеттік университеті, Шымкент, Қазақстан,
[3]Экономика ғылымдарының кандидаты, доцент, «Нархоз» Университеті, Алматы, Қазақстан,
[4]Лодздағы Қоғамдық ғылым академиясы-қолданбалы ғылымдарының Краковтағы факультетінің аймақтық директоры, Польша

ОҢТҮСТІК ҚАЗАҚСТАН ОБЛЫСЫ ШАҒЫН ҚАЛАЛАРЫНЫҢ ТИПОЛОГИЯСЫ

Аннотация. Шағын қалалардың құрылымы мен типологиясы, олардың функционалдық арналуы мен даму болашағы жөніндегі зерттеулер әлемдік қауымдастықта көшбасшы орындарда болып отыр. Осы аталған жайт жаңа экономикалық жағдайлардағы қоныстанудың аймақтық жүйесінің маңыздылығына, сонымен қатар жергілікті деңгейдегі ұйымдық-шаруашылық жетекшілік құрылымында өнеркәсіптік әлеуетті қалыптастыру процестеріне негізделген. Шағын қалаларды дамыту процесін басқарудың инновациялық модельдерін әзірлеудің қажеттілігі аумақтың әлеуметтік-экономикалық дамуының маңызды көрсеткіштеріне жататын бюджеттік қамтамасыз етілуге ескеретін ахуалдарды талдаудың жаңа әдістерін іздестіруге алып келді. Осы ретте шағын қалалардың әлеуметтік-экономикалық мәселелерін шешуге қабілетті маңызды шарттарға дамудың территориялық ерекшеліктерін ескеретін бюджетаралық қарым-қатынастардағы трансфомацияларды жатқызу керек. Территориялық тұтастық ретінде, ОҚО үшін жергілікті және аймақтық нарықтардың қажеттіліктерін анықтау керек. Талдау шағын қалалардың әлеуметтік-экономикалық дамуы тұрғысынан алғанда, территорияның экономикалық-географиялық ерекшеліктерін ескере отырып жасалынған. Осы тұрғыдан алғанда зерттеу мақаласында әдіснама құрылған. Атап айтқанда аймақтың шағын қалаларының даму болашағы анықталған. Шағын қалалардың қала қалыптастыратын кәсіпорындар тұрғысынан мәселелеріне негізгі көңіл бөлінген. Жергілікті өзін-өзі басқару жүйесін ары қарай қалыптастыру шағын қалалардың стратегиялық бағдарларын қайта қарауына алып келді. Ол өз кезегінде оның әлеуетін арттыруына ықпал жасады. Аймақтың шағын қалаларының әлеуметтік-экономикалық дамуының мәселелерін шешу бірқатар факторлармен шектеліп отыр. Оған шағын қаланың экономикалық әлеуеті құрылымын қалыптастыру ерекшеліктерін, сонымен қатар оның даму мүмкіндіктерін жеткілікті дәрежеде зерттелмегендігін кіргізуге болады. Мақалада ОҚО аудандары мен қалаларының әлеуметтік-экономикалық саласының даму деңгейіне бағалау жүргізілген. Базалық көрсеткіштер ретінде білім, мәдениет, спорт секілді салалар алынған. Талдау нәтижесі бойынша анықталғандай, бұл аудандарда өнеркәсіп пен ауыл шаруашылығының диверсификациясы әлсіз,

сонымен қатар инфрақұрлымы жеткілікті деңгейде дамымаған. Сонымен қатар көптеген елді мекендердің негізгі көлік магистралдарынан алыс екені де әсерін тигізеді. Алынған мәліметтердің негізінде ОҚО территориялық бірліктерінің типологиясы қоныстану бойынша әзірленді. Берілген типология алдағы уақытта осы қажеттіліктер мен қолда бар әлеуетті негізге ала отырып, сол территориялардың дамуының тиімді стратегиясын әзірлеуге мүмкіндік беретін болады.

Түйін сөздер: шағын қалалар, шағын қалалар сыныптамасы, типология, қалалық әлеуеті, стратегия, реттеуші принциптері, шағын қалаларды басқару.

Р. К. Ниязбекова[1], А. М. Есиркепова[2], Ж. Т. Алиева[3], Моника Яворска[4]

[1]Доктор экономических наук, профессор,директор ШПЦДО
Карагандинского экономического университета Казпотребсоюза, Шымкент, Казахстан,
[2]Доктор экономических наук, профессор, директор научно-исследовательского института проблем региональной экономики Южно-Казахстанского государственного университета им. М. Ауэзова, Шымкент, Казахстан,
[3]Кандидат экономических наук, доцент Университета «Нархоз», Алматы, Казахстан,
[4]PhD, региональный директор Академии общественных наук в Лодзи – факультет прикладных наук в Кракове, Польша

ТИПОЛОГИЯ МАЛЫХ ГОРОДОВ В ЮЖНО-КАЗАХСТАНСКОЙ ОБЛАСТИ

Аннотация. Исследования по структуре и типологии малых городов, их функциональному назначению и перспективам развития, занимают лидирующие позиции в мировом сообществе. Это положение обусловлено значимостью региональной системы расселения в новых экономических условиях. Также и процессами формирования промышленного потенциала в структуре организационно-хозяйственного руководства на локальном уровне. Необходимость разработки инновационных моделей управления процессами развития малых городов привела изысканию новых методов анализа ситуации. Данные методы учитывают бюджетную обеспеченность, относящуюся к важнейшим показателям социально-экономического развития территории. При этом к важнейшим условиям, способным решить социально-экономические проблемы малых городов, необходимо отнести трансформации в межбюджетных отношениях, учитывающие территориальные особенности развития. Для ЮКО, как территориальной целостности, необходимо выявить и определить потребности местного и регионального рынков. Анализ проведен с позиции социально-экономического развития малых городов, учитывая их экономико-географические особенности территории. На основе этих позиций построена методология проводимого в статье исследования. В частности, выявлены перспективы развития малых городов региона. Заострено внимание на проблемах малых городов с позиции градообразующего предприятия. Дальнейшее формирование системы местного самоуправления привело к пересмотру стратегических ориентиров малых городов, повлекшее изыскание путей наращивание их потенциала. Решение проблем социально-экономического развития малых городов региона сдерживается рядом факторов. К ним можно отнести недостаточность степени изученности особенностей формирования структуры экономического потенциала малого города, а также возможностей дальнейшего его развития.В статье проведена оценка уровня развития социально-экономической сферы городов и районов ЮКО. За базовые показатели для анализа приняты такие сферы как образование, медицина, культура и спорт. По результатам анализа выявлено, что для этих районов характерна слабая диверсификация промышленности и сельского хозяйства, слабо развита инфраструктура. Также влияние оказывает и тот факт, что многие населенные пункты значительно отдалены от основных транспортных магистралей. На основании полученных данных разработана типология территориальных единиц ЮКО по типу расселения. Данная типология способна в дальнейшем предоставить возможность для разработки эффективной стратегии развития этих территорий исходя из их потребностей и имеющегося потенциала.

Ключевые слова: малые города, классификация малых городов, типология, городской потенциал, стратегия, регулирующие принципы, управления малыми городами.

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A. A. Genbatch[1] , D. Yu. Bondartsev[2]

[1]Almaty University of Power Engineering and Telecommunications (AUPET), Kazakhstan,
[2]Almaty University of Power Engineering and Telecommunications (AUPET), JS «TrestSredazenergomontazh».
E-mail: d.bondartsev@saem.kz

INVESTIGATION OF THE HEAT EXCHANGE CRISIS IN POROUS STRUCTURES FOR HIGH PRESSURES

Abstract. The crisis of heat exchange in the boiling of water in porous structures is studied. The study relates to heat power plants of power stations. The experiments were carried out on a rocket type burner. The combustion chambers and supersonic nozzles were cooled with various porous structures. The mechanism of the heat exchange processes is described and optimal cell sizes of the porous structures are determined, and the design equation of the critical heat flux for high pressures is obtained.

Keywords: crisis of boiling, capillary-porous structures, cooling systems, the mechanism of heat exchange crisis.

The main task in power plants of power stationsis the creation of a cooling system for high-voltages and nodes. These include furnace screens of high-power boiler units, combustion chambers, nozzles and blades of gas turbine units [8].

In cooling systems, bubble fluid (water) bubbles proceed. At high thermal loads, the onset of a crisis situation with possible overheating of the heat exchange wall is not ruled out. To study the boiling crisis, weas sembled an experimental setup, the scheme of which and the experimental conditions are presented in [6, 7].

Calculation of the value of qcr with respect to the investigated porous system can be performed depending on the underheating and the flow velocity according to the equations of work [2], from which it follows that underheating of the liquid allows several expansion of the heat transfer capabilities in a porous cooling system. Since heat transfer processes take place in thin porous structures, even an insignificant excess of free flowing film on the outside of the structure, determined by the parameter m, at a given hydrostatic pressure ΔPd and a conditional coefficient of permeability Ku, creates a liquid core from which the underheated cooler will be continuously sucked temperature differences and capillary forces.

In addition, the gravitational potential promotes the destruction of steam conglomerates in a porous structure, facilitating the transport of an underheated liquid. The heat flow will be spent additionally on heating of leaking relatively cold portions of liquid.

Excess fluid in the porous system creates a directional movement to the flow, which leads to deformation of the vapor bubbles in the structure, a decrease in their diameter, an increase in the frequency of the formation of bubbles [3]. As the flow velocity increases, the energy expended in displacing liquid from the wall boundary layer increases, and consequently, the generation rate of the vapor V_{cr} and the quantity q_{cr} increase. However, at a certain value of the fluid flow rate determined by the parameter $\widetilde{m}_{cr}$, the energy expended for extruding liquid from the two-phase wall layer will not be enough, and a heat transfer crisis occurs. Of course, an increase in $q_{cr,\,v}$ will be achieved with a large flow of liquid, which will lead to an increase in energy costs for the drive of the injection machines.

Upon reaching a certain value of the water content $\bar{\varphi}^1_{кг}$, the flow rate will not contribute to an increase in the q_{cr} value, and in some cases may even lead to a decrease in the q_{cr} value, since vapor evacuation from the wall zone is difficult. The increase in the velocity of the liquid film adjacent to the wall,

due to the parameter $\tilde{m}$, begins to give way to the dominant influence of the fall in the moisture content $\bar{\varphi}_{kr}^{1}$ in the same zone, which will have a greater effect on the q_{cr} value, even decreasing it. Therefore, it is required in each individual case to establish an optimal ratio of the excess liquid $\tilde{m}$ depending on the type of the porous structure.

The hydrodynamic model of the liquid boiling crisis in a large volume on the technical surface does not reflect the effect of the thermophysical properties of the wall, although it does occur, which can be explained by the vibrational motion of the vapor-liquid interface. This leads to a wavy movement of the heating surface. Therefore, in some places of such a surface, resonance phenomena should be expected, when the wall temperature will decrease due to a large selection of vapor, which means that the higher the thermal properties of the wall, the more intensive the withdrawal of the quantity «q» will occur.

For porous cooling systems, for practically all regimes and geometric parameters at bubble water boiling, the depth of penetration of the temperature wave is $h_m<\delta_w$, therefore in the computation ratios for q_{cr} the wall thickness δ_w is not introduced [3].

The equation for computing q_{cr} in the case when P≥0.1MPa, and $b_g > 0{,}28\cdot10^{-3}$ m:

$$q_{cr} = 0{,}0347.r.\left[g.\left(\rho_l - \rho_s\right).\rho_s.\overline{D}_{c.cr} \right]^{0,5} .\left(\frac{b_h}{b_0}\right)^{0,3} .\left(\frac{\delta_f}{\delta_0}\right)^{0,5} .\left(1+\cos\beta\right)^{0,6}, \qquad (12)$$

It follows from equation (12) that

$$q_{cr} \sim \overline{D}^{0.5}{}_{c.cr}\,(p \geq 0{,}1\ \text{MPa}) \text{ and } q_{cr} \sim \bar{f}^{0.5}\,(p < 0{,}1\ \text{MPa}).$$

The value of $\overline{D}_{o.cr}$b $\bar{f}$ depends on the thermophysical properties of the heat-release surface: $\overline{D}_{c.cr} \sim K_w^{-1}$, $\bar{f}_{cr}^{-1} \sim K_w^{2}$, where $K_w = I\,[(\rho c\lambda)_l/(\rho c\lambda)_w]^{0,5}$. Then for surfaces made of copper and stainless steel and covered with grid structures, we have: $\tilde{q}_{cr} = 1{,}07$ (p ≥ 0,1 MPa), $\tilde{q}_{cr} = 1{,}15$ (p < 0,1 MPa).

The wall material influences the value of q_{cr} through the complex $(\rho c\lambda)_w$, where ρ, c, λ are density, heat capacity and heat conductivity of the wall respectively, but it is hardly right to state this unequivocally, since it is practically impossible to keep the same conditions for cleanliness of processing and microstructure. When designing the combustion chamber and especially the nozzle, it is necessary to take into account a certain margin for the thickness of the heating surface. Occurrence of boiling crisis will occur earlier on "thin" heaters, since the "dry" spot in the bubble base will start to increase in pre-crisis boiling area, the heat exchange process will drastically worsen, wall temperature will increase. Surfaces having a larger thickness will require more time for their heating.

For surfaces with porous coating this issue is particularly topical, because the bubble growth time is ten times less in them, the hydrodynamic conditions of the liquid supply change drastically and, consequently, the residence time of the steam near the wall can increase, which eliminates the contact of the liquid with the heat exchange surface, despite the large surplus of liquid $\tilde{m}$ [3].

The described process is the prehistory of the development of the boiling crisis. The further "fate" of the process, under otherwise equal conditions, is determined by the heat storage capacity of heating $(\rho c\lambda)_w$. When the size of the complex is chosen to be large, the probability of prolonging the boiling crisis increases, the heat flows along the heating surface will increase, and favorable conditions for the contact of the liquid phase with the wall will be created again. Increasing only the wall thickness by a tenth will increase the value of q_{cr} by just a few percent, besides this phenomenon is more noticeable for high heat conductive materials and at a pressure greater than atmospheric pressure.

The one-dimensional equation of nonstationary heat conductivity, describing the dynamics of the temperature field in a steam-generating wall proved to be useful for the study of the limit state of a surface at a boiling crisis when a "dry" spot of critical size is established on the wall below the steam bubbles. Up to this point, a developed bubble process of boiling, and at the base of the steam bubbles there was a "dry" spot with a radius of $R_{s.p.}$.

As the computations [10] have shown, for time τ ≤ 5 s, the heat flows reach values of ~ $8\cdot10^{7}$ W/m^2 for copper and $1.3\cdot10^{8}$ W/m^2 – for stainless steel. However, they will be shielded with melting lines in ~ 0,01 s. High heat tensile stresses occur as a result of a drastic increase of temperature gradients in the wall. The effect of various materials and wall thicknesses on the time of the onset of surface destruction at the

time of the boiling crisis was studied. With the help of holography and photoelasticity methods, the most dangerous place at the moment of destruction of the porous surface was determined [20, 21].

The phenomena of ejection of liquid drops from the cells of a porous structure [20] deteriorate the intensity of heat exchange when a certain boundary heat flow is reached. By choosing the type of structure, this phenomenon can be minimized. The smallest ejection was obtained for single-layer grids with cells more than $0.28 \cdot 10^{-3}$ m. The resulting degraded regimes are similar by their mechanism to the processes occurring when the steam-water mixture moves in pipes that do not have a porous coating. These regimes are characterized by a critical region of Reynolds numbers, when the friction head begins to decrease on the heated area. This is due to the fact that due to the violent drop ejection, the liquid consumption is reduced. In the initial stage of the discharge process, the drops turbulize the process, then at a critical ejection the amount of liquid becomes insufficient to irrigate the heat exchange walls.

As the intense drop drift disturbs the smooth flow of liquid along the external surface of the grid, a film break is observed, which also worsens the inflow of fresh portions of relatively cold liquid to the wall two-phase boundary layer. The experimentally chosen porous structures practically eliminated the drop ejection at a given heat flow that occurs due to the balancing of the frictional forces of the liquid in grids and on the surface of the grids with drops and the steam flow in the grids and near-grid space [7].

As a result of the imbalance of operating forces, the amount of incoming liquid becomes insufficient, dry spots occur on the heating surface, the wall temperature gradually increases to a certain value and the process proceeds at temperature headers (60–80) K. The pulsating regime of supplying the wall with liquid does not lead to overheating of the surface, although the intensity of heat transfer decreases. However, pulsations of the wall temperature and the associated with them heat braking stress occur, shortening the service life of the surface. Therefore, it is important to correctly optimize the type of the porous structure and not to allow high overheating of the wall relative to the liquid temperature.

The crisis boiling is characterized by loss of stability of the pulsating liquid film and blocking of the cells of the structure by steam formations. Despite a sufficient amount of liquid, a sharp increase in the heat resistance of the boundary layer is observed, a deterioration of the effect of swirl due to the hindered removal of steam from the cells of the porous structure.

In case of a boiling crisis, as holographic interferometry and high-speed filming have shown [3], the transferred heat flow gains limiting values q_{cr}, the bubbles of steam start to penetrate into adjacent cells of the structure before their departure, merge into conglomerates and form focal zones of steam films. Liquid films under steam conglomerates dry out and, in spite of the large amount of liquid present in the porous structure and on its surface, the coolant cannot penetrate to the wall.

The temperature head comes to a limit value relative to the saturation temperature T_s, $\Delta T_{cr} = T_{cr} - T_s$, where the value of T_{cr} corresponds to the value q_{cr}. At$\Delta T \geq \Delta T_{cr}$, which is more likely for porous structures at p <0,1 MPa, when the lowest values of the critical overheating of the wall takes place, or for grids with cells less than $0{,}14.10^{-3}$ m, the microlayer of liquid steams under the steam bubble, or its conglomerate, the wall temperature near the "dry" spot drastically increases, excluding contact of the existing portion of the liquid with the wall.

A study of the boiling of a liquid without a porous structure shows that when the heat flow reaches $\sim 1 \cdot 10^5$ W/m^2, the number of centers of steam formation drastically increases and the liquid film "swells". Steam bubbles begin to interact with each other, breaking over at smaller sizes. The main portion of the heat is consumed on boiling of the liquid into bubbles. Upon occurrence of the critical regime, the liquid film breaks over into spheroidal drops and does not wet the heating surface. The temperature of the wall starts to increase drastically, up to its burnout. This increase of liquid consumption does not lead to positive results. The crisis occurs at time when the rate of boiling of the liquid exceeds the rate of its spreading over the surface. The film dries out on the periphery of the heating surface, shrinking towards the center.

Since the pore sizes of the studied grid structures can be considered as identical, the outflow of steam will be equally probable. Steam pillars can be generated in much larger cells than, for example, in powder materials, and spaced from each other at shorter distances, and even in cells closely adjacent to each other. For water boiling in a large volume at atmospheric pressure, the critical wavelength λ_{cr} between the steam columns is $(15–25) \cdot 10^{-3}$ m, then for a powder porous coating it is (5–15) times smaller. If the value of $q_{cr} \sim U_{cr} \sim \lambda_{cr}^{-0.5}$, then the value of q_{cr} for powder materials turned out to be twice as high, but at a

temperature head ΔT= (600–800) K. For grid structures operating in the field of gravitational forces, in spite of an even smaller value of λ_{cr}, the value of q_{cr} was similar to the values achieved at boiling in a large volume on the technical surface, but at a value of ΔT_{cr} = 60 K [3], U_{cr} – critical velocity of steam.

Therefore, the hydrodynamic situation in the volume and on the surface of the grids, which, in turn, depends on the type of structure and organization of the liquid supply,should be considered as the determining factor of the boiling crisis. Due to a slight surplus of liquid (low underheating and flow velocity), as visual observations showed, it became possible to control the steam front in the volume of the structure and, above all, to destroy the accumulating steam formations.

An assessment for crisis state of the fraction of the surface occupied by the steam for p = 0,1 MPa, ΔT_{cr} = 60 K, $\overline{D}_{o.cr} = 0{,}5.10^{-3}$, $\tilde{m}$ = 1,1, $\bar{n} = 5.10^6$ m^{-2}, is provided by the following:

$$\frac{F_s}{F} \geq \frac{\pi.\overline{D}_{0,cr}^2.\bar{n}.K_{\min}}{4.1} \geq \frac{2,5.\pi}{16},$$

Where K_{min} – coefficient, taking into account the presence of a "dry" spot under the steam bubble. At the time of the crisis, the value of $K_{min} \geq 0{,}5$; F, F_n - the total heat exchange surface occupied by steam.

The number of cells for the structure of $0.4 \cdot 10^{-3}$ m, per 1 m^2, is $2.78 \cdot 10^6$ pcs. i.e. at the time of the crisis there may be two steam bubbles in each cell. When the liquid is boiling in a large volume for a horizontal heater with a technical surface in the theory of hydrodynamic crisis, the ratio is $F_s/F = \frac{\tilde{\pi}}{16}$, i.e. 2.5 times less. When the value of $K_{min} \to 1$, the ratio $F_s/F \to 1$.

Geometric dimensions that significantly affect redistribution of the capillary and gravitational potentials affect the value $q_{cr}$and thus require optimization. The maximum value of $q_{cr}$was obtained for vertical surfaces with large cell sizes (β =0 deg), where β is the angle of inclination of the surface to the vertical line (see formulas (4) and (12)).

In grid porous structures, the phenomenon of the heat transfer crisis runs more smoothly than on a smooth surface, which is analogous to the vapotron effect, when a certain relief is created on the heating surface with protrusions and recesses. In a crisis situation, the film boiling region starts to shift from the base of the edges to their apexes, increasing the intensity of heat transfer and the value of q_{cr}. This allows to stretch the boiling crisis on a non-isothermal surface. In the porous cooling system, the presence of pores and capillaries on the heat exchange surface creates an artificial roughness, which in this case will play the role of edges. In addition, account must be taken of the stabilizing effect of capillary forces leveling liquid distribution on the heat exchange surface.

Thus, the essential dependence of the heat transfer ability of the studied system from the width of grid (dozens of times), as it takes place in the heat pipes, was not observed. This can be explained by the fact that at small sizes of cells in the presence of gravitational forces, high hydraulic resistance limits consumption to a lesser extent, which can partially flow over for grid surface. At the same time, increased cell size does not lead to a significant decrease of transfer capacity. However, the width of a grid cell in the system under study affects the dynamics of the steam bubbles' development and hence the intensity of the heat exchange and the value of the q_{cr}. The behaviour of bubble formation in individual cells (isolated) as was the case in system under study prevents premature fusion of steam bubbles and the formation of a solid steam film. The presence of large cells allows to improve the ejection of the light phase from the steam-generating surface. However, it is not advisable to increase the cells' size starting from a width of $0{,}4 \cdot 10^{-3}$ m, as steam conglomerates occur in such cells, similar to boiling on a technical surface without a porous coating.

Conclusion. Studies of the heat transfer crisis were performed depending on underheating and flow velocity, thermal properties of the heating surface, and ejection of liquid droplets from the porous structure. The principles of designing combustion chambers and nozzles and calculation of the critical heat flux are determined. The studies have practical significance in the field of the limiting state of the steam generating surface, which is protected by cooling from overheating.

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А. А. Генбач, Д. Ю. Бондарцев

Алматы энергетика және байланыс университеті, Алматы, Қазақстан

ЖОҒАРЫ ҚЫСЫМҒА АРНАЛҒАН ҚУАТТЫ ҚҰРЫЛЫМДАРДАҒЫ ЖЫЛУ АЛМАСУ ДАҒДАРЫСЫН ЗЕРТТЕУ

Аннотация. Кеуекті құрылымдардағы суды қайнату кезінде жылу алмасу дағдарысы зерттеледі. Зерттеу электр станцияларының жылу электр станцияларына жатады. Эксперименттер зымыран тозаңдатқыштарында жүргізілді. Жану камералары мен дыбыстан шашатын саңылаулар түрлі кеуекті құрылымдармен салқындатылды. Жылулық алмасу процестерінің механизмі сипатталған және кеуекті құрылымдардың оңтайлы ұяшық мөлшері анықталып, жоғары қысымдар үшін есептелген жылу ағыны теңдеуі алынды.

Түйін сөздер: қайнау дағдарысы, капиллярлы-кеуекті құрылымдар, салқындату жүйелері, жылу дағдарысы механизмі.

А. А. Генбач[1] , Д. Ю. Бондарцев[2]

[1]Доктор технических наук, профессор АУЭС,
[2]Докторант АУЭС, ведущий инженер, АО «Трест Средазэнергомонтаж»

ИССЛЕДОВАНИЕ КРИЗИСА ТЕПЛООБМЕНА В ПОРИСТЫХ СТРУКТУРАХ ДЛЯ ВЫСОКИХ ДАВЛЕНИЙ

Аннотация. Исследован кризис теплообмена при кипении воды в пористых структурах. Изучение относится к тепловым энергетическим установкам электростанций. Эксперименты проводились на горелке ракетного типа. Охлаждались камеры сгорания и сверхзвуковые сопла различными пористыми структурами. Описан механизм процессов теплообмена и определены оптимальные размеры ячеек пористых структур, получено расчетное уравнение критического теплового потока для высоких давлений.

Ключевые слова: кризис кипения, капиллярно-пористые структуры, системы охлаждения, механизм кризиса теплообмена.

Information about authors:

Genbatch A.A., – Almaty University of Power Engineering and Telecommunications (AUPET), Doctor of Engineering Science, Professor

Bondartsev D.Yu. – Postdoctoral student AUPET, leading engineer,

JS «TrestSredazenergomontazh»

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**B. B. Benberin[1], G. A. Yermakhanova[2], A. A. Akhetov[2],
T. A. Vochshenkova[2], N. A. Shanazarov[2], A. Y. Naurazbayeva[2]**

[1]Medical Center of President's Affairs Administration of the Republic of Kazakhstan, Astana, Kazakhstan,
[2]Medical Center Hospital of President's Affairs Administration of the Republic of Kazakhstan, Astana, Kazakhstan.
E-mail: valeriy-benberin@mail.ru, ermakhanova@gmail.com, amir.akhetov.a@gmail.com,
vochshenkova@gmail.com, nasrulla@inbox.ru, anar.naurazbayeva@gmail.com

EFFICIENCY OF GRAPE POLYPHENOLS IN PATIENTS WITH METABOLIC SYNDROME (LITERATURE REVIEW)

Abstract. Purpose of the review: to study of the efficiency of grape polyphenols in patients with metabolic syndrome.

Methodology: A literature search was conducted in electronic databases and publications included in Embase, PubMed/Medline, Science Direct, Springer Link, Cochrane Library, eLibrary. The depth of the literature search was 12 years. More than 30 publications were selected and reviewed, including full-text articles, Systematic Reviews and Meta-Analysis that were published in English.

Results and conclusions: Grape polyphenols in supported doses can delay or prevent the onset of metabolic syndrome with reducing body weight, blood pressure and blood glucose levels and improving lipid metabolism. The results indicate that polyphenols are significant metabolic modulators because of their ability to influence different targets of the cellular and molecular pathways. However, some studies have shown inconsistent results and conflicting data on the efficacy of polyphenols in metabolic syndrome management have been obtained. Perhaps, contradictory data are associated with significant limitations of their bioavailability, especially in conditions of progressive metabolic syndrome. Therefore, more extensive and in-depth scientific research are needed to determine more accurately the role of polyphenols in the progression of metabolic syndrome components.

Keywords: grape polyphenols, metabolic syndrome.

Introduction. Cardiovascular disease and diabetes mellitus are currently the leading cause of death. The prevention of these diseases is an important problem and it is based on confronting risk factors. In medical practice at the stage of metabolic syndrome (MS), early detection and elimination of risk factors for cardiovascular disease and diabetes mellitus is possible. MS is a cluster of metabolic disorders that includes insulin resistance, hypertension, dyslipidemia and abdominal obesity. The prevalence of MS varies from 10% to 84% depending on the ethnicity, age, and sex [1], which makes it an important social and economic problem worldwide.

Metabolic Syndrome. International organizations and expert groups, such as the World Health Organization, the European Group for the Study of Insulin Resistance, the International Diabetes Federation, have attempted to integrate MS parameters. Nevertheless, the definition of the consensus of the International Diabetes Federation seems to be most suitable for practical use in clinical medicine, taking into account the inclusion of threshold values for different ethnic groups [3, 4]. According to this definition, MS is a cluster of the most dangerous risk factors for cardiovascular disease: central (abdominal) obesity, increased fasting plasma glucose, diabetes, high cholesterol and high blood pressure [2].

As the MS progresses, the subcutaneous abdominal adipocytes merge their lipolytic products (free fatty acids) directly into the portal vein, thereby increasing the concentration of fatty acids in the blood serum, increasing the absorption of fatty acids by the liver, skeletal muscles and beta cells of the pancreas and reducing glucose consumption. Reducing glucose consumption increases serum glucose levels and stimulates increased insulin secretion for glucose utilization: a lack of response to an additional secreted

insulin induces glucose resistance. The constantly high secretion of insulin, in turn, causes metabolic stress in the mitochondria of beta cells of the pancreas, causing the release of reactive oxygen species that damage the mitochondria and among other causes trigger the process of chronic systemic inflammation with time mitochondria lose their ability to support cellular processes, and beta- cells undergo apoptosis, irreversibly reducing the secretion of insulin. To reduce the increase in oxidative stress and inflammatory reaction means to control the onset of irreversible changes in the human body that contribute to premature aging.

Grape Polyphenols. Obviously, abdominal obesity, high blood pressure, impaired glucose tolerance, dyslipidemia and increased oxidative stress and inflammation are the interacting factors of the metabolic syndrome that can be effectively modified with dietary interventions involving polyphenol-rich foods or beverages [5]. Clinical researchers are increasingly attracted by natural healing factors in MS and one of the promising factors are grape polyphenols [6].

Polyphenols are a part of the group of antioxidants of natural origin and are plant pigments contained in large quantities in grapes and other fruits and vegetables. In addition, complexes of plant polyphenol compounds become one of the most important food additives of recent decades. Among plant polyphenols, the greatest attention is given to the research of red grape polyphenols.

Purpose of the Review. To review human studies of the effects of grape polyphenols intake in patients with MS.

Methodology of the Review. A literature search was conducted in electronic databases and publications included in Embase, PubMed/Medline, Science Direct, Springer Link, Cochrane Library, eLibrary. The depth of the literature search was 12 years (2005–2017). The following search terms were used (including synonyms and closely related words): “metabolic syndrome”, “grape polyphenols”, “effects of grape polyphenols”, “grape polyphenols”, “effect on the metabolic syndrome”, “hypertension” or “blood pressure”, “lipids” or “cholesterol”, “insulin” or “glucose”. More than 30 publications were selected and reviewed, including full-text articles, Systematic Reviews and Meta-Analysis that were published in English. They involved a clinical trial in healthy adults or adults suffering from the MS or closely related diseases such as obesity, coronary artery disease or type 2 diabetes.

Effects of Grape Polyphenols on Metabolic Syndrome. As is known, the evolution of MS passes in two directions: the development of dysfunction of β-cells of the pancreas and hyperinsulinemia with compensatory insulin resistance. Given that pro-oxidant status and chronic systemic inflammation accompany MS and that its severity, grape polyphenols manifest themselves as good dietary drugs to prevent the progression of MS by using certain mechanisms of action [7]. By modifying the inflammatory response and reducing the levels of free radicals, grape polyphenols reduce the severity of the chronic systemic inflammatory process. The mechanisms of action include both the manifestation of the antioxidant properties of polyphenols or the enhancement of the expression of antioxidant genes and proteins, as well as a decrease in the intensity of stress signals of the endoplasmic reticulum [8, 9].

According to the studies, oxidative stress occurs with systemic inflammation, endothelial dysfunction, impaired secretion of pancreatic cells and utilization of glucose in peripheral tissues, which lead to long-term secondary complications [10]. Many data from epidemiological studies indicate a positive relationship between a decrease in metabolic disorders and consumption of a diet rich in polyphenols [11].

Since polyphenols increase the antioxidant capacity of plasma, the reversibility of metabolic disorders can be explained by the adoption of an electron from active oxygen species and the formation of relatively stable phenoxy radicals. Active forms of oxygen are considered toxic by-products and pose a threat to cells, causing lipid peroxidation, protein oxidation and nucleic acid damage, inhibition of the enzyme, and activation of programmed cell death [12]. Polyphenols protect the cell constituents from oxidative damage and limit the risk of various degenerative diseases associated with oxidative stress.

Effects of Grape Polyphenols Intake in Patients with Metabolic Syndrome. At the present time, there are a number of clinical studies that are showed efficacy and safety of grape polyphenols intake in patients with MS, cardiovascular diseases, and diabetes mellitus. They indicate that polyphenols improve insulin resistance [13], reduce blood pressure [14], and body weight [15], and improve lipid metabolism [16]. However, results of other clinical studies show differential effects of grape polyphenols on MS components, and it depends on the number of MS components in every patient. However, dietary strategies may be less effective for patients with a group of MS risk factors in general than for patients with

one or two risk factors. The effects of polyphenols intake on healthy volunteers or patients with a low risk of cardiovascular disease may differ from those in patients with MS. Thus, the results of such clinical studies may be incompatible and the metabolic benefits of polyphenols intake may strongly depend on the studied population.

A systematic review [17] of the effects of grape polyphenols on the components of MS show the difference in the effects on the components of the MS. Also, in this review there is no convincing evidence that grape polyphenols can positively influence the level of glycemia, blood pressure and lipids in patients with MS.

A recent review [18] indicates that polyphenols are effective in reducing some MS components, but there is no a single extract or polyphenol that can affect all components of MS. The protective functions of polyphenols can be effective only through frequent and prolonged consumption in the long term, in the context of a healthy diet.

A review of the effects of polyphenol intake in patients with MS showed the results of the human interventional trials with polyphenols as polyphenol-rich foods and dietary patterns rich in polyphenols [19]. Evidences of this review suggest that polyphenols in supported doses may delay or prevent the onset and progression of MS by decreasing body weight, blood pressure, blood glucose and by increasing lipid metabolism. Polyphenols entering the human body, they control and normalize the metabolic processes at the cellular level, and also absorb and neutralize free radicals and stop chain reactions. In addition, in this review, many epidemiological and interventional trials have shown inconsistent results, only a small number of interventional trials indicate the benefits of polyphenol intake in improving the phenotype of MS. Long-term studies are justified in order to assess the possible preventive effects of a higher intake of polyphenols by combining their diverse dietary sources [20, 21].

Regarding the effect of polyphenols on the components of MS, some studies have shown that grape polyphenols have a potential effect on lipid metabolism and weight loss. The results of a study [22] on the effect of polyphenols on lipid metabolism in patients with type 2 diabetes on a background of overweight confirm that grape polyphenols improve lipid metabolism, reducing the plasma concentration of total cholesterol, low density lipoproteins and increasing the concentration of high-density lipoproteins.

A recent systematic review noted that weight loss caused by polyphenols is not clinically significant in people who are overweight and obese [23]. It has been indicated that many interventional trials have a duration of less than 3 months. Therefore, long-term randomized interventional trials with a duration of 12 months or more are needed to understand the effect of an intervention on weight loss and obesity prevention.

In recent years, a significant number of randomized trials have been conducted to evaluate preventive measures for type 2 diabetes and results from one of these studies [24] show the protective effects of grape polyphenols on oxidative stress and insulin resistance.

Regarding the effect of dietary polyphenolic compounds, in vitro and in vivo studies suggest improvement of glucose homeostasis through potential multiple mechanisms of action in the intestine, liver, muscle adipocytes and pancreatic β-cells, and through prebiotic effects in the digestive tract. In general, most epidemiological studies show that dietary polyphenols are associated with a lower risk of developing type 2 diabetes.

If the results of some clinical studies on the efficacy of polyphenols showed a significant reduction in hypertension [25-27], then in the other studies there were no significant changes [28, 29]. A meta-analysis [30] showed that daily consumption of grape polyphenols could significantly reduce systolic blood pressure. A significant decrease in blood pressure was noted when taking a low dose of grape polyphenols (<733 mg/day). However, results of this study indicated that diastolic blood pressure was not significantly reduced in patients in the study group as compared to controls, and therefore, this study confirms the hypothesis that daily consumption of grape polyphenols can affect systolic blood pressure, but not diastolic blood pressure.

Conclusion. Current clinical studies suggest that grape polyphenols in supported doses can delay or prevent the onset of MS, reducing body weight, blood pressure and blood glucose levels and improving lipid metabolism. Their results indicate that polyphenols are significant metabolic modulators because of their ability to influence various targets of the cellular and molecular pathways that have been proven as potential targets for the polyphenolic group of compounds.

However, some epidemiological and interventional studies have shown inconsistent results. Thus, based on the conducted review of clinical studies, conflicting data on the effects of grape polyphenols in MS patients were obtained. Perhaps, among other reasons, their inconsistency is associated with significant limitations of their bioavailability, especially in conditions of progressive MS. Therefore, more extensive and in-depth scientific studies are needed to determine more accurately the role of grape polyphenols in the progression of MS components, as well as to determine the best dose, ideal food matrix and method of administration. In this case, it is very likely to obtain an effective product for reducing the risk of cardiovascular disease in humans and prolonging active longevity.

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В. В. Бенберин[1], Г. А. Ермаханова[2], А. А. Ахетов[2],
Т. А. Вощенкова[2], Н. А. Шаназаров[2], А. Е. Науразбаева[2]

[1]Қазақстан Республикасы Президенті Іс Басқармасы Медициналық орталығы,
Астана, Қазақстан;
[2]Қазақстан Республикасы Президенті Іс Басқармасы Медициналық орталығы Ауруханасы,
Астана, Қазақстан

МЕТАБОЛИКАЛЫҚ СИНДРОМЫ БАР ПАЦИЕНТТЕРДЕ ЖҮЗІМ ПОЛИФЕНОЛЫНЫҢ ТИІМДІЛІГІ (ӘДЕБИЕТТЕРДІ ШОЛУ)

Аннотация. Мақсаты: Метаболикалық синдромы бар пациенттерде жүзім полифенолының тиімділігін зерттеу.

Әдістеме: Embase, PubMed/Medline, Science Direct, Springer Link, Кокран кітапханасы, eLibrary кіретін жарияланымдарда және электрондық дерекқорларында әдебиеттерді іздеу жүргізілді. Әдебиеттерді іздеу тереңдігі 12 жыл болды. 30-дан астам жарияланымдар қарастырылды, соның ішінде ағылшын тіліндегі толық мәтінді мақалалар, жүйелі шолулар мен мета-анализдер таңдап алынды.

Нәтижелер мен қорытындылар: Қолданылатын дозаларда жүзім полифенолы дене салмағын, қан қысымын және қан глюкозасының деңгейін төмендетумен және липидті метаболизмді жақсартумен метаболикалық синдромның басталуын болдырмайды немесе алдын алады. Нәтижелер полифенолдардың жасушалық және молекулалық жолдардың әртүрлі нысаналарына ықпал ету қабілетіне байланысты маңызды метаболикалық модулятор болып табылатынын көрсетеді. Алайда, кейбір зерттеулер метаболикалық синдромды емдеуде полифенолдардың тиімділігі туралы келісілмеген нәтижелерді және қайшы деректерді көрсетті. Мүмкін, қарама-қайшы деректер биожетімділіктің елеулі шектеулерімен байланысты, әсіресе прогрессивті метаболикалық синдром жағдайында. Сондықтан метаболикалық синдромы компененттерінің прогрессиясында полифенолдардың рөлін дәлірек анықтау үшін неғұрлым кең және терең ғылыми зерттеулер қажет.

Түйін сөздер: жүзім полифенолдары, метаболикалық синдром.

В. В. Бенберин[1], Г. А. Ермаханова[2], А. А. Ахетов[2],
Т. А. Вощенкова[2], Н. А. Шаназаров[2], А. Е. Науразбаева[2]

[1]Медицинский центр Управления делами Президента Республики Казахстан,
Астана, Казахстан,
[2]Больница Медицинского центра Управления делами Президента Республики Казахстан,
Астана, Казахстан

ЭФФЕКТИВНОСТЬ ПОЛИФЕНОЛОВ ВИНОГРАДА У ПАЦИЕНТОВ С МЕТАБОЛИЧЕСКИМ СИНДРОМОМ (ОБЗОР ЛИТЕРАТУРЫ)

Аннотация. Цель обзора: Изучение эффективности полифенолов винограда у пациентов с метаболическим синдромом.

Методология: Проведен поиск литературы в электронных базах данных и публикациях, вошедших в Embase, PubMed/Medline, Science Direct, Springer Link, Кокрановскую библиотеку, eLibrary. Глубина поиска литературы составляла 12 лет. Были выбраны и рассмотрены более 30 публикации, в том числе полнотекстовые статьи, систематические обзоры и мета-анализы на английском языке.

Результаты и выводы: Полифенолы винограда в поддерживаемых дозах могут задерживать или предотвращать начало метаболического синдрома, уменьшая массу тела, артериального давления и уровень глюкозы в крови и улучшая обмен липидов. Результаты указывают, что полифенолы являются значительными метаболическими модуляторами в силу их способности влиять на различные мишени клеточного и молекулярного пути. Однако некоторые исследования показали непоследовательные результаты и получены противоречивые данные об эффективности полифенолов в управлении метаболического синдрома. Возможно, противоречивые данные связаны с существенными ограничениями их биодоступности, особенно в условиях прогрессирующего метаболического синдрома. Поэтому необходимы более объемные и глубокие научные исследования, чтобы установить более точно роль полифенолов в прогрессии компонентов метаболического синдрома.

Ключевые слова: полифенолы винограда, метаболический синдром.

Information about authors:

Benberin V.V. – doctor of medical sciences, professor, corresponding member of the National Academy of Sciences of Kazakhstan, head of the Medical Center of the President's Affairs Administration of the Republic of Kazakhstan, Astana, Kazakhstan.

Yermakhanova G.A. – master of public health, head of Clinical trials Sector of the Center for Gerontology, Medical Center Hospital of the President's Affairs Administration of the Republic of Kazakhstan, Astana, Kazakhstan.

Akhetov A.A. – doctor of medical sciences, director of the Medical Center Hospital of the President's Affairs Administration of the Republic of Kazakhstan, Astana, Kazakhstan.

Voshchenkova T.A. – Master of Business Administration, deputy head of the Gerontology Center, Medical Center Hospital of the President's Affairs Administration of the Republic of Kazakhstan, Astana, Kazakhstan.

Shanazarov N.A. – doctor of medical sciences, deputy director for science of the Medical Center Hospital of the President's Affairs Administration of the Republic of Kazakhstan, Astana, Kazakhstan.

Naurazbayeva A.Y. – master of ecology, specialist of Clinical Trials Sector of the Center for Gerontology, Medical Center Hospital of the President's Affairs Administration of the Republic of Kazakhstan, Astana, Kazakhstan.

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A. A. Genbach[1], K. K. Shokolakov[2]

[1]Doctor of technical sciences, professor of «Almaty university power engineering and telecommunication», Almaty, Kazakhstan,
[2]Doctoral student AUPET, design engineer JSC «Kazakh institute oil and gas», Almaty, Kazakhstan.
E-mail: kudash@bk.ru

DEVELOPMENT OF AN EXPERIMENTAL PLANT OF A NON-NOZZLE POROUS FOAM GENERATOR FOR PRODUCING OF AIR (STEAM) AND MECHANICAL FOAM

Abstract. On the basis of studies of heat-mass exchange processes by boiling of pure liquids and with the addition of surface-active agents, a new class of non-nozzle porous foam generator for producing of air (steam) and mechanical foam was developed. The results of the experiment are generalized by the criteria equations of heat-mass exchange with an accuracy of ±20% with respect to the processes of bubbling, foam generation, pseudo-fluidization and boiling. The combined action of capillary and mass forces for capillary-porous structures of the 3x0,4 type made it possible to boost the operating mode of the foam generator by 1,5-2 times and reduce the consumption of the foam generating agent and reduce the hydraulic resistance tenfold.

Key words: porous foam generator, foam generation, heat-mass exchange, capillary-porous structures.

Studyoftheheatandmassexchangeof boilingpureliquidsincapillary porous structures, development of control methods for these processes [1]allowed to summarize trials with pure foam and dust-foam flows and study a single equation for calculation of the heat and mass exchange with an accuracy up to ±20 % [2], whereby boiling processes, bubbling, pseudofluizidation and foam generation were summarized as well.

Anewclassofnozzle-freefoamgeneratorsandfoam-dust catchers along with bubbling capillary porous grids were invented [3], as well as foam generating and defoaming structures located vertically. Duetothe controllinginternal characteristics of two-phase flows [4]different types of foam-dust catchers were designed[5-13]. Itispossibletoincreaseeffectivenessofdust-gascatchingbecauseofcontrollinggeometry of micro channels of porous material [6], separation of flow into wave energy and gas (steam) energy [7,11], forming generator with the help of power (without incoming flotation) [8], design of turbulizers as foam generating and defoaming structures using a joint action of gravitation and capillary forces, pressure and vibration forces.

InaccordancewiththearticleNo.358012, 1972 a method of electrostatic gas cleanup was described where electrization of settling elements was produced using a tribo effect. This effect was used earlier, though during electrization of filter elements they had a conductive layer on their surface, which reduced the electrostatic filtration component. Thereviewedmethoddescribesthataneffectiveness of electrostatic filters will be increased because it is recommended to implement electrization with the help of circulation of weight fine grained electrified agent in hollow settling elements.

MethodofelectrostaticgascleanupasperthearticleNo.358012, 1972intermsofdust settling effectiveness exceeds the known methods. However, incomparisonwiththeknownmethods it has a low dust settling productivity.

Therefore, it is possible to increase effectiveness of dust electrization in air flow by using a tribo effect. Though it requires to solve a problem of dust cleanup productivity.

Inadditiontomethodsofgascleanupfromdustthereisamethod/articleNo. 247241, 1969/, where it issuggestedtocatchthinaerosolsprayswiththehelpofchargingaerosolsprayparticleswhentheelectrostaticspray edeasilyevaporatingliquids are settled onthem, hence a liquid vapor in a form of condensate will be re-used. Such method has an advantage over method of dust catching by charging electrostatic sprayed water, because a mutual attraction of dust particles and drops of sprayed water leads to their adhesion, and growth of particles along with charge neutralization.

A common disadvantage of electric methods is a minor size and porous structure of formed aggregation of dust particles. Underimpactiontheycanbeeasilydestroyed. Low effectiveness of dust suppression process could be expected from settling of fine dust. Thus, itisrequiredto develop adust suppressionmethod, whichwouldallowsignificantlyincreaseresistance to destruction of formed dust aggregation whilst processing an air dust flow by electric field with retention of high productivity of dust cleanup.

Itisinterestingtoseethe air dedustingmethod using porous blankets /article No. №368413, 1973/. In order to increase an effectiveness of dust catching a dust flow goes through the parallel blankets that moist liquid. Amovingairflowhelps to vibrate blankets due to the irregular speeds. Dustparticleslocatedinairturbulentflowarebeingmoisturized andcoagulated. Fiberismoisturizedbywatersupplytopipe frame where the blankets are fixed.

Toachievearequiredeffectivenessofdustcatchingitisnecessarytoconductmultipletestresearchesinvarious modeparameters, aswellasperform newdesignstudiesforforminganaerodynamicstructureofairdustflow.

Thereisadustsuppressionmethodbased on enriched water steam. Withasteamcondensatethe area of low pressure is formed where all particles move and could be caught. The disadvantage of such method is its low effectiveness that is caused by unreasonable use of generated steam for the purposes of dust suppression. Besides, toachievearequirednormofdust content large steam resources are required, and that result in unreasonable costs for steam generation.

Similarmethodtotheabove-mentionedmethodisamethod(articleNo.130461), whereairdustflowismixedwithsteamspraywithfurthersettlingofsteam-dustflow by the sprayed water.

Under such process it is expected to obtain a low degree of dust catching. Condensateeffectwillbeshowninunstableway, takesprobabilistic nature depending on random contact of water sprayed drops with water steam molecules and will be determined by turbulence degree of airdust flow. Dust coagulation effectivenessis expected as minor in conditions of enriching air dust flow by steam. Thatiswhywater steam and sprayed water are used unreasonably, and there is increased consumption of steam and water.

Whenstudyingamovementofaerosolparticles in the steam diffusion field it was evident that the aerosol particles are intensively remote from a cold surface. Aerosolswithspeed 1 m/swere put though the condenser of 0,5 m long and 5x10-3m wide. Metalwalliswashedbywaterwithtemperatureatcondenserinlet20°Cand outlet about minus 70°C. Particle concentration was 1012 particles/m³. Catchingdegreevariedinlargelimits75-95%. Mechanismofthedustsuppressionprocessisbasedontwoprinciples: I) condensateenlargementofaerosolparticleslikecondensation nucleus; 2) directed movement of steam particles mainly towards a cold surface.

Mechanismofthedustsuppressionprocessisverycomplicated, thoughthemainactingfactorscould be indicated suchasStefanflowof condensed steam as a driving force of aerosol particles. Alsoitisenforcedbytheavailablediffusion, thermophoreticforcesandconvective flows, large particles are removed from flow due to the gravitation and centrifugal forces; some particles in air steam flow are minimized because of coagulation process.

Studyofthemechanismofdustsuppressioninthesteamdiffusionfieldrequiresfurther development, in particular it is related to enhancement of the steam condensation process, steadiness of liquid film distribution, development of new devices for feeding air dust flow by the enriched steam.

Someenhancement of the dust suppression processes could be achieved by additional power sources /article No.1032197, 1983/. Itissuggestedtochargewatersteamanddispersedwateroppositely, whereas water should be previously magnetized. Steam is injected to a tank with hot mass, which goes through the electric field formed at the steam nozzle outlet. Steam-air-dust flow leaving a tank is condensed at sprayed drops of electrically charged and magnetized water.

Undertheweightsteamconsumptionequalto7x10-3 kg/f and over, a relative air dust content reaches up to 3-6% and becomes self-simulated in relation to steam consumption. Theincreaseofprocesseffectivenessinthedescribedcondensate system of dust suppression occurs 1,5-2 times (probably in relation to condensate system without electric charge of steam, water and magnetization of water). Alsoitisunclearhowit impactsupon theprocessof water magnetization, and what contribution of electric charge separately for steam and water is.

Thereachedeffectisexplainedbythefactthatwhenoppositely electrically charged sprays of water and steam are injected to thedust source due to electric gravity forces between steam molecules and water drops it leads to more enhanced and ordered steam condensation at water drops. Atcondensatesurfacealargerhydrodynamic flotation occurs rather than at non-charged aerosols, which directs to drops that collects dust particles and tends to their catch by drops. Duetothatamassivedustparticlesaresettled. Capture rate of dust particles by water drops also is increased due to minimizing forces of surface tension of electrically charged drops.

Thedescribedmethodofdustsuppressionhasanadditionaleffectonsettlingdustparticles. However, itisachievedbyhugeeffortsasitrequirestheelectricchargeofsteam, water, watermagnetizationthatsignificantlycomplicatesa condensate system of dust suppression, and extra costs for establishing electric fields and ensuring electrical safety of manpower.

Therefore, furthertheoreticalandexperimentalstudiesofthedustsuppressionprocessesshouldbeaimed at new design solutions that are based on the reviewed methods using evaporator-condensing multiphase systems of dust collection and surface-active agents.

Basically, intermsoftheexistingtypesoffoamgeneratingagentswecouldhopeforthe newaerodynamicdiagramsandstructures, which will determine a behavior of dust suppression process, significantly increasing a cleanup degree of dust flow, and become reliable and easy to fabricate and operate and meet safety requirements whilst operating the equipment [8-13].

Figure 1 demonstrates a new class of nozzle-free foam generator with foam generating capillary porous structure.

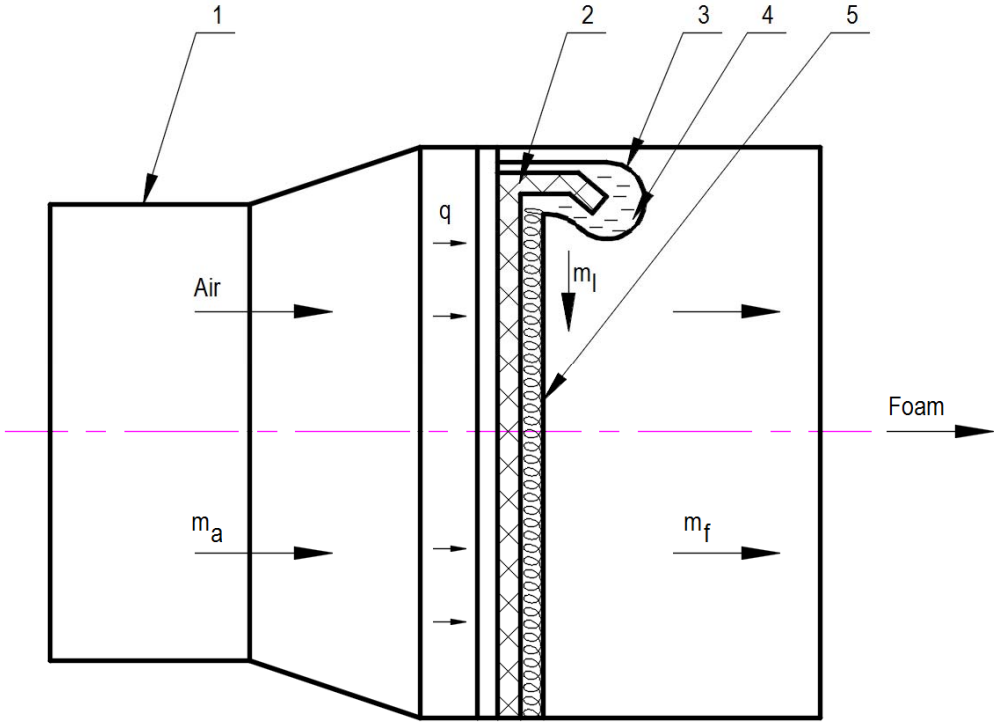

Figure 1 – Nozzle-free capillary porous foam generator of air (steam) mechanical foam:
1 – cylindrical case; 2 – capillary porous structure; 3 – spray device (feeding artery); 4 – foam generatingsolution;
5 – air (steam) – mechanical foam; ma, ml, ms – consumption of air (steam), liquid (foam generating solution), foam;
q – incoming (foam generating) flow energy density.

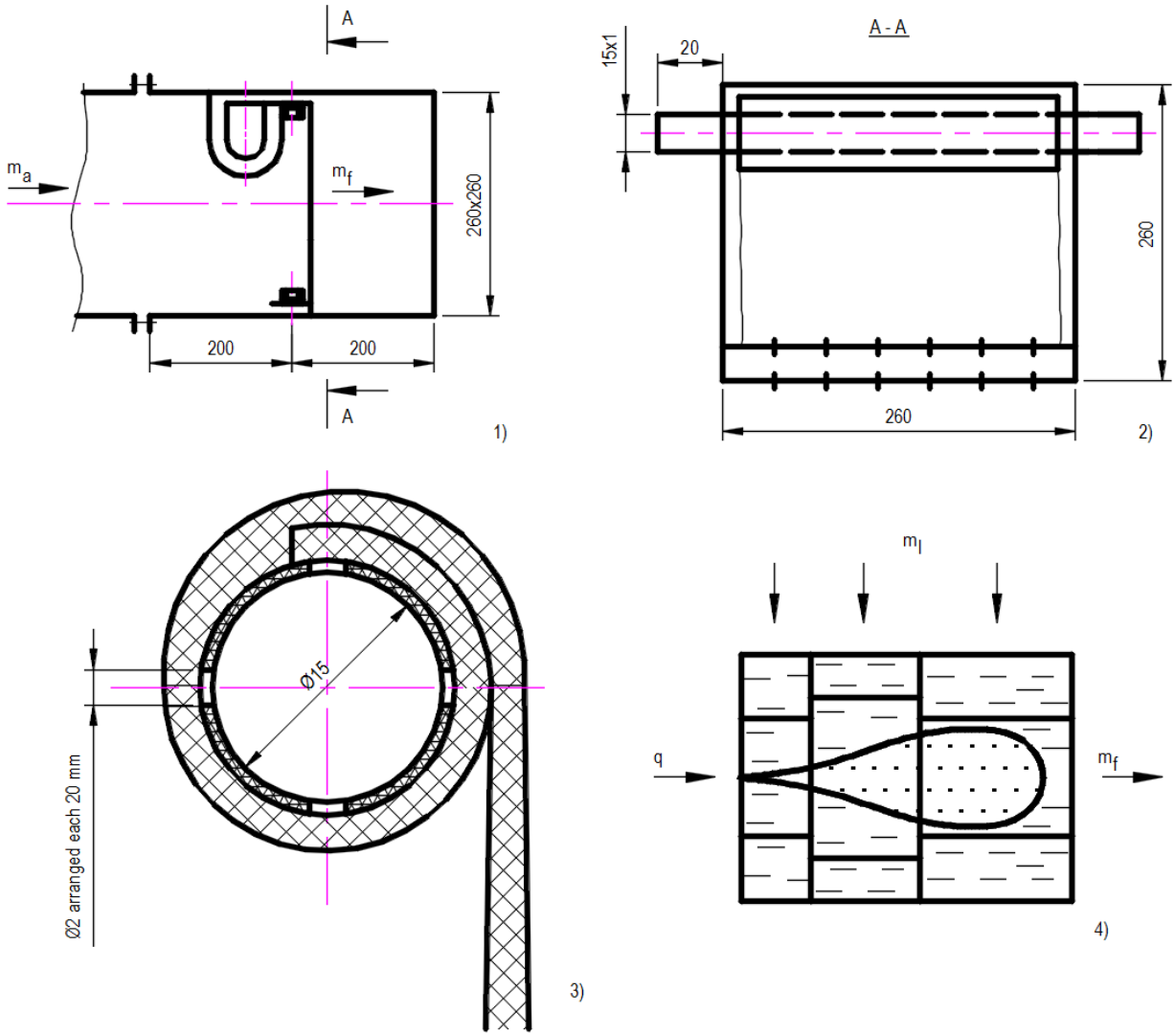

Figure 2 – Test facility for research of foam generation process:
1 – Foam generator; 2 – spray device; 3 – connection of capillary porous structure; 4 – bubble dynamics in structure

Figure 2 demonstratesatestfacilityforresearchofair (steam) generation processes - mechanical foam.

Combineduseofmassandcapillaryforcesensuresformationofuniformandstablefilmfordistributionofthefoamgenerationsolutionthroughoutallcapillary porous structure 3x0,4 (three layers of grid where cell width in light is $0{,}4 \cdot 10^{-3}$ m). Thisallowstoincreaseoperational mode of foam generator up to 1,5-2 times, reduce consumption of foam forming agent whilst retaining foam stability, dispersion and high expansion rate.

Valueofhydraulicresistancewillbea few times less because of nozzle unavailability rather than in foam generators GVPV-400 or PGG-4.

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А. А. Генбач[1], К. К. Шоколаков[2]

[1]Алматы энергетика және байланыс университеті, Алматы, Қазақстан,
[2]«Қазақ Мұнай және Газ Институты» АҚ, Алматы, Қазақстан

АУА (БУ) – МЕХАНИКАЛЫҚ КӨПІРІКТІҢ БҮРІККІШСІЗ БОРҚЫЛДАҚ КӨПІРІК ГЕНЕРАТОРЫН ЭКСПЕРИМЕНТАЛДЫ ОРНАТУДЫ ӘЗІРЛЕУ

Аннотация. Таза сұйықтықтарды қайнатумен және қабатты-белсенді заттарды қосумен жылу-салмақ алмастырғыш үдерісті зерттеу негізінде ауа (бу) – механикалық көпірікті бүріккішсіз капиллярлы-борқылдақ көпірік генераторларының жаңа класы әзірленді. Эксперимент нәтижелерін жылыну мен масса тасымалының критикалық теңдеулеріне көбік, поролон жасау, псевдоожолдау және қайнау процестеріне қатысты ±20% дәлдікпен қорытылады. Капиллярлы-бұрқылдақ құрылымдар үшін 3х0,4 түріндегі капиллярлы және салмақты бірыңғай әрекеттер көпірік генераторының жұмыс режимін 1,5-2 есе тездетуге, көпірік қалыптастырушының шығындарын қысқартуға және гидравликалық қақтығысты он есе азайтуға мүмкіндік берді.

Түйін сөздер: борқылдақ көпірік генераторы, көпірік генерациясы, жылу салмақ алмастырғыш, капиллярля-борқылдақ құрылымдар.

А. А. Генбач[1], К. К. Шоколаков[2]

[1]Доктор технических наук, профессор, кафедра «Тепловые энергетические установки»,
Алматинский университет энергетики и связи, Алматы, Казахстан,
[2]докторант Алматинского университета энергетики и связи, специальность «Теплоэнергетика», кафедра «Тепловые энергетические установки», инженер-проектировщик АО «Казахский институт нефти и газа», Алматы, Казахстан

РАЗРАБОТКА ЭКСПЕРИМЕНТАЛЬНОЙ УСТАНОВКИ БЕЗФОРСУНОЧНОГО ПОРИСТОГО ПЕНОГЕНЕРАТОРА ВОЗДУШНО (ПАРО) – МЕХАНИЧЕСКОЙ ПЕНЫ

Аннотация. На основе исследований процессов тепло-массообмена кипением чистых, жидкостей и с добавкой поверхностно-активных веществ разработан новый класс безфорсуночных капиллярно-пористых пеногенераторов воздушно (паро) – механической пены. Результаты эксперимента обобщаются критериальными уравнениями тепло- и массообмена с точностью ±20% применительно к процессам барботажа, пеногенерации, пвсевдоожижения и кипения. Совместное действие капиллярных и массовых сил для капиллярно-пористых структур вида 3х0,4 позволило форсировать в 1,5-2 раза режим работы пеногенератора, сократить расход пенообразователя и в десятки раз уменьшить гидравлическое сопротивление.

Ключевые слова: пористый пеногенератор, пеногенерация, тепломассообмен, капиллярно-пористые структуры.

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A. B. Baeshov[1], E. Zh. Tuleshova[2], A. K. Baeshova[3]

[1]Institute of Fuel, Catalysis and Electrochemistry named after D. V. Sokolsky, Almaty, Kazakhstan,
[2]Kh. A. Yassavi Kazakh-Turkish University, Turkestan, Kazakhstan,
[3]Al-Farabi National University, Almaty, Kazakhstan.
E-mail: elmira.tuleshova@ayu.edu.kz

ELECTROCHEMICAL BEHAVIOR OF SILVER IN ACID SOLUTIONS OF POLARIZATION BY UNSYMMETRICAL CURRENT

Abstract. In the scientific work, the effect of the magnitude of the current amplitude of the anodic and cathodic half-cycles on the current yield and the dissolution rate of silver during polarization by nonstationary currents in solutions of sulfuric and hydrochloric acids are considered. In this study, the current density in the cathode half-period was maintained at a constant value of 1000 A/sq.m, and in the anode half-cycle the current density varied from 0 to 1000 A/sq.m and vice versa. A special installation was used to convert the alternating current, which consists of an alternating current source, two diodes D1 and D2, one of which is connected in the transmission mode, and the other in the locking, two variable resistors R1 and R2, to control the magnitude of the cathode and anode half- R3 constant resistance, two ammeters A1 and A2, to control the current in the process of electrolysis in the cathodic and anodic half-cycle, electrolytic cell and oscillograph. The electrodes were silver and graphite plates. It has been established that in solutions of acids with the increase of size of amplitude of anodic semiperiod current output and speed of dissolution rise, and with the increase of size of cathode current there is a decline current output and speeds of dissolution of silver.

Key words: electrochemistry, electrolysis, not symmetric current, polarization, electrochemical dissolution, closeness of current.

Silver (from all metals) possesses the highest heat and electrical conduction and is widely used in electronics and electrical equipment. Alloyed by refractory metal, for example tungsten, silver is the ideal material for manufacture of high-voltage switches and electric interrupters. Silver contacts in sensor switches became as indispensable accessory of computer keypads, control panel of microwave ovens, call keys of elevators, etc. Electrical circuits in the microprocessor chips used in micro calculators, electrical instruments, automobiles, etc. are represented by conductors from alloys of silver and palladium.

Silver-oxide and galvanic cells (on the basis of silver oxide) have twice the high electrical capacity, than lead (acid) elements of the same size, therefore, all of them are more often used as in accumulators to aerospace technique and underwater fleet where is given pride of place to decreasing of mass of equipment, and in miniature batteries for watches and calculators [1, 2].

Metal silver serves for manufacture of high-quality optical mirrors by thermal evaporation. In the food industry, silver apparatus are used in which fruit juice and other drinks are prepared. It is known about the row of pharmaceutical preparations in medicine containing colloidal silver [3-5].

Silver alloys are widely applied to manufacture of coins, tooth seals, bridges and artificial limbs, tableware, in refrigerating chemical industry. Thus, processes of oxidation, restoration with an involvement of silver and its connections and also responses of its ionization in different water solutions is of a certain theoretical and practical interest.

Rapid development of the exact sciences in the modern world leads to origin of new methods of the research. Recently in electrochemical researches, special attention is paid to the processes proceeding with an electrode involvement by superimposed a. c. technique [6-12].

Use of the nonstationary mode of electrolyzing expands the possibilities of a research of the mechanism of the cathode and anode processes, opens essentially new opportunities of using them for the solution of different technological questions.

In the works [13-17] are provided this to polarization of a silver electrode by an industrial alternating current with a frequency of 50 Hz. It was set that in sulfate solution silver is dissolved with a high efficiency in case of low current densities, and in solution of hydrochloric acid the efficiency of dilution of silver makes only 10,4%.

It is necessary to mark that the detail researches carried out by us on a silver electrode and other researchers studying titanium, chrome, molybdenum, lead, etc. in case of polarization by an alternating current of industrial frequency, showed that the electrode processes proceeding with an electrode involvement by superimposed a. c. technique, sharply differ both on the mechanism, and according to the quantitative characteristics [18, 19]. In this regard we assumed that on results of the electrolyzing which is carried out under the influence of an alternating current, the considerable impact is exerted by change of the direction of currents, i.e. the electrode stays alternately in the cathode, in an anode half-cycle therefore it is possible that it undergoes certain structural changes. In order to make sure the researches of polarization by asymmetrical currents were carried out by us.

The purpose of this work was the study of electrochemical behavior of silver in case of polarization by asymmetrical current. Change of a ratio of values of amplitudes of anode and cathode half-cycles of an alternating current gives the chance to set dependence of efficiency of dilution of silver from a share of current of one of half-cycles by constant value of values of current of other half-cycle.

The experiments of polarization by asymmetrical and pulse currents in 0,5 M solutions of sulfuric and hydrochloric acids were carried out for a study of influence of values of anode and cathode half-cycles on dilution of silver. For transforming of an alternating current the special installation offered in the work was used [20].

The experiments were made in the 50 ml electrolyser without division of electrode spaces. Silver and graphite plates were served as electrodes. The efficiency of dilution of metal was calculated on an anode half-cycle of an alternating current on change of weight of a silver electrode.

Then the influence of a ratio of values of amplitudes of currents of anode and cathode half-cycles of an industrial alternating current with a frequency of 50 Hz was probed by us.

The influence of value of amplitude of current of an anode half-cycle on efficiency and the speed of dilution of silver is considered in case of polarization by nonstationary currents in solutions of sulfuric and hydrochloric acids. In this research the value of a current density in the cathode half-cycle was maintained constant, equal 1000 A/sq.m, and the current density in an anode half-cycle was changed in the range from 0 to 1000 A/sq.m. With increase in value of amplitude of an anode half-cycle the efficiency of dilution of silver begins to increase in sulfate solution and in case of ratio i_a/i_k = 0,6 reaches 2,2%. In case of further increase in value of current of an anode half-cycle the efficiency and the speed of dilution of silver are decreased, and in case of a symmetric alternating current the efficiency will be equal to 0,4% (figure 1). From this discussion, it is explained by increase in a share of response of formation of oxygen.

With increase in value of amplitude of an anode half-cycle the efficiency on dilution of silver grows in solution of hydrochloric acid and in case of ratio i_a/i_k = 1 reaches 3% (figure 2). As we would expect, with increase in value of amplitude of an anode half-cycle the efficiency and the speed of dilution are increased to values, i.e. to a ratio of values of anode and cathode half-cycles to equal unit, i.e. responding to a symmetric alternating current.

The study results of ratios influence of magnitude relation of amplitude of the cathode and anode half-cycle currents on the efficiency and speed of dilution of silver in case of polarization by nonstationary alternating currents in solutions of sulfuric and hydrochloric acids were presented respectively in figures 3 and 4.

The current density in the cathode half-cycle was changed from 0 to 1000 A/sq.m, supporting the current density in an anode half-cycle, being equal to 1000 A/sq.m.

At the same time the efficiency of metal dilution, with increasing in a current density in the cathode half-cycle, is gradually decreased. If in case of an anode pulse current, the efficiency of dilution was equaled to 26%, then upon step-by-step transition to a symmetric alternating current, i.e. in case of $i_к/i_a$ = 1 is decreased, reaching 0.4% in solution of sulfuric acid.

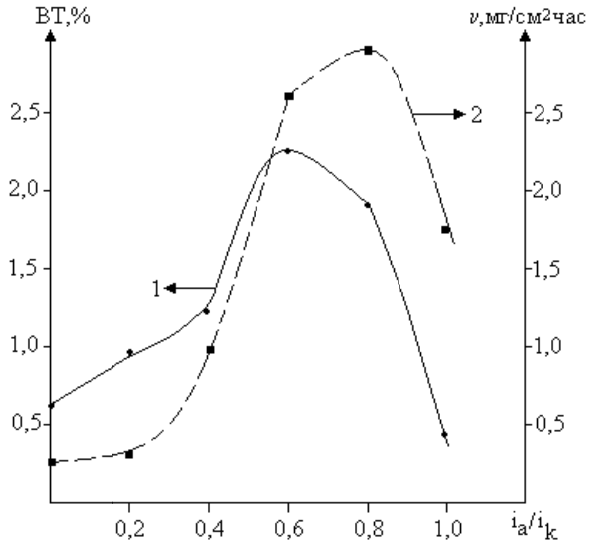

Figure 1 – Influence of correlations of sizes of amplitudes anodic and cathode semiperiods (i_a/i_k) on CO of dissolution of silver in a 0.5 M solution of sulphuric acid: $i_к$=1000 A/sq.m, τ=0.25 hour, t=25 ^{0}C

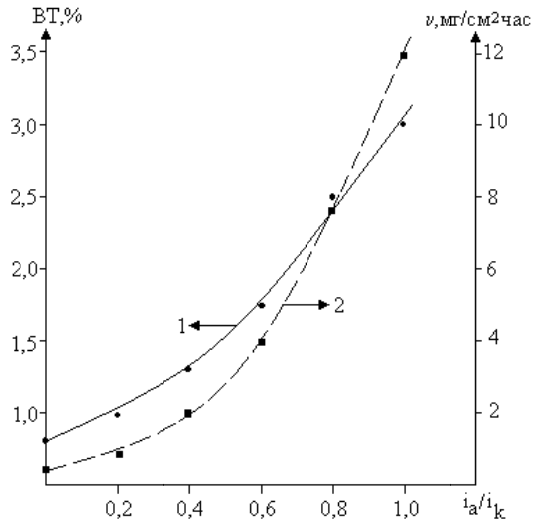

Figure 2 – Influence of correlations of sizes of amplitudes anodic and cathode semiperiods (i_a/i_k) on CO of dissolution of silver in a 0.5 M solution of hydrochloric acid: $i_к$=1000 A/sq.m, τ=0.25 hour, t=25 ^{0}C

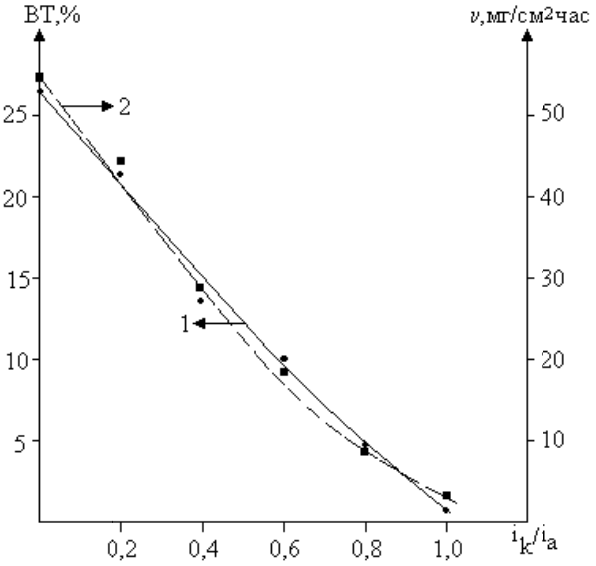

Figure 3 – Influence of correlations of sizes of amplitudes cathode and anodic semiperiods (i_k/i_a) on CO of dissolution of silver in a 0.5 M solution of sulphuric acid: $i_к$=1000 A/sq.m, τ=0.25 hour, t=25 ^{0}C

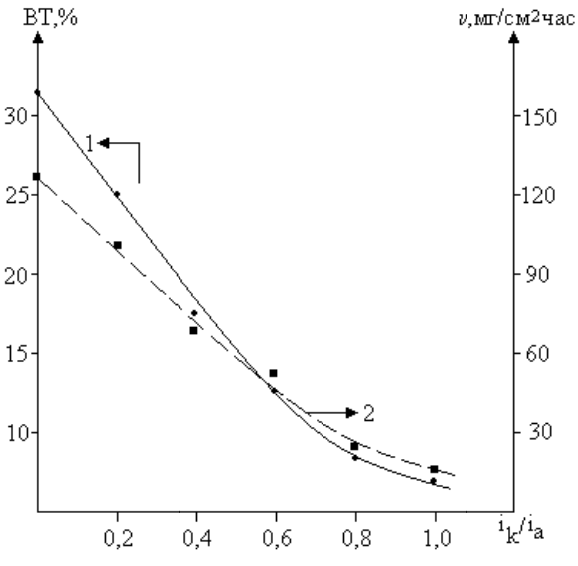

Figure 4 – Influence of correlations of sizes of amplitudes anodic and cathode semiperiods (i_k/i_a) on CO of dissolution of silver in a 0.5 M solution of hydrochloric acid: $i_к$=1000 A/sq.m, τ=0.25 hour, t=25 ^{0}C

The similar course of curve dependence the efficiency – i_k/i_a clearly is shown in solution salt acids. Here it is also possible to control the lowering of the efficiency and speed of dilution of silver with increase in value of the cathode current. That seemed to be connected to the fact that with increase in value of current in the cathode half-cycle the speed of the reverse restoration of the formed ions, oxides, sulfates or chlorides of silver in an anode half-cycle is increased.

Thus, the electrochemical oxidation of silver in case of polarization by asymmetrical and pulse currents was explored by us for the first time and it was defined that the magnitude relation of amplitude of the cathode and anode half-cycles has a great impact to the efficiency and silver dilution speed.

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А. Б. Баешов[1], Э. Ж. Тулешова[2], А. К. Баешова[3]

[1] «Д. В. Сокольский атындағы жанармай, катализ және электрохимия институты» АҚ,
Алматы, Қазақстан,
[2] Қожа Ахмет Ясауи атындағы Халықаралық қазақ-түрік университеті, Түркістан, Қазақстан,
[3]Аль-Фараби атындағы Қазақ ұлттық университеті, Алматы, Қазақстан

ҚЫШҚЫЛ ЕРІТІНДІЛЕРІНДЕ СИММЕТРИЯЛЫ ЕМЕС ТОКПЕН ПОЛЯРИЗАЦИЯЛАҒАНДА КҮМІСТІҢ ЭЛЕКТРОХИМИЯЛЫҚ ҚАСИЕТІ

Аннотация. Ғылыми жұмыста стационарлы емес токпен поляризациялағанда күкірт және тұз қышқылдарының ерітінділерінде анодты және катодты жартылай периодтарындағы ток амплитудасының шамасының күмістің еруінің ток бойынша шығымына және еру жылдамдығына әсері қарастырылды. Бұл зерттеуде катодты жартылай периодта ток тығыздығының шамасы тұрақты 1000 А/м^2, ал анодты жартылай

периодта ток тығыздығы 0-ден 1000 А/м^2 аралығында өзгертіліп тұрды. Айнымалы токты түрлендіру үшін арнайы қондырғы пайдаланылды, ол айнымалы ток көзінен, екі диодтардан Д1 және Д2, катодты және анодты жартылай периодтардағы токтың мәнін реттеу үшін екі айнымалы резисторлар R1 және R2, R3 тұрақты кедергі, анодты және катодты жартылай периодтардағы ток күшін бақылау үшін екі амперметр А1 және А2, электролиттік ұяшықтан және осциллографтан тұрады. Электродтар ретінде күміс және графит пластинкалары қолданылды.

Қышқыл ерітінділерінде анодты жартылай периодтың шамасының артуымен күмістің еру жылдамдығы және ток бойынша шығымы жоғарылайды, катодты жартылай периодтың шамасы артуымен күмістің еруінің ТШ және еру жылдамдығы төмендейтіні анықталды.

Түйін сөздер: электрохимия, электролиз, симметриялы емес ток, поляризация, электрохимиялық еру, ток тығыздығы.

А. Б. Баешов[1], Э. Ж. Тулешова[2], А. К. Баешова[3]

[1]АО «Институт горючего, катализа и электрохимии им. Д. В. Сокольского», Алматы, Казахстан,
[2]Международный казахско-турецкий университет им. Ходжи Ахмеда Ясави, Туркестан, Казахстан,
[3]Казахский национальный университет им. аль-Фараби, Алматы, Казахстан

ЭЛЕКТРОХИМИЧЕСКОЕ ПОВЕДЕНИЕ СЕРЕБРА В КИСЛЫХ РАСТВОРАХ ПРИ ПОЛЯРИЗАЦИИ НЕСИММЕТРИЧНЫМ ТОКОМ

Аннотация. В научной работе рассмотрены влияние величины амплитуды тока анодного и катодного полупериодов на выход по току и скорость растворения серебра при поляризации нестационарными токами в растворах серной и соляной кислот. В данном исследовании величина плотности тока в катодном полупериоде поддерживалась постоянная, равная 1000 А/м^2, а в анодном полупериоде плотность тока менялась в интервале от 0 до 1000 А/м^2 и наоборот. Для преобразования переменного тока использовалась специальная установка, которая состоит из источника переменного тока, двух диодов $Д_1$ и $Д_2$, один из которых подключен в пропускающем режиме, а другой - в запирающем, двух переменных резисторов R_1 и R_2, для регулирования величины токов катодного и анодного полупериодов, R_3 постоянное сопротивление, два амперметра A_1 и A_2, для контролирования силы тока в процессе электролиза в катодном и анодном полупериоде, электролитической ячейки и осциллографа. Электродами служили серебряная и графитовая пластинки. Установлено, что в растворах кислот с увеличением величины амплитуды анодного полупериода ВТ и скорость растворения повышается, а с увеличением величины катодного тока наблюдается снижение ВТ и скорости растворения серебра.

Ключевые слова: электрохимия, электролиз, несимметричный ток, поляризация, электрохимическое растворение, плотность тока.

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A. T. Tleuberdinova[1], D. M. Salauatova[2]

[1]Karaganda State University named after academician E. A. Buketov, Kazakhstan,
[2]Karaganda Economic University Kazpotrebsoyuz, Kazakhstan.
E-mail: tat404@mail.ru, [2]Di_kz010@mail.ru

FEATURES OF ENTREPRENEURSHIP ACTIVITIES IN TOURISM

Abstract. The purpose of the work is to identify the peculiarities of entrepreneurial activity in the tourism sphere. The work is a theoretical and empirical research. The article analyzes different points of view to determining the role and importance of entrepreneurship in the sphere of tourism, their interrelations. There are given the specific characteristics of the entrepreneur of tourism and its motives.

The result of the work was the identification of the distinctive features of the tourism industry, tourism services and the nature of the demand for tourism services. Measures have been developed to take into account these features and determine their impact on the development of the tourism industry. The field of application of the research results is the activity of the subjects of the tourism industry. It is necessary to take into account specific features of the industry for successful entrepreneurship activity and increasing entrepreneurial activity in the field of tourism, which in turn should contribute to the development of the industry as a whole.

Key words: entrepreneurship activity, tourism, tourist business, features.

Modern tourist business is one of the largest and fastest growing sectors of the economy. The tourism industry plays a significant role in creating jobs, reducing unemployment. Often, the tourism industry is seen as an intermediary of economic and social changes in society. In addition, tourism is able to support a nationwide association by inflowing foreign exchange, encouraging cultural activities and traditional crafts, to have a significant impact on the survival of various service sectors.

It is believed that tourism entrepreneurship can eliminate social problems, give impetus to the country's development and budget replenishment, which leads to GDP growth. Thus, according to a study by the World Travel & Tourism Council (WTTC), the total contribution of tourism to the world gross domestic product in 2016 amounted to 7,613.3 billion US dollars, which corresponds to 10.2% GDP. According to forecasts, by 2027 this indicator will grow by 3.9% per annum and amount to 11 512.9 billion US dollars (11.4% of GDP). In addition, in 2016, the tourism industry involved 108,741,000 jobs, which accounted for 3.6% of total world employment. According to the agency's experts, by 2027 the indicator is expected to grow to 138 086 000 jobs (4.0% of total employment) [1].

The constant change in tourist motives and preferences, the constant nature of the development of tourist destinations, the increase in demand for new tourist products and services, the growth in the number of new tourists and, finally, the intensification of competition contribute to the development of tourism entrepreneurship [2]. The main components of the success and development of the tourism industry, both globally and regionally, are entrepreneurship and innovation [3]. According to many scientists, the tourism, hospitality and leisure industry is primarily based on entrepreneurship [4-7], and tourism entrepreneurship is one way of providing strategic support to stabilize business development [8].

Tourist entrepreneurship is defined as activities related to the creation and operation of a legal tourism enterprise operating on the basis of obtaining material benefits through the satisfaction of tourists' needs [9]. Modern entrepreneurship in tourism has many different forms from traditional enterprises to innovative small and medium-sized enterprises offering local gastronomic tourism, rural adventure tourism, sustainable regional ecotourism packages, event tourism and festivals, authentic and ethnic

family restaurants, family pensions, "Bed and breakfast", economy-class hotels, boutique hotels, home-made rooms, local gift shops, car rental companies, agricultural farms, attractions and retail outlets, designed to meet the specific needs of different types of tourists [10, 11].

Historically, individual examples of tourism entrepreneurship have been observed mainly in a small family business [12], but over the last decade, entrepreneurship has become a common practice not only for global tourism networks, but also for small and medium-sized enterprises (SMEs). Since SMEs predominate in the tourism industry, working mainly on the basis of family enterprises and not demonstrating such entrepreneurial characteristics as are characteristic of large corporations, it is very important to distinguish between corporate entrepreneurship and SME entrepreneurship [13, 14]. As a rule, corporate entrepreneurship proceeds from a systematically developed plan known as Corporate Entrepreneurial Strategy (CES), which is not characteristic of SMEs. In attracting capital, hiring employees, finding markets, obtaining support for business, small businesses rely heavily on social and family networks [15].

In addition, entrepreneurship is common among SMEs specializing in ethnic niche tourism in rural areas, where local cultural factors are an indispensable condition for success. Entrepreneurship is important in the early stages of the development of regional urban tourism in cases where global hotel chains and international franchises do not seek to invest in destinations [16].

Entrepreneurship plays an important role in the realization of recreational opportunities. Entrepreneurship is seen as an important factor in the development of tourism, both regionally and globally. S. Khanka defines entrepreneurship in the sphere of tourism as a person or group of persons who produce and manage tourism products [17]. Tourist entrepreneurship is recognized as the main way of providing strategic support for business development, especially in rural areas. K. Koch and T. Halten identified the importance of entrepreneurs in the development of tourism, arguing that the birth of a tourist business is not an act of nature, but is an act of a tourist entrepreneur. They note that the environment, reliefs, flora and fauna, historical artifacts and hangars of cultural heritage become tourist resources only when there are entrepreneurs who can transform them into tourist attractions and destinations [18].

In the first published works devoted to the analysis of models of the formation of destinations, there was an underestimation of the historically important role of the entrepreneur in the development of tourism. In particular, V. Kristallers defined their role only in the development of infrastructure [19]. The published works of D. Miozeks and D. Lundgren mainly concerned the role of accessibility and transport, geographic location and physical attributes [20, 21]. In accordance with the R. Butler model of the "life cycle of tourist zones" (TALC), the role of local entrepreneurs is defined only in the development of tourist services, facilities, promotional activities in the early stages of development [22]. R. Tinsley and P. Lynch consider the TALC system as static, without a dynamic element, which does not take into account important non-material elements [23]. These omissions were also noted by G. Khovinen, who recognized the diminution of the importance of entrepreneurial activity, as a potential incentive for changes in tourism [24]. Similarly, T. Koles, who criticizes the existing models, considered the person as a passive subject [25].

Such criticisms can also be applied to the models of I.Gormsens and S.Keller, emphasizing, first of all, the importance of control by local authorities [26, 27]. Two models that give some idea of how local entrepreneurs influence are D. Lewis and D. Ritchie-G. Crow. D. Lewis defined entrepreneurs as triggers of change in the dynamic role of power [28]. The model of D. Ritchie and G. Crowe provides a more dynamic understanding of the fact that entrepreneurs and small enterprises play a significant role in creating competitive advantages, explaining that "... they are of fundamental importance for the development of tourism as an industry", contribute to the development and competitiveness of destinations through their strategies, intercompany competition and cooperation. In their view, competition between small enterprises in destination places creates an environment for excellence, while interdependence between firms encourages inter-firm cooperation [29].

Later, in the wider literature, the influence of entrepreneurship became more obvious. Authors such as A. Shapero and D. Pierce assumed that entrepreneurship provides communities with diversity and dynamism that ensure continuous development, and its influence can go beyond a single project and stimulate others [30, 31]. S. Britton believes that the construction of only one hotel in the locality can provoke further development of the tourist sphere, as it signals confidence in destination and pushes for further construction [32]. Z. Mottiar and H. Tucker emphasized the growing number of studies demon-

strating how small tourist firms can have a significant impact on the development and functioning of destinations [33]. They provide a platform that makes the region accessible and attractive. The idea of entrepreneurs influencing development that goes beyond their own individual contribution can be fundamental to understanding the extent of their impact on the development of tourism.

In recent years, the topic of the role of entrepreneurship in tourism has received more attention. Even in those areas that are advantageously provided with resources, it is doubtful the development of the tourism industry without the influence of entrepreneurs. R. Russell admits that "modern tourism is formed by innovation, talent and vision of entrepreneurs", and L. Lee, that "the hospitality and tourism industry has become a fertile field of business" [35]. A number of researchers point out that a certain range of "key entrepreneurs is crucial for tourism and community development" [36].

In comparison with the entrepreneurial process in other industries, tourist entrepreneurs have a certain feature: they are very motivated by their lifestyle and non-economic incentives [37, 38]. Research in the field of entrepreneurship in the field of tourism shows that for entrepreneurs of the tourism sector, characteristic features of entrepreneurs working in other sectors are characteristic: riskiness, financial independence, strategic vision, innovation, customer orientation and the desire for adaptation [39]. But entrepreneurs in the sphere of tourism and hospitality are different from other entrepreneurs in such matters as the possession of special PR methods, marketing and communication skills [40], and also orientation toward high quality of services [41]. Therefore, innovative managerial and marketing abilities and excellent communication skills of entrepreneurs have a huge positive impact on the successful application of entrepreneurial processes [42].

Figure 1 shows the differences in the motives of tourist entrepreneurs, since their motives are more associated with achieving a higher standard of living than simply maximizing profits.

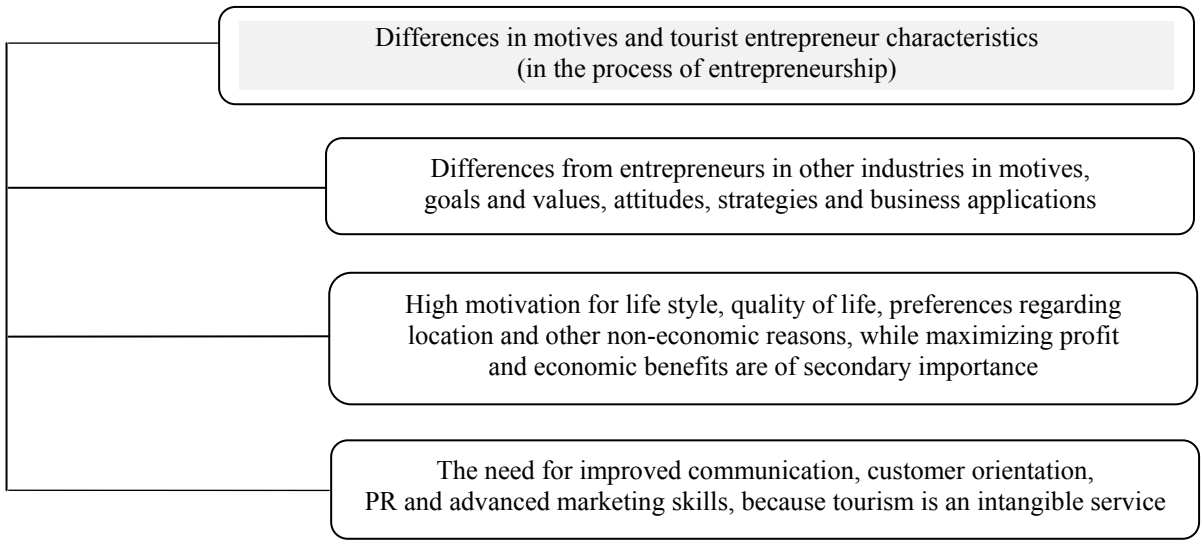

Figure 1 – Differences of motives and tourist entrepreneur characteristics.
Source: [49-51]

Tourism provides good opportunities for the formation of values for entrepreneurs where they were not previously [43]. It is considered as one of the ways to overcome barriers to regional development, due to the growth of market demand, by attracting tourists [44]. Despite the fact that economic development is the main point in the planning of the community, recently the so-called "triple line" of economic, environmental and social development is becoming popular [45]. For local communities, these development paths will always have a strong exogenous influence.

The goal of any country regions is to make the best use of tourism-related opportunities without being excessively dependent on the sector, because excessive dependence exposes the local economy to acute exogenous pressure through demand fluctuations [46-48]. Regions should activate their positive local social capital and connect the goals of economic development with other goals of the community, the main driving resource of which is entrepreneurship.

The business process brings many positive results not only to individuals and companies, but also provides a significant contribution of tourism to the development of the regions.

The inextricable link between tourism and regional development, both at the local and national levels, is the subject of many studies [52-54]. D. Saarinen associated with the regional development of Northern Europe, the following three factors: the EU policy, focused on the future; a growing trend towards natural tourism and a real or perceived lack of alternatives to tourism. Tourism remains "an important policy tool devoted to changes, reconstruction of the social and physical environment" [55]. The growing awareness of the economic role of tourism has made it a socio-political problem, even if the economic contribution is distributed unevenly. A number of studies on tourism focus on areas where tourist enterprises are based on cluster theory [56-58].

However, the reality is that not everywhere the development of tourism is associated with the overall strategy of the country's development. Most often this involves a number of common problems that have a decisive impact on the formation and survival of small businesses. D. Muller lists a number of common problems that usually affect tourism development initiatives:

- Lack of local control over decision-making. Communities are trying to focus on endogenous growth in order to reduce dependence on external actors;
- Weak domestic economic ties and information flows, which makes individual economic development more tied to the center or other regions and does not encourage local cooperation;
- Geographic distance from markets and poor infrastructure - a growing issue of concern for tourism;
- Growing societies with a decline in population;
- Lack of innovation and human capital, which reduces the possible positive changes [59].

The specificity of the tourism industry has a significant impact on the characteristics of entrepreneurial activity and determines the features of its measurement methods, analysis of economic influence on the development of the industry (figure 2).

First and foremost, the feature of the tourism sector is determined by a wide range of activities of related industries: transport (airlines, railways, taxis and buses, car rental, shipping lines), accommodation (hotels, motels, guest houses, apartments and villas, campsites, condominium deposits, tourist caravans), food industry (restaurants, cafes, bars, snack bars, canteens, catering), entertainment industry (natural and cultural attractions, theme parks, museums, national parks, wildlife parks, o objects of heritage, entertainment, events); trade, sector of the organization of tours (tour operators, travel agents, incentive travel organizers, tourist associations, etc.), consumer services, communications, etc. Therefore, often the tourist product is called amalgam, i.e. a mixture of everything that the tourist receives and uses in destinations, which can be compiled by any entrepreneur engaged in tourism [60-62].

The productivity of one subsector influences the profitability of other sectors, different suppliers always win, combining their efforts, therefore in the field of tourism, a good interconnection between entrepreneurs is very important. Tourist entrepreneurs should form stable relations with relevant stakeholders, contributing to the increase of business activity. Many researchers determine that the tourist entrepreneur is engaged in the proactive creation, development and maintenance of perfect, interactive and profitable exchanges with selected clients and partners, based on six components: trust; integration; communication; common values; empathy and reciprocity [63].

The co-operative and complementary nature of travel agencies develops through their own needs and community values. This interaction strengthens their specialization, improves their market potential and creates opportunities for others. This microcluster approach is designed to stimulate new growth at a level understood and controlled by the local community. A. Morrison defined such interconnection as interorganizational learning and the exchange of knowledge with a sense of community and purposeful cohesion. The main element of these communities is that they were historically formed as a result of various socio-political and economic interactions between the participants in an effort to maintain the competitive advantage of the appointment [64].

Another economic feature of tourism is the predominance of small and medium-sized enterprises (SMEs) in the tourism industry. V. Middleton, who called them "microenterprises", lists a number of their economic advantages and shortcomings:

- Money received by microenterprises, as a rule, remains in the local community and is part of the structure of the local money circulation cycle;

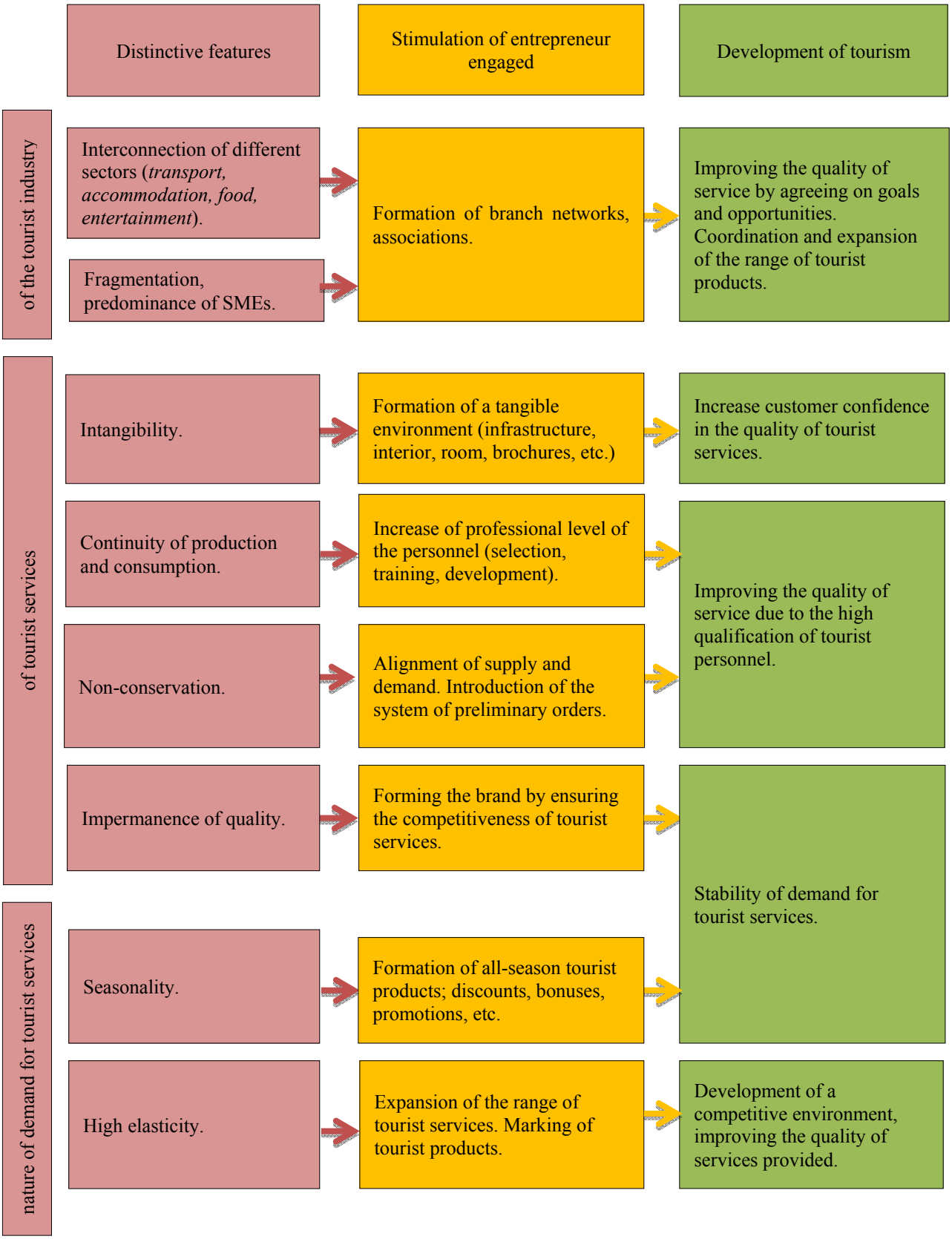

Figure 2 – Features of entrepreneurship activities in tourism.
Note: prepared by the authors

- They are a vital element in creating jobs in rural areas and less developed regions in general;
- They are not characterized by commercial substantiation dominating on the large enterprises
- Microenterprises are unique and cannot be standardized, which makes them amorphous and complex to define them as a single sector [65].

A high proportion of SMEs is due to rapid changes in industry trends, tourist behavior and preferences. In addition, the motives, goals values, attitudes, strategies and requirements for success for tourism entrepreneurs vary. Nevertheless, tourist entrepreneurs seem to be highly motivated by lifestyle, preferences for location and other non-economic motives that are not common for entrepreneurs in general; whose main motive is profit maximization and financial independence.

Tourism is the service industry, which is characterized by all the services. First, all tourist services are intangible, and from the point of view of international trade and balance of payments, incoming and outgoing tourism are accordingly invisible exports and imports. In essence, when acquiring a tourist service, the client gets the right to use it at a certain time in a certain place. About the service before its use, the client can judge only by tangible characteristics that can reduce uncertainty. For example, the quality of tourism services can be judged on various grounds: infrastructure, advertising materials, design and interior, professionalism of employees, formed image, etc. For tourism enterprises, the company's positive image and brand awareness are one of the ways to materialize tourism services.

Their production and consumption takes place at the producer's location, and not at the tourist's residence. The quality and performance of the service is determined by the attitude of the staff. Therefore, for the tourist, employees of suppliers of tourist enterprises who are in constant verbal contact with consumers are an integral aspect of the tourist product. The customer does not just consume the service; he connects to its production. Participation of the buyer in the service sector means that the manufacturer must take care of what he produces and how. The behavior of the manufacturer of the tourist service, his professional experience and knowledge during the consumption of the customer services determine the probability of its recurrence.

The third feature of tourist products is non-conservation. Unlike physical goods, it is impossible to save unsold hotel numbers, tickets for tickets, entertainment sessions, etc. for a specific date. The supply in tourism is inflexible: all hotels with a fixed number of rooms, transport operators, service and food operators – with a fixed number of seats. Therefore, entrepreneurial activity in these areas requires more intensive control of supply and demand, management of profitability, since seasonality causes the growth of fixed costs, and the capacities not used on a certain day are lost and cannot be restored. In this case, it is necessary to maintain the supply-demand ratio by differentiating prices, discounts, developing new tourist products and other incentive measures.

Variability in the quality of tourist services is determined by internal and external factors. Internal factors depend on the people who provide services. External factors include weather conditions during the tour, unexpected flight delays, and the like. It is necessary to comply with service standards and develop their own policy of monitoring the quality of customer service; the development of the brand by ensuring the competitiveness of tourist services. The nature of the demand for tourist services also has its own characteristics. It is seasonality and high elasticity.

Seasonality of demand for tourism products is closely related to the non-conservation of tourism services, uneven time allocation. This phenomenon differs between countries, between destinations. So, if for Turkey the tourist season lasts 9 months, then for individual regions of Kazakhstan - a maximum of six weeks. The main factors that determine the seasonal peaks are the climate, the period of vacation of residents of countries and school holidays.

The seasonal pattern of demand affects the level of employment in the tourism sector, congestion of the tourist infrastructure, growth in operating costs, rise in prices, decline in the quality of service during the peak season and, as a result, dissatisfaction of the tourist. This creates certain difficulties for the implementation of entrepreneurial activities.

To smooth out seasonal fluctuations in demand, it is recommended to apply methods of sales promotion: the provision of discounts and bonuses for a certain volume of purchases and its regularity; preliminary conclusion of contracts with tourist companies on more favorable terms; reduction in the price of policies in months with reduced demand; sale of services on credit; development and presentation of new service portfolios.

Since the second half of the 20th century, tourism has become one of the most significant and fast-growing sectors of the world economy, which greatly facilitates the search for target segments and positioning of own tourist services. In addition, a characteristic feature of the world tourism market is the demand for new directions, which further motivates entrepreneurship in developing destinations, to which Kazakhstan also belongs.

Relatively high growth rates of demand for tourism are partly the result of high elasticity of income of international arrivals and departures. According to I. Smeral, the demand for tourism shows a high degree of sensitivity to changes in incomes, and the demand for tourism is sensitive to price fluctuations [66]. As the tourist business is characterized by high competition, the coefficients of price elasticity have a negative sign. High elasticity of demand for tourist services demonstrates the dependence of consumption of tourist services on consumer income and tourist product prices. Expansion of the range of tourist services will make it possible for consumers to make a choice based on their income.

In addition, experts note the relatively low investment costs of the tourism sector, since the investments per employed person are relatively low. In addition, natural attractions have free access, or require only a small investment for inclusion in the tourist product. Most cultural attractions, not built for tourist purposes, only later become tourist attractions. It can be said that such facilities as airports, aircraft, highways, railways, cruise ships, cruise terminals, hydraulic structures and cable railways require high investment costs, but most of them are designed not only to serve the tourist sector, but also other activities of the national economy.

In many developing countries, tourism is a gateway to "entrepreneurship", and this is considered one of the positive aspects of tourism in the development process of many countries and regions [67, 68].

Thus, for successful entrepreneurial activity and increasing entrepreneurial activity in the sphere of tourism, it is necessary to take into account the specific features of the industry in order to ensure business success, which in turn should contribute to the development of the industry as a whole.

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А. Т. Тлеубердинова[1], Д. М. Салауатова[2]

[1]Академик Е. А. Бөкетов атындағы Қарағанды мемлекеттік университеті, Қарағанды, Қазақстан,
[2]Қазтұтынуодағы Қарағанды экономикалық университеті, Қарағанды, Қазақстан

ТУРИЗМДЕГІ КӘСІПКЕРЛІК ҚЫЗМЕТТІҢ ЕРЕКШЕЛІКТЕРІ

Аннотация. Жұмыстың мақсаты туристік саладағы кәсіпкерлік қызметтің ерекшеліктерін анықтау болып табылады. Баяндама теориялық-эмпирикалық зерттеу болып табылады. Мақалада туризм саласында кәсіпкерліктің рөлі мен маңыздылығын, олардың өзара қарым-қатынасын анықтау мақсатында түрлі көзқарастар талданады. Туризм саласындағы кәсіпкердің ерекшеліктері мен оның уәждемелері анықталды.

Жұмыстың нәтижесі туристік саланың, туристік қызметтердің, туристік қызметтерге сұраныстың сипатының айрықша ерекшеліктерін анықтау болды. Осы ерекшеліктерді есепке алу шаралары әзірленіп, олардың туристік саланың дамуына әсері анықталды. Зерттеу нәтижелерін қолдану саласы туристік индустрия субъектілерінің қызметі болып табылады. Табысты кәсіпкерлік қызмет және туризм саласындағы кәсіпкерлік белсенділікті арттыру мақсатында саланың ерекшеліктерін ескеру қажет, бұл өз кезегінде саланы дамытуға ықпал етуі тиіс.

Түйін сөздер: кәсіпкерлік қызмет, туризм, туристік кәсіпкерлік, ерекшеліктер.

А. Т. Тлеубердинова[1], Д. М. Салауатова[2]

[1]Карагандинский государственный университет им. академика Е. А. Букетова, Казахстан,
[2]Карагандинский экономический университет Казпотребсоюза, Казахстан

ОСОБЕННОСТИ ПРЕДПРИНИМАТЕЛЬСКОЙ ДЕЯТЕЛЬНОСТИ В ТУРИЗМЕ

Аннотация. Цель работы – выявить особенности предпринимательской деятельности в туристской сфере. Работа представляет собой теоретико-эмпирическое исследование. В статье проанализированы различные точки зрения к определению роли и значения предпринимательства в сфере туризма, их взаимосвязи. Приведены отличительные характеристики предпринимателя сферы туризма и его мотивов.

Результатом работы стало определение отличительных особенностей туристкой отрасли, туристских услуг и характера спроса на туристские услуги. Разработаны мероприятия по учету этих особенностей и определено их влияние на развитие туристской отрасли. Областью применения результатов исследования является деятельность субъектов туристской индустрии. Для успешной предпринимательской деятельности и повышения предпринимательской активности в сфере туризма необходимо учитывать специфические особенности отрасли, что в свою очередь должно способствовать развитию отрасли в целом.

Ключевые слова: предпринимательская деятельность, туризм, туристское предпринимательство, особенности.

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Aigul Mamyrbekova[1], A. B. Bayeshov[2], M. K. Kasymova[3], Aizhan Mamyrbekova[1]

[1]A. Yasawi International kazakh-turkish university, Turkestan, Kazakhstan,
[2]D. V. Sokolsky institute of fuel, catalysis and electrochemistry, Almaty, Kazakhstan,
[3]M. Auezov South Kazakhstan state university, Shymkent, Kazakhstan.
E-mail: aigul_akm@mail.ru

ELECTROCHEMICAL PROPERTIES OF SULFUR IN ALKALINE SOLUTIONS

Abstract. The kinetics and mechanism of the electrode oxidation-reduction of sulfur on an electrically conductive sulfur-graphite electrode in an alkaline solution was studied by the potentiodynamic method. To examine the mechanism of electrode processes occurring during AC polarization on a sulfur-graphite electrode, the anode-cathode and cathode-anode cyclic polarization and anode polarization curves were recorded. An analysis of the results and calculated kinetic parameters of electrode processes showed that discharge ionization of sulfur in alkaline solutions occurs as a sequence of two stages and is a quasireversible process. Final influence on speed of process in whole renders velosity of the stage of oxidation sulphur to sulfite ions, being slower and having, possibly, mixed nature of the control. In the field of potentials between the cathodic reduction of sulphur and its anodic dissolution, sulphur-graphite electrode is stable in alkaline solutions investigated and it can occur oxidation and reduction processes involving sulphur-containing ions.

Key words: sulphur, sulphur-graphite electrode, electrooxidation-reduction, kinetic parameters, electrodissolution.

Introduction. The isolation of sulfur compounds from natural gas, oil, and coke-chemical raw materials and their utilization is becoming an increasingly important problem. The deteriorating environmental situation resulting from the harmful impact of sulfur-containing waste in chemical and oil-refining industries is alleviated by recycling these wastes. Therefore, the search for various approaches to solving the problems of rational use of oil and gas desulfurization products is a challenge. A comprehensive study of elemental sulfur and its compounds is needed for solving these problems.

It is necessary to study the electrochemical properties of sulfur and its various compounds to explain its behavior in the development of new technological processes.

The laws governing the electrochemical behavior of metals in an aqueous medium were considered in many publications. The electrochemical behavior of nonmetals, in particular, sulfur, which is a poor conductor, was much less studied, despite the great potential of this study. To develop and improve the electrochemical technologies based on the electrolysis of sulfur-containing materials, information is required on the behavior of elemental sulfur in the electrochemical dissolution of electrodes containing sulfur or its alloys with various metals.

The mechanism of the electrochemical oxidation reduction of sulfur and its oxygen-containing compounds in aqueous solutions is of interest from the theoretical and practical viewpoints. Only a few studies are available that deal with the electrochemical behavior of elemental sulfur in aqueous solutions. The Russian scientists studied the anode behavior of sulfur in alkaline solutions on platinum, cobalt, and molybdenum [1]. The behavior of sulfur in aprotic solvents in dimethylsulfoxide, tetrahydrofuran, and dimethylformamide on gold, platinum, and graphite electrodes and in melts was investigated in [2-4]. The Japanese scientists studied the kinetics of oxidation of suspended copper sulfidecoated particles of elemental sulfur in acid and alkaline ammonia solutions [5]. The oxidation of disperse sulfur was studied on platinum, nickel, and stainless steel electrodes [6]. According to [6], the oxidation potential of powdered sulfur depends on the substrate material.

It was noted that the oxygen over potential in the presence of sulfur increases and shifts toward higher positive values compared with the supporting solution.

This effect was explained by partial passivation of the anode surface and adsorption of sulfur atoms on the electrode surface. The mechanism of the electrochemical reduction of elemental sulfur on mercury in a dissolved state was des-cribed in [7, 8]. An analysis of the literature data showed that sulfur exhibits elect-rochemical activity and is reduced and oxidized to various products in definite media on electrodes depending on the electrode material. However, there were no systematic studies on the electrochemical behavior of sulfur in aqueous solutions. Therefore, it was of interest to study the electrochemical behavior of sulfur.

The goal of the present study was to investigate the kinetic regularities of the electrode processes of sulfur electrooxidation and electroreduction in alkaline solutions and to examine the mechanism of the electrode processes by recording the potentiodynamic polarization curves.

Methods. The kinetic regularities of the anode electrochemical oxidation of sulfur in alkaline solutions were studied by recording the potentiodynamic polarization curves. The polarization measurements were performed with the aid of an SVA-1BM potentiostat using a YaES-2 three-electrode thermostatted glass cell. The cell was thermostatted with an ITZh-0-03 thermostat. The current–potential curves were recorded with an H301/1 flatbed XY recorder at a scan rate of 10-100 mV/s. The working electrode was a specially manufactured sulfur-graphite electrode (S = 0,04 cm^2) [9].

A silver chloride electrode was used as a reference electrode, and a platinum electrode was an auxiliary electrode. All the values of the working electrode potential are given here relative to the silver chloride electrode (E^o = +0,203 V).

The behavior of the sulfur-graphite electrode was studied in potassium hydroxide solutions in the concentration range 0,5–5,0 M at solution temperatures of 20–70^{o}C and potential scan rates of 10–100 mV/s.

Results and discussions. The anode-cathode and cathode-anode cyclic polarization curves were recorded to clarify the mechanism of electrode processes occurring on a sulfur electrode of special design.

When the sulfur-graphite electrode was polarized, the cathode-anode cyclic did not show any appreciable sulfur reduction current when the potential shifted to the cathode region, but the near-electrode space was colored yellow, which is the characteristic color of polysulfide ions. This process can be described by the following equation:

$$nS^o + 2e^- \rightarrow S_n^{2-}\ E^o = -0,5\ V \quad (1)$$

The results of kinetic studies suggest that the redox reactions of polysulfide ions with different compositions will form the same final products (sulfide ions) and be completed to the same extent. The conversion of the polysulfide ion into the sulfide ion can be represented as

$$S_n^{2-} + 2\ (n-1)e^- \rightarrow nS^{2-} \quad (2)$$

When the potential shifts from cathode to anode region, the polarogram shows two waves with current peaks: one distinct peak at a potential of –0,25 V and the other at +1,25 V. Based on the standard redox potentials, it can be assumed that during the anode scan, the first current maximum corresponds to the oxidation of polysulfide ions to elemental sulfur, and the second to the oxidation of freshly formed sulfur to sulfite ions by the following reactions:

$$S_n^{2-} - 2e^- \rightarrow nS^o\ E^o = -0,5\ B \quad (3)$$

$$S^o + 6OH^- - 4e^- \rightarrow SO_3^{2-} + 3H_2O\ E^o = -\ 0,657\ B \quad (4)$$

The formation of sulfite ions is indicated by the results of the chemical analysis of the electrolysis products obtained after the anode polarization of the sulfurgraphite electrode. As can be seen, the oxidation of freshly formed sulfur to sulfite ions proceeds with high overvoltage. In addition, in the presence of the sulfite ion, the oxygen release potential on the electrode shifts toward higher positive values. Figure 1 shows the anode behavior of the sulfurgraphite electrode after preliminary cathode polarization at a potential of –1.75 V at different concentrations. The reaction order for the formation of sulfur and sulfite ions was determined from the log*i*–log*C*con dependence: 0.41 and 0.44, respectively; these values are typical for complex electrochemical reactions occurring via the intermediate stages. The log *i*–log *C*con dependence is presented in figure 2. The linear increase in the reaction rate at increasing

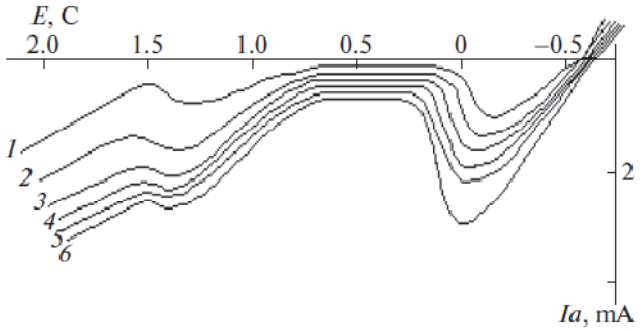

Figure 1 – Anode polarization curves of the sulfur-graphite electrode as a function of KOH concentration (ν =10 mV/s, t = 20°C): (1) 0,5, (2) 1,0, (3) 2,0, (4) 3,0, (5) 4,0, and (6) 5,0 M

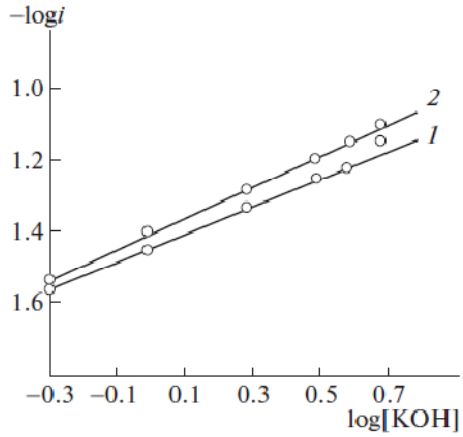

Figure 2 – Logarithmic dependences of the current maxima of oxidation of (1) polysulfide ions and (2) sulfur on the electrolyte concentration

alkali concentration suggests that the oxidation of the polysulfide ions and sulfur involves the hydroxyl ion. The rate of dissolution of elemental sulfur in alkaline solutions increases with the temperature and concentration of solutions. The sulfite ions are mainly formed by sulfur oxidation, but some of them also form due to sulfur disproportionation in an alkaline medium according to the equation:

$$(2n+1)S + 6OH^- \Leftrightarrow 2S_n^{2-} + SO_3^{2-} + 3H_2O \quad (5)$$

To examine the anode polarization of the sulfurgraphite electrode, we also studied the temperature effect. The form of the voltammograms is similar to that of the polarization curves obtained in the study of the electrolyte concentration effect. At 20–70°C, all the polarograms show two oxidation waves in the form of clear-cut current maxima corresponding to the oxidation of polysulfide ions and sulfur. The limiting current is proportional to the electrolyte temperature. The potentiodynamic curves were also recorded on a sulfur electrode in a 1 M potassium hydroxide solution at different potential scan rates (figure 3). A study of the effect of the potential scan rate in the range 5–100 mV/s showed that the height

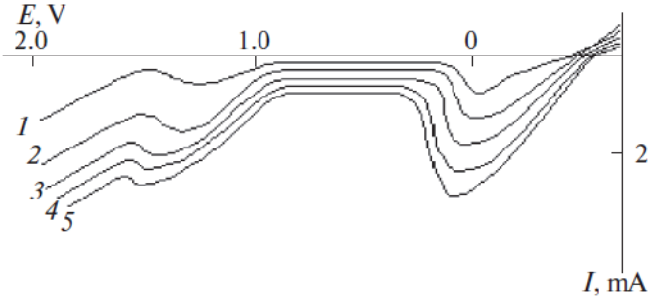

Figure 3 – Anode polarization curves of the preliminarily cathode-polarized sulfur-graphite electrode as a function of the potential scan rate: (1) 5, (2) 10, (3) 20, (4) 50, and (5) 100 mV/s; C_{KOH} = 2 M, t = 20°C

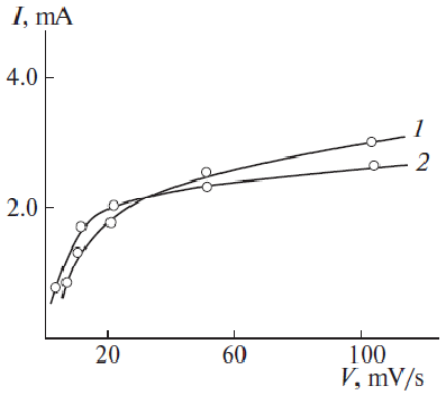

Figure 4 – Dependences of the current maxima of oxidation of (1) polysulfide ions and (2) sulfur on the potential scan rate

of the maxima of the oxi-dation current of polysulfide ions and sulfur increases with the potential scan rate. The dependences of both peak currents corresponding to the oxidation of polysulfides and the resulting sulfur on the potential scan rate are nonlinear (figure 4). The electrode processes are probably controlled simultaneously by the electron transfer kinetics and the diffusion rate [10].

The following kinetic parameters were determined by processing the polarization curves for characterization of the mechanism of sulfur electrooxidation reduction: charge transfer coefficients (α), diffusion coefficients (D), heterogeneous rate constants of the electrode process (k_s), and effective activation energies of the process (Ea).

For stage 1, $S_n^{2-} - 2e^- \rightarrow nS^o$: α_1=0,059; D = 1,03$\cdot 10^{-4}$ cm^2/s; k_s = 3,3$\cdot 10^{-3}$ см/s; E_a= 11,45 kJ/mol.

For stage 2, $S^o + 6OH^- - 4e^- \rightarrow SO_3^{2-} + 3H_2O$: α_2=0,049; D = 0,7$\cdot 10^{-4}$ cm^2/s; k_s = 6,8$\cdot 10^{-4}$ см/s; E_a= 9,33 kJ/mol.

An increase in the temperature from 20 to 70^{o}C caused a slight decrease in α_1 from 0.059 to the values characteristic of irreversible processes (0.045) for the oxidation stage of polysulfide ions. For the second stage of sulfur oxidation to the sulfite ions at the same temperatures, the α_2 values also show that the process is irreversible (0.049–0.034). The low values of the α_2 transfer coefficients of sulfur oxidation to the sulfite ions suggest that the second stage of electron transfer is much slower; i.e., the inhibition evidently occurs at the electrochemical stage.

The heterogeneous rate constant of the first stage of oxidation of polysulfide ions is an order of magnitude higher than that of the second stage. The low k_S values of the second stage suggest that this is the slowest stage of the overall electrode process. According to the Matsuda and Ayabe criteria, an analysis of the rate constants of the electrode oxidation of polysulfide ions and elemental sulfur shows that the processes on the sulfur-graphite electrode are quasi-reversible. For the first stage of the process, the effective activation energy Ea calculated from the temperature kinetic dependences in the temperature range 20–70 ^{o}C is 11,45 kJ/mol; for the second stage, there was an insignificant decrease in the activation energy to 9,33 kJ/mol. The obtained activation energies indicate that the electrochemical processes are diffusioncontrolled.

Thus, comparing the results of polarization studies with the available literature data on the electrochemical behavior of sulfur and its compounds, we can propose the following scheme of processes on the sulfurgraphite electrode.

At negative potentials in the cathode region of polarization, sulfur is reduced to polysulfides of varied composition by reaction (1). The results of the kinetic studies suggest that the redox reactions of different polysulfide ions form the same end products (sulfide ions) and occur with the same degree of completeness.

When the potential shifts to the anode region, the polysulfide ions are oxidized to elemental sulfur at potentials from –0.5 to 0 V according to reaction (3), and the limiting current is determined by the rate of diffusion of polysulfide ions to the electrode surface.

The second current maximum at potentials from +1.15 to +1.25 V is related to the oxidation of sulfur to sulfite ions by reaction (4). The rate of oxidation of elemental sulfur in the alkaline solutions increases

both with the temperature and concentration of potassium hydroxide solutions. Although the content of sulfite ions in solution is mainly determined by the primary oxidation of elemental sulfur, some of them are also formed due to sulfur disproportionation in the alkaline medium by the equation (6).

$$(2n+1)S + 6OH^- \Leftrightarrow 2S_n^{2-} + SO_3^{2-} + 3H_2O \quad (6)$$

The temperature studies show that an increase in the temperature leads to an increase in the electrodissolution rate of sulfur. An analysis of the results and the calculated kinetic parameters of the electrode processes showed that the discharge ionization of sulfur in alkaline solutions occurs in two successive stages and is quasi-reversible. The rate of the process mainly depends on the rate of the stage of sulfur oxidation to sulfite ions, which is slower and probably has a mixed nature of control.

Conclusion. Thus, the electrooxidation-reduction mechanism of sulfur on the electrode was determined and the kinetic parameters of sulfur electrooxidation were evaluated from the potentiodynamic polarization curves. In the range of potentials between the cathodic reduction of sulfur and its anodic dissolution, the sulfur- graphite electrode is stable in the alkaline solutions under study, and redox processes involving sulfur containing ions can occur on it.

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Айгуль Мамырбекова[1], А. Б. Баешов[2], М. К. Касымова[3], Айжан Мамырбекова[1]

[1]Қ. А. Ясауи атындағы Халықаралық қазақ-түрік университеті, Түркістан, Қазақстан,
[2]Д. В. Сокольский атындағы жанармай, катализ және электрохимия институты, Алматы, Қазақстан,
[3]М. Әуезов атындағы Оңтүстік Қазақстан мемлекеттік университеті, Шымкент, Қазақстан

СІЛТІ ЕРІТІНДІЛЕРДЕ КҮКІРТТІҢ ЭЛЕКТРОХИМИЯЛЫҚ ҚАСИЕТТЕРІ

Аннотация. Жұмыста потенциодинамикалық әдіспен сілтілік ортада электрөткізгіш күкірт-графитті электродында жүретін күкірттің тотығу-тотықсыздану электродты процестерінің кинетикасы мен механизмі зерттелген. Күкірт-графитті электродында айнымалы токпен поляризациялау кезінде жүретін электродты процестердің механизмін зерттеу үшін анод-катодты және катод-анодты циклді поляризациялық қисықтар, сонымен қатар анодты поляризациялық қисықтар түсірілген. Алынған нәтижелер мен электродты процестердің есептелген кинетикалық параметрлердің талдауы бойынша сілтілік ортада күкірттің иондануы екі саты бойынша және квазиқайтымды болып табылатындығы анықталды. Процестің жылдамдығына күкірттің сульфит-иондарға дейін тотығу сатысының жылдамдығы аса маңызды әсерін көрсетеді, бұл сатысы едәуір баяу жүреді және аралас табиғатқа ие. Күкірттің катодты тотықсыздану және онын анодты еру процестерінің потенциалдар аймағында күкірт-графитті электрод зерттелген сілті ерітінділерде тұрақты болып келетіндігі және оның бетінде құрамында күкірті бар иондарының қатысында тотығу-тотықсыздану процестерінің жүру мүмкіндігі анықталды.

Түйін сөздер: күкірт, күкірт-графитті электрод, электрототығу-тотықсыздану, кинетикалық параметрлері, электрохимиялық еру.

Айгуль Мамырбекова[1], А. Б. Баешов[2], М. К. Касымова[3], Айжан Мамырбекова[1]

[1]Международный казахско-турецкий университет им. Х. А. Ясави, Туркестан, Казахстан,
[2]Институт топлива, катализа и электрохимии им. Д. В. Сокольского, Алматы,
[3]Южно-Казахстанский государственный университет им. М. Ауэзова, Шымкент

ЭЛЕКТРОХИМИЧЕСКИЕ СВОЙСТВА СЕРЫ В ЩЕЛОЧНЫХ РАСТВОРАХ

Аннотация. В работе исследованы кинетика и механизм электродных процессов окисления-восстановления серы, протекающих на электропроводном серо-графитовом электроде в щелочной среде потенциодинамическим методом. Для выяснения механизма электродных процессов, протекающих при поляризации переменным током на серо-графитовом электроде, были сняты анодно-катодные и катодно-анодные циклические поляризационные кривые, а также анодные поляризационные кривые. Анализ полученных результатов и рассчитанных кинетических параметров электродных процессов показал, что разряд-ионизация серы в щелочных растворах протекает в две последовательные стадии и является квазиобратимым процессом. Решающее влияние на скорость процесса в целом оказывает скорость стадии окисления серы до сульфит-ионов, являясь более медленной и имеющей, вероятно, смешанную природу контроля. В области потенциалов между катодным восстановлением серы и ее анодным растворением, серо-графитовый электрод является устойчивым в исследованных растворах щелочи и на нем могут протекать окислительно-восстановительные процессы с участием серосодержащих ионов.

Ключевые слова: сера, серо-графитовый электрод, электроокисление-восстановление, кинетические параметры, электрорастворение.

Сведения об авторах:

Мамырбекова Айгуль Кумекбаевна – к.х.н., доцент, Международный казахско-турецкий университет им. Х. А. Ясави, медицинский факультет, кафедра лабораторных дисциплин, aigul_akm @mail.ru

Баешов Абдуали Баешович – д.х.н., профессор, Институт топлива, катализа и электрохимии им. Д. В. Сокольского, Алматы, Казахстан, aigul_akm @mail.ru

Касымова Махаббат Куандыковна – к.х.н., доцент, Южно-Казахстанский государственный университет им. М. Ауэзова, Высшая школа пищевой инженерии, кафедра пищевой инженерии, aigul_akm @mail.ru

Мамырбекова Айжан Кумекбаевна – к.х.н., доцент, Международный казахско-турецкий университет им. Х. А. Ясави, медицинский факультет, кафедра лабораторных дисциплин, aizhan_akm @mail.ru

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A. K. Saymbetov, M. K. Nurgaliyev, Ye. D. Nalibayev, G. B. Dosymbetova, M. M. Gylymzhanova, N. B. Kuttybay, Ye. A. Svanbayev

Al-Farabi Kazakh National University, Almaty, Kazakhstan.
E-mail: asaymbetov@gmail.com

DEVELOPMENT OF AUTONOMOUS PHOTOVOLTAIC SYSTEMS WITH SMALL POWER

Abstract. The development of autonomous photovoltaic systems is one of the most pressing problems in the electric power industry. One way to get cheap and affordable energy is solar energy. The structure of an autonomous photovoltaic cell, its main functional blocks, is considered in the article. The basic physical quantities concerning batteries and their connection are also considered. To construct autonomous low-power photovoltaic stations (up to 3000 W), accurate calculations are needed to identify the necessary and sufficient capacity of storage batteries, as well as the necessary power of solar cells. For this purpose, energy costs have been modeled, and calculations of the load during the day have been made in an apartment building with an average set of electrical appliances. The number of battery packs necessary for correct operation of the system was calculated. Based on the received data, calculations were made and a graph of the battery discharge at nighttime in the winter period was constructed.

Key words: solar cell, inverter, controller, capacity of accumulator, load power.

Introduction. In the world practice, two forms of power supply for objects are widely used: centralized and autonomous [1-3]. In recent years, the desire to introduce clean technologies contributes to the most active development of autonomous power supply using renewable energy sources. The use of solar energy in Kazakhstan is one of the most promising key topics of development of alternative energy.

Autonomous systems today have become an integral part of various SMART systems. To operate correctly any autonomous system requires a power source, as well as a way to communicate with the environment and a device for exchanging information with the dispatcher [4-6].

Very often there is a need to deploy a system that will be able to operate without external power supply, that is, perform certain operations in the field in the absence of a power source, being an independent source of energy for various needs of the consumer. Such autonomous systems can completely replace fuel electric generators.

As a power source for low-power and flexible autonomous systems are photoelectric converters or solar cells [7-10]. The constant increase in the cost of fossil energy resources and the associated incidental environmental problems increase the interest in alternative, renewable energy sources, of which solar power and solar photo batteries in particular occupy an important place. The efficiency of solar batteries is determined by their efficiency (Efficiency), maintenance costs and the cost of batteries. Data on the cost can be found from a specific manufacturer, and in many respects this factor is determined by the technology of manufacturing the battery.

Another important problem is the accumulation of energy generated by solar panels. To date, there are a lot of different batteries with different parameters, the choice of which depends on what we will be feeding, what load to use, and for how long this load will function.

Structure of the autonomous photovoltaic system. When you design photovoltaic systems, the first step is to determine the level of load power, the number of consumers and the schedule of their operation. Then, depending on what kind of load is required, a selection of solar cells and batteries is made. Depending on the capacity and the nominal voltage, the battery charge controller is selected.

The market of solar batteries is constantly replenished with new models with different capacities. When you choose solar cells, remember that the output power of the solar array should be at least 1.5 times higher than the power of the connected load to provide power in the winter months or in cloudy weather. When you calculate the capacity of the battery pack, remember that manufacturers recommend not to discharge batteries below 70% of its capacity to extend the service life. The required capacity of the battery pack is calculated by the formula (1):

$$C_N = \frac{100}{S_r}\frac{P_L}{U_N}\Delta t_{nt} \quad (1)$$

where S_r is the degree of battery rarefaction, P_L is the maximum load power, U_N is the nominal voltage of the battery, and Δt_{nt} is the duration of the night time. Then in order to find the number of batteries necessary to power the system, you should divide the received capacity by the nominal capacity of the battery, expressed in Ah (ampere hours).

$$N = \frac{C_N}{C} \quad (2)$$

Where C_N is the required capacity of the battery pack, C is the capacity of one battery.

When you choosing the inverter, the most important parameter is the power it is designed for. For low-power autonomous systems with a power of up to 1500 W, high-frequency inverters are sufficient, which have a relatively low weight. For higher powers, low-frequency inverters should be selected. Some inverters have a built-in battery charge controller. The most common battery charge controllers are the controllers that monitor the maximum power point (MPPT – maximum power point tracker). Such controllers constantly monitor the current and voltage on the solar battery and find the optimal current-voltage pair at which the power is maximal. In the same way, the controller keeps track of which battery stage the battery is in and provides the corresponding current.

Results and discussions. To develop a photovoltaic system with a power of 1.5 kW, six solar panels with a power of 250 W each are required. The maximum voltage is 32.5 V, the current is 7.9 A (table 1).

Table 1 – Calculation of voltage and current in different commutation of solar panels

U	32,5	65	97,5	195
I	47,4	23,7	15,8	7,9
P	1540,5			

When we choose a battery, we use formula (1) and calculate the capacity of the battery pack. To do this, we need to simulate the consumption of one residential house within a day. The results are summarized in table 2. With this load, using equation (1), we can calculate the capacity of the required battery pack. So, we need 6 (equation 4) batteries with a capacity of 200 Ah (3-4).

Table 2 – Total energy consumption during one day

Consumer	Power, W	Time of work, h	Energy consumption, Wh/day
Electric kettle	1000	0.25	312.5
Microwave	1200	0.25	375
Fridge	250	24	7500
TV	150	4	750
Lighting 1	100	4	500
Lighting 2	50	2.083	130.2083
Computer	400	0.83	416.67
Modem	6	24	180
Washing machine	150	1	187.5
Total			**10991.875**

$$C_N = \frac{100}{S_r}\frac{P_L}{U_L}\Delta t_{nt} = 1204{,}76\ Ah \quad (3)$$

where S_r = 70%, P_L = 632,5 W, U_L=12 В – nominal voltage of the battery, Δt_{nt} = 16 h.

$$N = \frac{1204{,}76}{200} \approx 6 \quad (4)$$

Table 3 – Load change diagram during a day

	Electric kettle, W	Micro-wave, W	Fridge, W	TV, W	Lighting 1, W	Lighting 2, W	Computer, W	Modem, W	Washing machine, W	Load power , W	Rated load power , Wh
7:00-7:05	1250		312,5			62,5		7,5		1632,5	136,04
7:05-7:10		1500	312,5			62,5		7,5		1882,5	156,875
7:10-8:00			312,5			62,5		7,5		382,5	318,75
8:00-13:00			312,5					7,5		320	1600
13:00-13:05	1250		312,5					7,5		1570	130,83
13:05-13:10		1500	312,5			62,5		7,5		1882,5	156,875
13:10-14:00			312,5				500	7,5		820	683,33
14:00-16:00			312,5					7,5		320	640
16:00-17:00			312,5					7,5		320	960
17:00-18:00			312,5					7,5	187,5	507,5	507,5
18:00-18:05	1250		312,5			62,5		7,5		1632,5	136,042
18:05-18:10		1500	312,5			62,5		7,5		1882,5	156,875
18:10-19:00			312,5			62,5		7,5		382,5	318,75
19:00-23:00			312,5	187,5	125			7,5		632,5	2530
23:00-7:00			312,5					7,5		320	2560
Total power kWh/day+night											**10991,87**
Total power kWh/night											**7780,83**

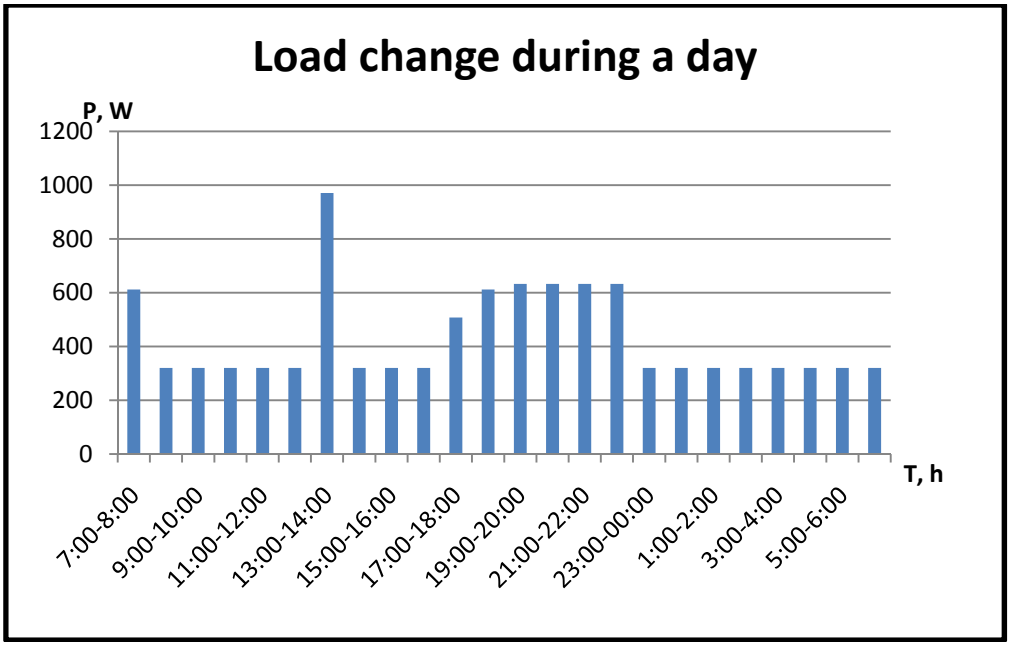

Figure 1 – Load change during a day

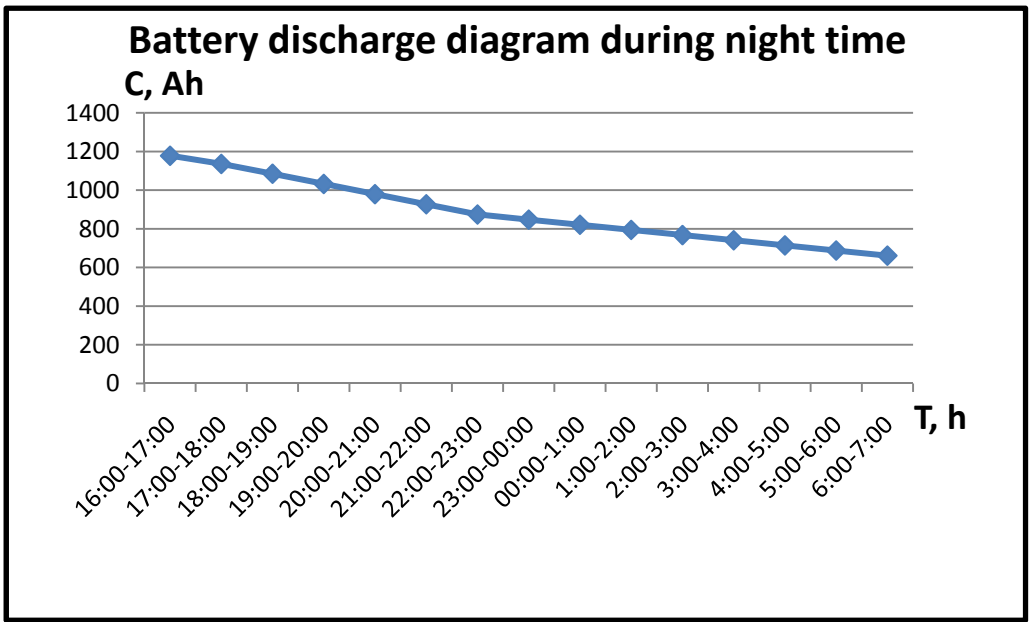

Figure 2 – Battery discharge diagram during night time

According to the schedule of load changes (table 3) per day we will construct a schedule for changing the capacity of the battery pack (figure 1, 2). The discharge of batteries starts at 16:00, which corresponds to the sunset in the winter season. With this battery operation pattern, the service life will be extended, since the design depth of the discharge is at least 54%.

Conclusion. The development of autonomous systems plays a huge role in the transition of energy to renewable sources, enables consumers to use cheap and affordable electric energy and not depend on the central power supply. Moreover, autonomous solar power stations of low power will become indispensable sources of energy for individual farms, for the development of agriculture for the supply of agricultural equipment. The results presented in the article can be used to design an autonomous solar power station with a capacity of 1.5 kW that can supply a small house with electricity.

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А. К. Саймбетов, М. К. Нұрғалиев, Е. Д. Налибаев, Г. Б. Досымбетова, М. М. Ғылымжанова, Н. Б. Құттыбай, Е. А. Сванбаев

Әл-Фараби атындағы Қазақ ұлттық университеті, Алматы, Қазақстан

АЗ ҚУАТТЫ АВТОНОМДЫ ФОТОЭЛЕКТРЛІК ЖҮЙЕНІ ДАЙЫНДАУ

Аннотация. Автономды фотоэлектрлік жүйені дайындау электроэнергетикадағы аса өзекті мәселелердің бірі болып табылады. Арзан және қолжетімді энергия көзін алу әдістерінің бірі күн энергетикасы болып табылады. Мақалада автономды фотоэлектрліктің құрылысы, оның негізгі функционалды блоктары қарастырылған. Сонымен қатар аккумуляторлық батареяларға және олардың байланысына қатысты негізгі физикалық шамалар қарастырылған. Аз қуатты (3000 Вт-қа дейін) автономды фотоэлектрлік станцияны құрастыру үшін аккумуляторлық батареялардың қажетті және жеткілікті сыйымдылығын, сонымен қатар күн батареясының қажетті қуатын анықтауға қажет нақты есептеулерді жүргізу қажет. Бұл үшін энергия шығыны үлгіленген және электр құралдарының орташа жинағы бар тұрғын үйде бір тәулік аралығында өндірілетін жүктеменің есептеулері жүргізілген. Жүйенің дұрыс жұмыс істеуіне қажет аккумуляторлық блоктардың саны есептелінген. Алынған мәліметтерге негізделе отырып, қыс мезгіліндегі түнгі уақыттағы аккумулятор зарядының бітуінің графигі құрылған және есептеулер жүргізілген.

Түйін сөздер: күн батареясы, инвертор, контроллер, аккумуляторлық батареялардың сыйымдылығы, жүктеменің қуаты.

А. К. Саймбетов, М. К. Нұрғалиев, Е. Д. Налибаев, Г. Б. Досымбетова, М. М. Ғылымжанова, Н. Б. Құттыбай, Е. А. Сванбаев

Казахский национальный университет им. аль-Фараби, Алматы, Казахстан

РАЗРАБОТКА АВТОНОМНЫХ ФОТОЭЛЕКТРИЧЕСКИХ СИСТЕМ МАЛОЙ МОЩНОСТИ

Аннотация. Разработка автономных фотоэлектрических систем является одной из наиболее актуальных проблем в электроэнергетике. Одним из способов получения дешевой и доступной энергии является солнечная энергетика. В статье рассмотрена структура автономной фотоэлектрической, ее основные функциональные блоки. Так же рассмотрены основные физические величины, касающиеся аккумуляторных батарей, и их связь. Для конструирования автономных фотоэлектрических станций малой мощности (до 3000 Вт) необходимо произвести точные расчеты для выявления необходимой и достаточной емкости аккумуляторных батарей, а также необходимой мощности солнечных батарей. Для этого смоделированы энергозатраты, и произведенырасчеты нагрузки в течение суток, производимые в жилом доме со средней комплектацией электроприборов. Было вычислено количество аккумуляторных блоков, необходимых для корректной работы системы. Основываясь на полученных данных, произведены расчеты и построен график разряда аккумуляторов в ночное время суток в зимний период.

Ключевые слова: солнечная батарея, инвертор, контроллер, емкость аккумуляторной батареи, мощность нагрузки.

Information about authors:

Saymbetov A.K. – PhD, Deputy Head of the Department of Solid State and Nonlinear Physics, Faculty of Physics and Technology, al-Farabi Kazakh National University. E-mail: asaymbetov@kaznu.kz

Nuraliyev M.K. – Master, Faculty of Physics and Technology, al-Farabi Kazakh National University. E-mail: madiyar-08@mail.ru

Nalibayev E.D. – PhD, senior lecturer, Faculty of Physics and Technology, al-Farabi Kazakh National University. E-mail: ednalibaev@gmail.com

Dosymbetova G.B. – Master, Faculty of Physics and Technology, al-Farabi Kazakh National University. E-mail: gulbakhard@gmail.com

Gylymzhanova M.M. – Master, Faculty of Physics and Technology, al-Farabi Kazakh National University. E-mail: gylymzhanova.myrzagyz@gmail.com

Kuttybay N.B. – teacher, Faculty of Physics and Technology, al-Farabi Kazakh National University. E-mail: nurjigit_10_93@mail.ru

Svanbayev E.A. – Ph.D., senior lecturer, Faculty of Physics and Technology, al-Farabi Kazakh National University. E-mail: svanbaev.eldos@gmail.com

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R. N. Nurdillayeva[1], A. B. Bayeshov[2], G. S. Serik[1]

[1]Khoja Akhmet Yassawi International Kazakh-Turkish University, Turkistan, Kazakhstan,
[2]Institute of Fuel, Catalysis and Electrochemistry named after D. V. Sokolsky, Almaty, Kazakhstan,
E-mail: raushan.nurdillayeva@ayu.edu.kz, bayeshov@mail.ru, gulzat.serik@ayu.edu.kz

THE ELABORATION OF COPPER BROMIDE SYNTHESIS BY ELECTROCHEMICAL METHOD

Abstract. The electrochemical behaviour of copper electrode was studied by anodic polarization in potassium bromide aqueous solution for the first time. To investigate the processes specificity occurring at anodic polarized copper electrode, anodic polarization curves were carried out in the potassium bromide solution. The influences of current density of copper (i_{Cu}=100-600 A/m^2) and titanium (i_{Ti}=20-120 kA/m^2) electrodes, electrolyte concentration ([KBr]=1-5 M), solution temperature (t=20-70^{0}C) and electrolysis duration (τ=0.5-1.5h) on the anodic current polarized copper electrode dissolution were investigated and optimal electrolysis conditions of copper (I) bromide formation were determined. The current efficiency of copper (I) bromide formation reached 72.1% at 200A/m^2 anodic current density in the copper electrode; this value decreased by 60% when the current density was further increased. The effect of the electrolyte concentration on copper (I) bromide formation was found to be significant. At 2 M potassium bromide solution, the current efficiency increased (~ 70%) and reached a maximal value. As a result of the further increase of the solution concentration, the current efficiency declined sharply. The research result on defining the electrolyte temperature effect on copper (I) bromide formation process during anodic polarization has shown that the current efficiency decreases due to an increase in the temperature. This can be explained by the excessive voltages reduction of oxygen gas evolution in the anode due to the increased temperature, by the increase in its proportion or by the dissolution of copper (I) bromide compounds.

Keywords: copper electrode, anodic polarization, potassium bromide, electrolyte, current efficiency.

Currently, electrochemical methods are widely used in obtaining valuable inorganic substances used in many fields of science and technology, chemical industry. A distinctive feature of this method is that it allows to obtain the valuable substances in pure form without additives and is characterized by a low flow rate of reagents. The advantages of the electrochemical method are the process simplicity, purity of the obtained products, no emission of toxic gases, electrolysis occurring at room temperature and the improvement of working conditions [1, 2].

Nowadays, various inorganic copper compounds are in high demand due to their wide usage in the modern scientific and technical spheres. For example, copper halides are a powerful oxidizer used in chemical production, especially in the synthesis of organic substances and used as a catalyst in many organic reactions [3-6].

The data provided in works [7-10] show that the copper bromide forms complex coordinate compounds with organic compounds.

Copper (I) bromide is thermally resistant light-green tetrahedron crystals. It is rapidly oxidized in the moist air, molds in the light, insoluble in cool water, ethanol and ether and decomposes in hot water. It dissolves in HCl, HBr, ammonium, ammonium salts, pyridine, concentrated chloride solutions, alkaline metals bromides and thiosulfates by forming coordinate compounds [11].

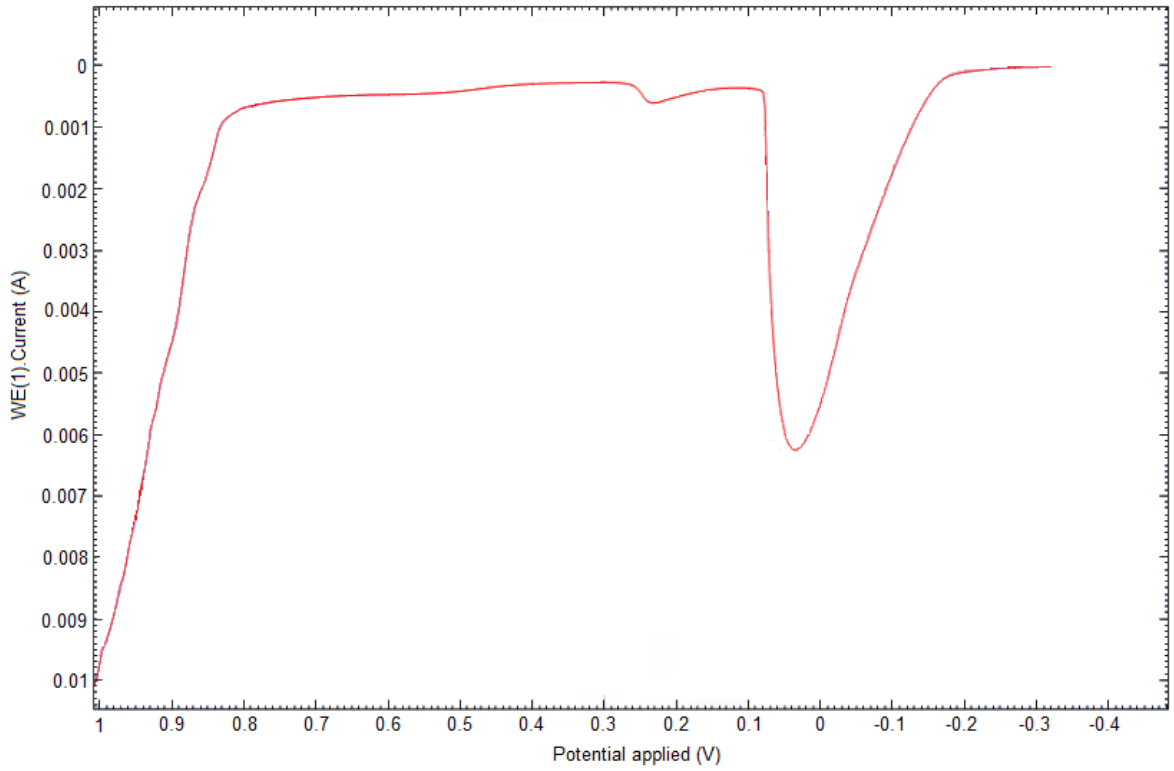
In previous studies, the electrochemical properties of copper in sulphate, chloride, iodide and acidic media were studied and the ways to obtain copper chloride, sulphate, iodide and oxide were offered and their novelty was protected by patents [12-16].

The authors [17] investigated copper dissolution in bromide medium in the absence and presence of HMTA by using Spectroelectrochemical techniques. In this work a passivant Cu/HMTA/Br^- film was observed in the presence of the inhibitor. The nature of the passivant film was confirmed by in situ surface-enhanced Raman scattering (SERS) and SEM/EDX measurements. However, in this work the method of copper (I) bromide obtaining is not suggested.

There are known chemical methods of obtaining copper (I) bromide by a chemical way. According to this method, the corresponding amount of pure copper sulfate and potassium bromide is heated slowly in boiling distilled water for 2 hours and then a strong flow of SO_2 gas is passed until the solution is completely cooled. At this point, the copper bromide is precipitated as sediment in the form of thin white-yellow crystals. The sediment is filtered by preserving from daylight, rinsed with boiled water containing $SO_2$for 5-7 times and then filtered again. Subsequently, the sediment is washed with absolute alcohol containing SO_2 and then with absolute ether with SO_2. The obtained salt can be dried in hydrogen atmosphere over H_2SO_4 and potassium hydroxide for 3 days and then can be dried in vacuum. Obtaining copper bromide in a chemical way takes long time, has multistage steps and consists from complex mechanism [18].

In the presented work electrochemical dissolution of copper electrode was investigated by taking anodic potentiodiodynamic polarization curves in 2M potassium bromide solution. The measurements were performed in a three-electrode thermostatic cell with potentiostat "Autolab". Silver chloride (E = +0,203 V) served as the relative electrode, the platinum as an auxiliary electrode, while the teflon covered copper wire edge was used as a working electrode.

In the works of A.K.Bayeshova and others, the electrochemical properties of copper were investigated in 1M potassium bromide aqueous solution by taking cyclic anode-cathodic and cathode-anodic potentiodynamic polarization curves. The effects of the rate of potential change and electrolyte temperature on the copper electrolyte oxidation process were considered. It was assumed that in this process the electrode reactions would be accompanied by a very complex mechanism and that copper (I) bromide could be formed on the electrode surface.



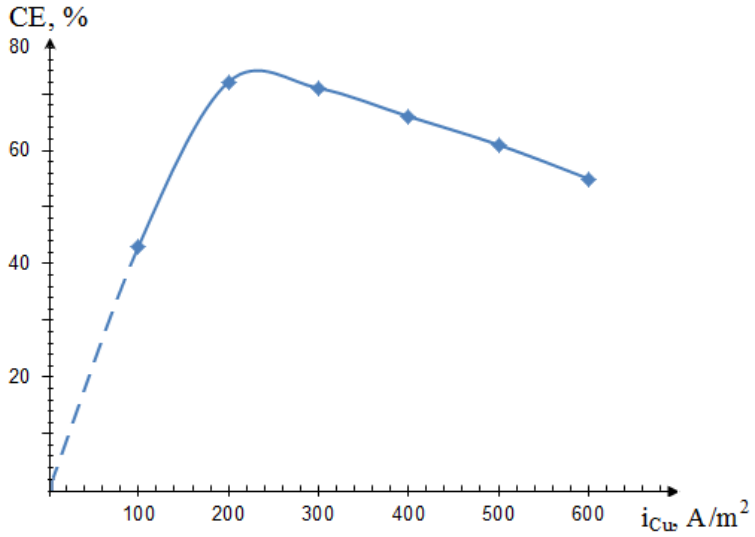
V = 100 mV/s, t = 25^0C, [KBr] = 2M

Figure 1 – The anode polarization curve of copper electrode in the potassium bromide solution

Two anodic maximum corresponding to the oxidation of copper Cu^+ and Cu^{2+} copper in the "plus" 0,03V and "plus" 0,28V potentials on an anode polarization curve of the copper electrode in the potassium bromide solution can be observed. Since the solubility of copper (I) bromide is considerably lower, formed copper (I) ions form CuBr by reacting with the Br^-anions in the solution volume and its stability increase [19].

Mainly, investigation on electrolytic formation of copper (I) bromide were performed in thermostatic glass cell. The electrolysis was conducted in a galvanostatic mode using the copper electrode as anode and the titanium wire as cathode. After the electrolysis, copper (I) bromide was filtered off and washed with distilled water and absolute alcohol, dried and weighted by the weight method. The electrolyte solutions were prepared from reagent grade KBr and distilled water.

The influence of anodic current density on current efficiency (CE) of copper (I) bromide formation was investigated in potassium bromide aqueous solution during anodic polarization (figure 2). There was observed, that the current efficiency of copper (I) bromide formation reached just over 72% at the current density in the copper anode 200A/m^2; this value decreased by 60% when the current density was further increased up to 600 A/m^2. This can be explained by the additional reaction of the oxygen gas evolution in the anode or a gradual passivation of the electrode covered with the copper bromide. The scientist of work [17] also established that CuBr precipitates on the electrode surface as the anodic current density becomes large enough.



i_{Ti} = 60 kA/m^2, [KBr] = 2 M, τ = 0.5 h, t = 20^{0}C

Figure 2 – Effect of the anodic current density in copper electrode on the current efficiency of copper (I) bromide formation

The impact of the current density in the additional titanium electrode on the current efficiency of the copper electrode was studied. According to figure 3, as a result of increasing the current density in the titanium electrode, the current efficiency initially increases until 60 kA/m^2 and then followed by gradually decrease; the maximum CE accounted more than 70%.

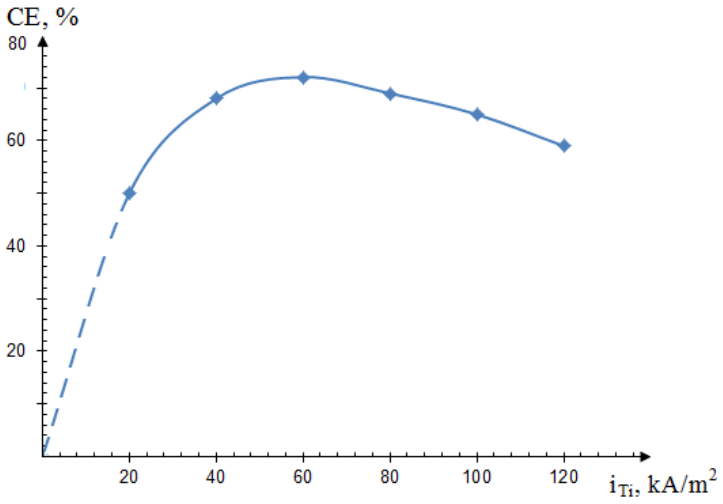
During the anodic polarization of copper electrode, the following electrochemical reactions can be occurred:

$$Cu^0 - \bar{e} \leftrightarrow Cu^+ \qquad E^0 = +0{,}52 \text{ V} \qquad (1)$$

$$Cu^+ - \bar{e} \leftrightarrow Cu^{2+} \qquad E^0 = +0{,}15 \text{ V} \qquad (2)$$

The solubility of copper (I) bromide is low (SP = 5,25·10^{-9}) [20], so that formed Cu (I) ions react with Br^- ions and form copper (I) bromide. It can be observed by the formation of orange sediment formed at the bottom of the solution:

$$Cu^+ + Br^- \rightarrow CuBr\downarrow \qquad (3)$$



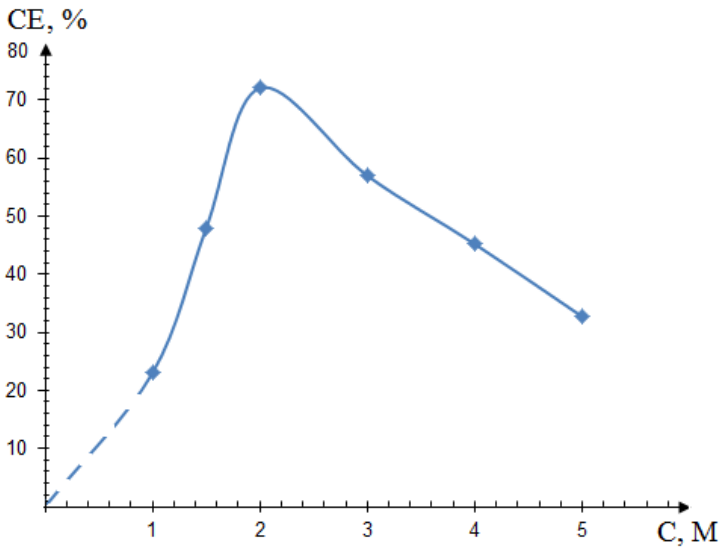
i_{Cu} = 200 A/m^2, [KBr] = 2 M, τ = 0.5 h, t = 20^{0}C

Figure 3 – Effect of the current density in additional titanium electrode
on the CE copper (I) bromide formation during anodic polarization of copper electrode

In work [21], the solubility of cuprous bromide in aqueous KBr and aqueous KBr-KNO_3 mixtures was measured at 24.8^{0}C. Based on the results of the analysis, the equilibrium constants for formation of neutral and negative charged CuBr complexes were given and the ways to calculate the activity coefficients for the complexes were determined.

The effect of potassium bromide concentration on the current efficiency rate of the CuBr formation at the anodic polarization of the copper electrode is presented in figure 4. With increasing the concentration of potassium bromide from 1.0 M to 5.0 M there was observed a sharp growth of the current efficiency of the copper (I) bromide formation until 2.0 M, while decrease-trend in the current efficiency observed in higher concentrations.

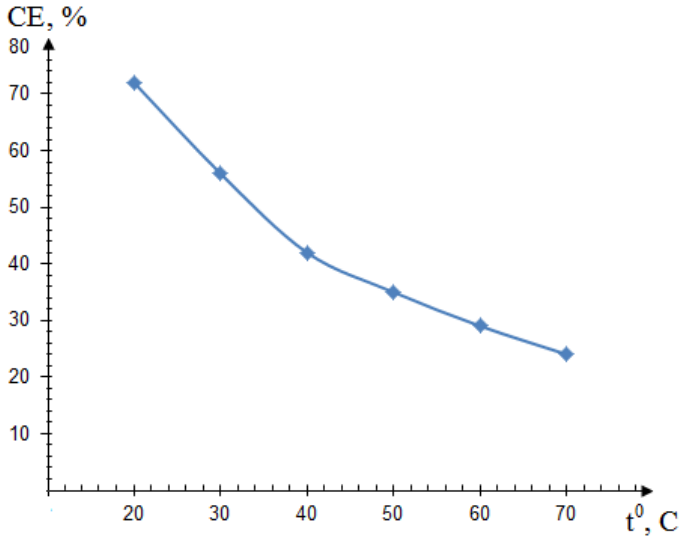
Initially, the interaction of Br^- anions with Cu^+ ions in the solution increases with the rise of the solution concentration. In high concentrations of the bromide ion, the copper electrode is covered with its bromide film and becomes passivated.



i_{Cu} = 200 A/m^2, i_{Ti} = 60 kA/m^2, τ = 0.5 h, t = 20^{0}C

Figure 4 – Effect of potassium bromide concentration in the solution
on the current efficiency of copper (I) bromide formation

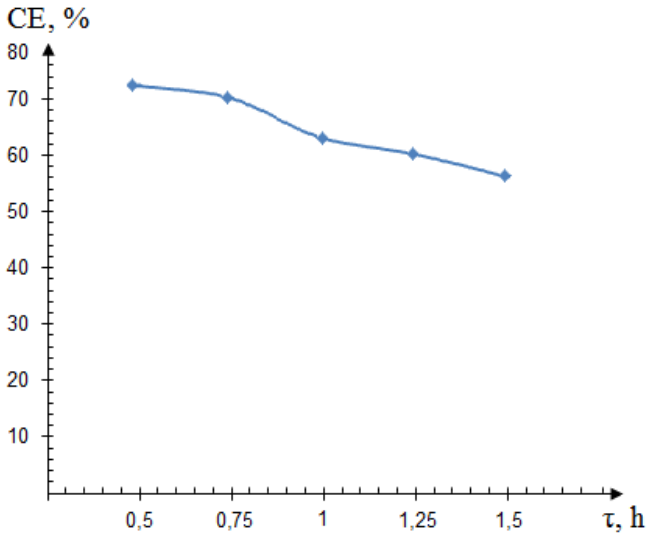
The influence of the solution temperature on the current efficiency of the copper electrode dissolution anodic polarized in the potassium bromide solution was investigated (figure 5). The electrolysis was performed in temperature intervals 20-70^{0}C. There was continuous decrease of current efficiency of copper bromide formation through the electrolyte temperature increased. This phenomenon can be explained by the excessive voltages reduction of oxygen gas evolution in the anode due to the increased temperature, by the growth its proportion or by the dissolution of copper (I) bromide compounds.



i_{Cu} = 200 A/m^2, i_{Ti} = 60 kA/m^2, [KBr] = 2 M, τ = 0.5 h

Figure 5 – Effect of the solution temperature on the current efficiency of copper (I) bromide formation

The effect of the electrolysis duration on the current efficiency on dissolution of anodic current polarized copper electrode was studied between 0.5-1.5 hours (figure 6). Gradual failing trends of current efficiency of copper (I) bromide formation was observed as a result of increasing the duration of electrolysis. This can be explained by the increase in the number of additional reactions as time goes by, the decrease of the concentration in the bromide ions solution and the passivation of electrode with electrolysis products.



i_{Cu} = 200 A/m^2, i_{Ti} = 60 kA/m^2, [KBr] = 2 M, t = 20^{0}C

Figure 6 – Effect of the electrolysis duration on the current efficiency of copper (I) bromide formation

In conclusion, the formation of copper (I) bromide compound was detected during anodic polarization of the copper electrode in the potassium bromide solution. The obtained product was analyzed by the X-ray phase analysis method and the formed product was proved to be CuBr based on these analyses (figure 7).

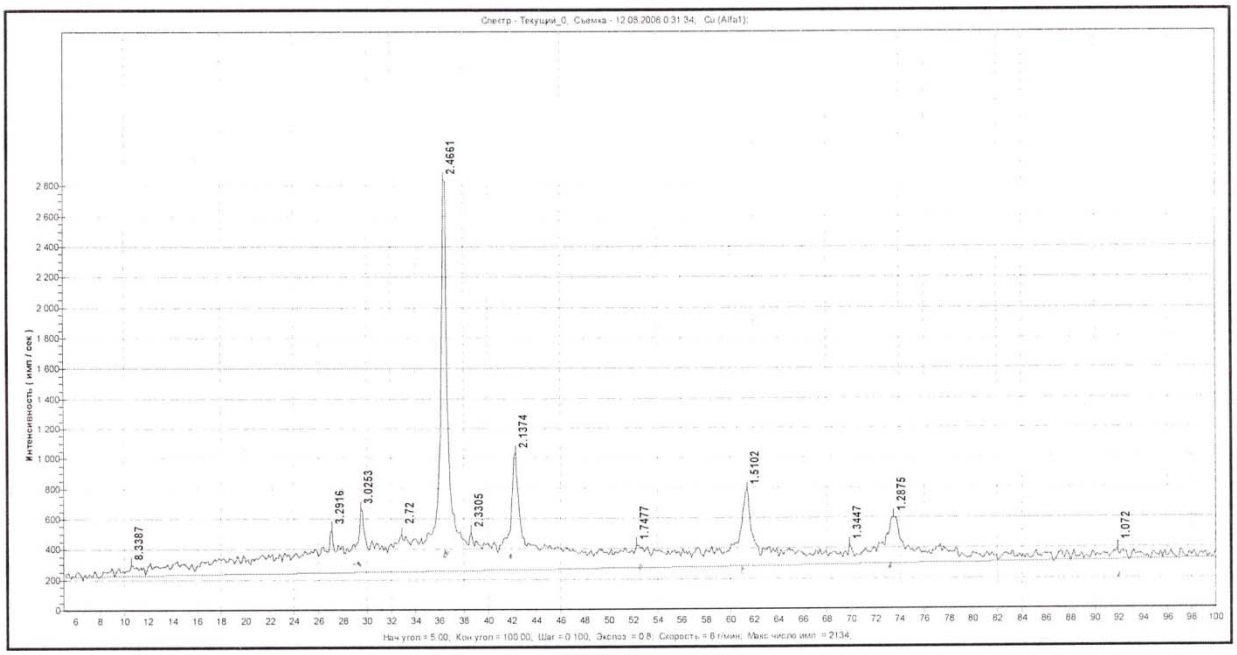


Figure 7 – Rentgenogram of copper (I) bromide formed during the electrolysis

Thus, the effect of basic electrochemical parameters (current density of copper and titanium electrode, potassium bromide concentration, electrolyte temperature, electrolysis duration) on copper (I) bromide formation during anodic polarization of copper electrode in potassium bromide aqueous solution was investigated. On the basic experimental data, the optimal conditions for the formation of copper (I) bromide compound were established: i_{Cu}=200 A/m^2, [KBr]=2M, t=20^{0}C. The current efficiency of copper (I) bromide formation by copper dissolution reached 72.1%.

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Р. Н. Нұрділлаева[1], Ә. Б. Баешов[2], Г. С. Серік[1]

[1]Қ. А. Ясауи атындағы Халықаралық қазақ-түрік университеті, Түркістан, Қазақстан,
[2]«Д. В. Сокольский атындағы Жанармай, катализ және электрохимия институты» АҚ, Алматы, Қазақстан

МЫС БРОМИДІН АЛУДЫҢ ЭЛЕКТРОХИМИЯЛЫҚ ТӘСІЛІН ЖАСАУ

Аннотация. Ұсынылып отырған жұмыста алғаш рет мыс электродының электрохимиялық қасиеті калий бромиді сулы ерітіндісінде анодты поляризациялау арқылы зерттелді. Анодты тоқпен поляризацияланған мыс электродында жүретін үрдістердің ерекшелігін зерттеу үшін калий бромиді ерітіндісінде анодты поляризациялық қисықтар түсірілді. Анодты тоқпен поляризацияланған мыс электродының еруіне мыс (i_{Cu}=100-600 А/м^2) және титан (i_{Ti}=20-120кА/м^2) электродтарындағы тоқ тығыздықтарының, электролит концентрациясының ([KBr]=1-5М), ерітінді температурасының (t=20-70^{0}C) және электролиз ұзақтығының (τ=0,5-1,5 сағ.) әсерлері қарастырылып, мыс (I) бромидінің түзілуінің тиімді жағдайлары анықталды. Мыс анодындағы тоқ тығыздығы 200А/м^2-ге тең болғанда мыс (I) бромидінің түзілуінің тоқ бойынша шығымы 72,1% құрады, ал тоқ тығыздығын одан ары жоғарылатқанда ТШ мәні төмендеп 60% көрсетті. Мыс (I) бромиді түзілу процесіне электролит табиғатының әсері мардымды екені анықталды. 2 М калий бромиді ерітіндісінде тоқ бойынша шығым жоғарылап (~70%), максимальды мәнді көрсетті. Ерітінді концентрациясын одан ары жоғарылату нәтижесінде тоқ бойынша шығым күрт төмендеді. Анодты тоқ қатысында мыс (I) бромидінің түзілу процесіне ерітінді температурасының әсерін зерттеу нәтижесі температураның жоғарылауынан тоқ бойынша шығымның төмендейтіндігін көрсетті. Мұны температура артуымен анодта оттегі газының бөлінуінің аса кернеулігінің төмендеп, оның үлесінің көбеюімен немесе мыс (I) бромиді қосылысының қайта еруімен түсіндіруге болады.

Түйін сөздер: мыс электроды, анодты поляризация, калий бромиді, электролит, тоқ бойынша шығым.

Р. Н. Нурдиллаева[1], А. Б. Баешов[2], Г. С. Серик[1]

[1]Международный казахско-турецкий университет им. Ходжи Ахмеда Ясави,
Туркестан, Казахстан,
[2]АО «Институт топлива, катализа и электрохимии им Д. В. Сокольского»,
Алматы, Казахстан

РАЗРАБОТКА ЭЛЕКТРОХИМИЧЕСКОГО МЕТОДА ПОЛУЧЕНИЯ БРОМИДА МЕДИ

Аннотация. В предложенной работе впервые исследовано электрохимическое свойство медного электрода при анодной поляризации в водном растворе бромида калия. С целью изучения специфичности процессов, протекающих на медном электроде при анодной поляризации, сняты анодные поляризационные кривые в растворе бромида калия. Рассмотрено влияние плотности тока на медном (i_{Cu}=100-600 А/м^2) и титановом (i_{Ti}=20-120 кА/м^2) электродах, концентрации электролита ([KBr]=1-5 М), температуры раствора (20-70^{0}С) и продолжительности электролиза (τ=0,5-1,5 ч.) на растворение меди при анодной поляризации и были определены оптимальные условия образования бромида меди (I). Выход по току образования бромида меди (I) при анодной плотности на медном электроде 200 А/м^2 составляла 72,1%, а дальнейшее увеличение плотности тока привел уменьшению значение ВТ на 60%. Установлено, что природа электролита оказывает существенное влияние на процесс образование бромида меди (I). При 2 М концентрации раствора бромида калия выход по току возрастает, и величина ВТ достигает максимального значения (~70%). В результате дальнейшего увеличения концентрации раствора выход по току резко снижается. Изучение влияния температуры раствора на процесс образования бромида меди (I) при анодной поляризации тока показало, что с повышением температуры выход по току снижается. Это связано с тем, что с увеличением температуры в аноде снижается перенапряжение выделения газообразного кислорода и увеличивается его доля, или можно объяснить растворением бромида меди (I).

Ключевые слова: медный электрод, анодная поляризация, бромид калия, электролит, выход тока.

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S. A. Azhayev, I. A. Ishigov, B. T. Tastemirova

International Kazakh-Turkish University named after H. A. Yassawi
Faculty of medicine, Turkestan, Republic of Kazakhstan

THE CULTURE OF SPEECH IN THE MEDICAL EDUCATIONAL SYSTEM

Abstract. The paper considers the state of the speech culture of medical students of the third class of study in practical classes in private histology. The following empirical methods of scientific and pedagogical research were used: 1) observation of oral speech of students during a survey on the topics studied and fixing errors in their speech; 2) studying the products of students' learning activities, in particular, written answers to assignments (for knowledge, understanding and application) of two boundary controls conducted at intervals of 2.5 months. A total of 187 written works in the Kazakh language and 120 works in Russian were analyzed.

As a result of the analysis of written works of the first boundary control, errors in written speech that distort the meaning of the statement were found in 75% of Kazakh-speaking students and 70% in Russian-language teaching. After analyzing and grouping mistakes in oral and written speech, students were informed about them, and they were given the opportunity to work on the errors. In addition, during the whole semester, the teacher systematically corrected the most frequent mistakes in the students' oral speech during practical sessions. By results of the second boundary control errors in written speech were 53% in the groups of the Kazakh language of instruction and 51% in the groups of the Russian language of instruction.

The received results testify to the necessity and effectiveness of work on correcting speech of trainees. Identifying and correcting mistakes in written and oral speech of students should become an integral part of the pedagogical process in all academic disciplines, beginning with the first training courses.

Keywords: speech culture, medical communication, speech mistake (error), correction of mistake (error), shaping speech culture, medical terminology, lexicon.

The culture of speech is the ability to accurately, clearly express your thoughts and feelings, freely own speech, use humor, expressive speech (gestures, mimes) in different conditions of communication, to master the norms of oral and written literary language. From all the this depends how much we will be correctly understood by others. "Wrong speech is either difficult to understand, or can be misunderstood, but if you misunderstand it, it's wrong and you'll do it" [1]. A study conducted by graduates of one of the American universities showed a big discrepancy between the topics, what doctors had in mind when talking to patients, and what the latter heard [2]. Culture of speech is a manifestation of the culture of thinking. "Who clearly thinks, explains clearly" [3].

Undoubtedly, the role of studying special medical-biological and clinical disciplines is very important in medical education, but the ability of the future doctor to have a good command of his speech, ability to listen and hear the patient and his relatives are equally important. On the healing power of medical communication (speech and listening), timely and intelligently chosen based on the situation of the word, spoke and wrote many outstanding figures of medicine. Thus, V.V. Veresaev, whose biography was connected with two confessions of a doctor and a writer, wrote: "A doctor can have a huge recognizing talent, be able to catch the details of his appointments, but all this is fruitless if he does not have the ability to subdue and subjugate the patient's soul." A sick person seeks and places high hopes on an active, even if calming, word of a doctor. Thus, speech communication, language skills is an important part of the professional activities of a doctor. Possession of a highly cultured speech greatly enhances the professionalism of any specialist, especially a doctor, for "the word is the most important therapist", "the word heals and

kills". The patient's satisfaction with the treatment depends on whether the communication with the doctor was positive, which directly depends on the speech culture of the doctor [4]. The most common complaint from patients is the inability of practitioners to listen carefully, give clear and understandable answers, and, first of all, accurately identify those problems with which the patient came to the doctor [5].

The purpose of this article is to analyze the state of the speech culture of modern medical students, to identify the main types of errors in their speech and to outline ways to correct and prevent speech errors in the context of the medical education system.

One of the most important types of speech activity is reading. At present, due to a number of reasons (wide entry into the life of television, the Internet and mobile communications, examinations at the end of the school in the form of UNT, etc.), the younger generation has lost interest in reading books – the source of information and the source of literate use of words in speech. In addition, there are also social reasons – the indifferent attitude of adults to the speech of the child, his long stay in the midst of incorrectly speaking peers. The situation is also aggravated by the lack of attention to the culture of speech on the part of the teachers of theoretical and clinical disciplines during all the years of study at the higher medical school. And as a result, negligent treatment with both oral and written speech, not only in the language of interethnic communication, but also in one's native language, which can be seen in the course of the everyday educational process. The decrease in interest in the book also negatively affects the abstract thinking, the ability to understand what is read and reflect on its meaning. Even in the third year of study, when the study of cycles of general and fundamental medical and biological disciplines is being completed, we are faced with the fact that some students still do not have the correct understanding and use of medical and biological terminology, the ability to express their thoughts clearly and fully.

Analysis of students' speech often indicates the presence in it of all sorts of errors that consist not only in deviating from the norms of the Kazakh or Russian language, but also in distorting the meaning of what has been said, which inevitably reduces the level of reliability of the information presented to them in the minds of listeners and readers [6]. As a consequence, there is a disruption in communication between the student and the teacher. Undoubtedly, in the future, these shortcomings of the speech of the future doctor will affect the communication between him and the patient with his relatives and colleagues, can cause conflicts between them. In the oral and written speech of medical students, the following mistakes are often encountered: 1) pronouncing – the manner to swallow the beginning, end or middle of the word, indistinct, incorrect pronunciation of words (stammering); 2) the lexical use of words in values that are not characteristic of them; 3) morphological irregular formation of word forms; 4) syntactic violations of the construction of sentences, rules for combining words; 5) orthographic; 6) punctuation, etc. [7].

Empirical methods of pedagogical research are used in the work: 1) the method of monitoring oral speech of students during the current practical sessions during the semester; 2) the method of studying the products of the students' learning activities, in particular, their written responses to the tasks of two intermediate knowledge controls conducted at intervals of 2.5 months.

A systematic observation of the correctness of the oral speech of students was carried out in 14 groups (about 160 students) during an oral survey on the topics of practical histology lessons. 93 written works in the Kazakh language and 69 works in the Russian language of the first interim control served as the material for the study of writing errors, and accordingly 94 and 71 work - the second control. In both cases, the most frequent and significant errors were recorded, i.e. Those who distorted the meaning of the information presented, or made it difficult to understand. Identified errors were grouped according to the language norms of oral and written speech [7].

In oral and written speech of students, the following mistakes were often encountered: 1) pronunciation – the way to swallow the beginning, end or middle of the word, indistinct, incorrect pronunciation of words (stammering); 2) lexical – the use of words in values unusual for them; 3) morphological – incorrect formation of the word forms; 4) syntactic – violation of the construction of sentences, rules for combining words. As a rule, these errors led to a logical incompleteness of statements, inconsistencies in judgments, incorrect speech construction, etc.

During the analysis of written works of the first interim control, similar errors were detected in 75% of the written works of students of the Kazakh language of instruction and 70% of the Russian language of instruction. Later, students were informed of the structure of typical errors in their speech, and, in addition, they were given the opportunity to work on errors, given specific recommendations for the formation

of correct speech. Based on the results of oral interviews, systematic correction of typical speech errors was systematically carried out.

The results of the second boundary control of students' knowledge, conducted after 2.5 months, were as follows: mistakes were revealed in 53% of written works of students of the Kazakh language of instruction and 51% of the Russian language of instruction.

When attending classes within the framework of intra-departmental quality control of education, there are often instances of indifferent attitude of teachers towards such mistakes in the speech of students. Although it is known that the correction of errors is part of the learning process, so they need to be noticed, explained, sought correction. This does not mean that it is necessary to interrupt a student on every word, which can adversely affect the course of communication, causing him psychological discomfort, stiffness and fear of talking. There are various methods of correcting oral speech, for example, you can listen to all the statement without interrupting the speaker, but fixing the errors [7]. In this case, you should pay special attention to those errors that distort or make the meaning of the statement incomprehensible, and also repeated in the answers of different students. It is advisable to offer the student to correct mistakes himself. If the student can not correct the mistakes, the teacher seeks help from the other students of the group, and the responding student repeats the correct answer after correction. If neither the student nor the group can correct the mistake, in this case, the teacher should do it. Thus, in carrying out correctional work, the teacher needs to show tact, patience and methodical literacy.

A specific feature of the education of the culture of speech is that it cannot be separated from the process of teaching and medical practice[8]. It should become an indispensable organic part of the pedagogical activity, integrated into the overall process of learning and development. Formation of competent speech of the future doctor is possible only in direct contact with the teacher and in the process of practical activity, communication with the patient. In this regard, the teacher must make high demands not only to the speech of the student, but also to his speech. If the teacher does not follow his speech, inattentively and indifferently treats the student's speech errors, this in combination negatively affects the formation of the speech culture of the student as a whole. If our speech is incomprehensible to the student, our words can easily be reinterpreted in a different way. The teacher should demonstrate a pattern of correct pronunciation of speech sounds and, in general, correct speech. The doctor in conversation with the patient should avoid banal phrases, beaten expressions of sympathy, not to abuse special medical terms, especially Latin ones, which may not be so interpreted and cause unreasonable anxiety in another person.

Speech – the most important indicator of the general culture of man, his intellect and thinking. A doctor must be a priori intelligent, educated person. A huge role in the formation of a culture of speech is played by books. The great Russian surgeon N.I. Pirogov expressed the idea that a doctor who does not have a general education and is not interested in the works of great writers and poets is not a doctor, but a craftsman. Stanislav Lem, MA Bulgakov, I.F. Schiller, A. Conan Doyle, A. Chekhov, V.V. Veresaev was a doctor, which means that medicine is really connected with literature. Fiction not only reveals and explains to the reader the life of society and nature, but also lays the foundations of morality, develops thinking and imagination, enriches the vocabulary with new words and expressions. The work of art acts on a person's emotions-it evokes a sense of satisfaction and pride, resentment and indignation, aesthetic pleasure, etc. Emotional activity pushes and speeds up mental processes; thoughts tend to speech [9, 10]. Therefore, a good book teaches you to think, develop speech, memory, stimulatecreativity.

It is prestigious to speak correctly and beautifully, as this ability testifies to the general cultural level of the doctor, the level of his thinking, increases the trust of patients and relatives. The cornerstone of the culture of speech, free and convincing speech is a rich vocabulary. Each academic discipline, which is an area of scientific knowledge, has its own specific language – a system of concepts, terms, symbols; the task of the learner is to assimilate this language. "Speech is the channel of the development of the intellect, the earlier the language is learned, the easier and more fully the knowledge will be assimilated" [11]. Then the words would come to their minds themselves, without a special mental strain, you can replace one word with another, more accurate and relevant. With the scarcity of the vocabulary, it is painfully difficult to find the right word in time, it is not easy for such a person to state his thought [9]. To fill pauses in speech and missing words, the creator is forced to use words-parasites, on-duty phrases. An erudite, well-read person has an active stock of words, as determined, at least 6-7 thousand.

What are the most rational ways of working on your speech, replenishing and expanding the vocabulary? This, of course, primarily is reading fiction. It is important to consider that reading only benefits when a person comprehends what is read, "scrutinizes" words, analyzes the structure of sentences. In the Al-FarabiKazNU, in 2012, a list of "100" best books of all times was developed, which should be read by every self-respecting student [12]. Such lists are being developed in other universities in Kazakhstan and the CIS [13]. Excellent opportunities for self-education provides the Internet (special literature on the development of speech, articles on its industry in scientific sites, theWikipediareference book, etc.). It is possible to recommend to the student from the first course of education to get a pocket dictionary in which it is necessary to write down all new or incomprehensible words and terms. It will be of great benefit to communicate with educated people with the holders of pure speech, study the life and work of outstanding thinkers, scientists, public figures who can become an example for young people. An important means of improvement is the visit (including virtual) of theaters, museums and exhibitions. All this in aggregate forms a high general culture, which serves as a favorable background for the development of speech.

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С. А. Ажаев, И. А. Ишигов, Б. Т. Тастемирова

Международный казахско-турецкий университет им. Х. А. Ясави,
Медицинский факультет, Туркестан, Республика Казахстан

КУЛЬТУРА РЕЧИ В СИСТЕМЕ МЕДИЦИНСКОГО ОБРАЗОВАНИЯ

Аннотация. В работерассмотрено состояние речевой культуры студентов-медиков 3-го курса обучения на практических занятиях по частной гистологии. Использованы следующие эмпирические методы научно-педагогических исследований: 1) наблюдение за устной речью студентов в ходе опроса по изучаемым темам и фиксирование ошибок в их речи; 2) изучение продуктов учебной деятельности студентов, в частности письменных ответов к заданиям (на знание, понимание и применение) двух рубежных контролей, проведенных с интервалом в 2,5 месяца. Всего проанализировано 187 письменных работ на казахском языке и 120 работ на русском.

В результате анализа письменных работ первого рубежного контроля ошибки в письменной речи, искажающие смысл высказывания, выявлены у 75% студентов казахскоязычного и 70% – русскоязычного обучения. После анализа и группировки ошибок в устной и письменной речи студенты были информированы о них, а также им была предоставлена возможность работы над ошибками. Кроме того, преподаватель в течение всего семестра на практических занятиях систематически осуществлял коррекцию наиболее частых ошибок в устной речи студентов. По результатам второго рубежного контроля ошибки в письменной речи составили 53% в группах казахского языка обучения и и 51% – в группах русского языка обучения.

Полученные результаты свидетельствуют о необходимости и эффективности работы над исправлением речи обучаемых. Выявление и коррекция ошибок письменной и устной речи студентов должны стать неотъемлемой частью педагогического процесса на всех учебных дисциплинах, начиная с первых курсов обучения.

Ключевые слова: культура речи, врачебное общение, речевые ошибки, коррекция ошибок, формирование культуры речи, медицинская терминология, словарный запас.

С. А. Ажаев, И. А. Ишигов, Б. Т. Тастемирова

Қ. А. Ясауи атындағы Халықаралық қазақ-түрік университеті,
Медицина факультеті, Түркістан, Қазақстан

МЕДИЦИНАЛЫҚ БІЛІМ БЕРУ ЖҮЙЕСІНДЕГІ ТІЛ МӘДЕНИЕТТІЛІГІ

Аннотация. Мақалада 3-курс медиктердіңжеке гистологияның тәжірибелік сабақтарында тіл мәдениеттілігінің күйі қарастырылған. Жұмыста ғылыми-педагогикалық зерттеудің мына эмпиризмдік әдістері қолданылған: 1) өқып біліп жатқан тақырыптар бойынша сұрау кезінде студенттердің ауызекі тілін бақылау және сөйлеуіндегі қателерді жазып алу; 2) студенттердің оқу әрекеттерінің өнімдерін зерттеу – аралығы 2,5 ай құрайтын екі аралық бақылаудың тапсырмаларына (білім, түсіну және қолдану) берген жазбаша түрінде жауаптарын зерттеу. Барлығы қазақ тілінде 187 жазбаша жұмыс және орыс тілінде 120 жұмыс талданды.

Бірінші аралық бақылаудың жазбаша жұмыстарын талдау нәтижесінде айтайын деген пікірлерінің мағынасын бұрмалайтын қателер қазақ тілді студенттердің 75% және орыс тілді студенттердің – 70% жұмыстарында анықталды. Ауызекі және жазбаша тіліндежіберілген қателерді талдаудан және топтастырудан кейін студенттерге олар туралы мәлімет берілді және бұл қателерді түзетуге мүмкіндік берілді. Бұдан басқа, оқытушы тәжірибелік сабақтарда студенттердің ауызекі тілінде ең жиі ұшырасатын қателерді семестр бойы жүйелі түрде және белгілі әдістер негізінде коррекция жасап отырды. Екінші аралық бақылау нәтижесінде жазбаша тіліндегі қателер қазақ тілді топтарда – 53% және орыс тілді топтарда 51%болды.

Бұл нәтижелер білімгерлердің тілін түзету жұмыстың қажеттілігін және тиімділігін дәлелдейді.Медик-студенттердің ауызекі және жазбаша тіліндекездесетін қателерді айқындау және түзету оқытудың алғашқы курстарынан бастап педагогикалық процестің ажыратылмайтын бөлігі болуы тиіс.

Түйін сөздер: тіл мәдениеттілігі, дәрігерлік қатынас, тіл қателері, қателерді түзету (коррекция), тіл мәдениеттілігін қалыптастыру, медицина-лық терминология, сөздік қор.

Information about authors:

Azhayev S.A. – kand.med.sc., professor of Faculty of medicine IKTU after named Kh. A. Yassawi, E-mail: genetic.sovet@mail.ru;

Ishigov I.A. – doct.med.sc., professor of Faculty of medicine IKTU after named Kh. A. Yassawi, E-mail: ibragim.49@mail.ru;

Tastemirova B.T. – magister of biology, teacher-assistant of Facultyof medicine IKTU after named Kh. A. Yassawi, E-mail: bibka-097@mail.ru.

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G. A. Babayeva, E. K. Ibrahimova

A. Yasavi International Kazakh-Turkish University, Turkestan, Kazakhstan.
E-mail: gulmirababaeva@mail.ru i_elm78@mail.ru

AREA OF APPLICATION OF ENVIRONMENTALLY EFFECTIVE WAYS IN THE SOLUTION OF THE PROBLEM OF WATER TREATMENT

Abstract. Today, one of the most difficult issues in land development is the use of semi-desert lands in Kazakhstan, 29% of which are steppe, and 44% are desert territories. The main part is occupied by semi-deserts and desert territories. As foreign practice shows, these lands can be transformed into effectively used lands.Taking into account these issues, the efficiency of the drip irrigation of Israeli technology in the Mayakum village of the South Kazakhstan region of the Otyrar district was studied. Thus, this method of drip irrigation when grown in greenhouses and gardens of various cultures is widely used also in many regions of the country.In addition, the fermentation method is used by the pipeline system, that is, by feeding the fertilizer solution. This type of irrigation allows to use both fertilizer and water in the required quantity and is an effective way of saving water.

Key words: ecology, desertification, water resources, pollution, irrigation, drip irrigation, fermentation.

Today, one of the most difficult issues in land development is the use of semi-desert lands in Kazakhstan, 29% of which are steppe, and 44% are desert territories. The main part is occupied by semi-deserts and desert territories. Depending on weather conditions and soil fertility, the index of arable land in each region of the country is different [1].

As foreign practice shows, these lands have the potential to be transformed into a profession. Taking into consideration these issues, the Israeli technology was researched in Mayakum village, Otyrar district, South Kazakhstan region. Compared to other regions of the country, the less developed land use in the South Kazakhstan region is the hardness of the soil cover, the saline soils. Therefore, it is necessary to familiarize and use the world experience in the field of agriculture for the development of agriculture. Water shortage issue in Mayakum village of Otrar region of southern region is one of ecological crisis. The following figure 1 shows the satellite imagery of the village surveyed.

The Committee for Consumer Protection of the National Expertise Center of the Republic of Kazakhstan The structure of the heavy metal salt in the waters of the Syrdarya River of the Department of Consumer Protection of the South Kazakhstan region is significantly lower than norms, according to research data (figure 2) [2].

In foreign countries, the method of drip irrigation in greenhouses as well as in hanging gardens is widely used. Drip irrigation – the method of production, used for accurate and uniform delivery of agrochemicals, protecting water, fertilizer and plant pests from the roots of the plant. Drip irrigation pipes can be placed on top or bottom of the soil. You can also use the method of fermentation by pipes, that is, fertilizing in water. This type of irrigation allows you to use both fertilizer and water in the required amount, which means water conservation [3-5].

The introduction of the best international practices in agriculture is being made in Kazakhstan. The impact of anthropogenic action on the environment is constantly increasing year by year. The most unpleasant results of this activity are the spread of various toxic substances into the soil system, and chemical, radiation and other types of pollution. Substances that are pollutants and pollutants include petroleum products, heavy metals, radioactive particles and other ecotoxicants. Outbreaks of these pollutants are industrial enterprises, transport, energy complexes, agriculture and many other industries.

Therefore, we need to use advanced technology to reduce pollution.In connection with the market relations that have developed in agricultural production, it is possible to abandon the use of high doses of expensive mineral fertilizers and to introduce them in smaller quantities for various crops together with natural glauconite mineral, which is characterized by a whole set of chemical compounds and microelements necessary for mineral nutrition of plants [6-8]. Changes in the method of drip irrigation, occurring in the Republic over the last several years, are shown in figure 3.

Figure 1 – Satellite view of the village of Mayakum

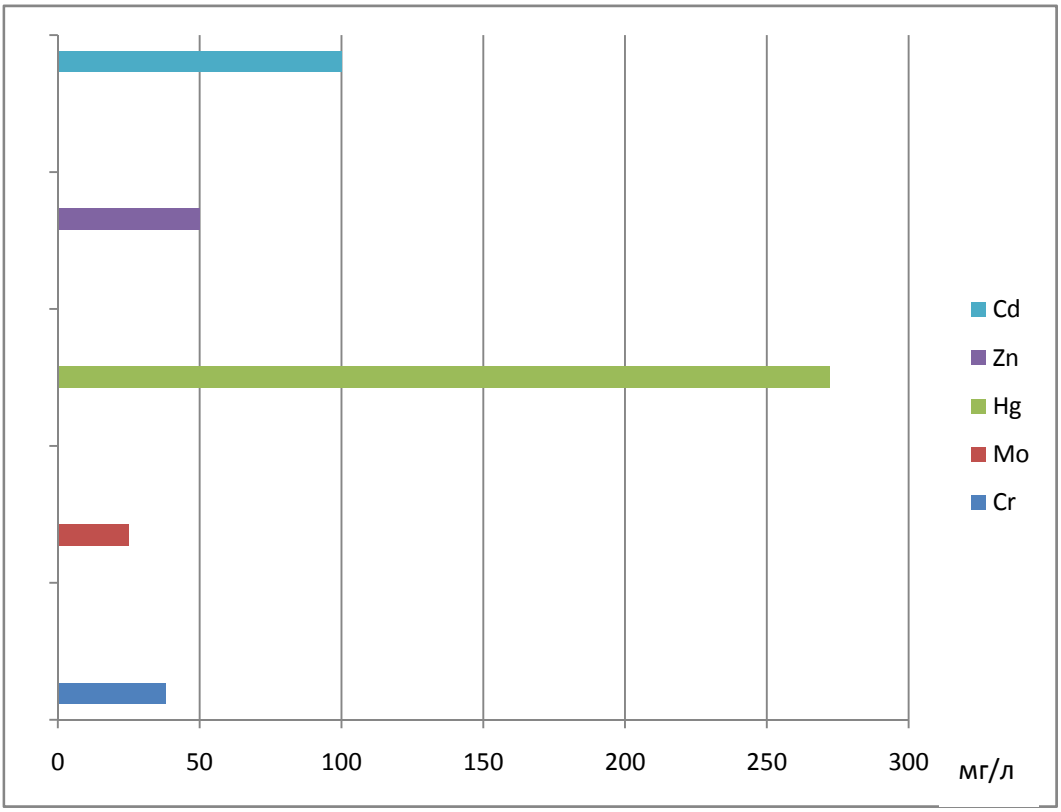

Figure 2 – The composition of heavy metal salts in the Syrdarya river water

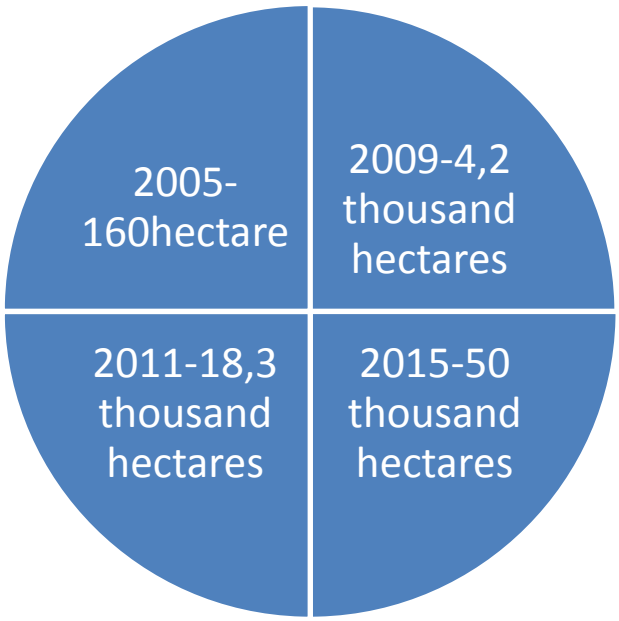

Figure 3 – Changes in drip irrigation method throughout the Republic

That is 300 times more than ten years. For example, if you plan to plant corn on a hectare of 10 hectares and use a drip irrigation system, you can get a product at least 4.5–5 million tenge a year. The cost of installing facilities and equipment, hinge system is compensated within one year. Annual irrigation of crops makes 4.1 billion tons. square meters of irrigation water is allocated. Consequently, water conservation in the field of agriculture is a key requirement of today. Rice cultivation uses more water than other crops. More precisely, it is found that it requires 3–4 times more. Therefore, introduction of water-saving technologies in the region is underway. That is, it is necessary to carry out work on increasing the productivity of agricultural crops on the basis of drip irrigation of arable land and gardens and planting of arable land by new technology. Another advantage of the new system is saving energy, water and fertilizer.In this regard, if we planted an intensive apple tree on a 3 hectare area. The peculiarity of this cord is that it can be produced in 3 years. There are 3750 at each hectare. In the area of 14 tons of products are harvested. 20 million tenge will be spent on 3 hectares. About 30% are funded by local social business corporation. In the third year, the gardens will produce 28-30 tons of fruit, and will eventually increase product volume.And each kg of 30 tonnes of products is sold at an average of 500 tenge, and it earns about 15 million per year.This loss can be compensated for 1 year.

According to the above-mentioned data, the technology of drip irrigation has shown its effectiveness in the issue of the production of vegetables and fruits.

One of the major sources of water in Kazakhstan is transboundary riverside water. It was mentioned that its size is decreasing from year to year. It is clear that in the future, it will be less. Nevertheless, the preservation of its current level of importance through the implementation of intergovernmental agreements that have already been adopted or adopted in the coming years will inevitably become a part of the country's water fund.

There are other ways in which the country can utilize its future water resources. One of them is artificial replenishment of water resources, unnecessary use. There is also a lot of opportunities in this direction. It is commonly known that frosts are frequent in every season, especially in the spring due to snow floods and floods. How much extra water would be generated if we increase the amount of absorption of these waters by using the local relief, using the appropriate recesses, creating appropriate conditions. On the other hand, if you stop using special fresh water supplies from remote areas to wash off vehicles, cars and other vehicles in major towns, towns, industries, and irrigate gardening in the summer months, how much water can be disposed of when the waste of in- saving.

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Г. А. Бабаева, Э. К. Ибрагимова

Международный казахско-турецкий университет им. А. Ясави, Туркестан, Казахстан

ОБЛАСТЬ ПРИМЕНЕНИЯ ЭКОЛОГИЧЕСКИ ЭФФЕКТИВНЫХ ПУТЕЙ В РЕШЕНИИ ПРОБЛЕМЫ НЕХВАТКИ ВОДЫ

Аннотация. Сегодня одним из самых сложных вопросов в области освоения земель является использование полупустынных земель территории Казахстана, из которых 29% – степь, 44% – пустынная территория. Основную часть занимают полупустынии пустынные территории. Как показывает зарубежная практика, эти земли могут быть преобразованы в эффективно используемые угодья. Принимая во внимание эти вопросы, была изучена эффективность применения капельного орошения израильской технологии в селе Маякум Южно-Казахстанской области Отырарского района. Таким образом, данный способ капельного орошения при выращивании в теплицах и садах различных культур широко используется также и во многих регионах страны. Кроме того, используется метод ферментации системой трубопровода, то есть подачей раствора удобрений.Этот тип ирригации позволяет использовать как удобрение, так и воду в требуемом количестве и является эффективным способом экономии воды.

Ключевые слова: экология, опустынивание, водные ресурсы, загрязнение, ирригация, капельное орошение, ферментация.

Г. Ә. Бабаева, Э. Қ. Ибрагимова

А. Ясауи атындағы Халықаралық казақ-түрік университеті, Түркестанғ Қазақстан

СУ ТАПШЫЛЫҒЫ МӘСЕЛЕСІН ШЕШУДЕГІ ЭКОЛОГИЯЛЫҚ ТҰРҒЫДАН ТИІМДІ ЖОЛДАРЫН ҚАРАСТЫРУ

Аннотация. Бүгінде жер игеруде ең күрделі мәселенің бірі шөлейтті жерлерді пайдалану. Қазақстан аумағының 29%-ы далалық, 44%-ы шөлді аумақ. Яғни жердің жартысына жуығы шөлді және шөлейтті. Шетелдік тәжірибеде көрсеткендей бұл жерлерді өңдеп, кәсіп көзіне айналдыруға мүмкіндік мол. Осы мәселелерді ескере отырып, Израильдік технологияны орнату тиімділігі Оңтүстік Қазақстан облысындағы, Отырар ауданының Маяқұм ауылына зерттеу жұмыстары жүргізілген. Бұл әдіспен өсімдіктерді тамшылатып суару жылыжайларда, сондай-ақ аспалы бақтарда өсіру жолы еліміздің көптеген аудандарында кең қолданыс тапқан. Сонымен қатар, құбырлар арқылы фертигация әдісін, яғни тыңайтқыштарды суға қосып қолдану әдісі де қолданылады. Суарудың мұндай түрі тыңайтқышты да, суды да қажет мөлшерде пайдалануға мүмкіндік береді және суды үнемдеудің тиімді жолы.

Түйін сөздер: экология, шөлейттену, су ресурстары, ластану, ирригация, тамшылатыпсуару, ферментация.

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K. M. Lakhanova[1], B. Sh. Kedelbaev[2]

[1]Yassawi International Kazakh-Turkish University, Turkestan, Kazakhstan,
[2]South Kazakhstan state university of M. Auezov, Shymkent, Kazakhstan.
E-mail: kulzada.lakhanova@iktu.kz; kedelbaev@yandex.ru

DEVICE ESTIMATION OF HAIR COAT PIGMENTATION OF KARAKUL SHEEP OF BLACK COLOURING

Abstract. The article provides traditional and device data on the pigmentation of hair color black of Karakul sheep.In article the data on studying of pigmentation of a coat of karakul sheep of black colouringis cited. Under the melanin content have the specific features and are in limits from 7,93 to 12,54%. As criterion of selection of different degrees of expressiveness of pigmentation following parametres are accepted: intensive-from above 10,0 %; normal-in limits of 8,5–10,0 %) and the weakened-is lower 8,5 %.Microscopic researches of classification of cages layer of karakul lambs hair of black colouring are differentiated on classes. For black colouringon intensity and with different degree of pigmentation 5 classes are characteristic and 3 rd is modal (60 %).

Key words: karakul, lambs, coloring, hair, melanin, microscope, electron-paramagnetic resonance (EPR).

Variability of coloring is inherent in Karakul breed. Now in breed there are six main colourings, twenty eight colorations and shades.

Many options of the Karakul lambs colourings are described in monographs, guidelines for breeders are known (N.S. Gigineyshvili [1], Instruction on conducting breeding work in Karakul farming [2], E.B.Vsevolodova.o. [3], to S.Adalsteinsson [4], A.M.Ombayev [5].

S.Adalsteinsson suggests classifying wool coloring by three signs: 1 – as a pigment; 2 – on nature (drawing) of coloring; and 3 - on existence or lack of white spots [4].

Different colourings are modifications of process of the pigmentation, being expressed in change: 1) the general contents of melanins in a hair, 2) qualitative structure of melanins (ratios of black eumelanin and red pheomelanin components in a pigment), 3) distributions of melanin in a hair. In turn, distribution of melanin depends on physiology of cells of melanocytes, settling down in a bulb of a hair follicle (E.B.Vsevolodov and others). [3].

Melanin biopolymers are formed of various quantities tyrosine and cysteine (G.Prota [6], Ito e.a. [7], Vsevolodova O. [8]). Distinguish two types of melanins: dark brown eumelanin and red - brown pheomelanin. Melanins on degree of color selectivity are various, so pheomelanin has a big difference in extent of absorption of blue-violet and red - yellow beams, than eumelanin and therefore it has more expressed red shade.

The quantity and type of a pigment are studied biochemical (Ito e.a. [7], Sponenberga O. [9] and biophysical (Vsevolodova O. [8], Sealy et.al [10] methods.

Okuno Sachiko [11] noted that absolute and relative quantity the eumelanin and the feomelanin granules in the hair defining coloring, it is necessary to consider as final result of activity of melanocytes and their interactions with keratinocytes. Farragut J.A. et al. [12] established that the main processes of melanogenesis are carried out in the melanocytes – the most part of the factors inhibiting process, operates on this stage. The factors of biochemical and genetic character controlling quantity and quality of active molecules of tyrosinase enzyme, render direct effect on the current melanogenesis. Possibly, this possibility of change of activity of the main enzyme is realized as one of the main regulatory mechanisms of process.

In selection of karakul sheep of different colourings and colouring there are the specific features, in particular, at black colouring desirable is intensive pigmentation, at grey colouring of a blue colouring depending on specialisation directions equall light blue, sredne-blue and dark-blue, at all intrapedigree types of colouringsour (Bukhara, Karakalpak,Surkhan-Darya and Kazakh) intensive expressiveness of a colouring.

Selection-breeding work in a karakul breeding is directed on increase of genetic potential of karakul sheep of different colourings and colouring for the purpose of production of astrakhan of desirable quality types.

Available methods are labour-consuming and bulky for mass researches. Especially great difficulties in an estimation of type of colouring arise at an appraisal of quality of numerous shades and astrakhan colouring where it is a question of various combinations of brown, yellow and red shades, sometimes against black and grey tones of deep layers of a coat. For studying of inheritance of a colouring very important accurately and objectively to outline a sign which inheritance is necessary for studying. Otherwise, there is a risk that by means of a hybrid analysis two different colourings which we not in a condition are reliable for distinguishing but which objectively are different, everyone with the special gene mechanism of reproduction will be studied.

Black colouring is most extended among karakul sheep and it usually characterises the given breed.

Karakul sheep of black colouring are not subdivided into shades and colouring, but share on expressiveness of black colour on intensively-black, is normal-black and is weakened-black.

Thus the most desirable for selection is intensive.

Degree of expressiveness of pigmentation black karakul lambs is defined visually and consequently the big errors are supposed at their estimation by bonitious [2]. Thereupon at the present stage of development of selection-breeding work with karakul sheep of black colouring by an actual problem is working out of objective methods of an estimation of degree of pigmentation

Methodics. Samples of hair, were sheared at lambs with dorsal body surfaces in area of sacrum. Degree of expressiveness of pigmentation of black Karakul lambs defined visually (appraisal) and objective method (EPR- spectrometry). In early published researches has been shown possibility of EPR-spectrometer diagnostics of types of the melanin defining colouring of hair.

Counting of cover cells with different degree of pigmentation on the smear of cover cells hairs received by the way of acid hydrolysis to karakul lambs to methodic E.B.Vsevolodov and all [8].

Results. Therefore, as one of objective methods in the researches applied method EPR-spektro-metricion and microscopy (table 1).

Table 1 – The melanin Content in hair at karakul lambs of black colouring

Inpercentage

Expressiveness	It is considered lambs	The melanin content		
		> 10,0	10,0-8,5	<8,5
Theintensive	37	73.0±7,3	16,2±6,06	10,8±5,10
Thenormal	35	17.1±6,36	65,7±8,02	17,1±6,36
Theweakened	31	12.9±6,02	22,6±7,51	64,5±8,59
Intotal	103	35.9±4,73	35,0±4,70	29,1±4,78

Proceeding from the general quantitative content of melanin at lambs of black colouring within 7,93-12.54 %, its indicators subdivided into three groups: the first-from above 10,0 %; the second-10,0-8,5 %; the third - below 8,5 %.

The expert estimation on the content of melanin at the lambs of the black colouring carried on a traditional visual method to intensive, normal and weakened is spent. The content of melanin inherent in them over 10,0 % - 73 %, normal - 8,5-10,0 %>, by average - 65,7 of % weakened below 8,5-64,5 % is thus established for intensive lambs.

Thus, as criterion of selection of different degrees of expressiveness of pigmentation of black lambs of karakul breeds following parametres are accepted: intensive-from above 10,0 %; normal-in limits of 8,5-10,0 % and the weakened-is lower 8,5 %.

As a method characterising degree and uniformity of pigmentation the microscopic method of calculation of cages layer on dabs macerates hair is used.

Research of types of distribution of melanin in cages a layer karakul lambs of different colourings has shown that the corresponding data (table 2) is inherent in each class.

Table 2 – Frequency of layer cages of different classes of pigmentation in macerates hair of karakul lambs of black colouring

Inpercentage

Expressiveness	Stake-in of goals	Classes of cages on pigmentation					
		0	1	2	3	4	5
Theintensive	37	–	2,7±2,66	8,1±4,48	54,1±8,19	21,6±6,76	13,5±5,62
Thenormal	35	–	2,9±2,84	11,4±5,37	60,0±8,28	17,1±6,36	8,6±4,74
Theweakened	31	–	6,4±4,40	12,9±6,02	67,7±8,40	9,6±5,29	3,2±3,16
Intotal	103	–	3,9±3,64	10,7±3,05	60,2±4,82	16,5±3,66	8,7±2,78

Depending on pigmentation degree distinguished following classes of cages: 0 is not present melanin, 1 no more than 20 separate melanosoms in a cage, 2 more than 20 separate melanosoms, but they, basically, can be counted, 3 only separate melanosoms ("scattering" melanosoms), but them so much, is 1-3 «glybki» (compact congestions melanosoms) the melanin which diameter does not exceed 1/2 diameters of a cage, 4 in a cage there are huge glybka a pigment, on diameter more than 1/2 diameters cages. 5 pigments in a cage a hook are a lot of that its congestions shield each other and to count them it is impossible.

Results of the analysis show (table 2) that for all black lambs absence of a class 0 and the lowest frequency of 1 and 2 classes is characteristic. 3 class which microscopy has found out only separate melanosoms ("scattering" melanosoms) has high frequency of occurrence. Them it has appeared so much, it is impossible what to count, as they shielded each other. In the given table the third class has kept the modality. In the first class primary expressiveness of the weakened pigmentation 6,4±4,40 % is observed. In the second class also the weakened expressiveness has an indicator a little above the others 12,9±6,02 %. Intensive expressiveness of pigmentation considerably prevails in 4 and 5 groups-21,6±6,76 of % and 13,5±5,62 % accordingly. It is characteristic that indicators of the intensive and weakened expressiveness inversely proportional each other. Lambs of normal expressiveness of pigmentation give out stably average indexes on all classes.

Thus, instrument estimations of pigmentation of a coat of karakul sheep of black colouring by the EPR-spectrometry and microscopy method have great value for identification of expressiveness of the colouring, based on definition of the content of melanin in a coat and microscopy of cages layer of hair. We recommend following criteria of selection of expressiveness of colour for the purpose of their typification and classification: black intensive - the content of melanin from above 10,0 and microscopy of classes of cages layer-3, 4 and 5.

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К. М. Лаханова[1], Б. Ш. Кедельбаев[2]

[1]Х. А. Ясауи атындағы Халықаралық қазақ-түрік университеті, Түркістан, Қазақстан,
[2]М. Әуезов атындағы Оңтүстік Қазақстан мемлекеттік университеті, Шымкент, Қазақстан.

ҚАРА ТҮСТІ ҚАРАКӨЛ ҚОЗЫЛАРЫНЫҢ ЖАМЫЛҒЫ ТҮГІНІҢ ПИГМЕНТТІҢ АСПАПТЫҚ ЖОЛМЕН БАҒАЛАУ

Аннотация. Мақалада қара түсті қаракөл қозыларының жүн талшығының бойында пигмент меланиннің мелшері және түктің қыртыс қабатындағы кератиноциттегі меланин таралуын аспаптық-объективті жолмен бағалау қарастырылған. Қара қозылардың түсінің жүннің құрамындағы меланин мөлшеріне байланысты болуының өзіндік ерекшеліктері олар мынандай шамада болады: қара түс – 7,93-12,54% аралығында болады.

ЭПР спектромерии зерттеулер көрсеткендей, меланин мөлшері қанықтылығы қарқынды – 10,0% жоғары, қалыпты – 8,5–10,0% шегінде және әлсіз дәрежедегі 8,5% төмен. Жамылғы түгінің қыртыс қабаттың жасушаларын микроскоптық зерттеу арқылы топтастыру, қаракөл қойларының жүндерін кластарға бөліп дифференциялау. Қара түсті реңдер үшін пигменттелу дәрежесі 5 класқа бөлінеді және модалдық болып 3-клас саналады (60%).

Түйін сөздер: қаракөл қозылары, түс, жүн талшығы, меланин, микроскоп, электронды-парамагнитті резонанс (ЭПР).

К. М. Лаханова[1], Б. Ш. Кедельбаев[2]

[1]Международный казахско-турецкий университет им. Х. А. Ясауи, Туркестан, Казахстан,
[2]Южно-Казахстанский государственный университет им. М. Ауезова, Шымкент, Казахстан

ПРИБОРНАЯ ОЦЕНКА ПИГМЕНТАЦИИ ВОЛОСЯНОГО ПОКРОВА КАРАКУЛЬСКИХ ОВЕЦ ЧЕРНОЙ ОКРАСКИ

Аннотация. В статье приводятся данные по изучению пигментации волосяного покрова каракульских овец черной окраски. По содержанию меланина имеют свои специфические особенности и находятся от 7,93 до 12,54%. В качестве критерия отбора разных степеней выраженности пигментации приняты следующие параметры: интенсивная – свыше 10,0%; нормальная – 8,5–10,0% и ослабленная – ниже 8,5%.

Микроскопические исследования классификации клеток коркового слоя волос каракульских ягнят черной окраски дифференцированы по классам. Для черной окраски по интенсивности и с разной степенью пигментации характерны 5 классов и модальным является 3-й (60%).

Ключевые слова: каракуль, ягнята, окраска, волос, меланин, микроскоп, электронно-парамагнитная резонанс (ЭПР).

Сведения об авторах:

Лаханова Кулзада Мергенбаевна – доктор сельскохозяйственных наук, профессор, Международный казахско-турецкий университет им. Х. А. Ясауи, кафедра «Морфологии и физиологии человека»

Кедельбаев Бахытжан Шильмирзаевич – доктор технических наук, профессор, Южно-Казахстанский государственный университет им. М. Ауэзова, Высшая школа «Химическая инженерия и Биотехнология», кафедра «Биотехнология»

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N. V. Kushzhanov, U. Zh. Aliyev

Turan-Astana University, Astana, Kazakhstan.
E-mail: kushzhan@bk.ru aliyevu@mail.ru

DIGITAL SPACE: CHANGES IN SOCIETY AND SECURITY AWARENESS

Abstract. Digital transformation of world permits all areas in our life from economy to policy, society and culture. The recent scandal with community service center and data protection showed how much sensitive we are in front of cyber-attacks and vulnerable when it comes to our personal security. The security awareness is necessary skill in present life, it's important for our job, social interactions and etc. EAUE stepped in new stage of interaction its formation of Digital Space, where no borders or limitation of information and resources. Cybersecurity as a national strategy and plan needs to deliver not only better security in government and business services, but a fundamental shift in the safety of the electronic environment in which they operate. Over the last 20 years, the IT community has failed to deliver a data utility that has the level of trust common in other utilities. What can the IT community do to turn around the current obstacles to developing an effective digital society? The purpose of this research paper is to discuss the security challenges that are associated with the digital age. The topic of cyber security is one that should be talked about more often in today's society. This paper points out the importance of cyber security awareness and protection. It touches on the major ideas of why our community and corporations are currently in a predicament. Lastly, the paper ends with proposed solutions on what can be done to address cyber security challenges in digital life.

Keywords: security; mobile devices; security awareness; cyber threats, digitalization, digital space.

Introduction. Mobile devices (i.e., cellphones, laptops, tablets) have become an indispensable part of our everyday life, since they fulfill the increasing users' desire for Internet connectivity and access to information, social and private networks at any time and place. Owing to the proliferation of "smart" devices and the escalating dependency on them with respect to the execution of everyday tasks, they have evolved from a communication medium to a multifunctional equipment. The reduced cost, in combination with the increasing computational and storage capacity of mobile devices, allow them to accommodate critical functionalities with significant security and safety related impact such as e-banking, control systems and Internet of things architectures. Such devices do not simply store information related to their owners, but also receive data on people and infrastructure related in some way to them. As a result, they can retrieve, store and modify extensive quantities of diverse and potentially sensitive information.

Furthermore, the users are accustomed to the notion of continuous connectivity, even across networks with potentially unknown configurations. Such transmissions are likely to be vulnerable to unauthorized access and, consequently, they constitute a security risk. In many cases, these risks materialize as direct criminal attacks, such as privacy intrusions or unauthorized disruptions of communication. Moreover, they can expose the users to more complex types of malicious activity, such as identity theft, blackmailing, active data collection, or defamation. In light of the increasing risks due to the aforementioned use of mobile devices, it is important that users are aware of the risks they are exposed to and, more importantly, that they are informed about how to protect themselves.

The exponential spread and scale-up of digital technologies and services has profound global implications, creating opportunities for sustainable development and inclusive growth, but at the same time new threats and challenges. Digitalization has an important role to play in a wide range of areas including gender, good governance, transparency and accountability, the fight against corruption, job

creation and private sector development, access to micro-finance, improving access to public services - notably energy, protecting the environment and addressing climate change, providing humanitarian aid, promoting education, health or agriculture. As such, digital solutions can help combat poverty, contribute to better targeting and the linking of humanitarian and development activities, and help to manage migration and address shortcomings in a number of EU partner countries where identification and civil registries, digital entrepreneurship and Small and Medium Enterprises (SME's), e-Services, e-Government, mobile financing or blockchain secured transactions can reduce inequalities and increase prosperity. Digitalization acts as an accelerator and enabler of many, perhaps all of the SDGs. The 2030 Agenda for Sustainable Development sets specific targets in this respect.

Security awareness is the knowledge and attitude members of an organization possess regarding the protection of the physical, and especially *informational*, assets of that organization. Many organizations require formal security awareness training for all workers when they join the organization and periodically thereafter, usually annually.

The ability to evolve a digital society and to gain the many promised benefits depends in large part on a widespread confidence in the fabric of cyberspace. The denial-of-service attacks against Paypal and Amazon.com (2010), CNN (2008), Twitter (2009), the Australian Parliament (2010) and US oil firms (2011) may or may not have been successful in damaging the target, and indeed may have been used for publicity by Internet security companies, but they have increased public concern over security in cyberspace. The more serious intrusion attacks against Sony Corp. (in which credit card details of thousands of gamers were released) and RSA (in which highly sensitive information relating to its secure two-factor authentication device was compromised) demonstrate that the Internet is increasingly a very dangerous place to operate.

So what has changed on the Internet? The answer, of course, is everything – business activities, information technology, the communications environment and the threat landscape. Today, vendors and attackers have become embroiled in a cyber arms race, and users are the losers. There are regular reports of government and business systems being infiltrated and data breaches in government departments. Consumers' computers, wireless modems and, increasingly, cell phones are being subverted, and even the basic fabric of cyberspace is under attack, with nations demonstrating their ability to take control of the Internet.

In the last five years, there have been a number of fundamental shifts in technology and its use that require equally fundamental shifts in attitudes towards security. Information technology has evolved from purely a means of systems automation into an essential characteristic of society: cyberspace. The kind of quality, reliability and availability that has traditionally been associated only with power and water utilities is now essential for the technology used to deliver government and business services running in cyberspace.

Technology is changing rapidly, and another fundamental shift is occurring with the emergence of cloud computing. Cloud computing enables individuals and organizations to access application services and data from anywhere via a web interface; it is essentially an application service provider model of delivery with attitude. The economies possible through use of cloud, rather than internal IT solutions, will inevitably see the majority of businesses and, increasingly, governments running in the cloud within the next five years. This substantially changes the ways in which organizations can affect and manage both their IT function and security in their systems.

Today's security standards were developed in a world in which computers were subject to fraud and other criminal activities by individuals inside and, in some cases, outside the organization. However, this has changed in the last five years with the rapid increase in organized cybercrime through the emergence of robot networks (botnets), which enable criminal activity to be conducted on an unprecedented global scale and can also be used as force multipliers to deliver massive denial-of-service attacks on targeted businesses – at a level at which nations are increasingly at risk of being cut off from the global Internet.

Unfortunately, the capability of national police forces to stop global cybercrime is developing much more slowly than the technical abilities of cybercriminals. Cybercrime is now arguably a bigger issue than illegal drugs. The adoption of the Council of Europe Convention on Cybercrime is setting the scene for a global response to cybercrime, and there are signs that police forces globally are working together. However, much more needs to be done to develop the concept of a global jurisdiction before an adequately agile response to cybercrime can be developed.

Understanding the Threat Source. Clearly, understanding the source of any threat and the likelihood of the threat being a danger to an organisation's business interests is a critical first step in building a cybersecurity strategy. Steven Bucci describes the threat actors as shown in figure.

Figure 1—Threat Actors

Threat Sources	Description
Bot network operators	Bot network operators are hackers; however, instead of breaking into systems directly, they take over multiple systems to co-ordinate attacks and distribute phishing schemes, spam and malware attacks. The services of these networks are sometimes made available in underground markets (e.g., purchasing a denial-of-service attack, servers to relay spam, phishing attacks).
Criminal groups	Criminal groups seek to attack systems for monetary gain. Specifically, organised crime groups are using spam, phishing and spyware/malware to commit identity theft and online fraud.
State-sponsored actors	Foreign governments and intelligence services use cybertools as part of their information-gathering and espionage activities. In addition, several nations are aggressively working to develop information warfare doctrine, programmes and capabilities.
Hackers	Hackers break into networks for the thrill of the challenge or for bragging rights in the hacker community. While remote cracking once required a fair amount of skill or computer knowledge, hackers can now download attack scripts and protocols from the Internet and launch them against victim sites.
Insiders	The disgruntled organisation insider is a principal source of computer crime. Insiders may not need a great deal of knowledge about computer intrusions because their knowledge of a target system often allows them to gain unrestricted access to cause damage to the system or to steal system data. The insider threat also includes outsourcing vendors as well as employees who accidentally introduce malware into systems.
Phishers	Individuals or small groups who execute phishing schemes in an attempt to steal identities or information for monetary gain
Spammers	Individuals or organisations that distribute unsolicited email with hidden or false information to sell products, conduct phishing schemes, distribute spyware/malware or attack organisations (e.g., denial-of–service attacks)
Spyware/malware authors	Individuals or organisations that produce and distribute spyware and malware, sometimes for free and sometimes to sell to the highest bidder
Terrorists	Terrorists seek to destroy, incapacitate or exploit critical infrastructures to threaten national security, cause mass casualties, weaken the global economy, and damage public morale and confidence.

Steven Bucci"s model of treat factors

Steven Bucci shows that while cyberthreats are changing from individual hackers through organized crime and terrorist-based attacks to national- or state-sponsored cyberattacks, the level of danger is correspondingly increasing. Thus, while individuals may cause mayhem, it has been largely unsustainable and fairly contained. Now an attack may result in widespread destruction and an ongoing undermining of state sovereignty.

There is no single solution or panacea to the issues of cybersecurity, nor should there be. Each organization should assess what its needs are, how it intends to conduct its business activities and what the risks are to that process. There is a plethora of highly capable solutions that can then be implemented and, more important, maintained.

Consumers in cyberspace, be they government, industry or society, continue to be more mobile, more demanding and less tolerant of failure. While there is an increased awareness of threats, often the increased adoption of security comes only after data breaches and system failures.

What is cyber security and why should we care? Cyber security has become a new concept in the last decade. With technology advancing every day our society is becoming more connected than we have ever been before. While these advances are making our daily lives easier they are also adding extra risks to our

personal information. Most people do not think about their identities getting stolen when they make an online purchase, check their email, or use social media. However, each time that you put your personal information on the Internet you are at risk of that information getting stolen. This is especially true for students, who spend so much time online doing school activities. Every time that they login to do school work, they are putting themselves at risk. There are many simple ways that these risks can be reduced, but it starts with cyber security awareness.

Cyber Security. The internet is not a secured space. It is an area where currently there are not many regulations. It is where anyone can put up, take down, or gather as much information as they want (Hall, 2012). It is open for anyone to place any information that they want online. Cyber security is becoming an increasingly talked about topic. With more and more people making their personal information available online than ever before, it is becoming a hacker's paradise. There are multiple different schemes that have been happening recently that are associated with Internet usage. Some of these scams involve hackers cracking passwords to get access to personal information and criminals using phishing techniques to gather information that they can use to steal individual's identities. Lastly, some schemes include phishing techniques used to con people out of money (Jansson & von Solms, 2013).

However, most individuals do not know about all of these scams and are unaware when they are happening to them. Because of this, people do not know how to protect themselves and how to stop being a target. It is important that we, as a nation, focus on making these individuals aware of the potential risks associated with the Internet. Cyber security needs to be more common knowledge and education needs to be more readily available. It is important for us to help educate individuals on what they can do to stop and prevent potential cyber security attacks. It is also especially important that our students to be able to recognize potential threats. Therefore, cyber security, awareness, and education needs to be taught at the higher education level.

Awareness. We log into our email account, bank account, or social media account and we do not even think about the process. These are the types of activities that hacker's make a living off of. The majority of people are not only unaware that cyber threats are real, but are also unaware of what to do about them. Most people just hope or assume that identity theft and phishing attacks are not going to happen to them. Ignorance is bliss after all. But, making society aware that even the smallest tasks can pose potential threats is crucial for their safety.

Awareness is the first step in reducing the number of identity thefts and personal information threats. The majority of individuals understand that by having their personal information online that they are taking a risk of that information being compromised. However, they do not possess the knowledge to know how to protect themselves. These people also understand that they should not include very sensitive information online, such as their social security numbers. Yet, they do not realize that even accessing your email could be just as detrimental to their safety.

Individuals believe that if they have a unique password then they are protecting themselves enough that they do not have to worry about cyber security threats (McCrohan, Engel, & Harvey, 2010). While this is a good first step, and it is strongly recommended to create unique passwords, it still simply is not enough to keep information private. Most hackers have the technology and knowledge to know how to decrypt these passwords or bypass them completely. Each day that our technology is improving is another day that hackers are figuring out how to crack that technology. "There is no argument whatsoever that the proliferation of devices and information are empowering. Technology is today far more democratically available than it was yesterday and less than it will be tomorrow" (Geer, 2015).

Likewise, much of the population believes that installing virus protection or spy software onto their computers is enough. They think that this software is going to save them from ever being hacked or having their information stolen (McCrohan, Engel, & Harvey, 2010). This is also simply not true. We need to change this way of thinking by helping society recognize the signs of the potential threats and risks. We then need to hand them the information that they need to keep themselves safe and protected. Some of the signs that users need to be aware of that usually indicate a phishing attempt are: words being misspelled, a certain degree of urgency or "deadlines", fake names and web links, and a request for personal information (Lungu & Tăbuşcă, 2010).

Mobile Awareness. Cyber security threats are not only common with computers. These threats are becoming increasingly popular on mobile devices. This is something that everyone, including students

need to become aware of as well. With just as much information, if not more, on our cell phones as on our computers, hackers are starting to utilize the same technics that they do for computer phishing as they are now using for mobile device phishing. This threat is also something that students also need to recognize and become aware of. Behaviors need to change with both computer and mobile device usage. Just because your phone is almost always in your possession does not mean that the information in it is secured.

Education needs to become more available for both computer security and mobile device security as well. Many corporations are at risk because their employees are not knowledgeable on internet protection. This problem is one that needs to be addressed at the higher education level with college students (Patten & Harris, 2013). Many of the same security threats that are associated with computers are also associated with mobile devices. However, mobile devices pose more threats and challenges when it comes to protecting your information. This is because your cell phone usually holds more personal data than your computer does. Also, with mobile devices constantly moving in and out of Wi-Fi networks, many of which are unsecured, it makes stealing data easier for hackers. Another problem with mobile device security is the amount of malware being downloaded from App downloads. Malware on mobile devices is now higher than it is for PCs (Patten & Harris, 2013).

Creating a Safer Future. Teaching cyber security awareness and protection to students is not only important for their personal safety, but it is also setting us up for a safer future. Many of the threats that companies face could have been prevented if their employees were more educated on the subject of cyber security. “The state cyber-security in the United States is suffering from a lack of attention from industry and academia” (Pappalardo, 2004). This is leaving large corporations unprotected because their employees are not trained in this field. This is also leaving many of their client’s personal information unsafe and unsecured. It is the responsibility of The Department of Education to address attention to this major issue.

In fact, this issue is becoming “a matter of local and global importance” (U.S. Schools Not Preparing Kids for Digital Age, 2013). The workplace is filled with challenges associated with the digital age. Students in the United States are coming out of college not prepared to handles these challenges. This is making it difficult for employers who are looking for an IT professional that can help them with their cyber security needs. Since employers are not able to find these professionals who are both trained in general IT and security, it is leaving the employers and their company vulnerable. “Not only must students know how to stay safer online at school and at home, but they also must be equipped to deal with the workplace challenges of the digital age” (U.S. Schools Not Preparing Kids for Digital Age, 2013).

Technology is continuing to change and therefore curriculum needs to be changing along with it. “Cybersecurity is perhaps the most difficult intellectual profession on the planet” (Geer, 2015). Employers are realizing that they need more employees that have technology and security knowledge, but are finding it difficult to find students with the right combination of knowledge and expertise (Patten & Harris, 2013). They are finding that students are usually trained in specific areas of IT, but not with knowledge of cyber security practices. Colleges and Universities should be steering students towards degrees and careers that focus on cyber security and IT practices for the future safety of US organizations (Peterson, 2014).

Proposed Solutions. So what is to be done about this ever increasing dilemma? Well, there are a few options. The first option is to make everyone aware of the problem and get them excited about learning about cyber security. President Obama has taken the first step in making this come to life. He has declared that October will be National Cyber Security Awareness Month (Homeland Security, 2016). NCSAM is all about getting both the public and private sectors aware that the internet affect’s all of our daily lives, whether we realize it or not. The month is filled with events that are aimed at making the community aware of the threats associated with the internet. In addition to NCSAM, January 28th has been declared National Data Privacy Day (StaySafeOnline.org). On this day the National Cyber Security Alliance holds an event to promote cyber security awareness. They encourage users to STOP. THINK. CONNECT. All of these events are a great way to get information out to the public. However, for it to sink in for users and to make a difference we need this information to be important all year long, not just in October or on January 28th. These events are great for awareness and for getting the public excited about cyber security, but the end goal is for this information to be important year round.

The second option to solving this problem is starting cyber security education at younger ages. This topic should be just as important as history and gym. We need to start education in the middle school and

high school levels. If we education students when they are younger, then there is a chance that we can get them excited about cyber security. We can create passion in students and they will then continue with that passion into college and their future careers. "Kids and teens have embraced the digital world with great intensity, spending as many as eight hours a day online by some estimates" (U.S. Schools Not Preparing Kids for Digital Age, 2013). This option will work because kids are already interested in the digital world, now we need to get them interested in how to protect themselves. We need to create a generation of cyber security enthusiasts.

The third option is to better educate our teachers. A major reason that our students are not educated on the affects cyber security is because our teachers are not educated on the subject either. "Yet, few …educators are teaching topics that would prepare students to be cyber-capable employees or cybersecurity-aware college students" (U.S. Schools Not Preparing Kids for Digital Age, 2013). The only way that we can expect student's behavior to change is if we teach them the proper way to handle these situations. Therefore, students who are now enrolled in teaching programs should be required to take cyber security courses. And current teachers should focus on online safety and cyber security awareness when taking continuing education courses and professional development training.

Lastly, the fourth option is for the academic community and corporations to team up (Pappalardo, 2004). We need to know what these corporations are looking for in an IT professional when they come out of college. We need to know what their company's needs are. Then the academic community will be able to come up with curriculum that meets and exceeds those needs. We need to start producing college graduates that possess the knowledge, skills, and capabilities to handle the new challenges that are associated with the digital age and cyber security.

Conclusion. Cyber security awareness is more important now than it has ever been before. Threats to personal information is increasing and identities are getting stolen every day. Making individuals aware of this is the first step. The second step is giving individuals the tools and knowledge that they need to protect themselves.

Being security aware means you understand that there is the potential for some people to deliberately or accidentally steal, damage, or misuse the data that is stored within a company's computer systems and throughout its organization. Therefore, it would be prudent to support the assets of the institution (information, physical, and personal) by trying to stop that from happening.

According to the European Network and Information Security Agency, 'Awareness of the risks and available safeguards is the first line of defense for the security of information systems and networks. With technology advancing every day our society is becoming more connected than we have ever been before. While these advances are making our daily lives easier they are also adding extra risks to our personal information. Most people do not think about their identities getting stolen when they make an online purchase, check their email, or use social media. However, each time that you put your personal information on the Internet you are at risk of that information getting stolen. This is especially true for young generation, who spend so much time online doing school activities. Every time that they login to do some work; they are putting themselves at risk. There are many simple ways that these risks can be reduced, but it starts with cyber security awareness.

The Internet and social media have become powerful channels for learning about public policy issues, exhorting friends and family to vote and supporting one's favorite causes or candidates. Over the last 20 years, there has been immense growth in the number of computing and network services, enabling transactions to be undertaken by the smallest businesses across a global marketplace. At the same time, there has been a growing community of individuals who have sought to exploit the vulnerabilities of network devices, computer systems and applications.

IT systems have proved over the last 20 years to be less than perfect, requiring compensating controls to address problems when they arise. Vendors continually release tactical patches and upgrades to fix problems, but hackers with knowledge, skills and capability have developed and released exploits and easy-to-use tools to enable even the least technical users to become adversaries. Security is not an adjunct or add-on to cyberspace; it is a fundamental aspect that must be considered alongside all other core functions to ensure that the business can meet its strategic objectives. Academics need to include cybersecurity as a core component of computer and information science to deliver a workforce properly prepared for its role in the digital society. The organization's leaders need to ensure that security architectures are deve-

loped to reflect the needs of the business, that the people it employs are certified professionals and tradespeople, and that the technology products and services that it uses are fit for purpose. For its part, government can usefully set the necessary standards and lead by example.

New governance models need to be developed that provide a consistent and effective basis for trust in a business process co-sourcing environment, and should ensure the existence of testing, monitoring and business continuity. Security technology continues to be complex and unwieldy, and not well aligned with consumer needs. Having to remember multiple IDs and complex passwords is a major inconvenience and a cause of many security issues. Posting personal information to public sites continues to be a contributing factor to identity theft. Firewalls protect what information is left behind inside the corporate electronic perimeter, but do little to protect the vast amount of business-sensitive information outside. Intrusion detection systems detect yesterday's problems, but not tomorrow's problems. Security models, architectures and technologies need to reflect these concerns.

Multiple activities within the business do not mean that there should be multiple security architectures to support them. Having a single, consistent and persistent approach that is proven and flexible is much easier to maintain. However, this does require a good understanding of the business objectives, the operational market and the risks the business faces. Hence, the security model must recognize that protection of services and information in itself is not enough; the company must be able to recover from failure and continue to operate at a level expected by its operating partners and customers. And, it must be able to demonstrate that capability on a continuous basis.

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Н. В. Күшжан, О. Ж. Әлиев

«Тұран-Астана» университеті, Астана, Қазақстан

САНДЫҚ КЕҢІСТІК: ҚОҒАМДАҒЫ ӨЗГЕРІСТЕР ЖӘНЕ ҚАУІПСІЗДІК МӘСЕЛЕЛЕРІ

Аннотация. Әлемдегі сандық жаңару өмірімізде экономикадан бастап саясатқа дейінгі аймақты, қоғам мен мәдениетті қамтиды. Жақын арада халыққа қызмет көрсету орталығындағы жеке мәліметтердің жоғалу жағдайы біздің кибершабуылға әлсіздігімізді көрсетті, бұл жерде қауіпсіздік мәселесі де бар. Қауіпсіздік шараларын білу және түсіну – өзіміздің жұмысымыз үшін, әлеуметтік қарым-қатынастар үшін қажет дағды. ЕАЭС өзара қарым-қатынастың жаңа кезеңіне аяқ басты, бұл – ақпарат пен ресурстарда шектеу болмайтын Сандық Кеңістіктің қалыптасуы. Киберқауіпсіздік ұлттық стратегия сияқты дамуы керек, ол іскерлік қызмет көрсету нарығында қауіпсіздікті қамтамасыз етіп қоймай, IT қоршаған ортадағы қауіпсіздікті түпкілікті өзгерту жоспарын да қамтиды. Бұл ғылыми-зерттеу жұмыстарының мақсаты – сандық ғасырмен байланысты қауіпсіздік мәселелерін талқылау. Киберқауіпсіздік тақырыбы бүгінгі қоғамда жиі айтылатын мәселе. Аталған мақала қоғамдағы қауіпсіздік мәселесін тұтастай қарастырады. Біз сандық өмірде киберқауіпсіздікті қамтамасыз ететін нақты шешімдерді ұсындық

Түйін сөздер: қауіпсіздік, мобильді құрылғылар, қауіпсіздік мәселелері, кибер қауіптер, сандық кеңістік, сандық трансформациясы.

Н. В. Кушжанов, У. Ж. Алиев

Университет «Туран-Астана», Астана, Казахстан

ЦИФРОВОЕ ПРОСТРАНСТВО: ИЗМЕНЕНИЯ В ОБЩЕСТВЕ И ВОПРОСЫ БЕЗОПАСНОСТИ

Аннотация. Цифровое преобразование мира охватывает все области нашей жизни – от экономики до политики, общества и культуры. Недавний скандал с ЦОН и утечкой личных данных показал, насколько уязвимы мы перед кибератаками, когда дело доходит до нашей личной безопасности. Знание и понимание мер безопасности – необходимый навык в существующей жизни, это важно для нашей работы, социальных взаимодействий и т.д. ЕАЭС вступил в новый этап взаимодействия, это – формирование Цифрового Пространства, где не существуют границ или ограничений информации и ресурсов. Кибербезопасность должна развиваться как национальная стратегия и план, в рамках, которых должна обеспечить не только лучшую безопасность в правительстве и рынке деловых услугах, но и фундаментальное изменение в безопасности IT окружающей среды, в которой они работают. Цель этой научно-исследовательской работы состоит в том, чтобы обсудить проблемы безопасности, которые связаны с цифровым веком. Тема кибербезопасности – это та проблема, о которой нужно говорить чаще в сегодняшнем обществе. Данная статья рассматривает проблемы безопасности общества в целом. Мы попытались предложить определенные решения того, что может быть сделано, для того, чтобы обеспечить кибербезопасность в цифровой жизни.

Ключевые слова: безопасность; мобильные устройства; вопросы безопасности; кибер угрозы, цифровая трансформация, цифровое пространство.

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Zh. M. Omarkhanova[1], Z. S. Mukhambetova[2], B. T. Mataeva[2]

[1]Kazakh S. Seifullin Agrotechnical University, Kazakhstan,
[2]Karaganda Economic University Kazpotrebsoyuz, Kazakhstan.
E-mail: zhynysova@mail.ru, zamira250172@mail.ru, botagozmatayeva@mail.ru

COMPETITIVENESS OF MEAT PRODUCTION OF RURAL REGIONS OF KAZAKHSTAN

Abstract. The purpose of the study is to study the current state of the competitive environment of agriculture in the regions of Kazakhstan. Competitiveness of livestock production is determined, on the one hand, by the availability of production and technological knowledge among managers, on the other hand, by the price of livestock products, which depends both on the sales channel and on the quality of the products produced. The result of the research showed the unsatisfactory state of the competitive environment of agriculture in the regions of Kazakhstan, which requires fundamental changes in the support of the livestock sector. Economic analysis in the search for ways to improve the competitiveness of livestock production should be aimed at increasing productivity, reducing feed consumption per unit of output, reducing losses in livestock and products, and also in obtaining the maximum possible prices when it is sold. State support in the opinion of the authors will be decisive in the effective development of agricultural competitiveness.

Key words: meat products, competition, livestock, agriculture, state, program, diversification.

Introduction. The agricultural sector of Kazakhstan in terms of its role in the structure and, in general, in the reproductive process of the economy is the basis. In accordance with the Development Strategy until 2020, the agro-industrial complex among the seven priority sectors should fully realize its branch advantages and scale potential [1]. Kazakhstan needs to more effectively use its competitive advantages, especially in the production of environmentally friendly products. Much attention is now being paid not only to increasing the volume of production, but also to increasing its level of efficiency and profitability.

Agricultural production in Kazakhstan today is a small commodity, which is the main reason for its weak competitiveness. Concentration of livestock on private farmsteads makes it difficult to use the achievements of breeding, progressive technologies of keeping and feeding livestock, does not allow growing livestock using scientific methods and achieving its high productivity.

Most small private farms do not have the opportunity to equip their farmsteads with the appropriate technical equipment, which negatively affects the quality of production. The state does not have the capacity to fully control all farms at once. This leads to small-scale production, while the tribal direction in livestock breeding is particularly affected. Along with this, the problem arises with the reproduction of animals. Thus, the prevailing level of non-native cattle does not provide an opportunity to calculate for quality products and maintain a competitive position in the market.

Methods of research. The main methods of research are a method of deduction and induction, as well as a comprehensive approach and a method of scientific abstraction. The variety of goals, objectives and areas of activity in agriculture predetermines various criteria for assessing the effectiveness of economic entities.

Results. Livestock in Kazakhstan is growing rapidly, mainly due to imports. This fact has a positive effect on the development of the breeding base. Selection work on pedigree cattle breeding is now conducted very carefully, which promotes the production of quality products, as well as the breeding of thoroughbred animals. An important point is that the import of livestock must pass through all related facilities, for example, the breed's correspondence to living in Kazakhstan's climatic conditions, the identity of the forage base, the possibility of providing veterinary care for specific breeds, etc.

First of all, the situation is unfavorable in opposing the accession to the WTO so aggressive pricing policy will not be able to compete with large foreign suppliers and associations, even the largest Kazakh companies. To receive subsidies to private farmsteads and small farms, it is necessary to group and create special programs for quantitative and qualitative development [2]. Since cooperation today is one of the most pressing methods for solving agricultural problems.

The development of the system of state financial and credit support for agricultural enterprises is confirmed by the development of a new State Program for the Development of the Agroindustrial Complex of the Republic of Kazakhstan for 2017-2021 from 14.02.2017, the main task of which is to involve small and medium-sized farms in agricultural cooperation.

Priority right to receive all measures of state support:

- leasing of agricultural machinery and equipment;
- investment subsidies for the purchase of agricultural machinery and equipment;
- subsidizing interest rates for crediting agribusiness entities, leasing of agricultural machinery and animals, technological equipment;
- subsidizing the costs of the audit unions of agricultural cooperatives for conducting internal audit of cooperatives;
- simplification of the procedures for the provision of loans and leasing under the terms of subsidiaries of JSC "NUKH "KazAgro" with repayment of the initial loan payment by means of investment subsidies and granting loans for subsequent crediting of its members [3].

Table 1 – Bereke Financing Program

Special purpose	Processing of agricultural products
Recipients	Entrepreneurs operating within the South Kazakhstan region
Maximum amount of financing	from 16 million tenge
Interest rate	Loan - 7%, leasing - 8%
Loan term	Up to 84 months
Repayment of principal / interest	monthly / quarterly / semi-annually;
Grace period for repayment of principal and compensation	up to 24 months (it is established personally according to the business plan)
General requirements	• Absence of overdue debts for taxes and other mandatory payments to the budget; • Absence of overdue debts to second-tier banks and other financial institutions.
Security	The main collateral is immovable property, with mandatory coverage of the total amount of obligations (amount of microcredit + planned interest for 12 months); Additional collateral - movable / immovable property (land plots, transport); Leasing - an advance payment in monetary terms of 20% of the cost of the equipment purchased (in the absence of cash, 40% of collateral is required).
Special conditions	• The presence of a business location (a building and/or a building with an adjacent land plot, etc.), all necessary infrastructure that may belong to the borrower, the relative of the borrower (father, mother, spouse, spouse, brother, sister), as well as a third party in the presence of a lease contract for a business location, or an agreement on joint activities.

Table 2 – Conditions for lending under the Yrys program

Special purpose: 1. Acquisition of pedigree brood stock of cattle of dairy breed; 2. Acquisition of the necessary agricultural machinery and equipment for dairy farms subject to subsidy in accordance with the subsidy rules for the reimbursement of part of the costs incurred by the agro-industrial complex subject to investment; 3. Replenishment of working capital. Financial instrument: 1. loan / non-renewable credit line for purchase of breeding dairy cattle of cattle of dairy breed: 2. loan / non-renewable credit line / leasing - for the purchase of machinery and equipment; 3. loan / non-revolving credit line - to replenish working capital in the total amount of not more than 15% of the loan / credit line / leasing amount. Maximum loan / credit line / leasing amount per one Borrower: up to 60 (sixty) million tenge. Interest rate: - 4% per annum with a subsidized rate of remuneration; 11% per annum in the event that the rate of remuneration is not subsidized.

Conditions of lending under the "Yntymak" program:

The program "Yntymak" is aimed at the creation and development of agricultural cooperatives for meat, dairy and fruit and vegetable products. Provision is made for the purchase of equipment, specialized agricultural machinery, replenishment of working capital. The loan term is up to 7 years, the interest rate is 7%, the loan amount is up to KZT 50 million.

The creation of agricultural cooperatives contributes to solving not only economic, but also social problems: through the organization of agricultural cooperatives in the areas of marketing, processing of agricultural products, logistics and maintenance of agricultural producers, increase employment of the rural population, and create additional jobs.

Sources of financing

- Contributions of members of the cooperative, external investors
- NCA "KazAgro"
- JSC "Fund for Financial Support of Agriculture"
- JSC KazAgroFinance
- Agrarian Credit Corporation JSC
- JSC KazAgroGarant
- JSC "KazAgrounim"
- JSC KazAgroMarketing (information and consulting services)
- JSC Damu Entrepreneurship Development Fund
- Banks of the second level.

Kazakhstan has real opportunities to occupy a worthy niche among the world's exporters of meat and processed products - these are vast pasture lands that allow to maximally reduce the cost of production, the presence in the neighborhood of a capacious Russian market (which is in a single customs space) and, finally, existing national traditions of keeping beef cattle. In terms of meat production, Kazakhstan ranks third after Russia and Ukraine.

All beef production, occurring on the territory of the country, accounts for the most part from the whole assortment – the share of beef production is 41.8% [4]. Many experts predict that by 2020 the country may face a deficit of beef, and the demand for it will increase by 1.8%. To avoid this situation, it will be necessary to reform the production system and the livestock population. These reforms require a large investment, however, based on their experience of developed countries in this sector, this business will be quite profitable, and on average its profit will be about 40%.

Conclusions. Summarizing the analysis of the present state of beef cattle breeding, we can conclude that the development of livestock in Kazakhstan is hampered by four key factors. Firstly, it is the concentration of livestock in small-scale property, secondly, the low breed of livestock, thirdly, insufficient feed provision and, fourthly, this is an inadequate veterinary service. However, the measures of state support that have been undertaken have made it possible to create the necessary conditions for stabilizing the development of the agro-industrial complex, expanding export opportunities, improving the living standards and welfare of the rural population, and strengthening the positive trends in the development of the agrarian sector of the economy.

The increase in the number of livestock will stimulate the growth of domestic trade, and will also push the country to large volumes of exports. For Kazakhstan, exporting at a sufficient level of livestock will be fairly easy, thanks to the appropriate market conditions, namely, natural and climatic conditions, the availability of pastures (180 million hectares), proximity to large sales markets.

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Ж. М. Омарханова[1], З. С. Мухамбетова[2], Б. Т. Матаева[2]

[1]С. Сейфуллин атындағы Қазақ агротехникалық университеті, Астана, Қазақстан,
[2]Қазтұтынуодағы Қарағанды экономикалық университеті, Қазақстан

ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ ОБЛЫС АУДАНДАРЫНДА ЕТ ӨНІМДЕРІН ӨНДІРУДІҢ БӘСЕКЕГЕ ҚАБІЛЕТТІЛІГІ

Аннотация. Зерттеудің мақсаты Қазақстанның өңірлерінде ауыл шаруашылығының бәсекелестік орта жағдайын зерттеу болып табылады. Мал шаруашылығы өнімдерінің бәсекеге қабілеттілігі, бір жағынан, өндіріс және технологиялық білімдердің менеджерлердің қолжетімділігі, екінші жағынан, сату арнасында да, шығарылатын өнімнің сапасына да байланысты мал шаруашылығы өнімдерінің бағасы бойынша анықталады. Зерттеудің нәтижесі мал шаруашылығы секторын қолдаудың түбегейлі өзгерістерін талап ететін Қазақстанның өңірлеріндегі ауыл шаруашылығының бәсекелестік ортасының қанағаттанарлықсыз күйін көрсетті. Мал шаруашылығының бәсекеге қабілеттілігін арттыру жолдарын іздестіруде экономикалық талдау өнімділікті арттыруға, өнімнің бірлігіне қарай азықтандыруды азайтуға, мал мен өнімнің шығындарын азайтуға, сондай-ақ сатылған кезде барынша мүмкін болатын бағаларды алуға бағытталған болуы керек. Авторлардың пікірі бойынша мемлекеттік қолдау ауыл шаруашылығы бәсекеге қабілеттілігін тиімді дамытуда шешуші болады.

Түйін сөздер: ет өнімдері, бәсекелестік, мал, ауыл шаруашылығы, мемлекет, бағдарлама, әртараптандыру.

Ж. М. Омарханова[1], З. С. Мухамбетова[2], Б. Т. Матаева[2]

[1]Казахский агротехнический университет им. С. Сейфуллина, Астана, Казахстан,
[2]Карагандинский экономический университет Казпотребсоюз, Казакстан

КОНКУРЕНТОСПОСОБНОСТЬ МЯСНОЙ ПРОДУКЦИИ СЕЛЬСКИХ РЕГИОНОВ КАЗАХСТАНА

Аннотация. Цель исследования – изучить современное состояние конкурентной среды сельского хозяйства регионов Казахстана. Конкурентоспособность производства животноводства определяется, с одной стороны, наличием производственно-технологических знаний у руководителей, с другой – ценой на продукцию животноводства, которая зависит как от канала реализации, так и от качества производимой продукции. Результат исследования показал неудовлетворительное состояние конкурентной среды сельского хозяйства регионов Казахстана, требующее кординальных изменений в поддержке отрасли животноводства. Экономический анализ при поиске путей повышения конкурентоспособности производства животноводства должен быть направлен на увеличение продуктивности, сокращение расхода корма в расчете на единицу продукции, снижение потерь поголовья и продукции, а также на получение максимально возможных цен при ее реализации. Государственная поддержка, по мнению авторов, будет решающей в эффективном развитии конкурентоспособности сельского хозяйства.

Ключевые слова: мясная продукция, конкуренция, животноводство, сельское хозяйство, государство, программа, диверсификация.

About the authors:

Omarkhanova Zhibek Maksutovna – associate professor of the Department of Finance of the Kazakh S. Seifullin Agrotechnical University G. Astana. zhynysova@mail.ru

Mukhambetova Zamira Seydakhmetovna – Associate Professor of the Department of Economics and Entrepreneurship, Karaganda Economic University Kazpotrebsoyuz, zamira250172@mail.ru

Mataeva Botagoz Tuleshovna – I.O. head. Department of Tourism and Catering, Associate Professor, Candidate of Economic Sciences, Karaganda Economic University Kazpotrebsoyuz, botagozmatayeva@mail.ru

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S. K. Kurbaniyazov

Research Institute of Ecology, International Kazakh-Turkish University named after H. A. Yassavi,
Turkestan, Kazakhstan.
E-mail: saken_geo@mail.ru gazi_toychibekova@mail.ru

CHARACTERISTICS OF ZEOLITES FROM CANKANAY, ALTYN-EMELSKOYE, KAINARSKAYA, TUZKOLSKOE, DAUBABINSKOYE DEPOSITS

Abstract. The article gives a description of the zeolites of the Chankanay, Altyn-Emel, Kaynar, Tuzkol and Daubabinskoye deposits. Zeolites (natrolite and thomsonite) along with analcime and calcite perform numerous tonsils in lavas, cement clastic material in tuffs, and also form secondary emissions of feldspar, leucite and volcanic glass. The content of zeolites is from 5 to 15%. Monomineral zeolite accumulations are found in some areas, along faults. Horizons of zeolite-containing rocks can be traced for 5 km at a power of up to 50 meters or more. The most promising in the search for zeolite are sites along tectonic disturbances, where zeolitization processes have intensively manifested. Mineral composition shows that zeolites of these deposits can be used as ameliorants, diet additives in the cement industry.

Key words: zeolite, deposits, minerals, spar, tectonics.

Zeolite is a generalized name for frame aluminosilicates produced in deposits and obtained synthetically. Their crystal structure is represented by tetrahedra of silicon and aluminum oxides, united in lacy frames with the same size cavities filled with cations of alkali and alkaline earth metals and water molecules. It is the porous structure and diverse composition of ions that determine its qualities, making the zeolite irreplaceable for use in the chemical, nuclear, food, agriculture, life and medicine. In the world there are about 1000 deposits where it is possible to extract natural zeolite (tuff) on a large scale [1].

The Chankanay deposit (467) is located in the Guards district of the Almaty region, 25km southeast of the railroad. Saryozek station and 5 km to the south-east from the Chankanay RTS, 1 km from the asphalt road. The area is economically developed. It was opened in 1990. Almanemel party. Studied by AV Morozov in 1994.

The deposit is confined to the Saryozek brachisinclinorium. The host rocks-tuffs, ignimbrites of the rhyolite-dacite composition of the Zalgizagashsky permian formation (Figures 135, 136). Mineralization is represented by a horizontally lying deposit of zeolites, not contoured in length and width. Its average power is 25 m. Depth of occurrence of the rabbit from 0 to 25 m.

Chemical composition of ores, %: SiO_2 – 50-62, TiO_2 – 0,3, Al_2O_3 – 12-16, Fe_2O_3 – 3,1-4,0, CaO – 1,4-1,9, MnO – 0,1, Na_2O – 0,1-1,4, K_2O – 5-5,5.

Mineral composition of zeolite ores: clinoptilolite, lomontite, analcime. Content of zeolites – 15-90%.

Zeolites can be used as a sorbent for purifying waters for domestic and drinking purposes and as a feed additive in animal husbandry and poultry farming.

The following conditions are taken into account when calculating the reserves: the on-board content of zeolites is – 20%, the minimum content of zeolite is 50%, the minimum thickness of the ore body is 2 m.

Inventories recorded in the balance sheet (kt) as of 01.01.96 are A + B + C1-3406, with a zeolite content of 60.4%, off-balance – 3604 at a zeolite content of 47.64%.

Open-cast mining with a maximum working depth of 20 m has been carried out since 1996 by Rystas JSC. The conditions of occurrence of zeolites, the shape of the body, high power, insignificant depth and

volume of overburden are very favorable. Prospects of the field are very significant due to transfer of reserves to higher categories, additional exploration of flanks and promising ore occurrences near the field [2].

The Altyn-Emel field (468) is located in the Panfilov district of the Almaty region, 55 km west-north-west of the railroad station Sary-Ozek. The Almaty-Sary-Ozek-Khorgos highway runs through the field. In 7km north-west of the settlement properties. Tests as strontium and cadmium sorbents were carried out at the Institute of Metallurgy and Enrichment of the National Academy of Sciences of the Republic of Kazakhstan. On the chemical faculty of KazNU on their basis a catalyst was obtained, intended for direct purification of gases and hydrogen sulphide.

Altynamel, in 20km south-east of the village of Baschi. The area is economically developed. In a 5 km power line with a capacity of 10 kW. It was discovered in 1986 by V.N. Portnyagin, V.I. Lysov. It was studied in 1990 by L.G. Pavlov.

It is confined to the Altyn-Emel anticline. It is located among the volcanogenic strata of the rocks of the Zheldykarinskaya suite of the upper Permian. The thickness falls monoclinically to the northwest at an angle of 200. The underlying rocks are andesite and dacite porphyrites, overlapping-tuffs and tuffites of various composition. The total thickness of the formation is 900 m, zeolite-bearing rocks are 150 m. Zeolitization affected tuffs of mixed composition (andesite-dacite). The richest areas with a high content of zeolites are confined to zones of disruption. The shape of the bodies is lenticular. Stretching them north-west 290-3300, length 1500 m, width 100-700 m, power 16-51m (average 43m). The depth of occurrence is 0-52 m.

Mineral composition: Heylandite, Stilbite, Skulecite, Lomontite.

Chemical composition: %: SiO_2 – 47.94; TiO_2 – 0.84; Al_2O_3 – 17.59; Fe_2O_3 – 7.93; FeO – 0.62; Fe_2O_3 + FeO – 8.55; CaO – 7.31; MgO – 4.28; MnO – 0.12; Na_2O – 2.67; K_2O – 0.47; Na_2O + K_2O – 3.14; P_2O_5 – 0.14; SO_3 – 0,1.

Physico-mechanical properties of zeolites: density – 2.54-2.89 (2,76) g/cm^3, bulk weight – 2.37-2.63 (2.42) g/cm^3, total porosity – 8.21-18.59 (13.97) % , bulk density – 1.33-1.46 g/cm^3.

The crush strength index is 0.51 - 1.03 kg/cm^2, the abrasion strength index is 99.0-99.9%, the water resistance is 98.05 - 99.7%, the benzene pore volume is 63 g/cm^3. Adsorption properties – 3.6 and 7.3% at p/ps = 0.4-1.0%, cationic properties from 24 to 64 meq / 100 grams (average 35), non-thermoresistant, highly acid resistant. Reserves of zeolites, approved by the balance on 01.01. 96. g., Account for the category C1 - 41 million tenge.

Forecast reserves with a zeolite content from 46.8 to 53.1% (average 50.1%) are 41163 thousand tonnes. The tests carried out allow the use of zeolite ores in the production of building materials (active mineral additives), as a feed additive for agricultural animals and birds, and for environmental protection (water treatment). The reserve deposit, explored, recommended for further technological study.

The described manifestations are located on a very promising area (425 sq. km.), Where the estimated reserves for P3 are estimated – over 5 billion tons of zeolite [3].

In addition to the above, there are manifestations of unclear perspectives, which require redemption: Dardandallah, Oikaragan, Kokto-Beb, Shakpakty, Saryozek, Maytyubinskoye, Shiylisu, Arkharli, Malaysar, and many unnamed manifestations. Most of them gravitate to the Chankanai field, significantly increasing its prospective reserves.

Sedimentary type.

The manifestation of the Kainar (474) is located in the Syrdarya region of the Kyzylorda region, 20 km east of the railroad. Zhana-Korgan station, in the central part of the Prikaratau region, in the interfluve of the Akuyk-Besharyk and is confined to the Zhana-Korgan elevation, complicated by the Shukyroy graben-syncline, Zhidelinsky and Zhana-Korgan anticlines.

Deep geological mapping of scale 1: 50000 was carried out within the area, thematic and prospecting works on granular phosphorites.

Phosphate deposits of the Middle Eocene occur on the noncarbonate bentonite clays of the Lower Eocene and are subdivided into the upper siliceous and lower carbonate packs. The rocks are porous, the composition is siliceous-argillaceous, and the silica is represented by globular and worm-like intergrowths of opal. Clay substance - montmorillonite composition. The silica content is 69.14 to 73.76%, the

carbonate content is 4.08-6.8%. Carbonate pack capacity of 8-20 m is composed of marls clay and phosphate-containing carbonate clays, limestones and phosphorites. Carbonate rocks 56-59% [4-5].

The clinoptilolite, quartz, cristobalite, calcite and montmorillonite were determined in the upper, siliceous part of the section in well.24a by X-ray analysis. Moreover, the amount of clinoptilolite decreases as it approaches the phosphatonic thicker.

In the interval of 12-22 m clinoptilolite more than 50%, 22-31 m – up to 20%. On an area of 300 sq. Km, 2700 million tons of clinoptilolite ore can be expected in category P3.

Manifestation Tuzkolskoye (475) is located in the Syrdarya region of the Kzyl-Orda region, 80 km north of the city of Kzyl-Orda, on the Tuzkol uplift, which extends along the main Karatau fault and has an isometric shape.

The arch of the uplift is composed of deposits of the Upper Cretaceous, the northeastern and eastern slopes are lacustrine sedimentary deposits of the Paleocene, Lower, Middle and Upper Eocene, overlapped by Neogene-Quaternary formations. The geological structure is complicated by a series of faults. The depth of occurrence of the mid-Eocene soles exceeds 100 m. Middle Eocene deposits are phosphate-bearing, occur on dark gray (to black) clays of the Lower Eocene. Regularities in the distribution of carbonate and siliceous rocks along the section are not observed. Plastics are not sustained on laterals.

Taking into account the lithological-facies, structural and stratigraphic features on the recommendation of S. Ya. Bayakhunova, phosphatostenium, higher and lower deposits for the presence of sedimentary-diagenetic zeolites.

In clay-zeolite rocks (well # 32/38), lying above the productive horizon, 65-70% of the zeolite is determined from the sections. In the sections taken between the layers of granular phosphorites, the content of the zeolite along the thin sections in the borehole. 34/38 at a depth of 12 m - 30%, 36 m - 15-20%, 48 m - 10-12%. In the base of the productive bundle along the well. 14/12 in the interval 97.5-98.4 m on the grinding of the zeolite 70%, at a depth of 111 m - up to 80%. In a similar horizon along the well. 18/0 determined up to 90% of zeolites at a power of up to 20 m. Radiographic analysis determined clinoptilolite-geylandid.

On an area of 750 km^2 along P3, it is possible to expect 13,500 million tons of ore. A comprehensive assessment of the area for the extraction of zeolite, granular phosphorites, glauconite and bituminous shales, containing rhenium, tungsten, molybdenum, germanium.

The Daubabinskoye deposit (469) is located in the Sairam district of the South Kazakhstan region on the right bank of the Daubab River, 15 km to the southeast of the village. Sas - Tube and 50 km northeast of Shymkent.

The rocks of the Daubabinsky permian formation form the core of the Daubabin brachisinline and are characterized by a high content of zeolites (Kompaneytsev, 1962). A complex of non-metallic minerals is associated with the volcanoes of the Daubabinsky Formation. Here, a large deposit of volcanic rocks, suitable as active additives to cement and for the production of mineral wool, has been explored. The area of development of the Daubaban volcanics is promising for the discovery of deposits of zeolites, vermiculites and Iceland spar (Fig. 139). The increased content of potassium, magnesium and a number of trace elements in volcanics allows us to recommend them as fertilizers [6, 7].

Zeolites (natrolite and thomsonite) along with analcime and calcite perform numerous tonsils in lavas, cement clastic material in tuffs, and also form secondary emissions of feldspar, leucite and volcanic glass. The content of zeolites is from 5 to 15%. Monomineral zeolite accumulations are found in some areas, along faults. Horizons of zeolite-bearing rocks can be traced for 5 km at a power of up to 50 meters and more.

Estimated reserves of zeolites (Kompaneets, 1962) – hundreds of thousands of tons, and active mineral additives – 221132 thousand tenge. The most promising in the search for zeolite are sites along tectonic disturbances, where zeolitization processes.

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С. К. Құрбаниязов

«Экология» ҒЗИ, Қ. А. Ясауи атындағы халықаралық қазақ-түрік университеті,
Түркістан, Қазақстан

ЧАНКАНАЙ, АЛТЫН-ЭМЕЛЬ, ҚАЙНАР, ТҰЗКӨЛ, ДАУБАБИНСК ЦЕОЛИТТІ КЕН ОРЫНДАРЫНЫҢ СИПАТТАМАСЫ

Аннотация. Мақалада Чанканай, Алтын-Эмел, Қайнар, Тұзкөл және Даубабинск кен орындарының цеолиттері сипатталған. Цеолиттер (натролит және томсонит) анальцим мен кальцитпен бірге лавалардағы көптеген бөртпелерді, түтіктердегі цемент-қылшықты материалдарды орындайды, сондай-ақ қайталама дала шпатының тұнба, лейкит және вулканды шыны түзейді. Цеолиттердің құрамы 5-тен 15%-ға дейін. Мономинералды цеолит жинақтары кейбір жерлерде, ақаулықтар бойында кездеседі. Цеолит құрамындағы жыныстардың горизонты 50 метрге дейін немесе одан да көп қуатпен 5 шақырымға дейін байқалады. Цеолит қорларын іздестіруде ең перспективалы болып табылатыны – цеолитизация процестері қарқынды түрде көрініс тапқан тектоникалық бұзылыстары бар жерлер. Минералды құрамы көрсеткендей, осы кендердің цеолиттері цемент өндірісінде мелиоранттар, диеталық қоспалар ретінде қолданыла алады.

Түйін сөздер: цеолит, кендер, минералдар, шпат, тектоника.

С. К. Курбаниязов

НИИ «Экология», Международный казахско-турецкий университет им. Х. А. Ясави,
Туркестан, Казахстан

ХАРАКТЕРИСТИКА ЦЕОЛИТОВ МЕСТОРОЖДЕНИЙ ЧАНКАНАЙ, АЛТЫН-ЭМЕЛЬСКОЕ, КАЙНАРСКОЕ, ТУЗКОЛЬСКОЕ, ДАУБАБИНСКОЕ

Аннотация. В статье приведена характеристика цеолитов местрождений Чанканай, Алтын-Эмельское, Кайнарское, Тузкольское, Даубабинское. Цеолиты (натролит и томсонит) вместе с анальцимом и кальцитом выполняют многочисленные миндалины в лавах, цементируют обломочный материал в туфах, а также образуют вторичные выделения по полевым шпатам, лейциту и вулканическому стеклу. Содержание цеолитов от 5 до 15%. На отдельных участках, вдоль разломов, встречаются мономинеральные цеолитовые скопления. Горизонты цеолитсодержащих пород прослеживаются на 5 км при мощности до 50 метров и более. Наиболее перспективными на поиски цеолита являются участки вдоль тектонических нарушений, где интенсивно проявились процессы цеолитизации. Минеральный состав показывает, что цеолиты данных месторождений могут быть использованы в качестве мелиорантов, диетдобавок в цементной промышленности.

Ключевые слова: цеолит, месторождения, минералы, шпаты, тектоника.

About the author:

Kurbaniyazov S.K. – Ph.D, Research Institute of Ecology, International Kazakh-Turkish University named after H. A. Yassavi, Turkestan, Kazakhstan. saken_geo@mail.ru gazi_toychibekova@mail.ru

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A. Zh. Asainov[1], K. S. Mustafayev[2], E. N. Zhaulubaev[2]

[1]University "Turan Astana", Astana, Kazakhstan,
[2]Kazakh University of Technology and Business, Astana, Kazakhstan.
E-mail: arhat_asainov@mail.ru, astana_kzo@mail.ru, bosyaj@mail.ru

ECONOMIC SECURITY IN ENTREPRENEURSHIP ACTIVITY

Abstract. In the authors' opinion, entrepreneurial activity, in its essence, is very versatile and involves the solution of organizational issues, legal and economic problems, technical aspects, personnel, etc. Particularly difficult is the management of such activities, when the firm is a large, diversified manufacturing enterprise that has the broadest business connections and a significant number of counterparties: suppliers, creditors, borrowers, customers. In any case, each firm is a system that includes the basic elements and relationships between them. Economic security is one of the main elements of national security, and economic interests are an integral part of national interests. The economy of Kazakhstan grew rapidly before the period under review. This was facilitated by rising oil prices, fiscal and tax incentives and the growth of consumer lending, which supported the demand of the population.

Keywords: politics, security, economy, sovereignty, principles, system, security.

Introduction. A system is a collection of objects, the interaction of which determines the presence of integrative qualities, not inherent in its parts, components. Just by the lines of internal and external links of the system (firm), threats to its economic security can be realized. To ensure the maximum degree of protection against these threats, certain activities are required, which should also be systemic.

The subject of the economic security system is the stable economic state of the entity.

Entrepreneurial activities in the current and prospective period. It is from the object of protection that the basic characteristics of the system for ensuring economic security largely depend. Since the object of protection is complex, multidimensional, the effective provision of economic security must be based on an integrated approach to managing this process.

In the United States, economic security is the ability to protect or strengthen the US economic interests in relation to events, processes or actions that could threaten these interests, and discourage them. The basic condition for ensuring Japan's economic security is the preservation of global political and economic stability, the full maintenance of free trade, and the maintenance of friendly relations.

Methods of research. The study of this topic was based on modern materials of domestic and foreign sources recognized by worldwide scientists in the field of economic security. The main methods of research are a method of deduction and induction, as well as a comprehensive approach and a method of scientific abstraction.

The discussion of the results. The complex approach assumes the account in management of the object of all its basic aspects, and all elements of the controlled system are considered only in the aggregate, integrity, unity. Thus, it is necessary to create an integrated system for ensuring the economic security of entrepreneurial activities.

An integrated system for ensuring the economic security of entrepreneurship is a set of interrelated measures of an organizational and legal nature carried out to protect business activities from real or potential actions of individuals or legal entities that can lead to significant economic losses.

At the heart of the development of an integrated system for ensuring the economic security of entrepreneurship must be a certain concept. The concept includes the goal of an integrated security management system, its objectives, principles of operation, object and subject, strategy and tactics.

The purpose of this system is to minimize external and internal threats to the economic state of the business entity, including its financial, material, information, human resources, based on the developed and implemented set of measures of economic, legal and organizational nature. It should be borne in mind

that the primary importance in ensuring economic security of business belongs to the primary - economic, legal and organizational measures that provide the foundation, the basis of the security system, in contrast to the secondary - technical, physical,

In the process of achieving this goal, specific tasks combining all areas of security are being addressed.

Tasks solved by the security system:

- forecasting of possible threats to economic security;
- organization of activities to prevent possible threats (preventive measures);
- identifying, analyzing and assessing the real threats to economic security that have arisen;
- decision-making and organization of activities to respond to emerging threats;
- constant improvement of the system of ensuring economic security of entrepreneurship.

The organization and functioning of an integrated system for ensuring the economic security of entrepreneurial activities for maximum efficiency should be based on a number of the following principles.

1. The principle of legality. All activities of the company, including its security services, must, of course, be legal, otherwise the security system can be destroyed through the fault of the business entity itself. As negative consequences, there may be various kinds of sanctions by law enforcement agencies, recruiting as a defendant in court, blackmail from criminal structures.

2. The principle of economic feasibility. Only those objects whose defense costs are less than the losses from the implementation of threats to these objects should be protected. The financial capabilities of the company in organizing the economic security system should also be taken into account here.

3. Combination of preventive and reactive measures. Preventive measures are precautionary measures that prevent the occurrence or realization of threats to economic security. Reactive - measures that are taken in case of actual occurrence of threats or the need to minimize their negative consequences.

4. The principle of continuity - assumes that the functioning of an integrated system for ensuring the economic security of entrepreneurship must be carried out continuously.

5. The principle of differentiation. The choice of measures to overcome the emerging threats takes place depending on the nature of the threat and the severity of the consequences of its implementation.

6. To achieve these objectives, it is necessary to constantly coordinate the activities of various units of the security service, the firm itself and a combination of organizational, economic, legal and other means of protection.

7. Full control over the system of economic security provision to the management of the business entity. This is necessary firstly, so that the security system does not become a closed formation focused on solving narrow problems, without taking into account the interests of the firm as a whole, and secondly, to assess the effectiveness of the system and its possible improvement.

The strategy is a long-term approach to achieving the goal. The general strategy of economic security is expressed through a general concept of an integrated system for ensuring the economic security of business. In addition to the general strategy, special strategies are also highlighted (for example, depending on the stage of entrepreneurial activity). Finally, functional safety strategies can be applied:

1. The strategy of economic security includes, first of all, the system of preventive measures, implemented through regular, continuous, operation of all units of the business entity to verify counterparties, analysis of prospective transactions, examination of documents, compliance with confidential information rules, etc. The security service in this case acts as a controller.

2. The strategy of reactive measures, applied in the event of the occurrence or actual implementation of any threats to the economic security of entrepreneurship. This strategy, based on applying a situational approach and taking into account all external and internal factors, is implemented by the security service through a system of measures specific to the given situation.

Conclusions. Medium-sized enterprises, as a rule, use a combined security system. On the one hand, if necessary, they receive services from outside organizations, on the other hand, they actively rely on the capabilities of their own services and units, for example, legal and financial departments, marketing, security, personnel, economic analysis, records management, etc. Sometimes, in order to increase the effectiveness of these services and units for the protection of economic interests in such enterprises, a coordinating body is created or a manager responsible for the economic security of the enterprise is appointed. For a large enterprise, it is advisable to create your own security service. As a rule, all security activities are coordinated by one of the company's managers.

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А. Ж. Асаинов [1], К. С. Мустафаев[2], Е. Н. Жаулаубаев[2]

[1]«Тұран Астана» университеті, Астана, Қазақстан,
[2]Қазақ технология және бизнес университеті, Астана, Қазақстан

ЭКОНОМИКАЛЫҚ ҚАУІПСІЗДІК КӘСІПКЕРЛІК ҚЫЗМЕТТЕ

Аннотация. Авторлардың пікірі бойынша, кәсіпкерлік қызметі, мәні бойынша, өте жан-жақты және ұйымдастырушылық мәселелерді, құқықтық және экономикалық мәселелерді, техникалық аспектілерді, қызметкерлерді және т.б. шешуді қамтиды. Фирма кең ауқымды іскерлік байланыстары бар және контрагенттердің айтарлықтай саны бар ірі өндіруші кәсіпорын болған кезде мұндай қызметті басқару қиынға соғады: жеткізушілер, кредиторлар, қарыз алушылар, клиенттер. Кез келген жағдайда, әр фирма – олардың арасындағы негізгі элементтер мен қатынастарды қамтитын жүйе. Экономикалық қауіпсіздік-ұлттық қауіпсіздіктің негізгі элементтерінің бірі және экономикалық мүдделер ұлттық мүдделердің ажырамас бөлігі болып табылады. Қарастырылып отырған кезеңге дейін Қазақстан экономикасы қарқынды түрде өсті. Бұған мұнай бағасының өсуі, салықтық және салықтық ынталандыру және халықтың сұранысын қанағаттандыратын тұтынушылық несиелердің өсуі ықпал етті.

Түйін сөздер: саясат, қауіпсіздік, экономика, егемендік, принциптер, жүйе, қауіпсіздік.

А. Ж. Асаинов[1], К. С. Мустафаев[2], Е. Н. Жаулаубаев[2]

[1]Университет «Туран Астана», Астана, Казахстан,
[2]Казахский университет технологии и бизнеса, Астана, Казахстан

ЭКОНОМИЧЕСКАЯ БЕЗОПАСНОСТЬ В ПРЕДПРИНИМАТЕЛЬСКОЙ ДЕЯТЕЛЬНОСТИ

Аннотация. По мнению авторов, предпринимательская деятельность, по своей сути, является весьма разносторонней и связана с решением организационных вопросов, правовыми и экономическими проблемами, техническими аспектами, кадровыми и т.д. Особенно усложняется управление такой деятельностью, когда фирма является крупным, диверсифицированным производственным предприятием, которое имеет широчайшие деловые связи и значительное количество контрагентов: поставщиков, кредиторов, заемщиков, клиентов. В любом случае каждая фирма представляет собой систему, включающую основные элементы и связи между ними. Экономическая безопасность является одним из основных элементов национальной безопасности, и экономические интересы являются составной частью национальных интересов. Экономика Казахстана до анализируемого периода росла быстрыми темпами. Этому способствовали рост цен на нефть, фискальные и налоговые стимулы и рост потребительского кредитования, которое поддерживало спрос населения.

Ключевые слова: политика, безопасность, экономика, суверенитет, принципы, система, защищенность.

Сведения об авторах:

Асаинов Архат Жоламанович – докторант, Университет «Туран-Астана», Астана, Казахстан

Мустафаев Канат Сеиткамалович – к.э.н., ассоциированный профессор, Казахский университет технологии и бизнеса, Астана, Казахстан

Жайлаубаев Ерболат Нурахметович – магистр естественных наук, старший преподаватель, Казахский университет технологии и бизнеса, Астана, Казахстан

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Z. K. Ayupova[1], D. U. Kussainov[2]

[1]Kazakh national agrarian university, Almaty, Kazakhstan,
[2]Kazakh national pedagogical university named after Abai, Almaty, Kazakhstan.
E-mail: zaure567@yandex.ru

SOME ASPECTS OF FURTHER DEVELOPMENT OF EURASIAN ECONOMIC UNION

Abstract. For broad research of the sense and maintenance of this problem the authors carefully studied the problems of integration and further strengthening of economic relations of the countries-participants of the Eurasian Economic Union. The Eurasian Economic Union (EAEU) is the international organization, which joined the economies of the several statesin order to conclude and realize the international contracts and also to develop the international legal relations. Such integration organically keeps in accordance with the global vectors of the political, social and economic development. We consider that the world in the next decades will change in the direction of the decentralized globalism, dynamically developed regional states with the consolidation around themselves the respective regions. Emergence of this model, probably, will lead to economic crises and local conflicts. But at the same time, similar negative manifestations won't be able to develop integration processes back since the successful development of the Eurasian Economic Union. Therefore in the short term, obviously, the links, connected with the attraction of the new countries in EEU, will be resolved.

Keywords: integration, Customs Union, regional economic integration, eurasianism, harmonization, common economic space, monetary policy, tax policy, customs taxes, deepening of the market relations.

The model of the Eurasian integration is presented today by Belarus, Kazakhstan, Kyrgyzstan, Armenia and Russia in the Customs Union format - the Common Economic Space. Feature of the present stage is that creation of EAEU is carried out in parallel with the processes of the formation of the common regional market, including the countries of the Custom's Union into the World Trade Organization - WTO, expansions of the structure of participants of the regional economic integration.

In these conditions the analysis of features of a new stage of regional integration from the point of view of definition of factors of stability and risk, problems and ways of deepening of the Eurasian integration, and also preservation and development of the Eurasian zone of economic growth is submitted actual.

Officially Eurasian Economic Union (EAEU) of Belarus, Kazakhstan, Kyrgyzstan, Armenia and Russia started to function since January 1, 2010. The Customs Code of the Custom's Union has marked the beginning of cooperation in a new format. Since July 1, 2011 customs control was postponed for an external contour of borders of customs space of three states. According to the basic principles of functioning of the Customs union in its framework domestic market functions; use of import and export duties [1].

The common economic space of Belarus, Kazakhstan and Russia officially earned on January 1, 2012 from the moment of introduction of the numeral documents consisted of 17 agreements, concerning the rights of migrant workers and members of their families; principles of currency policy; regulations of access to services railways; rules of support of agricultural producers and creation of conditions for ensuring the free movement of the capital.

Formation of the key factors, defining the stability of future iterative group - EAEU, among which we see the main result of the Eurasian integration:

the beginning of activity of the Eurasian Economic Commission (EEC) as supranational body within the borders of delegation of the national sovereignty on supranational level;

reforming of EAEU. A number of solutions of basic character was transferred some power to the Interstate Council of EAEU, the creation of Eurasian economic commission;

formation of the Free Trade Zone (FTZ) of the CIS. The contract on FTZ of the CIS has to come into force for ten CIS countries. According to the contract, the number of agreements came into the force (multilateral and bilateral). In addition, the mechanism of settlement of disputes, according to the procedures of the WTO, is the order of the solution of some other questions;

To our mind, the stability of the Eurasian Economic Space (EES) at the present stage depends on extent of deepening of the Eurasian integration processes within the CIS and openness of the Eurasian market.

The major factors of risk, reducing the stability of EES in all space of the Eurasian integration, at the present stage are:

- unequal correlations of the Eurasian states for contacts with the world market owing the different level of economic development and economic openness of the integrated countries;

- differentin come as one of the main social and economic consequences of the processes of the globalization of the CIS countries.

Reliability of the domestic regional market in CIS by the means of formation of the internal sources of the development as the main condition of stability of the Eurasian economic space.

As O.J. Bakayeva wrote: “For example, in the Contract on the EAEU the importance of domestic market for prospects of the Union is emphasized, in particular, high degree of competitiveness of social market economy, full employment, social progress, high level of environmental protection, scientific and technical progress, etc.”[2, P.17].

Preservation and strengthening of stability of the Eurasian integration space can and has to be provided, in our opinion, the countries of the Eurasian Economic Union within the policy of a new stage (which can be defined as “the Eurasian policy of development, openness and alignment”) in the way of:

- strengthening of the common market of five countries;

- creation of incentives to integration cooperation with other countries within domestic market of the CIS.

Successful realization of such policy at the new stage assumes:

- firstly, “cultivation” of zone of economic growth as the CIS market;

- secondly, definition of the general priorities (for all countries, participating in the Eurasian integration processes at different stages, levels, speeds and in different formats), for example, such as stability, growth and openness of the regional market CIS.

The accelerated rates of integration increase risks of economic security of the regional market in general (caused by reduction of import duties, restriction of forms of state support of branches and growth of competitiveness of foreign goods, decrease in the regional competition, deterioration of structure of economy) and cause the necessity of coordination of economic policy of the countries for providing:

- protection of the competition in the Eurasian Economic Union, assuming non-discriminatory positioning in the regional market of all countries of integration group. Kazakhstan should realize the available favorable competitive conditions for extension of the range of export goods of agrarian and industrial complex, fuel and energy, chemical, metallurgical complexes;

- protection of structure of national economies against possible consequences of openness of the market for foreign import and reduction of intra gross product (GDP)in order to share own industry and agriculture, and «preservation of national identity» of the state with the features of traditional economy;

- social protection of the population and improvement of quality of life. In particular, the question of alignment of a standard of living of the population due to GDP indicator per capital and to the Index of Human Development within the importance for Kazakhstan;

- rate protection as the main risks of accession to WTO are connected with its decrease. In average the rate will decrease approximately by 3,5%. Zones of risk can appear for those branches, where decrease in tariff will be essential.

Specifics of the present stage of the relations with the WTO are reception of Russia in the WTO. The analysis of the first results of membership of Russia in the WTO shows that the main risks for countries

with economies in transition period, including the Republic of Kazakhstan, are connected with fixing of international specialization; further decrease in competitiveness of national economy; deterioration of conditions for development of branches of agrarian and industrial complex.

These risks are aggravated with unavailability problems to participation in the international trade system; need of structural economic reorganization; undeveloped competitive environment; lack of experience within legal space of the WTO.

At the present stage expansion of the Custom's Union is carried out on space of the CIS in two directions (Central Asian and European):

- first, from positions of preservation of the existing economic space of EAEU, that is expansion of the Custom's Union at the expense of Central Asian member states of EAEU;
- second, from the point of view of expansion of economic borders of customs space due to accession of Ukraine.

Considering features of the international situation in the first case is the question about common regional safety and safety of customs space, in the second - about economic scales of the Eurasian integration space.

S.N. Garmonnikov insisted, that "strategically important from the Custom's Union to EAEU is to provide all opportunities of "flexible integration" in the transition period, the participation in the all-Eurasian integration processes of all CIS countries, despite the distinctions and approaches to the solution of key questions of definition of the purposes of participation in the Eurasian integration processes, creations of supranational bodies, advisory organizational structures" [3, p. 58].

Rejection of the CIS countries from the Eurasian economic space (disintegration of space of the Eurasian integration) is represented inadmissible, especially in the modern conditions and the increased risks of regional economic security, automatically means reduction of "a zone of economic growth" for the countries of the Custom's Union.

Perhaps, in these conditions it is necessary to make active efforts in the direction of adaptation of the contract of the CIS to Eurasian Economic Union conditions; the conclusion of the separate contracts between the Eurasian Economic Union and the CIS countries; signings of memorandums with the Eurasian economic commission, etc.

It is advisable to make use of experience in drawing up simple and accurate formulations, concerning the admission to membership of the Union and secession of the Union. So, according to the Contract on the EAEU, the member of the Union can become any European state, which respects the general values "member states within the society, which is characterized by pluralism, non-discrimination, tolerance, justice, solidarity and equality of women and men", and any member state can make the decision on secession of the Union "according to the constitutional rules". Besides, the membership in the EAEU assumes the possibility to establish a format of "the advanced partnership" of member states in the limits and an order, provided by Contracts of the EAEU.

J.V. Ginzburg stressed: "The engine of globalization is development of the world market in the interests of world powers that is practically always interests of the developing of the regional market conflict to global interests. In these conditions enhancing cooperation of the Eurasian countries within the regional and international institutes: EAEU, CIS, WTO, and UN" [4, p.37].

As we noted before, at the present stage the interests of an emerging market of the countries of the Custom's Union are conflict to the interests of the WTO, concerning the development of competitiveness of customs space. Considering structure and the directions of foreign trade of the countries of the Eurasian Economic Union, there is a danger of fixing of raw international specialization of customs space, decrease in competitiveness of the processing branches and branches of agrarian and industrial complex as preservation of the developed foreign trade priorities, the benefits from accession to WTO are received by suppliers of resources from the countries of the Eurasian Economic Union.

Permission of the considered contradiction will demand, at least, the preservation of competitive positions of customs space, in general, and competitiveness of production. There are the following factors of preservation of competitiveness of the Eurasian Economic Union in the conditions of WTO:

- transitional (or adaptation) period;
- CIS market.

The structure of the foreign trade and competitiveness of the EAEU market are available as the potential of trade economic cooperation with the CIS countries[5].

At the stage of adaptation of economies of the EAEU to the rules of the WTO new opportunities of deepening of the Eurasian integration, consisted in enhancing cooperation with the CIS countries within the WTO by consolidation of the positions and collective interests of the countries-members of the WTO.

New advantages of the participation in international trade as uniform trade and economic space are consisted from the:

- solutions of the main problems of trade liberalization, and also protection of EAEU, trade and economic space of the CIS, in particular, the market of agricultural and industrial goods, according to the legal framework of the WTO;
- participations in the questions of reforming of the WTO and safety of the international trade and economic space.

In the conclusion we would like to stress, that the new stage of the Eurasian integration, connected with creation of Eurasian Economic Union, is followed by new processes of formation of the common regional market; entries of the countries of the Eurasian Economic Union into the WTO; expansions of structure of participants of economic integration. The main problem of the present stage is ensuring stability of the Eurasian economic space, which depends on openness of the Eurasian market and deepening of the Eurasian integration processes within the CIS by coordination of economic policy in the framework of Eurasian Economic Union, including the trade policy of the countries in WTO system, in the formats of the regional integration and cooperation.

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З. К. Аюпова[1], Д. Ө. Құсайынов[2]

[1]КазНАУ, кафедра «Право», Алматы, Қазақстан,
[2]КазНПУим. Абая, общеуниверситетская кафедра политологии и социально-философских дисциплин, Алматы, Қазақстан

ЕУРАЗИЯЛЫҚ ЭКОНОМИКАЛЫҚ ОДАҚТЫҢ ОДАН ӘРІ ДАМУЫНЫҢ КЕЙБІР АСПЕКТІЛЕРІ

Аннотация. Мәселенің мәні мен маңызын кең көлемде ашу үшін мақала авторлары экономикалық одаққа қатысушы елдердің – Еуразиялық экономикалықодақ елдерінің арасындағы экономикалық байланысты одан әрі нығайтудің мәселелерін зерттейді. Еуразиялық экономикалық одақ (ЕАЭО) – бұл халықаралық ұйым, дербес елдердің экономикасын біріктіреді, әр ел өз еркімен басқа елдермен де халықаралық келіс сөздер жүргізуге, сонымен қатар басқа да халықаралық құқықтық қатынастар орнатуға ерікті мүмкіндікте. Бұл интеграция көптеген жаһандық саяси және әлеуметтік-экономикалық дамудың бағыт-бағдарларын көрсетеді. Біздің ойымызша, жақын он жылдықта әлем жаһанданудың децентрализациялық бағытында өзгереді, соның әсерінен тез қарқында дамып жатқан регионалдық мемлекеттер бір-біріменен бірігіп бірыңғай экономикалық қатынастар орнатады. Осы модельдің пайда болуының арқасында, біздің ойымызша, әртүрлі мемлекеттер осы ұйымға қосылуы мүмкін.Сонымен қатар, әлемдегі болып жатқан қайшылықты қатынастар алға дамыған интеграциялық процесстерді тоқтатуы мүмкін емес, сондықтан да қазіргі бұл елдердің алға қойған ең маңызды міндеттері – Еуразиялық экономикалық одақты сапалы түрде жетілдіру. Яғни жақын уақыттың

болашағында, біздің ойымызша Еуразиялық экономикалық одаққа басқа да мемлекеттерді кіргізе отырып, тек қана сауда саттық бағытында тоқталмай, басқа ада іс-шараларды кеңейту керек.

Түйін сөздер: интеграция, кеден одағы, аймақтық экономикалық интеграция, еуразийшілдік, гармонизация, бірегей экономикалық кеңістік, монетарлық саясат, салық саясат, кедендік салық, нарықтық қатынастардың тереңдеуі.

З. К. Аюпова[1], Д. У. Кусаинов[2]

[1]КазНАУ, кафедра «Право», Алматы, Казахстан,
[2]КазНПУим. Абая, общеуниверситетская кафедра политологии и социально-философских дисциплин, Алматы, Казахстан

НЕКОТОРЫЕ АСПЕКТЫ ДАЛЬНЕЙШЕГО РАЗВИТИЯ ЕВРАЗИЙСКОГО ЭКОНОМИЧЕСКОГО СОЮЗА

Аннотация. Для широкого раскрытия смысла и содержания данной проблемы авторы изучают проблемы интеграции и дальнейшего укрепления экономических связей стран-участников Евразийского экономического союза. Евразийский экономический союз (ЕАЭС) – это международная организация, объединяющая экономики отдельных государств, которая обладает способностью заключать и реализовывать международные договоры, а также в ином контексте быть непосредственным участником международных правовых отношений. Такая интеграция органично укладывается в глобальные векторы политического и социально-экономического развития. Мы считаем, что мир в ближайшие десятилетия будет меняться в направлении децентрализованного глобализма, в рамках которого динамично развивающиеся региональные государства смогут консолидировать вокруг себя соответствующие регионы. Появление данной модели, видимо, будет сопровождаться экономическими кризисами и локальными конфликтами, в которые будут вовлечены различные государства. Но вместе с тем, подобные негативные проявления не смогут развернуть интеграционные процессы обратно, так как первостепенная задача – это качественное развитие Евразийского экономического союза. Поэтому в ближайшей перспективе, очевидно, будут решаться вопросы, связанные с привлечением новых стран и расширением взаимодействия не только в сфере торговли, но и во многих других областях.

Ключевые слова: интеграция, таможенный союз, региональная экономическая интеграция, евразийство, гармонизация, единое экономическое пространство, монетарная политика, налоговая политика, таможенные пошлины,углубление рыночных отношений.

About the authors:

Ayupova Z.K. – Doctor of Juridical Sciences, Professor, Chair Of Law, Kazakh national agrarian university, Almaty, Kazakhstan,

Kussainov D.U. – Doctor of Philosophy Sciences, Professor, Interuniversity Chair of Politology and Socio-Philosophy Disciplines, Kazakh national pedagogical university named after Abai, Almaty, Kazakhstan,

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A. S. Baidalinova[1], A.M. Uakhitzhanova[1], Zh. Nurlankyzy[2]

[1]JSC "Financial Academy", Astana, Kazakhstan,
[2]JSC «S. Seifullin Kazakh Agrotechnical University», Astana, Kazakhstan.
E-mail: aynur.sultanovna@mail.ru; All_999@mail.ru; zhiba_22@mail.ru

STATE SPONSORSHIP OF AGRICULTURE – AN INITIAL CONDITION OF PROVIDING OF FOOD SAFETY OF THE COUNTRY (ON THE EXAMPLE OF SOUTH KOREA)

Abstract. The article considers the problem of ensuring food security and the role of public financial support as important conditions of its providing. Currently, the national food system trends impact on a planetary scale, contributing to the formation of potential threats to food security and the need for state financial support to the agricultural sector of the economy. The role of the state is considered in providing of food safety on the example of South Korea.

Key words: agriculture, food safety, investments, subsidies, state financing, import, export.

There is no doubt that the problem of food safety is important for any country and on the different stages of socio-economic development. Its providing is necessary not only with economic but also with social and political positions. The key problems of the economy, the real tendencies of development of agricultural production, food market, changes its degree of dependence on the world market, the social situation, solvency of the population as a whole and consumers in different regions are connected in the field of food security of the state.

Presently the tendencies of planetary scale impact on national food systems, stipulating forming of potential threats of food safety and necessity of state sponsorship of agrarian sector of economy. Economists and politicians name the number of arguments of a global nature in favor of such support.

Hasty economic growth and increase of population in many countries with developing economy. Passing ahead rates of height of solvent demand of population on food as compared to suggestion in such countries, as China, India, Brazil and other new industrially developed states, are violated balance in the global food system. As you know, demand, exceeding supply, conduces to the price advance. A price increase on food undermines the process of development of country, that causes slowing down of increase of production of agricultural goods, especially in the economically developed countries, which are its basic exporters. Thus world demand on food will always increase, as a population annually increases by 80 million people or by 1.4 % [1, p. 13]. About the same, the number of poor and hungry people annually increases. They become more every year, and food is less. In addition, the increase of prices on food exacerbates poverty, there are increases in social tensions and stratification of society.

Accelerated development of production and use of biofuels. The use of agricultural raw material for the production of liquid biofuels assists the height of demand on an agricultural produce, and also influences to the markets of other agricultural commodities. The height of production of biofuels not only has influence on the costs of the agricultural cultures, used for its production, but also conduces to the origin of potential connection between price changes on oil and agricultural raw material for an industrial production and other food stuffs. We will note that in recent years, price advance on oil is contributed to price increase on such food cultures, as wheat, corn, seed of oil-bearing cultures, and is resulted in retail price advance on basic food stuffs.

The rapid development of the production and use of biofuels is caused a reduction in food supplies on the world market, especially grain, which is a basic food product, not renewable due to the increase of agricultural production in the countries-importers. In recent years in foreign countries farmers mass abbreviate the sowing areas of food grain-crops in behalf on a corn and rape. About 80 % of EU biofuel is produced from rape. Among developing countries a leader in its production due to the grown cheap sugar-cane is Brazil. It is expected that world production of ethanol and biodiesel will increase rapidly [2, p. 548].

Reduction of level of world supplies of food, and, first of all, transitory supplies of grain.

The global change of climate. Over the past 100 years, the average global temperature on earth has increased by 0.3–0.6°C. In the future, as it is expected to rise by 1.5–4.5°C. The global change of climate will substantially influence on agriculture and cattle breeding, will strengthen degradation of soil and water resources, will considerably hamper providing of food safety. The increase of average annual temperature can lead to a reduction of the global volume of food production and cause the increase of prices. Thus, the decline of amount of fallouts and productivity is forecast in the countries of south group, and in the countries of north group, the productivity can grow.

Thus, the considered modern global calls of food safety are major arguments in behalf on the necessity of state sponsorship of agrarian sector of economy.

In this connection, the actual is a study of experience of foreign countries in area of financing of development of agriculture for providing of food safety of national economy. We will consider experience of South Korea in financing of agrarian sector of economy.

The structural transformation of Korea's agriculture was pursued with the rapid growth in Korea's economy and industrialization in the late 1960s, and also through the interaction between the agricultural and manufacturing sectors. The acceleration of urbanization due to economic growth led to an increase in the demand for agricultural products, and the farmers awakened witnessing the development of manufacturing and other industrial sectors, and the relevant advanced technologies were spread to the agricultural sector [3, 4].

Investment in social overhead capital such as roads, in the process of economic development, led to easier transportation of agricultural products, and the supply of farming materials such as fertilizers, thanks to the development of industry, contributed to the enhancement of agricultural productivity.

Korea's agricultural and rural development went through a 3-staged development process as seen in table 1. From the 1960s to 1970s, in the early stage of development during the pursuit of sustainable economic growth, the government directed policy concentrating on food production and self-sufficiency in staple grains to address food shortages and poverty [5-8]. From the 1980s to mid – 1990s, in the latter stage of development, the government focused on the enhancement of agricultural productivity, increasing agricultural household income, and the improvement of the agricultural structure. After 2000, Korea's agriculture entered the 'global era' and faced the new environment of market opening and trade liberalization in agricultural products, and the government had to go through a major transformation in its policies such as reducing subsidies on agricultural products [9].

Table 1 – Agricultural development of Korea by period

	Earlier Development (1960s–1970s)	Later Development (1980s–1990s)	Globalization Era (2000s–)
Economic policy	Poverty reduction Self-reliance econom	Economic growth Industrial developmen	Economic maturation Knowledge-based society
Goal of agricultural development	Agricultural production Self-sufficiency in staple food-grains	Enhancing agricultural productivity Creating farmers' income	Strengthening agricultural competitiveness Enhancing quality of rural life
Strategy of agricultural Developmen	Seed improvement, Technology development and extension Food production	Fostering commercial farms Increasing off-farm income	Promoting sustainable agriculture Integrated rural development
Source: KSP team based on the literature.			

Korea's agriculture experienced a rural exodus due to rapid economic development in the 1970s, but managed to respond to the reduction in the rural workforce by increasing capital investment [5, 6]. In other words, without major changes in land input, the government increased the input of intermediary goods along with the input of capital. From 1970 to 2012, total agricultural output increased annually with the slow relative increase rate of output. As result, Korea's actual labour productivity per household in agriculture was KRW 2,465 per hour in 1970 and KRW 13,972 per hour in 2012, showing an increase index with 5.67 times in table 2.

Table 2 – Trend of agricultural productivity in Korea

	1970	1980	1994	1995	2000	2010	2012
Labor productivity per household (KRW/hour)	2,465	3,506	10,540	9,593	11,017	15,480	13,972
(index)	(100)	(142)	(427)	(389)	(46)	(628)	(567)
Source: NH Economic Research Institute 2013.							

Continuous public investment in agricultural and rural development areas led to support in agricultural development and structural transformation. When formulating budgets, the government strengthened investment in agricultural infrastructure, such as the consolidation of arable land and agricultural irrigation, and conducted a dual pricing system for rice production with the aim of achieving income stability, higher production motivation for farmers, and the stabilization of inflation. In Korea's agricultural development and structural transformation, the improvement and strengthening of agricultural cooperatives' functions led to a nationwide agricultural financing and rural household credit system [10].

As a result of 40-year-long comprehensive economic and agricultural development projects undertaken since the 1960s, Korea could achieve a remarkable agricultural structural transformation as well as economic development as seen in Table 3. Due to economic growth, the rural population ratio of the total population was reduced from 58.2% in 1960 to 8.6% n 2000, and the agricultural production proportion of GDP was reduced from 36.8% in 1960 to 4.9% in 2000 [11].

Moreover, the agriculture employment ratio was reduced from 63% in 1960 to 10.5% during the same period. Concurrently, due to the restructuring of farmland, cultivation area per agricultural household increased from 0.9 ha per household in 1960 to 1.4 ha per household in 2000 [12].

Compared to other advanced countries, Korea's agriculture went through a relatively drastic structural transformation in a short period of time. The structural transformation was accelerated with market internationalization and opening that started in the 1990s. As seen in Table 3, agricultural structural transformation in advanced countries was achieved gradually over 40 to 70 years; in Korea, however, this was achieved within 25 years along with industrialization. Dramatic growth in Korea's economy enabled rapid structural transformation in agriculture; even though the contribution of agriculture to the nation's economy has decreased dramatically [13].

Table 3 – Korea's economic development and agricultural structural transformation

	1960	1980	2000
Economic growth rate (annual average, %)	2,3	-1,7	8,9
Per capita GDP (USD)	79	1,713	11,951
Proportion of rural population (%)	58,2	28,4	8,6
GDP share of agricultural production (%)	36,8	16,2	4,9
Proportion of employment in agriculture (%)	63,0	34,0	10,5
Cultivated acreage per farm household (ha)	0,9	1,0	1,4
Source: Korea Rural Economy Institute, National Statistics Office, and the Bank of Korea.			

Korea pursued government-led policies to effectively achieve the goals of agricultural development, which were the reduction of poverty and increase of agricultural productivity, responding to potential possibilities or market failure during the early stage of agricultural development [5,8]. In general, agriculture that depends highly on the natural environment is regarded as an infant industry with relatively more possibility of market failure than other industries. The following elements could lead to potential market failures in agricultural development:

Uncertainties of agricultural economy and imperfect competition:

- Unstable prices due to non-elasticity of supply and demand of agriculture
- The nature of public goods of agricultural infrastructure such as irrigation
- Public service taking charge of agricultural R&D and extension
- Disparity of income between agriculture and non-agriculture, urban and rural areas
- Asymmetric information of farmers and the limitations of their bargain power

In the early stages of agricultural development in Korea, agricultural development policies were carried out under the government's initiative in order to achieve the goals of agricultural development in a short period of time and visible progress in agricultural structural transformation, while responding to the abovementioned elements, with the possibilities of market failure [14].

In particular, among the factors above, market functions were ineffective in: 1) building agricultural infrastructure such as irrigation facilities, 2) R&D and extension system of agricultural technologies, and 3) policies to alleviate the income reason, Korea pursued government-led policies and strengthened public investment for effectively responding to potential market failure.

The agricultural development policy was, in part, consistent with the government-led national development strategy to overcome poverty and achieve sustainable growth in a short period of time [15].

However, in terms of overall economic or agricultural development policies, Korea did not focus only on government- led policies. In the early stages of development, Korea had scarce resources to work with, the domestic markets were small, and purchasing power was low due to low income levels. In order to overcome these limitations, the Korean government carried out government-led policies to enhance efficiency in resource allocation responding to potential market failure. Finally, Korea's economic policy, including agricultural policy, could be defined as a mixed-economy policy, tuning and harmonizing market functions in certain areas when required.

Korea achieved the goals of agricultural development, the increase of agricultural productivity and the self-reliance of staple food, through government–led agricultural policy during the early stage of development. However, it experienced several cases of price distortion and the impact of fiscal deficit where the government intervened in agricultural policies. Examples of price distortion brought about by governmental intervention can be found in subsidies for agricultural inputs such as fertilizer and machinery [10]. The Korean government supported a subsidy of approximately 20% for fertilizer in 1970s, which resulted in a great increase of agricultural productivity through the increased input of fertilizer. The subsidy policy, however, also brought about a shortage of financing and inevitable borrowing of currency from the Central Bank.

In this regard, Korea pursued government-led policy to achieve the goal of agricultural policy; to increase agricultural productivity and to release the food shortage, even though it allowed side effects to some extent, such as price distortion and the impact of fiscal deficit from government intervention

South Korea has experienced rapid industrialization resulting in a radical decline in agriculture. Food insecurity in South Korea is rooted in its heavy reliance on food importation and price volatility of staple foods. Food security policies have focused externally on establishing overseas grain production and securing alternative channels for grain importation [16].

Alarmed over a surge in global food inflation, Korea is ratcheting up its efforts to safeguard against price volatility and secure a stable supply.

The government and companies are joining hands to expand the country's overseas farming bases, establish a direct import channel and modernize agricultural production and distribution.

Fear about a food crisis has gripped the world in recent years as exploding demand, bad weather and speculative commodity investments combined to lift grain prices [17].

Among the countries hit was Korea, one of the world's largest importers of agricultural produce. The country's food supply has been further dampened by its worst outbreak of foot-and-mouth disease.

The government has recently advanced its plan to operate a grain trading firm in Chicago for direct importation and is expediting work to expand domestic grain stocks and boost investment in overseas farmland.

Experts call for bolder, better-informed strategies, increased funding and closer public-private sector cooperation, in order to cope with the cutthroat competition among countries to secure agricultural land and the global dominance by a few multinational behemoths [18].

Korea imports a majority of key grain products except rice. As of 2009, its self-sufficiency rates for wheat, corn and soybeans were 0.5 percent, 1 percent and 8.4 percent, respectively, government data showed.

The figure for grain in general currently stands at a mere 26.7 percent. In stark contrast, nations such as the U.S., China and Germany have kept their rates at around or greater than 100 percent – Korea ranks near the bottom among OECD nations [19].

The most urgent task, experts agree, is an early establishment of a stable international procurement system.

Last year's grain imports reached 14.2 million tons – corn with 9 million tons, wheat 3.7 million tons and soybeans 1.5 million tons – all from major agro-food groups that reign over the market oligopoly.

Cargill and ADM account for nearly half of Korea's imports of corn, wheat and soybeans, according to Samsung Economic Research Institute. The ratio goes beyond 70 percent if combined with Bunge, France's Louis Dreyfus SAS and Japanese traders such as Marubeni Corp. and Mitsubishi Corp. [20].

The limited range of dealers, coupled with heavy dependence on imports, further exposes the country to international price volatility.

The state-run Korea Agro-Fisheries Trade Corp. (aT) is set to open an agricultural trading firm in Chicago on March 31 in cooperation with Samsung C&T, CJ CheilJedang Corp., STX Corp. and Hanjin Transportation Co., Ltd.

The establishment, expected in May, has been pushed forward amid global instability and mounting public anxiety over inflation.

Under the public-private partnership, aT plans to invest 20 billion won ($17.8 million) and the four firms together will pump 25 billion won into the project this year, officials said.

The project is aimed at supplying up to 30 percent of Korea's grain needs, or 4 million tons, by gradually raising the amount of dealings over a 10-year period through 2020.

The total budget is estimated at about 240 billion won, of which 95 billion won will come from aT.

The operators plan to import 5 million tons of corn and soybeans each and purchase a grain elevator at a U.S. production site this year.

The 2017 Global Food Security Index provides a worldwide perspective on which countries are most and least vulnerable to food insecurity and how resource risks increase vulnerability [21].

The Economist Intelligence Unit's Global Food Security Index (GFSI), sponsored by DuPont, provides a common framework for understanding the root causes of food insecurity by looking at the dynamics of food systems around the world. It seeks to answer the central question: How food-secure is a country?

The Global Food Security Index considers the core issues of affordability, availability, and quality across a set of 113 countries. The index is a dynamic quantitative and qualitative benchmarking model, constructed from 28 unique indicators, that measures these drivers of food security across both developing and developed countries.

This index is the first to examine food security comprehensively across the three internationally established dimensions. Moreover, the study looks beyond hunger to the underlying factors affecting food insecurity. This year the GFSI includes an adjustment factor on natural resources and resilience. This new category assesses a country's exposure to the impacts of a changing climate; its susceptibility to natural resource risks; and how the country is adapting to these risks [22].

Food security is defined as the state in which people at all times have physical, social and economic access to sufficient and nutritious food that meets their dietary needs for a healthy and active life.

Using this definition adapted from the 1996 World Food Summit, the Global Food Security Index considers the core issues of affordability, availability, and quality across a set of 113 countries. The index is a dynamic quantitative and qualitative scoring model, constructed from 28 unique indicators, that

measures these drivers of food security across both developing and developed countries. The overall goal of the study is to assess which countries are most and least vulnerable to food insecurity through the categories of Affordability, Availability, and Quality and Safety. The index also looks at the impact that Natural Resources & Resilience have on food security [23].

While food security research is the subject of many organisations worldwide, this effort is distinct for a number of reasons. This index is the first to examine food security comprehensively across the three internationally established dimensions. Moreover, the study looks beyond hunger to the underlying factors affecting food insecurity [24].

This index includes the following categories:

Affordability - Measures the ability of consumers to purchase food, their vulnerability to price shocks and the presence of programmes and policies to support customers when shocks occur [25].

Availability – Measures the sufficiency of the national food supply, the risk of supply disruption, national capacity to disseminate food and research efforts to expand agricultural output.

Quality & safety – Measures the variety and nutritional quality of average diets, as well as the safety of food.

Natural Resources and Adjustment – Assesses a country's exposure to the impacts of climate change; its susceptibility to natural resource risks; and how the country is adapting to these risks [26, 27].

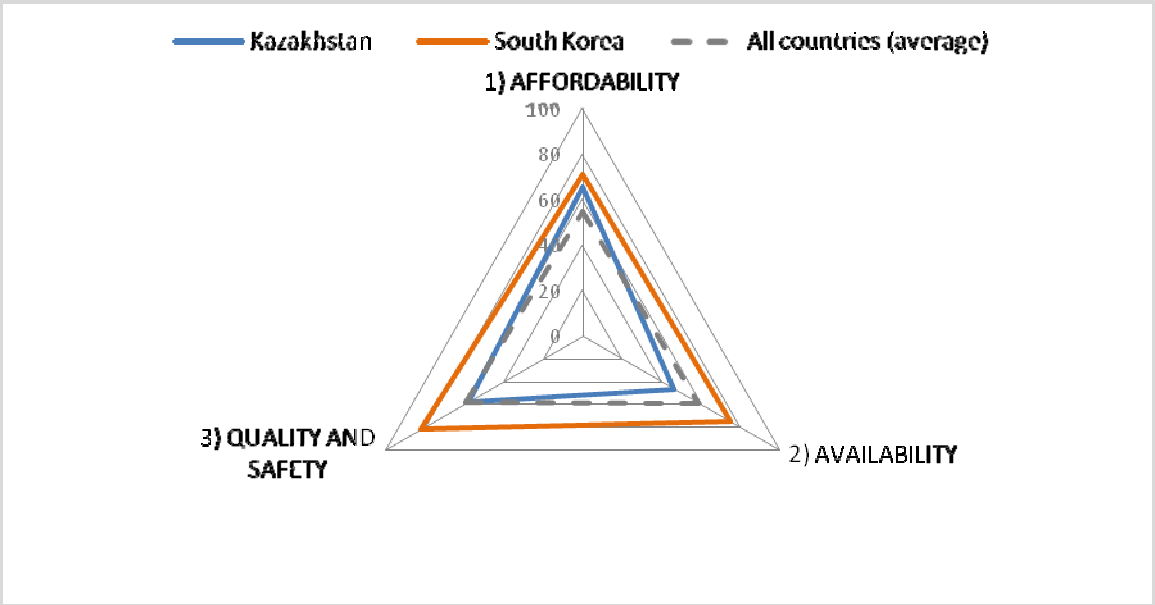
We will conduct the comparative analysis of Kazakhstan and South Korea on the index of food safety, according to the presented methodology.

Table 4 – The global index of food safety of Kazakhstan and South Korea on the state on September, 2017

Category	Score			Rank	
	Kazakhstan	South Korea	All countries (average)	Kazakhstan	South Korea
OVERALL	56,0	74,7	57,3	60	=24
1) AFFORDABILITY	65,5	71,2	54,8	45	35
2) AVAILABILITY	46,7	75,2	59,0	=90	22
3) QUALITY AND SAFETY	57,8	81,9	58,7	58	17
1.1) Food consumption as a share of household expenditure	48,4	88,0	58,6	73	18
1.2) Proportion of population under global poverty line	99,7	100,0	73,0	33	1
1.3) Gross domestic product per capita (US$ PPP)	16,6	24,9	14,5	38	28
1.4) Agricultural import tariffs	83,8	6,2	76,4	29	112
1.5) Presence of food safety net programmes	100,0	100,0	65,5	1	1
1.6) Access to financing for farmers	75,0	100,0	61,3	40	1
2.1) Sufficiency of supply	55,6	84,6	56,5	55	21
2.2) Public expenditure on agricultural R&D	0,0	50,0	15,0	62	8
2.3) Agricultural infrastructure	51,9	80,6	57,6	=59	=18
2.4) Volatility of agricultural production	56,2	94,2	86,2	112	32
2.5) Political stability risk	23,5	52,9	46,8	93	40
2.6) Corruption	0,0	50,0	37,4	90	25
2.7) Urban absorption capacity	64,9	72,3	66,6	78	27
2.8) Food loss	85,3	88,0	84,9	76	62
3.1) Diet diversification	73,2	64,3	56,4	33	44
3.2) Nutritional standards	0,0	100,0	79,1	=111	=1
3.3) Micronutrient availability	54,4	80,9	43,9	=42	1
3.4) Protein quality	55,5	76,2	49,4	46	23
3.5) Food safety	94,0	98,0	80,5	60	=46

Food safety is estimated from 0 to 100, where 100 is the best index. A rating estimation is conducted for to 113 countries, where 1 is the best index [28].

As be obvious from data of table 4 and picture 1 Kazakhstan on the majority categories of global index of food safety yields to South Korea, except presence of food safety net programmes.



The Global index of food safety of Kazakhstan and South Korea on the state on September, 2017

Necessity of providing of food and economic safety of country, satisfactions of necessities of population in foodstuffs and height of socio-economic efficiency of agriculture pull out the task of increase of competitiveness of domestic agroindustrial complex on the first plan. Without a high-efficiency and competitive agroindustrial production the decision of many primary and strategic concerns is impossible on development of economy of country and forming of the civilized agrofood market [29, 30].

Therefore, until in agroindustrial complex of Kazakhstan the sufficient inflow of investments is not provided with the purpose of realization of scale modernisation and reconstruction of agricultural production, technical and technological lag will be saved in industry, consequently, a problem of increase of competitiveness will be especially actual. At the same time, the most important conditions affecting competitiveness are [2]:

- it is positioning in the world market (stake of export in producing and her loud speaker);
- it is positioning at the internal market (stake of import at the market and its loud speaker);
- it is the technological level of industry, expressed in size of the accumulated investments and quality descriptions of powers;
- it is a level of concentration on markets, that suffices for a successful competition with world companies - leaders in corresponding industries;
- it is material well-being by the source of raw materials, development of co-operation, historical "attachment" of consumers to the producers.

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А. С. Байдалинова[1], А. М. Уахитжанова[1], Ж. Нұрланқызы[2]

[1]«Қаржы академиясы» АҚ, Астана, Қазақстан,
[2]С. Сейфуллин атындағы Қазақ агротехникалық университеті, Астана, Қазақстан

АУЫЛ ШАРУАШЫЛЫҒЫН МЕМЛЕКЕТТІК ҚАРЖЫЛЫҚ ҚОЛДАУ – ЕЛДІҢ АЗЫҚ-ТҮЛІК ҚАУІПСІЗДІГІН ҚАМТАМАСЫЗ ЕТУДІҢ БАСТАПҚЫ ШАРТЫ (ОҢТҮСТІК КОРЕЯ МЫСАЛЫНДА)

Аннотация. Мақалада азық-түлік қауіпсіздігін қамтамасыз ету мәселесі және оны қамтамасыз етудің маңызды шарты ретіндегі мемлекеттік қаржылық қолдаудың рөлі қарастырылған. Қазіргі уақытта ұлттық азық-түлік жүйесіне экономиканың аграрлық секторын мемлекеттік қаржылық қолдау қажеттілігі мен азық-

түлік қауіпсіздігінің әлеуетті қатерлерін анықтаушы ғаламдық масштабтағы үдерістер әсер етуде. Оңтүстік Корея мысалында азық-түлік қауіпсіздігін қамтамасыз етудегі мемлекеттің рөлі қарастырылған.

Түйін сөздер: ауыл шаруашылығы, азық-түлік қауіпсіздігі, инвестициялар, субсидиялар, мемлекеттік қаржыландыру, импорт, экспорт.

А. С. Байдалинова[1], А. М. Уахитжанова[1], Ж. Нұрланқызы[2]

[1]АО «Финансовая академия», Астана, Казахстан,
[2]Казахский агротехнический университет им. С. Сейфуллина, Астана, Казахстан

ГОСУДАРСТВЕННАЯ ФИНАНСОВАЯ ПОДДЕРЖКА СЕЛЬСКОГО ХОЗЯЙСТВА – ИСХОДНОЕ УСЛОВИЕ ДЛЯ ОБЕСПЕЧЕНИЯ ПРОДОВОЛЬСТВЕННОЙ БЕЗОПАСНОСТИ СТРАНЫ (НА ПРИМЕРЕ ЮЖНОЙ КОРЕИ)

Аннотация. В статье рассмотрена проблема обеспечения продовольственной безопасности и роль государственной финансовой поддержки как важного условия ее обеспечения. В настоящее время на национальные продовольственные системы воздействуют тенденции планетарного масштаба, обусловливающие формирование потенциальных угроз продовольственной безопасности и необходимость государственной финансовой поддержки аграрного сектора экономики. Рассмотрена роль государства в обеспечении продовольственной безопасности на примере Южной Кореи.

Ключевые слова: сельское хозяйство, продовольственная безопасность, инвестиции, субсидии, государственное финансирование, импорт, экспорт.

About the authors:

Baidalinova A.S. – PhD student, JSC "Financial Academy", Astana, Kazakhstan, aynur.sultanovna@mail.ru

Uakhitzhanova A.M. – PhD student, JSC "Financial Academy", Astana, Kazakhstan, All_999@mail.ru

Nurlankyzy Zh. – Master, Senior teacher, JSC «S. Seifullin Kazakh Agrotechnical University», Astana, Kazakhstan, zhiba_22@mail.ru

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A. Zh. Eskalieva, S. A. Rakhimova

Pavlodar State University named after S. Toraigyrov, Kazakhstan.
E-mail: saulesha_rahimova@mail.ru, assel_2704@mail.ru

RESEARCH AND ANALYSIS OF MODERN METHODS OF ESTIMATION OF INFLUENCE OF SOCIAL AND ECONOMIC SYSTEM ON TRANSFORMATION PROCESSES

Abstract. The state is an integral and integrating structure of modern society, which concentrates the highest powers, concentrates management mechanisms and carries out activities aimed at regulating social relations. The main task of the state is to ensure the effective functioning of power in the society, as well as the optimal management of social processes, the definition of promising development strategies, the solution of current pressing problems that arise in front of people, taking into account their interests, on the one hand, and available potential resources, on the other. In applied sociological research, mathematical and statistical methods, such as correlation theory, cybernetic modeling, game theory, etc., are mainly used to analyze the actions of the laws of functioning and the development of social systems in the implementation of the labor process. However, these methods only perform the functions of the toolkit in the analysis. Reliable knowledge in the scientific or practical field is always preceded by rational comprehension and evaluation of the factual material delivered by observation.

Keywords: analysis, evaluation, socio-economic systems potential, methods, transformation, processes, state.

The head of state repeatedly noted the priority of schools with a natural-mathematical bias and computer science. Today, 20 intellectual schools have been created in Kazakhstan. Similar kinds of schools open all over the world. It is generally known that the 21st century will be a century of competition of ideas and new technologies. It is these students in the future will determine the level of development of the country and its economic success. For example, in China in all provinces there are very strong specialized schools. This is the concern of the state about the development of its intellectual nation [1].

Socio-economic processes are changes in society that are reflected in its welfare, political and economic stability, security conditions, etc. The functioning of these processes determines the complex nature of social changes, in the structure of which the social and economic properties of processes are supplemented by political ones. If the basis of socio-economic processes is the cycle of "innovation-investment", then the political – opposition "challenge-reaction." The main elements of the socio-economic process are: participants, the subject (initiator) of the process, the reasons and the observer, who is a member of the scientific community. Among the participants in the process are all active and passive members of society whose interests affect the changes taking place in society. By the number of participants in the process, one can judge its nature, scope and level of coverage. The subject (initiator) of the process is one of its participants, which has considerable resources, which allow maintaining the dynamics and direction of social changes for a long time. The initiator of the process is able to seriously influence the course of such changes by reproducing favorable conditions aimed at achieving the expected result. The initiator's influence on the process may not be conscious, causing certain changes contrary to the will and interests of the initiator. Being the manager of funds, resources, exercising the right of legislative initiative, the subject of the process establishes the rules of the game for all its participants, setting the desired vector of direction to the process [2].

In the applied sociological study, three kinds of tests are used:

– projective, allowing to reveal the presence of certain socio-psychological properties of the person;

– assessments that allow for relative measurements of ability, level of development, etc.;

– professionalism, which allows to reveal the degree of readiness for a certain activity.

According to the subject of the study, there are general tests that fix some integrity of the personality's psychic properties, personal tests – special tests designed to diagnose one or another trait, characteristics, properties of the subject (for example, mental development, professional and creative abilities, level of shared responsibility, self-control and others), and group, designed to diagnose group psychic processes – the level of cohesion of groups and collectives, the characteristics of group social-n syche climate, interpersonal perception, and so on. [3]

Particularly widely used in sociological research are group tests, which include sociometry, which is a kind of psychological test on the survey and is a kind of method for diagnosing, quantifying and analyzing the relationships of small, fully formed social groups.

Studying the nature of the relationship of members of the work collective is one of the most urgent tasks of the sociology of labor. Sociology makes it possible to measure the degree of unity (disunity) of a group; identify "sociometric positions", that is, the relative authority of the members of the group on the grounds of sympathy (antipathy); Identify intragroup cohesion, leaders, etc.

The results of the sociometric study can be interpreted graphically and quantitatively (sociometric indices, statistical analysis). Being easy-to-use, sociometry is widely used by sociologists-practitioners to diagnose group cohesion, to identify leaders. At the same time, the limitation of this procedure was proved, because with its help surface, not deep relationships are fixed. To develop measures to manage the development of relationships in the surveyed groups, it is necessary to resort to other methods of research that allow us to identify the specificity of groups, their value-normative unity, and the motivation of sociometric elections [4-6].

In the practice of sociological research, the method of studying the products of activity is frequently used-the collection of information in the analysis of materialized results of labor activity. At the same time, the object of research is not people or their relations, but the products of their previous labor activity.

This mental activity is accompanied by the construction of various kinds of conjectures and presumptive explanations of the observed phenomena. In the beginning, explanations are problematic. Further study amends these explanations. As a result, science and practice overcome numerous deviations, errors and contradictions and achieve objectively true results.

The decisive link in the cognitive chain that provides the formation of new knowledge is the hypothesis. The most important among those noted in the definition will be the following characteristic features of the hypothesis.

Hypothesis is a universal and necessary for any cognitive process form of development of knowledge. Where there is a search for new ideas or facts, regular connections or causal dependencies, there is always a hypothesis. It acts as a link between previously achieved knowledge and new truths and, at the same time, a cognitive tool that regulates the logical transition from the former incomplete and inexact knowledge to a new, fuller and more accurate one.

Thus, the development inherent in the process of cognition predetermines the functioning of the hypothesis in thinking as a necessary and universal form of such development.

The construction of the hypothesis is always accompanied by the hypothesis about the nature of the phenomena being investigated, which is the logical core of the hypothesis and is formulated as a separate judgment or system of interrelated judgments. It always has a weakened epistemic modality: it is a problematic judgment in which inaccurate knowledge is expressed.

To become a reliable knowledge, the hypothesis is subject to scientific and practical verification. Running with the use of various logical methods, operations and forms of output, the process of testing the hypothesis leads to a refutation or confirmation and further proof of it.

The hypothesis arising during the construction of the hypothesis is born from the analysis of the actual material, on the basis of the generalization of numerous observations. An important role in the emergence of a fruitful hypothesis is played by intuition, creativity and imagination of the researcher. However, the scientific hypothesis is not just a guess, a fantasy or an assumption, but a rationally based, based on concrete materials, rather than an intuitively and unconsciously accepted assumption.

These features enable us to more clearly define the essential features of the hypothesis. Any hypothesis has initial data, or bases, and the final result is an assumption. It also includes the logical processing of the input data and the transition to the assumption. The final stage of cognition is the hypothesis testing, which turns the assumption into reliable knowledge or refutes it.

A common technique for predicting certain processes and phenomena is modeling. Modeling is considered a sufficiently effective means of predicting the possible occurrence of new or future technical means and solutions. For the first time for forecasting purposes, the construction of operating models was undertaken in the economy. The model is designed by the subject of the study so that the operations reflect the characteristics of the object, essential for the purpose of the study. Therefore, the question of the quality of such a mapping – the adequacy of the model to the object – is lawful to solve only for a certain purpose. The construction of the model based on preliminary study and identification of its essential characteristics, experimental and theoretical analysis of the model, comparison of the results with the data of the object, correction of the model, constitute the content of the modeling method [7].

One of the methods of modeling is the method of mathematical modeling. The economic-mathematical model is understood as the method of bringing to a complete description of the process of obtaining, processing the initial information and evaluating the solution of the problem in question in a fairly broad class of cases. The use of a mathematical apparatus for describing models (including algorithms and their actions) is associated with the advantages of a mathematical approach to multi-stage information processing, the use of identical means of problem formation, the search for a method for solving them, fixing these methods and converting them into programs designed for the use of computer facilities.

The application of mathematical methods is a prerequisite for the development and use of forecasting methods that provide high requirements for the validity, effectiveness and timing of forecasts.

An important applied value in forecasting belongs to methods of regression analysis. Regression analysis is used to study coupling forms that establish qualitative relationships between the random variables of the random process being studied. In other words, the connection between random and nonrandom variables is called regression, and the method of analyzing such relationships is called regression analysis. The advantage of the regression method should be considered its universality, a wide range of functional dependencies, the possibility of inclusion in the statistical model as an independent variable of the time factor.

A specific forecasting method is the scenario forecast – it is a kind of method for describing a logically sequential process, events based on the current situation. The scenarios are described taking into account time estimates. The main purpose of the scenario is to determine the general goal of the development of the projected object, the phenomena and the formulation of criteria for assessing the upper levels of the "target tree". Scenarios are usually developed on the basis of preliminary forecast data and initial materials on the development of the forecasted object. The initial materials should include technical and economic characteristics and indicators of the main processes of the production and scientific base for the solution of the stated goal.

The scenario is a picture that shows a consistent detailed solution of the problem, identification of possible obstacles, detection of serious shortcomings, in order to prejudge the issue of the possible termination of ongoing work on the projected facility. The scenario by which a forecast for the development of an object or processes should be drawn up should contain questions of the development not only of science and technology, but also of the economy, foreign and domestic policy. Therefore, scenarios should be developed by highly qualified specialists of the appropriate profile of the projected facility. The script, by its descriptiveness, is the accumulator of the initial information, on the basis of which all the work on the development of the predicted object must be built. Therefore, the script in its final form should be carefully analyzed.

Consequently, in the process of systematized scientifically based forecasting of the development of socio-economic processes, the methodology of forecasting, as a set of methods, methods and methods of thinking, was developed, which allows analyzing the retrospective data, exogenous and endogenous links of the forecasting object, as well as their measurements within the framework of the phenomenon under consideration or the process of deducing judgments of certain certainty as to its future development.

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А. Ж. Ескалиева, С. А. Рахимова

С. Торайғыров атындағы Павлодар мемлекеттік университеті, Қазақстан

ТРАНСФОРМАЦИЯ ПРОЦЕСТЕРІНЕ ҚАТЫСТЫ ӘЛЕУМЕТТІК-ЭКОНОМИКАЛЫҚ ЖҮЙЕНІҢ ЗИЯНДЫЛЫҒЫН БАҒАЛАУДЫҢ ҚАЗІРГІ ЗАМАНҒЫ ӘДІСТЕРІН ЗЕРТТЕУ ЖӘНЕ ТАЛДАУ

Аннотация. Мемлекеттік тұтастық және жоғары өкілеттіктерін, басқару тетіктерін байыту және әлеуметтік қарым-қатынастарды реттеуге бағытталған іс-шараларды жүзеге асыру концентраттарын қазіргі қоғамның құрылымын, біріктіру болып табылады. Мемлекеттің басты міндеті – қоғамда билік тиімді жұмыс істеуін қамтамасыз ету, сондай-ақ мемлекеттік процестерді оңтайлы басқару, перспективалы даму стратегиясын, бір жағынан, ескере өз мүдделерін ескере отырып, және қол жетімді әлеуетті ресурстар арқылы, адамдар алдында тұрған өзекті мәселелер шешу анықтау үшін – басқа. өтініш жағдайда еңбек процесін жүзеге асыру әлеуметтік жүйелерінің жұмыс істеуінің іс-әрекеттерін және заңдар талдау зерттеу негізінен математикалық және статистикалық әдістер пайдаланылады және т.б. корреляциялық теориясы, кибернетикалық модельдеу, ойын теориясы, Алайда, бұл әдістер талдау құралдарының функцияларын ғана орындайды. ғылыми-практикалық саласындағы сенімді білімге әрқашан нақты материалды қадағалау жеткізілді ұтымды түсінуге және бағалауға алдында.

Түйін сөздер: талдау, бағалау, әлеуметтік-экономикалық жүйелер әлеуеті, әдістері, трансформациясы, процестер, күй.

А. Ж. Ескалиева, С. А. Рахимова

Павлодарского государственного университета им. С. Торайгырова, Казахстан

ИССЛЕДОВАНИЯ И АНАЛИЗ СОВРЕМЕННЫХ МЕТОДИК ОЦЕНКИ ВЛИЯНИЯ СОЦИАЛЬНО-ЭКОНОМИЧЕСКОЙ СИСТЕМЫ НА ТРАНСФОРМАЦИОННЫЕ ПРОЦЕССЫ

Аннотация. Государство является целостностной и интегрирующей структурой современного общества, которое концентрирует высшие властные полномочия, сосредоточиваются управленческие механизмы и осуществляя деятельность, направленную на регулирование социальных отношений. Главная задача государства – обеспечение эффективного функционирования власти в обществе, а также оптимальное управление общественными процессами, определение перспективных стратегий развития, решение текущих актуальных проблем, возникающих перед людьми, на основе учета их интересов, с одной стороны, и имеющихся потенциальных ресурсов – с другой. В прикладном социологическом исследовании для анализа действий законов функционирования и развития социальных систем в осуществлении трудового процесса в основном используются математические и статистические методы – теории корреляции, кибернетического моделирования, теории игр и т.д. однако, эти методы выполняют лишь функции инструментария в анализе. Достоверному познанию в научной или практической области всегда предшествует рациональное осмысление и оценка доставляемого наблюдением фактического материала.

Ключевые слова: анализ, оценка, социально-ээкономические системы потенциал, методы, трансформация, процессы, государство

Information about authors:
Eskalieva Asel Zhumabaevna – doctoral student, Pavlodar State University named after S. Toraigyrov
Rakhimova Saule Abaybekovna – Candidate of Economic Sciences, Associate Professor, Head of the Department of Economics, Pavlodar State University named after S. Toraigyrov

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G. Zh. Zhumabekova

Financial Academy, JSC, Astana, Kazakhstan.
E-mail: gaukhar69@mail.ru

PECULIARITIES OF CALCULATION FOR A PROPOSITIVE METHOD OF ACCOUNTING COSTS

Abstract. The main methods of accounting for costs and calculating the cost of production are ordering and non-process, other calculating systems, as a rule, are varieties of these methods. In the management accounting, the domestic simple (process) and the crocheting methods are combined into one, which is translated as "process-costing", in addition, there are practically no significant differences between the content of the "process" and "redistribution".

At the heart of the separation of ordering and procedural methods is the methodology for calculating the unit cost of production. This indicator is very useful for the company for a number of reasons. Calculation of costs per unit of production is necessary to justify the production of new types of products, determine the profitability of individual production lines, determine the level of selling prices, etc. Calculation of the unit cost of production also contributes to planning and control processes at various levels of enterprise management.

Keywords: costing, costs, methods, accounting, process, production.

A process is used when production consists of a sequence of continuous or repetitive operations or processes, and the cost of production is determined at each stage of production, operation or process.

The process-based calculation method uses, in general, the same accounting procedures as the custom system: planning and control of the production process as a whole, and planning and monitoring data on the cost of production for individual phases of production. Process accounting in one form or another provides:

- Production planning in general and in the context of the flow of costs;
- Calculation of the conditional volume of production for a certain period;
- collection and distribution of costs;
- preparation of reports on the cost of production;
- maintenance of calculation accounts, journals, books and other accounting registers that form the accounting structure and its connection with the calculating system [1].

By the process method of cost accounting and costing of production uses in general the same accounting procedures as the ordering system: planning and control of the production process in general and planning and monitoring data on the cost of production for individual phases of production.

Planning production in general and in the context of the flow of costs. By the process calculating system involves providing data on the costs of processes and, accordingly, the division of production technology into structural units for accounting and analysis purposes. The process can be characterized as a part or phase of a complex of production activities, through which the manufactured products pass.

The leading role in the process system is played by the production plan of the enterprise, broken down by cost centers, which are usually a process or shop. As a rule, each cost center correlates with either direct or indirect costs, but some centers can be related to combined costs. The detailed work of the system is determined by the existing conditions of entrepreneurship. The most important provisions can be considered, firstly, that the division into divisions is of a natural nature; secondly, the cost centers must be organically interconnected with the division made, and, thirdly, the accumulation of costs occurring in the cost centers must be really feasible and economical [2].

Calculation of conditional output for a certain period. In the system of process accounting, the calculation of the volume of production proceeds from the fact that the operations are already known in advance and practically unchanged. Therefore, the calculation of production volume relates only to the number and time of production. Of course, if an enterprise produces more than one product, then the calculation is made for each product.

Calculation of the volume of production in the process accounting system should contain data on the number of products that must be produced for a specific period of time. Since mass production is usually material intensive, raw material data are often used to determine the volume of production, therefore, the calculation will contain relevant information on the use of such raw materials. The main task of these calculations is, of course, forecasting the volume of production activity and sales, but they are also suitable for calculating purposes. Due to the content in the calculation of plan data, it provides a good opportunity to take into account preliminary (estimated or normative) costs, which can later be compared with production reports containing actual data.

However, in determining the volume of production, we are faced with a special problem inherent in the process of pricing, because there is a product, the production of which is only partially completed by the end of the reporting period. The problem is that for the production of fully finished units the enterprise bears 100% of the costs, and the production of incomplete units - only part of the costs. In order to accurately determine the output, partially finished products should also be included in the calculation. However, the volume of output is not a simple sum of fully completed and partially completed units. The output of workshops is usually measured in equivalent (conventional) units. Therefore, partially prepared units are recalculated into equivalent units, and then the release data is accordingly adjusted. Equivalent units can be defined as the number of units produced during the reporting period, if all costs of shops are expressed in units of finished products.

In the process of costing, the costs are only related to production workshops, and not to specific orders. In other words, the costs can not be traced to a variety of different orders, but only for a few production shops. This means that, firstly, the costs can be collected over a longer period of time, and secondly, at least one distribution at the end of the period (a week, a month, etc.) is required to calculate the costs of output for the period. . The data on costs used in the process accounting system are classified according to the elements of costs for material, labor and overhead costs [3].

Material costs in a non-process method can be accounted for and calculated in two ways. With the first method of billing for materials or the requirements for their release into production, they can be used in the same way as in the case of a custom-made method, by estimating material costs as withdrawals from stocks. In the second method, a consumption report is prepared showing the value of the materials used, either on the basis of either the analysis of the products at the final stage or at the stage of the semi-finished product or the evaluation of the final stocks left unused.

With the first method of accounting, there is only one main difference from the order-based method: in the process-based method, the cost of a process or product is determined rather than a single order. Material inventories for a certain period or individual applications for materials are also used here, only specific data are correlated not with the order, but with the shop for a certain period of time. At the same time, one should pay special attention to the fact that there should not be a period of time between the holidays and the use of materials or any other recorded but not actually incurred costs. The rather fast identification of products inherent in the ordering system is not suitable for materials intended for the production of mass production.

The second way of accounting for material costs is the reverse procedure. In an enterprise where there is a continuous process of a steady flow of raw materials, it is not always expedient to take into account materials when entering the process, and a number of relationships can be used. Examples of such enterprises can serve the chemical industry, ferrous metallurgy, steelmaking, the production of mirrors, cotton, etc.

Just as with a custom costing system, it is preferable to use normative rates for allocating overhead, but in some cases actual rates can also be used. This practice is quite applicable if production from month to month remains relatively stable and, consequently, the amount of overhead costs for the period is practically unchanged. The use of actual overhead costs is also justified, if production overhead is not the main cost item, i.e. their share in the total cost price is relatively small. Fluctuations in the production

process can lead to an uneven monthly allocation of actual overhead costs. In such cases, production overheads should be allocated to the production process using regulatory rates in such a way that the units produced receive the appropriate portion of the overhead costs. Typically, if the production overhead, especially in the case of fixed overheads, represents a significant amount, it is desirable to attribute overhead costs based on normal or averaged production, using regulatory rates. In addition, the use of regulatory rates is useful for the purpose of controlling costs and their analysis [4].

Maintenance of calculation accounts, journals, books and other accounting registers. In a process system, the connection of cost data with accounting accounts has the same basic goals as for a custom order system, except that now a process or shop, rather than an order, becomes a unit. Consequently, the control of work in progress must be subdivided into processes, not orders, and incoming balances in each production account must be indicated in accordance with production operations. Each subsequent process takes over the costs transferred from the previous process, until the final transfer of accumulated costs to the finished product takes place.

The peculiarity of accounting procedures for process calculating is that for each production department, an account "Incomplete production" (in the domestic account "Main production") opens, and not the only account "Work in progress" for the whole company. Finished products that have come out of the first workshop are transformed into "Work in Process" in the second shop, where it is further processed, then the same occurs in the third workshop, etc. depending on the number of processes (redistribution).

Incomplete production (WIP) – products that have not passed all the stages of technological processing provided for by the technological process, and not accepted by the OCT as finished. Incomplete production affects the value of the actual production cost of finished products, in connection with which its objective valuation is required. For this purpose, an inventory is required for all stages of the technological cycle (the number of illegal-products in each workplace in the valuation). It is possible to distinguish the factors influencing the choice of the method of estimating WIP:

• type of production;
• Materiality of the resources used;
• features of the existing system of accounting for production costs.

The distribution of costs between finished (commodity) products and unfinished production is determined on the basis of the balance sheet costing by the formula:

NZP n + Z f. = C. - НЗПк

where NZPn - work in progress at the beginning of the reporting period; ZF - actual costs for the reporting period; With g. - the cost of finished products for the reporting period.

At the same time, the cost of finished (marketable products) will be:

With g. = NZP n. + Z f.- NZP to.

In accordance with the provisions of accounting and accounting policies of companies, WIP in the balance sheet may reflect:

• Actual or accounting (estimated) cost;
• by direct cost items;
• at the cost of raw materials, materials and semi-finished products.

The method of estimating WIP at actual cost is the most common and reliable. The essence of this method is that according to the inventory data the number of WIPs at the end of the reporting period is determined. By multiplying the amount by the accounting (calculated) average cost of a unit of WIP, the actual production cost of the total WIP at the end of the month is determined [5].

The definition of the refinery at the end of the reporting period based on the normative (at the planned cost price) method is made by calculation. The actual production costs for the reporting period are taken from the finished products at the planned cost price. The use of discount prices greatly simplifies the accounting of WIP, but in this case, the process of determining the cost of finished products is more labor-intensive. When using this method, it is necessary to keep a record of deviations from the cost of WIP at discount prices and the actual cost price that is accounted for on account 8110 "Basic Production". Valuation of WIP by the cost of raw materials, materials and semi-finished products is mainly used in material-intensive industries. This method differs from the previous ones in that the WIP includes only direct costs or only raw materials, materials and semi-finished products, and all other costs are written off to the cost of finished products. In the accounting policy of the company, the chosen method of assessing

the work in progress must be clearly indicated. After this, the finished product units become finished products. The amount of expenses for refineries at the beginning of the reporting period is the cost of the reporting period, and the following entry is made in the accounts of accounting: ДТ8110; КТ1340, and the amount of the refinery at the end of the reporting period goes to another production cycle, with the following correspondence: DT1340; KT8110.

The necessary precondition for calculating the practice of traditional production accounting is the organization of a consolidated record of production costs. In foreign practice, it is not used, since there is no special system of consolidated accounting.

The domestic school of accounting treats the concept of "consolidated accounting" as a system of generalizing the costs of production by items of expenditure in the context of shops of main and auxiliary production, types of products (works, services) as a whole for the enterprise with the aim:

- preparation of information for calculating the cost of certain types of finished products of all products;
- for the distribution of costs incurred by the enterprise between finished products and work in progress.

The essence of the marginal method is that direct costs are reflected in the current accounting not by the types of products, but by the processing (stages) of production. Therefore, the object of accounting is redistribution. Repartition is part of the technological process. In the industry, two variants of the cost-effective method of accounting for production costs and calculating the cost of production are used: semi-finished and semi-finished products. The application of the first or second version of the consolidated accounting of production costs depends on the need to determine the cost price of certain semi-finished products, which are unfinished products of the main production. This can be caused by the implementation of part of the semi-finished products on the side. Then the accounting department must make a set of costs for the production of semi-finished products and determine its cost [6].

The process-based method of calculating and recording costs is that direct and indirect costs are accounted for in the costing clauses for the entire output. In this regard, the average cost per unit of output is determined by dividing the sum of all the costs incurred per month (in total by the total and for each item) by the volume of finished products for the same period. This method is applied at enterprises where production is of a mass character, the same type of products is produced, limited by the nomenclature, which moves from one technological area to another by a continuous stream, with no work in progress or little. The main feature of the method is the consideration of direct and indirect costs on each individual technological process of production. At the same time, many costs, which are considered indirect by the order method, become direct. Depending on the stocks of finished products, a single-stage or two-stage method is used. The merits of the method include simplicity of calculations, accumulation of production costs by units, less labor intensity. To disadvantages: efficiency with low production volumes, limited scope.

Thus, the process is fairly well studied in the economic literature and is widely used in practice. Therefore, talk about the need for its implementation will be unnecessary. It can only be noted that it is necessary to follow the path of improvement and further development of this method with the aim of making maximum use of its control and lytic ability.

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Г. Ж. Жұмабекова

«Қаржы академиясы» АҚ, Астана, Қазақстан

ЕСЕПТІК ШЫҒЫСТАРДЫҢ ЖЕТКІЗУ ӘДІСІМЕН ЕСЕПТЕНІҢ НЕГІЗДЕРІ

Аннотация. Тапсырыстың бөлінуін және өңдеудің емес әдістерін зерттеудің негізінде өндірістің өзіндік құнын және олардың ерекшеліктерін есептеу әдістемесі болып табылады. Бұл тақырыптың өзектілігі, бұл көрсеткіш Қазақстанның түрлі кәсіпорындары үшін көптеген себептерге байланысты өте пайдалы. Осылайша шығындардың бірлігіне шығындарды есептеу жаңа өнімдерді өндіруді негіздеу, жекелеген өндіріс желілерінің кірістілігін анықтау, сату бағаларының деңгейін анықтау және т.б. қажет. Өндірістің бірыңғай құнын есептеу сонымен бірге кәсіпорындарды басқарудың әртүрлі деңгейлеріндегі процестерді жоспарлауға және бақылауға мүмкіндік береді. Авторлар шығындар есебін жүргізудің негізгі әдістерін ұсынды және өндіріс шығындарын есептеу тәртібі мен өңдеудің емес әдістерін, басқа есеп айырысу жүйелерін, әдетте, осы әдістердің сорттары болып табылады.

Түйін сөздер: шығындар, шығындар, әдістер, бухгалтерлік есеп, процесс, өндіріс.

Г. Ж. Жумабекова

АО «Финансовая академия», Астана, Казахстан

ОСОБЕННОСТИ КАЛЬКУЛИРОВАНИЯ ПРИ ПОПРОЦЕССНОМ МЕТОДЕ УЧЕТА ЗАТРАТ

Аннотация. В основе исследования разделения позаказного и попроцессного методов лежит методика калькулирования себестоимости единицы продукции и их особенности. Актуальность данной темы связана с тем, что данный показатель представляется весьма полезным для деятельности предприятия Казахстана по целому ряду причин. Так, расчет издержек на единицу продукции необходим для обоснования производства новых видов продукции, определения доходности отдельных производственных линий, определения уровня отпускных цен и тому подобное. Калькулирование себестоимости единицы продукции также содействует процессам планирования и контроля на различных уровнях управления предприятием. Авторами представлены основными методами учета затрат и калькулирования себестоимости продукции являются позаказный и попроцессный методы, остальные системы калькулирования, как правило, представляют собой разновидности названных методов.

Ключевые слова: калькуляция, затраты, методы, учет, процесс, производство.

Information about authors:

Zhumabekova Gaukhar Zhunisovna – candidate of economic sciences, associate professor of the department "Accounting and audit" Financial Academy, JSC. Astana

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L. K. Zhusupova[1], K. U. Torlanbayeva[2]

[1]Pavlodar State University after S. Toraygyrov, Kazakhstan,
[2]University of Turan and Institute of History and Ethnology, Kazakhstan.
E-mail: laura_zusip@mail.ru, torlanbayeva@mail.ru

THE ROLE OF RELIGION IN THE HERITAGE OF THE KAZAKH INTELLIGENTSIA DURING THE PERIOD OF COLONIALISM

Abstract. The article examines Valikhanov's views about Islam's role in Kazakh steppe. The article about Islam in the steppe represents Valikhanov's ideas for development in this sphere. The author of the article analyzes the work «On Muslim in the Steppe» by Chokan Valikhanov. In the manuscript collection of M. Kopeyev, religion occupies a central place. In this regard, researchers set the task of analyzing the role of religion in the handwritten heritage of the Kazakh intelligentsia.

Analysis methodology based on studying Valikhanov's researches on religion in «On Muslim in the Steppe». In the article the manuscripts of Mashkhur Kopeyev were studied in the positions of studying Islam and traditions of the Kazakh people.

Results. The study resulted in the conclusion that in the views of the Kazakh intelligentsia the role of Islam and traditions in the life of society was not divorced from the transformational socio-political changes of the era when they lived and worked. The correlation between the traditional and the modern in the religious life of the society leads scientists to discuss this issue, what is the relationship between religion and the modernization of society.

Keywords: Chokan Valikhanov, Mashkur Zhusup Kopeev, religion, Kazakhs, culture, history.

The life and activity of the Kazakh enlightener Chokan Valikhanov (1835 - 1865) reveals his state and thoughts about Islam in the Kazakh society in a small study "On Islam in the steppe", exposing the readiness to preserve the spiritual core with an innovation coming from outside that requires the transformation of the Kazakh society in the XIX century. Chokan Valikhanov is an outstanding personality in the history of the Kazakh people, an educator, a talented man of his era, who left numerous studies on the Kazakh people and his neighbors. At the same time, he belonged to the Sultan family. His great-grandfather was the famous Ablai Khan. In 1815, alongside with Uali (Vali) khan, the new khan of imperial Russia, Bukey Khan was appointed. After their death, Bukey Khan in 1817 and Ualiy-khan in 1819, whose sons, Chokan's father, Genghis and Uncle Chokai, Gabidullah, did not become khans. Gabidulla was sent into exile, and Genghis received his father's inheritance, received a salary for the post of senior sultan [1, p. 184]. Already at that time the opinion about the future of the Sultan's family of Vali disagreed, on the one hand, the Kazakh aristocracy was deprived of the right of political and economic independence, and on the other hand, the subordinate system of relations with the Russian government demanded changes in the Kazakh society [2, c. 306]..

In the steppe came a system of relations to which it was necessary to adapt in order to survive, the mechanism of the process of transformation of the Kazakh society was launched, while the traditional mentality of the Kazakh people, expressed in the name of the Steppe itself, converged in calling the national party «Ak Arch». The other side of this process was the appearance of the Kazakh intelligentsia, they will be called enlighteners: «Chokan Chingizovich Valikhanov - one of the first Kazakh enlighteners and democrats, was an outstanding oriental scholar» [3, p. 3]. An important question of Valikhanov's life and creative activity is his attitude towards Islam. As G.N. Potanin: «Chokan was his street name given to him in his childhood; his Muslim name was Muhammad Khanafiyah» [1, p. 280].

Chokan Valikhanov did a lot as a Kazakh researcher, an officer and a man whose destiny was connected, on the one hand, with the outlook of the Kazakh society, and those of them who had real power, and on the other hand, his biography is an example of mastering a new culture, a system of views. Perhaps, therefore, in one of the manuscripts «On Islam in the steppe» we do not find the actual description of Islam in the steppe, but we see Chocan's reasoning about Islam, his notes on the changes taking place before his eyes, and at the same time, the specific proposals of the Russian administration for reforms in the steppe. Ch. Valikhanov, his reasoning leads in this direction: «Muslims have not yet entered into our flesh and blood. It threatens us with disengagement in the future. Between the Kirghiz there are still many who do not even know the name of Muhammad, and our shamans have not lost their importance in many parts of the steppe. We are now in the steppe a period of two-faith, as it was in Russia at the time of the Monk Nester. Our scribes also energetically, as the scribes of ancient Russia pursue their folk antiquities. (Our legends, epics, legal and judicial customs, they branded the shameful name of the «felt book»), and they call our pagan rituals, games and celebrations only demonic. Under the influence of the Tatar mullahs, the Central Asian Ishans and their proselytes of the new teaching, our nationality in-creasingly takes on a common Islamic type» [4, p. 187]. This reasoning of Chocan Valikhanov is indicative in two aspects:

1) Islam and shamanism are considered by him as rivals, Islam as something that increasingly occupies a cultural space, and shamanism as that which lives as a people's, traditional;

2) the influence of the Tatar mullahs and the Central Asian Ishans, who introduce the foundations of Islam, which were formed in their environment, and «their proselytes» contribute to the emergence of a common Islamic image in the steppe. Further, he expresses a sharp opinion on the role of the Tatars in spreading Islam and Muslim education in the steppe, saying that such a policy is supported by the Russian government [4, p. 190-191].

The writing of the manuscript «On Islam in the Steppe» had concrete goals for Chocan Valikhanov, and he thought as a person with the right to influence events. After the Kashgar expedition, his trip to St. Petersburg and his life there, he began to appreciate his role in the politics of the steppe. It is this awareness and desire to serve the future of its people [2, p. 307] gave him this right, but circumstances changed. According to the memoirs of G.N. Potanin, when he met with Chokan Valikhanov, probably in 1864, he lay sick in a yurt and, during a conversation with him, complained to his superiors, «Chocan, if appreciated, it is not so» [2, p. 304].

As Valikhanov writes in his work: «Taking advantage of the emerging question of the spiritual court, radical reforms could be undertaken in the spiritual management of our steppe.

1. Separate the Kirghiz steppe from the Orenburg mufti department as people that differ from the Tatars in the confession of faith, and designate a special regional akhun that would be like the adviser from the Kirghiz, with the general presence of the regional government.

2. Approve the title of mullah only indigenous Kyrgyz or Kyrgyz Khodja, if there are urgent requests from the people.

3. Do not appoint more than one mullah in the district, and the post indicated in the volosts should be abolished.

4-e. Do not allow Ishans and Hodjas coming from Central Asia to the Tatar seminarians to live in nomad camps without definite occupations, and to have strict supervision so that they do not form dervish and mystical societies between Kyrgyz like those that exist now in the Bayan-Aul and Karkaralin districts» [4, p. 193].

Whether these recommendations of Ch. Valikhanov were heard is not known, but this passage, perhaps, outlines the author's attitude to Islam. First, Chokan did not deny Islam. Second, he believed that Islam in the steppe is different than Tatars' Islam or Central Asian people. Third, he understood the role of Islam in the life of society and proposed to manage the spiritual space of Kazakhs by the Kazakhs themselves. Four, he was negative about the influence of the Central Asian Ishans and Khodjas that inspired Sufi sentiments among the Kazakhs.

In our study, we also examined the legacy and biography of a prominent poet, a Sufi philosopher, historian Mashkhur Zhusup Kopeyev. He lived in a difficult time between the two epochs, colonialism and Soviet modernization. Kopeyev is a man who was persecuted during Tsarist Russia, and during the Soviet regime. As Allen Frank noted, in comparison with Valikhanov or Kunanbayev, Kopeyev's works were

very conservative and were not popular in Soviet times. But after Kazakhstan's independence there was a returning of this scientist and Sufi [5, p. 258].

He was born in 1858 in the village located between the mountains of Kyzyltau Bayanaul District. The title of the area is «Ashamay tas». The name that his parents gave him was Adam Zhusip. His father received a Muslim education in Petropavlovsk in 1817 but he gave a more powerful education from the experts of Islam in Bukhara. When Mashkhur turned 9 years old, the sultan of the Bayanaul district Musa Shormanov called him Mashhur Zhusup (famous) for his magnificent performance of legends, dastans, poems. This name was fixed to him among people forever.

The era in which he grew up is marked by major contradictory historical events for Kazakhstan. The Russian empire completely supplanted the Kokand khanate and the Bukhara emirate from the southern regions of Kazakhstan and completely colonized the entire territory of Kazakhstan. Russian laws began to dominate the Kazakh steppe. Officials pursued an imperial policy towards the indigenous population. Since 1858 the parents of Mashkhur Zhusup settled in the mountains of Kyzyltau. In 1861, when he was three years old, the family lost all the livestock during the winter jute. Then the father of Mashhur Zhusup Kopei decided: «Animals are not a support for man, but knowledge», and gave his already 5-year-old son to a medresse for studying literacy». From 1872 to 1874 Mashhur Zhusup studied in Bukhara and learned Arabic, Persian, Chaghatay languages. After returning to his native village, he taught children to read and write. In 1887, 1895, 1907 he traveled three times around Central Asia. He was in the cities of Turkestan, Bukhara, Tashkent, Samarkand, where he deepened his knowledge about Islam.

M. Kopeyev began to collect folklore from early childhood. In 1865 he wrote the epic «Yer Olzhabay batyr», his teacher Hamar Khazret influenced and helped him a lot. In 1881, he lived in the city of Akmola, where for the year he collected and recorded historical information about the events of the XVIII-th – XIX-th centuries. In 1887, while traveling to Bukhara, he visited historical places, where he recorded legends. Later in 1889-1891 he visited Western Kazakhstan, where he collected and recorded information about Isatay Taymanov and other famous people of the region. Since 1880, he began to publish his manuscripts in the newspapers «Dala Layatyi», «Turkistan Province», in «Ayip» journal. Democratic events of 1905-1907 reflected on the outskirts of the Russian Empire. M. Kopeyev raised this topic in his work «Kandy Zheksenbi» (Bloody Sunday). Using the advantage of democratic manifesto by the tsar, he published 3 books, there are «The Life Is», «To Whom Does Saryarka Own?», «There is a lot in the long life». Later these publications were recognized as royal censorship harmful, and the author was persecuted by the authorities.

After long inspections in 1913, the Kazan Chamber of Justice against Kopeev instituted criminal proceedings under Article 129, part 6 of the Criminal Code. October Revolution and the coming of Soviet power M. Zh. Kopeyev met with suspicion. Distrust of Soviet power increased after the defeat of the Alashorda government and the tyranny of the Bolsheviks, during the civil war in Kazakhstan. Kopeyev at this time moved away from social and political affairs and only continued to work on the product of «Kazak Tubi». His system of knowledge had poetry works, folklore, historical and genealogical narratives, as well as Islamic teachings and Sufism.

Thus, in the views of the Kazakh intelligentsia, the role of Islam and traditions in the life of society was not divorced from the transformational socio-political changes of the era when they lived and worked. The correlation between the traditional and the modern religious life of the society leads scientists to discuss this issue, what is the relationship between religion and the modernization of society. During the Soviet period, the traditional foundations of the nomadic way of life and the economy of the Kazakhs broke down, and the sedentarization of their society was carried out, accompanied by the atheistic policy of the government, which broke the spiritual traditions of the Kazakhs.

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Л. Қ. Жүсіпова[1], К. Ө. Торланбаева[2]

[1]С. Торайғыров атындағы Павлодар мемлекеттік университеті, Қазақстан,
[2]Туран университеті және Ш. Уәлиханов ат. тарих және этнология институты, Қазақстан

ҚАЗАҚ ЗИЯЛЫЛАРЫ МҰРАСЫНДАҒЫ ДІНІҢ РӨЛІ ОТАРЛАУ КЕЗЕҢІ

Түйіндеме. Басылымға ұсынылған мақалада Шоқан Уәлиханов пен Мәшһүр Жүсіп Көпейұлының қазақ даласындағы ислам дінінің рөлі туралы пікірлері зерттелді. Шоқан Уәлихановтың қолжазбалары арасында қазақ даласындағы ислам діні туралы мақала бар, онда осы саладағы білім туралы Шоқанның пікірлері ұсынылған. М. Ж. Көпеевтің қолжазбалық жинағында да ислам діні маңызды орын алады. Сондықтан зерттеушілер қазақ зиялыларының қолжазбалық мұрасындағы ислам дінінің рөлін талдауды міндет етіп қойды.

Талдау әдіснамасы Шоқан Уәлихановтың діндер туралы зерттеулері, атап айтқанда, «Даладағы ислам туралы» зерттеуін негізге алынған. М. Ж. Көпеевтің қолжазбалары ислам көзқарасын және қазақ халқының дәстүрлерін зерттеу үшін негізге алынды.

Зерттеу нәтижесінде зиялы қауымның көзқарасы бойынша, қазақ қоғамы өмірінде және тұрмыс тіршілігінде ислам дәстүрлері мен сол дәуірдің трансформациялық әлеуметтік-саяси өзгерістері ажырамас болған. Дәстүрлі және қазіргі қоғамдағы діни өміріндегі ара-қатынасы ғалымдарды дін мен қоғамды жаңғырту арасындағы қарым-қатынас дегеніміз не деген мәселеге талқылауға әкеледі?

Түйін сөздер: Шоқан Уәлиханов, Мәшһүр Жүсіп Көпеев, дін, қазақтар, мәдениет, тарих

Л. К. Жусупова, К. У. Торланбаева,

Павлодарский государственный университет им. С. Торайгырова, Казахстан,
Университет Туран и Институт истории и этнологии, Казахстан

РОЛЬ РЕЛИГИИ В НАСЛЕДИИ КАЗАХСКОЙ ИНТЕЛЛИГЕНЦИИ В ПЕРИОД КОЛОНИАЛИЗМА

Аннотация. В представленной к публикации статьи изучаются взгляды Чокана Валиханова и Машхура Жусуп Копеева на роль ислама в казахской степи. Среди рукописей Ч.Валиханова имеется статья о мусульманстве в степи, в которой представлены предложения Чокана о просвещении в этой области. В рукописном фонде М.Копеева религия занимает центральное место. В этой связи исследователи ставят задачу анализа роли религии в рукописном наследии казахской интеллигенции.

Методология анализа основана на изучении исследований Ч.Валиханова по религиям, в частности, его работа «О мусульманстве в степи». В статье были изучены рукописи Машхура Копеева позиций изучения ислама и традиций казахского народа.

Результатом исследования стали выводы о том, что в воззрениях казахской интеллигенции роль ислама и традиций в жизни общества не была оторвана от трансформационных социально-политических перемен эпохи, когда они жили и творили. Соотношение традиционного и современного в религиозной жизни общества выводит ученых на обсуждение такого вопроса, какова связь между религией и модернизацией общества.

Ключевые слова: Чокан Валиханов, Машхур Жусуп Копеев, религия, казахи, культура, история.

Information about authors:
Zhusupova Laura – Doctor of historical sciences, professor of Pavlodar State University after S. Toraygyrov
Torlanbayeva Kenzhe – Doctor of historical sciences, professor of Turan University

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K. M. Utepkaliyeva, R. K. Sabirova, A. A. Abilkhan

Atyrau State University named after H. Dosmukhamedov, Kazakhstan.
E-mail: kaldenova@mail.ru, sabirovarysty@mail.ru, atyrauuniv@nursat.kz

IMPROVEMENT OF ORGANIZATIONAL-ECONOMIC MECHANISMS OF THE NATIONAL INNOVATION SYSTEM OF THE REPUBLIC OF KAZAKHSTAN

Abstract. Effective development of the mechanism in conditions of transformation of the national economy requires a clear and justified innovation strategy. The construction and effective functioning of the innovative mechanism for ensuring development are necessary conditions for the implementation of strategic goals and objectives at the regional level. In the innovation strategy, a situational model of regional management should be synthesized, focused on financing, both in high-tech projects and in human development. State development institutions are endowed with budgetary financial resources necessary to finance investment and innovation projects, as well as to participate in statutory funds of newly created and modernized enterprises in manufacturing and infrastructure. They are called to perform the role of "locomotive" for the purpose of economic growth and the formation of an export-oriented model for the development of the national economy, supporting those investment and innovation projects that the private sector, for various reasons, can not finance and implement independently.

Key words: strategy, potential, intellectual nation, innovation, prosperity, education.

Introduction. In the period of globalization, the quality and potential of human resources are becoming one of the fundamental criteria for the competitiveness of the state. In this regard, the key to the innovative development of the Kazakh economy is to improve the quality of human capital. The quality of the formation of human resources directly depends on the level of development of the country's education system. Therefore, Kazakhstan pays priority attention to the development of human capital and allocates significant financial resources for the development of education – over one trillion tenge in 2012. "Equal opportunities for education are created in Kazakhstan. Over the past 15 years, spending on education has grown 9.5 times. The State Program for the Development of Education for 2011-2020 is being implemented, aimed at radically modernizing all levels of education, from preschool to higher education. Thanks to the policy of long-term investments in the development of human capital, we have formed the current talented generation of youth ... "[1, p.1-8]. Practically all the topical issues of the national education system are supposed to be solved in the light of the world development trends in a positive way, since a good economic base has been created in our country.

Methods of research. The main methods of research are a method of deduction and induction, as well as a comprehensive approach and a method of scientific abstraction. The variety of goals, objectives and areas of activity in agriculture predetermines various criteria for assessing the effectiveness of economic entities.

Results. By 2020, the proportion of universities that have received independent national accreditation according to international standards will be 30%. Up to 5% the share of universities that carry out innovation activities and introduce research results into production will increase. At least two higher educational institutions will be noted in the ranking of the world's best universities [3].

The next most important factor in the development of innovations is the systemic modernization of the economy of the republic, which implies a withdrawal from raw dependence, the achievement of a high level of industrial production, a radical change in the structure of the economy. At the same time, the

ultimate goal of modernizing the economy is to increase the well-being of the population, increase the country's competitiveness in the world market, ensure rapid spread of innovations, rationalize financial flows, and efficiently locate production.

The need for innovative development in Kazakhstan is especially evident against the background of the key challenges facing the national economy today. Reduction of available labor resources, low labor productivity and low energy efficiency, raw material dependence of the economy – all this, of course, means that stimulating innovation is really a key task for the economy and society today. At the same time, it is impossible to achieve positive results without the support of the state, without a purposeful innovation policy.

The acquisition of new knowledge and technologies and their effective application in social and economic development determine decisively the role and place of the country in the world community, the standard of living of the people and ensuring national security. In industrialized countries 80-95% of GDP growth falls to the share of new knowledge embodied in technology. This transition to an innovative development path was made possible through the creation of national innovation systems (NIS), which, according to research conducted in the United States, is the main achievement of the XX century. Being a natural result of the previous industrial development, NIS as an effective system of institutions allowed highly developed countries to provide brilliant technological breakthroughs and maintain the competitiveness of their economies at the highest level.

In general, with the adoption of the strategy and program for the formation of NIS of Kazakhstan, the government established the main institutes that provide innovative development:

- National Fund, which ensures stable social and economic development of the country;
- JSC "Fund Samruk-Kazyna", the main activity of which is assistance in the modernization and diversification of the national economy;
- Development institutions that promote the implementation of innovative projects;
- Technological parks of national and regional levels, special economic zones. Also, within the framework of improving investment policy, a legislative framework was established that defines the legal and economic bases for stimulating investment.

Despite some positive results, the goals of the Strategy and the Program were not fully achieved.

Thus, the choice of priorities for scientific, technical and innovation policies requires a deeply justified strategic approach, any mistake can result in irreparable losses. First, it concerns the directions of the development of science and technology, which form the structure of a scientific and technical revolution, a promising technological order. It is inadmissible to use the limited means of the state to support pseudo-innovations that improve the prevailing generations of technology, thereby preserving technological backwardness and low competitiveness of products. It is equally dangerous to concentrate efforts on the implementation of inventions and technologies, the time for the implementation of which has not yet come, and the resources spent for ten years will not give returns, will be dead. Secondly, the economy of each state, its structure, technological needs, available scientific reserves are original and unviable. Hence, it is necessary to adapt the scientific and technical policy to the specific conditions of the given country. Harmful and destructive can be the mechanical transfer of even the most effective technologies into the environment that rejects them. Careful selection and adaptation of those elements of the revolution in science and technology are required, which are most fruitful on this basis.

In the process of improving the market model of the national economy based on the integration of the scientific and technical sphere into the processes of economic and social development of the society, which means the formation of a system of institutions that create powerful incentives for generating a steady flow of effective innovations, priority should be given to such a promising direction of economic development Kazakhstan, as regional (spatial) modernization, structural and technological transformation, gradual clustertion, the creation of a mechanism to support domestic producers.

Conclusions. To create an effective national innovation system, it is necessary:

• to increase the demand for innovation from a large part of the economy;

• to increase the effectiveness of the knowledge generation sector (fundamental and applied science), as there is a gradual loss of established in previous years, aging of personnel, a decline in the level of research, weak integration into world science and the world innovation market and lack of orientation to the needs of the economy;

• to overcome the fragmented nature of the innovation infrastructure, since many of its elements are created, but do not support the innovation process throughout the process of generation, commercialization and introduction of innovations.

Foreign experience shows that in the system of generation of new knowledge, all types of scientific research have the same value and it is inexpedient to give special priority only to applied scientific research. In addition, raising the productivity of labor and capital, and therefore, the competitiveness of the economy, is impossible without the creation and strengthening of its own scientific and technological potential.

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К. М. Өтепқалиева, Р. К. Сабирова, А. Ә. Әбілхан

Х. Досмұхамедов атындағы Атырау мемлекеттік университеті, Қазақстан

ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ ҰЛТТЫҚ ИННОВАЦИЯЛЫҚ ЖҮЙЕСІНДЕГІ ҰЙЫМДАСТЫРУШЫЛЫҚ-ЭКОНОМИКАЛЫҚ МЕХАНИЗМІН ЖЕТІЛДІРУ

Аннотация. Ұлттық экономиканы трансформациялау жағдайында тетікті тиімді дамыту нақты және негізделген инновациялық стратегияны талап етеді. Дамыту үшін құрылыс және инновациялық механизмін тиімді жұмыс істеуі өңірлік деңгейде стратегиялық мақсаттары мен міндеттерін іске асыру үшін қажетті шарттары болып табылады. Аймақтық басқарудың жағдайлық моделін инновациялық стратегиясы жоғары технологиялық жобаларға және адам дамуы үшін де, синтезделген қаржыландыруға бағытталуы тиіс. Мемлекеттік neobhodimymi инвестициялық және инновациялық жобаларды кредиттеу үшін бюджеттік қаржы ресурстарына бай даму институттары, сондай-ақ ustavnyh қаражат қатысуға өндіру мен инфрақұрылымды кәсіпорындар құрылды және жаңғыртылды. Олар өз қаржыландыру және жүзеге асыру мүмкін емес, түрлі себептермен, экономикалық өсу мен жеке сектор деп инвестициялық және инновациялық жобаларды қолдау арқылы ұлттық экономиканы дамыту, экспортқа бағытталған моделін қалыптастыру мақсатында «Локомотив» ретінде қызмет етуге арналған.

Түйін сөздер: стратегия, әлеует, интеллектуалдық ұлт, инновация, өркендеу, білім.

К. М. Утепкалиева, Р. К. Сабирова, А. Ә. Әбілхан

Атырауского государственного университета им. Х. Досмухамедова, Казахстан

СОВЕРШЕНСТВОВАНИЕ ОРГАНИЗАЦИОННО-ЭКОНОМИЧЕСКИХ МЕХАНИЗМОВ НАЦИОНАЛЬНОЙ ИННОВАЦИОННОЙ СИСТЕМЫ РЕСПУБЛИКИ КАЗАХСТАН

Аннотация. Эффективное развитие механизма в условиях трансформации национальной экономики требует наличия четкой и обоснованной инновационной стратегии. Построение и эффективное функционирование инновационного механизма обеспечения развития являются необходимыми условиями реализации стратегических целей и задач на уровне региона. В инновационной стратегии должна быть синтезирована ситуационная модель управления регионом, ориентированная на финансирование как в высокотехнологичные проекты, так и в развитие человека. Государственные институты развития наделены бюджетными финансовыми ресурсами, необходимыми для кредитования инвестиционных и инновационных проектов, а также для участия в уставных фондах создаваемых и модернизируемых предприятий в обрабатывающей промышленности и сфере инфраструктуры. Они призваны выполнять роль «локомотива» с целью экономического роста и формирования экспортоориентированной модели развития национальной экономики, поддерживая те инвестиционные и инновационные проекты, которые частный сектор, по разным причинам, не может финансировать и реализовывать самостоятельно.

Ключевые слова: стратегия, потенциал, интеллектуальная нация, инновации, процветание, образование.

Information about authors:

Utepkalieva Kansulu Musaevna – Candidate of Economic Sciences, acting. Associate Professor, Dean of Atyrau State University named after Kh. Dosmukhamedov

Sabirova Rusty Kuandikovna – Ph.D., Associate Professor, Head of the Department of Economics, Atyrau State University named after Kh. Dosmukhamedov

Әbilhan Ainamkuz Әbilkhanzyzy – Master of Atyrau State University named after H.Dosmukhamedov, specialty 6M050600 – "Economics"

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**D. A. Baimukanov[1], A. Baimukanov[2], O. Alikhanov[1],
D. A. Doshanov[1], K. Zh. Iskhan[3], D. S. Sarsenbai[3]**

[1]Scientific research institute "Problems of the agroindustrial complex and water resources"
of the South Kazakhstan State University named after M. Auezov, Shymkent, Kazakhstan,
[2]FAO, International Commission on Genetic Resources for Farm Animals and Birds, Rome, Italy,
[3]Kazakh National Agrarian University, Almaty, Kazakhstan

GENETICS OF THE PRODUCTIVE PROFILE OF CAMELS OF DIFFERENT GENOTYPES OF THE KAZAKHSTAN POPULATION

Abstract. For the first time, camels of hybrid origin of F_2 (25%td, 25%kb, 50%kd), F_3 (12.5%td, 62.5%kb, 25%kd), F_4 (56.25%td, 31.25%kb, 12.5%kd), F_5 (28.1%td, 15.6%kb, 56.2%kd), pure Kazakh bactrian of the South Kazakhstan type and Mangistau population, arvana - Turkmen dromedary, Kazakh dromedary, bred in South Kazakhstan and Mangistau regions of the Republic of Kazakhstan, were studied in comparative aspect.

The genetic profile of live weight, dairy productivity, wool cutting, body measurements of the studied groups of camels is established. The results of the study showed the efficiency of breeding hybrid camel dams of the dromedary group for the production of camel milk, in view of the optimal ratio of milk fat and protein.

The phenotypic profile of camels of the Kazakh dromedary of the Arada F_5 type (28.1%td, 15.6%kb, 56.2%kd), is suitable for breeding "in itself". Camels have one compact hump of medium size - 2/3 of the oblique body length. Head profile is hook-nosed. The profile of the neck from the base of the neck to the head without bends is straight. The main color of the fleece (wool) is brown and sandy, without additional coloring. The main color of the covering hair is brown and sandy, there is an additional color that does not exceed 10% of the total livestock.

Keywords: Genetics, milk yield, Kazakh bactrian, arvana, Kazakh dromedary, hybrids.

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**Д. А. Баймуканов[1], А. Баймуканов[2], О. Алиханов[1],
Д. А. Дошанов[1], К. Ж. Исхан[3], Д. С. Сарсенбай[3]**

[1]Научно-исследовательский институт «Проблем агропромышленного комплекса и водных ресурсов»
Южно-Казахстанского государственного университета им. М. Ауэзова, Шымкент, Казахстан,
[2]ФАО, Международная комиссия по генетическим ресурсам сельскохозяйственных животных и птиц,
Рим, Италия,
[3]Казахский национальный аграрный университет, Алматы, Казахстан

ГЕНЕТИКА ПРОДУКТИВНОГО ПРОФИЛЯ ВЕРБЛЮДОВ РАЗНЫХ ГЕНОТИПОВ КАЗАХСТАНСКОЙ ПОПУЛЯЦИИ

Аннотация. Впервые изучены, в сравнительном аспекте верблюды гибридного происхождения F_2 (25%td, 25%kb, 50%kd), F_3 (12,5%td, 62,5%kb, 25%kd), F_4(56,25%td, 31,25%kb, 12,5%kd), F_5 (28,1%td, 15,6%kb, 56,2%kd), чистопродные казахские бактрианы южно-казахстанского типа и мангистауской по-

пуляции, арвана – туркменский дромедар, казахский дромедар, разводимые в Южно-Казахстанской и Мангистауской областях Республики Казахстан.

Установлен генетический профиль живой массы, молочной продуктивности, настрига шерсти, промеров тела изученных групп верблюдов. Результаты исследования показали, эффективность разведения гибридных верблюдоматок группы дромедар для производства верблюжьего молока, в виду оптимального соотношения молочного жира и белока.

Определен фенотипический профиль веблюдов казахских дромедаров типа Арада F_5 (28,1%td, 15,6%kb, 56,2%kd), пригодные к разведению «в себе». У верблюдов один компактный горб средней величины – 2/3 косой длины туловища. Профиль головы горбоносый. Профиль шеи от основания шеи до головы без изгибов – прямой. Основная масть руна (шерсти) бурая и песчаная, без дополнительной окраски. Основная окраска кроющего волоса – бурая и песчаная, имеется дополнительная окраска, не превышающая 10% от общего поголовья.

Ключевые слова: генетика, удой молока, казахский бактриан, арвана, казахский дромедар, гибриды.

Введение. Казахстан является единственным мировым центром на Евразийском континенте, где возможно разведение двух видов верблюдов одногорбых – дромедаров (Camelus *dromedarius*) и двугорбых – бактрианов (Camelus *bactrianus*) рода Camelus [1].

Установлено, что при спаривании верблюдов казахской породы бактрианов, выращенных в различных условиях и относящихся к разным популяциям, возможен эффект внутрипородного гетерозиса, который чаще проявляется при гетерогенном подборе [2]. То есть, одним из эффективных вариантов получения высокопродуктивных казахских бактрианов является использование гетерогенного подбора при внутрипородном спаривании [3].

Наличие огромных территорий полупустынных и пустынных пастбищ, высокая приспособленность верблюдов позволяют интенсивно развивать верблюдоводство в продуктивном направлении [4].

В практике отечественного верблюдоводства, наряду с чистопородным разведением казахских бактрианов получило широкое распространение два метода выведения гетерозисных животных: межвидовое скрещивание между казахскими бактрианами и туркменскими дромедарами, а также межпородное скрещивание между казахскими и калмыцкими бактрианами.

Одной из особенностей проявления гетерозиса является наибольшая степень выраженности лишь в первом поколении у помесных казахско-калмыцких бактрианов [5] и гибридных верблюдов [6]. Затем гетерозис в последующих поколениях затухает.

Межвидовое скрещивание верблюдов бактрианов и дромедаров практикуется с целью выведения гибридов первого поколения, так называемых наров [7]. При разведении гибридов первого поколения «в себе» эффект гетерозиса во втором поколении полностью исчезает. Сохранение гетерозиса в последующих поколениях межвидовых гибридов верблюдов является актуальной проблемой в теории и практике отечественного верблюдоводства. В этом плане поглотительное скрещивание гибридов первого поколения наров с исходными родительскими формами, с использованием традиционных способов межвидовой гибридизации, не дало ожидаемых результатов [8, 9].

Одним из резервов увеличения производства верблюжатины является увеличение численности верблюдов породы казахский бактриан и казахский дромедар, являющийся специализированной мясной породой комбинированного направления продуктивности. Дальнейшее увеличение производства верблюжатины и улучшение ее качества связаны с рациональным использованием генофонда отечественной породы верблюдов казахского бактриана и дромедаров туркменской породы, а также верблюдов разных генотипов.

Следует отметить, что казахские бактрианы в сравнении с межвидовыми гибридами верблюдов являются малопродуктивными [10]. В связи с этим для повышения молочной, мясной и шерстной продуктивности казахских бактрианов различных типов и популяций необходима разработка эффективных зоотехнических параметров отбора, основанная на использовании коэффициентов молочности, настрига шерсти и др.

В зоотехнической науке гибридизацией называют скрещивание животных, принадлежащих к разным видам. Гибридизация как один из методов разведения включает в себя скрещивание гибридов с гибридами разного и одинакового происхождения. По данным В.Ф. Красота и др. [11]:

«Основная задача этого очень трудного метода скрещивания – вовлечение в материальную культуру человека новых ценных диких и полудиких форм животных. В зависимости от способности или неспособности гибридов давать потомство различают гибридизацию, которая широко распространена и дает пользовательных животных, и гибридизацию, используемую при создании новых пород и видов животных. В связи с этим выделяют четыре вида гибридизации животных: промышленную, поглотительную, вводную и воспроизводительную».

«Одним из перспективных и эффективных методов дальнейшего повышения мясной продуктивности – промышленное межпородное скрещивание и гибридизация. Они получили широкое распространение в мясном скотоводстве в пользовательных (товарных) стадах при получении помесей для откорма, а также при создании новых пород и типов мясного скота» [12].

В верблюдоводстве широкое распространение получила межвидовая гибридизация между бактрианами казахской породы и дромедарами туркменской породы Арвана [13].

Гибридизация по данным советских ученых представляет собой систему скрещиваний, основанную на спаривании особей, представляющих две (или более) генетически исходные группы, и противоположную родственным скрещиваниям [14].

Селекционеры издавна знали, что гибриды в отношении многих признаков, в том числе хозяйственно важных, по своим значениям превышают обе исходные родительские формы.

А. Баймуканов [15] предложил при изучении интенсивности роста верблюдов учитывать вес при рождении и при отъеме. Б.С. Турумбетов [16] считает, что еще необходимо изучать и промеры тела при рождении, при отъеме, при достижении половой зрелости. З.М. Мусаев [17] при изучении роста и развития чистопородных казахских бактрианов учитывал живую массу и промеры тела при рождении, в годовалом возрасте, при достижении двухлетнего и трехлетнего возраста.

То есть, в верблюдоводстве изучению роста и развитию верблюжат уделяется особое внимание. Связано это с тем, что интенсивный рост верблюжат в первые месяцы постэмбрионального развития в той или иной мере положительно сказывается на формировании направления продуктивности. В частности, по данным Д.А. Баймуканова [18] интенсивный рост и развитие чистопородных казахских бактрианов в первые три и шесть месяцев постэмбрионального развития положительно влияют на формирование молочного направления продуктивности.

К.Б. Сапаров [19] считает, что частичное доение верблюдиц туркменской породы Арвана при правильной его организации не наносит ущерб развитию молодняка.

Д.А. Баймуканов [20] в своей монографии указывает, что рост верблюжат чистопородных казахских бактрианов наибольший в первые периоды постэмбрионального развития. Для обеспечения соответствующего коэффициента роста необходима правильная организация дойки верблюдиц. Однако автор ограничивается данными при рождении, в три месяца и шесть месяцев.

На необходимость правильной организации кормления и содержания взрослых верблюдов и молодняка отмечается в рекомендации по развитию верблюдоводства [21] и в сборнике «Проблемы развития верблюдоводства в Казахстане» [22].

Д.А. Баймуканов [23] считает, что: «Гетерозис у наров обусловлен полигенными факторами…». Далее: «Гибриды первого поколения при обоих способах скрещивания внешне похожи на дромедаров - одногорбые, но горб большей растянутости спереди назад. Форма головы, шеи и оброслости гибрида сходна с формой бактриана. Наследование молочной и шерстной продуктивности промежуточное. По массивности, рабочим качествам и выносливости гибриды превышают исходные родительские виды».

В условиях Казахстана определенную ценность имеют гибридные верблюды коспак, которые в зависимости от кровности бактриана делятся на бал-коспак (75% бактриана), мырза-коспак (87,5% бактриана) и нар-коспак (93,75% бактриана) [23].

Из межвидовых гибридных верблюдов хорошо изучены нар-мая (F_1), инер-мая (F_1), коспак 1 (F_2), кез-нар 1 (F_3), курт-нар (F_3).

Однако до сих пор в научной литературе недостаточно освящены данные о закономерностях постэмбрионального развития гибридов коспак 2 (F_3), коспак 3 (F_4), кез-нар 2 (F_4), кез-нар 3 (F_3), курт-нар (F_4) и их биологических особенностях формирования продуктивности. Кроме того, следует отметить, что без определенных знаний о молочной, мясной шерстной продуктивности,

научно-обоснованных опытов и полученных результатах преждевременно утверждать о преимуществе того или иного генотипа межвидовых гибридов.

Верблюжье мясо используется для производства мясной продукции соответствующая стандарту «Халал», традиционно используемая в исламском мире. Связано это с тем, что верблюжий жир является заменителем свиному жиру, традиционно используемый в изготовлении колбасных изделии [24]. В этом аспекте, Казахстан согласно данным ООН может стать в краткосрочном периоде лидером в производстве верблюжьего молока и мяса на мировом рынке мясной и молочной индустрии.

По данным А. Баймуканова [22] в создании прочной кормовой базы для пустынного животноводства важную роль играют долголетние высокопродуктивные культурные пастбища и сенокосы, основой которых должна служить природная флора пустынь и полупустынь.

А. Тастанов [25] считает, что одним из резервов быстрого подъема молочности верблюдов является гибридизация казахского бактриана с туркменскими дромедарами. В частности удой молока за шесть месяцев лактации от гибридных верблюдов кез-нар и курт-нар составляет 1700-1750 л молока, с учетом высосанного молока верблюжатами. Дальнейшее скрещивание гибридных верблюдиц кез-нар и курт-нар с производителями гибридного происхождения селекции отдела верблюдоводства Казахского научно-исследовательского института каракулеводства (г. Шымкент) курт III и курт IV является перспективным направлением по совершенствованию межвидовой гибридизации в верблюдоводстве.

В верблюдоводстве из отобранных для размножения животных составляют пары таким образом, чтобы отбор и подбор дополняли друг друга и вместе с направленным выращиванием молодняка они были эффективным методами совершенствования пород.

Цель работы. Определение генетического профиля продуктивности верблюдов казахский бактриан, Арвана, казахский дромедар и межвидовых гибридов в Республике Казахстан.

Методы исследования. Исследования проведены в период 2015–2018 гг.

Объект исследований чистопородные верблюды породы казахский бактриан (kb), Арвана дромедар (td), казахский дромедар (kd) и гибридные верблюды – дромедары от ротационного скрещивания разводимые в условиях ТОО «Таушык» Тупкараганского района Мангистауской области, КХ "Усенов Н" и «Гулмайра» Отрарского, КХ "Нұрбол" Сузакского района и КХ «Даурен-Н» Арыского района Южно-Казахстанской области.

Настриг шерсти устанавливали во время весенней стрижки путем индивидуального взвешивания состриженной шерсти на 20 кг весах с точностью до 0,1 кг. В последующем, состриженную шерсть классифицировали на четыре класса. По результатам анализа шерсти выявлены эффективные варианты отбора и подбора чистопородных казахских бактрианов западной популяции и их межвидовых гибридов.

Формирование гуртов подопытных верблюдов при нагуле проводили по требованию Предпатента Республики Казахстан №16227 [26].

Живую массу верблюдов определяли двумя способами: первый – индивидуальным взвешиванием на стационарных однотонных весах с точностью до 1,0 кг; второй – по требованию Предпатента Республики Казахстан №15886 [27].

Молочную продуктивность определяли по результатам контрольных доек за два смежных дня на 3-ем и 4-ом месяцах лактации, согласно Инструкции по бонитировке верблюдов. Ежемесячный удой определяли путем проведения контрольных доек за два смежных дня (21, 22 числа каждого месяца). В первые два месяца лактации, месячный удой ожеребившихся верблюдоматок устанавливали по абсолютному приросту живой массы их верблюжат. При оценке молочной продуктивности дополнительно определяли степень полноценности лактации по требованию Предпатент Республики Казахстан №16226 [28].

Содержание жира и белка в молоке по общепринятой методике, с использованием прибора «Лактан 3» (производство Россия).

Промеры тела измеряли по требованию Инструкции по бонитировке верблюдов [29, 30].

Морфофункциональные особенности вымени верблюдиц определяли по методике А. Баймуканова [31].

Мясную продуктивность верблюдов изучали по общепринятой методике в модификации профессора А. Баймуканова и др. [32].

Основные показатели контрольного убоя верблюдов самцов разных генотипов определяли при достижении 30 месячного возраста.

Биометрическую обработку цифровых материалов проводили по Н.А. Плохинскому [33] и Е.К. Меркурьевой, Г.Н. Шангин-Березовского [34].

Кровь для исследования брали из ярёмной вены в утренние часы у ненакормленных животных, находившихся в загоне. Определяли количество форменных элементов крови – эритроцитов и лейкоцитов по общепринятой методике в камере Горяева, концентрацию гемоглобина в гемометре Сали, общий белой крови рефрактометрический [20].

Результаты исследований.

1. Селекционно-генетический и продуктивный профиль верблюдов F_2 (25%td, 25%kb, 50%kd). Объектом исследовании послужили казахские бактрианы мангистауской популяции, Арвана – туркменский дромедар, казахский дромедар, гибридные верблюды второго поколения F_2 Айдарамир – арада и Байшин из верблюдоводческого хозяйства ТОО «Таушык» Тупкараганского района Мангистауской области (таблицы 1, 2).

Таблица 1 – Генетические параметры продуктивности подопытных верблюдов

Порода	Кол-во, голов	Живая масса, кг	Удой молока за 240 дней лактации	Жир	Белок
Казахский бактриан	12	551,8±11,3	1182,3±18,7	5,42±0,08	3,40±0,02
Арвана	12	478,3±9,7	2645,7±28,3	3,23±0,07	3,12±0,04
Казахский дромедар	12	485,6±7,8	2191,2±21,5	4,42±0,07	3,53±0,04
«Айдарамир - арада» F_2 (25%td, 25%kb, 50%kd)	12	613,4±12,6	2139,2±31,3	4,29±0,07	3,53±0,03
«Байшин» F_2 (25%td, 25%kb, 50%kd)	12	584,1±9,7	1837,3±41,2	4,32±0,06	3,53±0,04

Таблица 2 – Результаты контрольного убоя 30-ти месячных самцов подопытных групп верблюдов

Порода	Кол-во, голов	Постановочная живая масса, кг	Съемная живая масса, кг	Предубойная живая масса, кг	Убойная масса, кг/ Убойный выход, %
Казахский бактриан	5	225,9±15,1	338,3±9,3	308,6±7,4	163,9±5,1/53,1±0,3
Туркменский дромедар Арвана	5	322,5±18,4	431,9±11,2	392,1±10,5	193,3±8,4/49,3±0,9
Казахский дромедар	5	242,3±13,8	427,6±14,6	395,4±6,9	219,1±3,6/55,4±0,5
«Айдарамир - арада» F_2 (25%td, 25%kb, 50%kd)	5	261,7±19,2	457,8±22,4	418,5±9,1	231,0±6,3/55,2±0,8
«Байшин» F_2 (25%td, 25%kb, 50%kd)	5	256,4±12,9	429,2±18,7	403,7±7,7	224,4±7,1/55,6±0,4

Казахские бактрианы мангистауской популяции являются основной плановой породой в Мангистауской области. Получила распространение в Прикаспиской низменности.

Арвана – туркменский дромедар, трансграничная порода. В условиях прикаспийской низменности получило распространение ербенский заводской тип Арвана.

Казахский дромедар мангистауской популяции уникальная породная группа, получившая распространение в Мангистауской области.

Байшин (F_2 d) – группа гибридных верблюдов второго поколения (50% кровности казахского дромедара, 25% кровности казахского бактриана, 25% кровности туркменского дромедара), получаемые путем скрещивания гибридных самок первого поколения Инер – мая (F_1) с производителями казахского дромедара.

Айдарамир - арада (F_2 d) – группа гибридных верблюдов второго поколения (50% кровности казахского дромедара, 25% кровности казахского бактриана, 25% кровности туркменского дромедара), получаемые путем скрещивания гибридных самок первого поколения Нар – мая (F_1) с производителями казахского дромедара.

Молочная продуктивность. Изучение молочной продуктивности является одним из сложных в генетике и селекции верблюдов. В проведенных исследованиях изучали удой молока за 240 дней лактации, среднее содержание в молоке жира и белка в течение 240 дней лактации (таблица 1).

Установлено, что гибридные верблюдоматки группы «Айдарамир» достоверно превосходят казахских бактрианов по удою молока (P≤0,001), но уступают по содержанию жира в молоке и не уступают по массовой доле белка в молоке (таблица 1).

По живой массе наблюдается эффект гетерозиса. Все верблюдоматки второго поколения «Айдарамир» и «Байшин» превосходят своих чистопородных сверстниц по живой массе (P≤0,001).

Скороспелость и мясная продуктивность. Предубойная живая масса у 2,5 летнего молодняка самцов F_2 (25%td, 25%kb, 50%kd) составляет в среднем 403,7-418,5 кг. Убойный выход у самцов F_2 (25%td, 25%kb, 50%kd) в среднем составляет 55,4% (таблица 2), обусловленный влиянием генов казахских дромедаров.

2. Селекционно-генетический и продуктивный профиль верблюдов F_3 (12,5%td, 62,5%kb, 25%kd). Объектом исследовании послужили казахские бактрианы южно-казахстанского типа, Арвана – туркменский дромедар, казахский дромедар, гибридные верблюды третьего поколения F_3 Айдарамир – нар и Байкажы из КХ "Усенов Н" и «Гулмайра» Отрарского, КХ "Нұрбол" Сузакского района и КХ «Даурен-Н» Арыского района Южно-Казахстанской области.

Казахские бактрианы южно-казахстанского типа, плановая порода верблюдов в Южно-Казахстанской области.

Арвана – туркменский дромедар представлен сакарчагинским заводским типом.

Казахский дромедар южно-казахстанской популяции, ограниченная локальная породная группа.

Айдарамир - нар F_3 – это группа гибридных верблюдов третьего поколения (12,5% арвана, 62,5% казахского бактриана, 25% казахского дромедара), получаемых путем поглотительного скрещивания самок – гибридов второго поколения Айдарамир - арада с самцами-казахский бактриан.

Байкажы F_3 – это группа гибридных верблюдов третьего поколения (12,5% арвана, 62,5% казахского бактриана, 25% казахского дромедара), получаемых путем поглотительного скрещивания самок – гибридов второго поколения Байшин с самцами-казахский бактриан.

Молочная продуктивность. Установлено, что гибридные верблюдоматки группы «Айдарамир - нар» достоверно превосходят казахских бактрианов, туркменских дромедаров и казахских дромедаров по живой массе (P≤0,01). Аналогичное превосходство наблюдается и у гибридных верблюдоматок «Байкажы» (таблица 3).

Таблица 3 – Зоотехнические параметры молочной продуктивности подопытных верблюдов

Порода	Кол-во, голов	Живая масса, кг	Удой молока за 240 дней лактации	Жир	Белок
Казахский бактриан	15	587,4±22,1	944,1±45,2	5,61±0,07	3,52±0,04
Туркменский дромедар Арвана	15	535,1±13,6	2921,7±25,9	3,17±0,05	2,99±0,02
Казахский дромедар	15	551,9±16,4	2468,2±31,1	4,45±0,07	3,51±0,05
«Айдарамир - нар» F_3 (12,5%td, 62,5%kb, 25%kd)	15	628,2±17,2	1764,9±23,8	4,37±0,06	3,51±0,05
«Байкажы» F_3 (12,5%td, 62,5%kb, 25%kd)	15	612,4±14,3	1543,4±28,4	4,46±0,07	3,51±0,04

Удой молока у гибридных верблюдиц третьего поколения достоверно выше в сравнении со сверстницами казахского бактриана (P≤0,001), но ниже в сравнении с дромедарами.

Выявить общие закономерности в наследовании показателей содержания жира в молоке у гибридных верблюдоматок третьего поколения не удалось, но следует отметить промежуточный тип наследования содержания жира в молоке.

Касательно наследования массовой доли белка в молоке у гибридных верблюдиц прослеживается большее влияние казахского дромедара.

Таким образом, «Айдарамир - нар» F_3 (12,5%td, 62,5%kb, 25%kd) имеют живую массу 628,2 кг, удой молока за 240 дней лактации 1764,9 кг, содержание жира в молоке 4,37%, содержание

молочного белка 3,51%. Гибридные верблюдоматки «Байкажы» F_3 (12,5%td, 62,5%kb, 25%kd) имели соответственно 612,4 кг, 1543,4 кг, 4,46% и 3,51%.

3. Селекционно-генетический и продуктивный профиль F_4 (56,25%td, 31,25%kb, 12,5%kd). Объектом исследовании послужили казахские бактрианы южно-казахстанского типа, Арвана – туркменский дромедар, казахский дромедар, гибридные верблюды третьего поколения F_4 Айдарамир – курт и Ардас из КХ "Усенов Н" и «Гулмайра» Отрарского, КХ "Нұрбол" Сузакского района и КХ «Даурен-Н» Арыского района Южно-Казахстанской области.

Айдарамир – курт (F_4) – группа гибридных верблюдов четвертого поколения (56,25% кровности туркменского дромедара, 31,25% кровности казахского бактриана, 12,5% казахского дромедара) получаемые путем скрещивания гибридных самок третьего поколения Айдарамир-нар (F_3) с производителями туркменского дромедара.

Ардас (F_4) – группа гибридных верблюдов четвертого поколения (56,25% кровности туркменского дромедара, 31,25% кровности казахского бактриана, 12,5% казахского дромедара) получаемые путем скрещивания гибридных самок третьего поколения Байкажы (F_3) с производителями туркменского дромедара.

Генетика постэмбрионального роста и развития верблюдов. Результаты исследовании динамики возрастной изменчивости живой массы самок подопытных верблюдов дромедаров казахского типа F_4 (56,25%td, 31,25%kb, 12,5%kd) от 15 дневного возраста до 2,5 лет приведены в таблице 4.

Таблица 4 – Возрастная изменчивость живой массы подопытных верблюдов – самок, кг

Возраст	Группа	Единица измерения		
		$X \pm m_x$	Cv	δ
15 дней	Казахский бактриан	32,5±1,8	12,4	3,7
	Арвана	36,9±2,1	9,8	2,4
	Казахский дромедар	42,4±1,5	6,5	3,3
	«Айдарамир - курт» F_4	44,2±2,4	7,7	4,1
	«Ардас» F_4	43,1±2,7	7,1	3,8
6 мес.	Казахский бактриан	142,4±4,3	9,2	5,6
	Арвана	151,2±5,1	8,7	11,2
	Казахский дромедар	148,6±4,8	8,5	9,1
	«Айдарамир - курт» F_4	154,9±6,3	9,5	10,2
	«Ардас» F_4	161,7±5,9	7,9	12,7
18 мес.	Казахский бактриан	233,8±5,8	6,2	12,7
	Арвана	263,2±4,4	9,3	8,2
	Казахский дромедар	257,5±6,1	5,8	12,8
	«Айдарамир - курт» F_4	278,4±6,3	6,4	14,3
	«Ардас» F_4	295,8±7,1	6,9	11,9
30 мес. (2,5 года)	Казахский бактриан	327,3±5,7	5,2	9,6
	Арвана	355,2±8,2	7,4	18,1
	Казахский дромедар	328,7±6,5	6,5	15,3
	«Айдарамир - курт» F_4	389,5±10,1	9,3	17,5
	«Ардас» F_4	397,1±7,2	8,7	14,7

При достижении 15-дневного возраста верблюжата – самки дромедара казахского типа F_4 имеют в среднем живую массу 43,1-44,2 кг, что соответствует показателям сверстниц казахского дромедара (42,4±1,5 кг), но достоверно выше в сравнении со сверстницами казасхкого бактриана (32,5±1,8 кг) и Арвана (36,9±2,1 кг).

При достижении шестимесячного возраста верблюжата – самки дромедара казахского типа F_4 превосходят по живой массе все подопытные группы. Данное превосходство связано с эффектом гетерозиса от трехпородного ротационного скрещивания.

В дальнейшие возрастные периоды, превосходство по живой массе у самок дромедаров казахского типа достоверно увеличивается в сравнении с чистопордными сверстницами.

В 18-месячном возрасте живая масса самок казахского бактриан достигает 233,8±5,8 кг, Арвана 257,5±6,1 кг, казахского дромедара 257,5±6,1 кг, «Айдарамир - курт» F_4 278,4±6,3 кг и «Ардас» F_4 295,8±7,1 кг.

При достижении возраста 2,5 лет самки дромедары казахского типа «Ардас» F_4 превосходят достоверно по живой массе сверстниц казахского бактриана на 69,8 кг или на 21,3% ($P<0,001$), арвана на 41,9 кг или 11,7% ($P<0,01$).

Живая масса 2,5 летних самок «Айдарамир - курт» F_4 в среднем достигает 389,5±10,1 кг, «Ардас» F_4 - 397,1±7,2 кг, что достоверно выше в сравнении с показателями живой массы казахского бактриана (327,3±5,7 кг), арвана (355,2±8,2 кг) и казахского дромедара (328,7±6,5 кг).

В таблице 5 приведены результаты исследования возрастной динамики промеров тела у подопытных групп верблюжат – самцов от рождения до 18 месячного возраста. Верблюжата – самцы

Таблица 5 – Возрастная динамика промеров тела молодняка верблюдов самцов, см

Видовая принадлежность	Возраст	Промеры телосложения			
		высота в холке	косая длина туловища	обхват груди	обхват пясти
Бактриан (n=10)	при рождении	109,7±2,1	72,6±3,3	95,2±3,1	11,1±0,3
	в 3-х мес.воз.	128,5±2,4	92,4±3,9	120,9±4,5	12,8±0,3
	в 6-ти мес.воз.	141,3±2,7	103,5±3,5	144,7±4,2	15,3±0,4
	в 9-ти мес.воз.	145,8±3,1	107,7±3,8	155,7±5,3	16,8±0,3
	в 12-ти мес.воз.	151,7±4,1	112,7±4,7	170,8±4,9	18,2±0,3
	в 18-ти мес.воз.	156,8±4,6	118,7±3,9	185,1±4,6	18,7±0,3
Арвана (n=10)	при рождении	112,3±1,4	71,4±2,5	102,92±4,2	12,1±0,2
	в 3-х мес.воз.	131,9±2,7	95,3±3,1	140,12±3,7	12,7±0,3
	в 6-ти мес.воз.	147,4±3,2	114,4±2,7	155,80±4,2	13,5±0,4
	в 9-ти мес.воз.	152,7±3,9	119,2±3,2	160,7±4,1	14,2±0,3
	в 12-ти мес.воз.	163,5±2,6	123,1±3,9	172,5±2,8	14,5±0,3
	в 18-ти мес.воз.	169,1±2,8	128,3±3,5	176,2±5,4	15,8±0,2
Казахский дромедар (n=10)	при рождении	111,4±1,6	65,7±3,2	87,8±4,5	11,6±0,3
	в 3-х мес.воз.	132,1±1,2	83,1±3,3	124,1±3,4	13,2±0,4
	в 6-ти мес.воз.	144,2±3,5	99,2±3,7	147,6±4,7	14,1±0,3
	в 9-ти мес.воз.	148,1±3,7	109,1±3,4	153,5±4,2	14,5±0,4
	в 12-ти мес.воз.	159,3±3,2	117,4±3,1	167,4±3,2	15,2±0,3
	в 18-ти мес.воз.	167,4±2,5	121,4±3,7	171,3±3,4	15,5±0,5
Айдарами – курт» F_4 (n=10)	при рождении	114,2±2,4	70,2±3,1	97,2±3,9	11,6±0,2
	в 3-х мес.воз.	135,3±4,3	93,5±3,6	127,5±4,4	13,1±0,3
	в 6-ти мес.воз.	142,9±4,8	106,2±3,4	150,71±3,9	15,9±0,3
	в 9-ти мес.воз.	154,7±3,7	115,3±4,3	155,9±4,0	16,6±0,4
	в 12-ти мес.воз.	166,8±4,1	120,2±2,8	173,4±3,1	17,2±0,3
	в 18-ти мес.воз.	169,7±3,7	121,1±2,7	188,7±3,6	17,5±0,4
«Ардас» F_4 (n=10)	при рождении	114,7±3,2	72,9±2,2	93,3±3,6	11,9±03
	в 3-х мес.воз.	133,5±3,5	91,8±3,9	126,1±3,5	12,8±0,4
	в 6-ти мес.воз.	144,1±3,1	103,4±3,3	146,50±3,8	15,8±0,4
	в 9-ти мес.воз.	155,4±2,3	115,7±3,8	152,1±4,0	16,5±0,3
	в 12-ти мес.воз.	164,6±3,2	119,4±3,1	172,1±3,5	16,9±0,4
	в 18-ти мес.воз.	172,2±2,6	123,2±3,4	183,7±4,2	17,1±0,4

группы дромедар казахского типа F_4 превосходят по всем промерам тела сверстников казахского бактриана, арвана и казахского дромедара.

В виду высокой молочной продуктивности у верблюдиц арвана, казахского дромедара и дромедаров казахского типа F_4 прослеживается более интенсивное увеливение высоты в холке, косой длины туловища и обхвата груди у их верблюжат в молочный период в сравнении с казахскими бактрианами.

Установленные параметры промеров тела рекомендуется использовать в качестве стандарта для определения интенсивности роста и развития от рождения до 18-месячного возраста при различных технологиях выращивания и доращивания молодняка верблюдов в молочный и постмолочный периоды онтогенеза.

Генетика крови и плодовитости верблюдов. Морфобиохимические показатели крови характеризуют гематологические и биохимические исследования. В связи с этим нами проведены исследования содержания эритроцитов, лейкоцитов, гемоглобина в крови, а также особенности белкового коэффициента крови у подопытных верблюдиц (таблица 6).

Таблица 6 – Гематологические и биохимические показатели крови подопытных верблюдиц (n=40; Σ_n=200)

Признаки	Группа				
	Казахский бактриан	Арвана	Казахский дромедар	«Айдар-амир – курт» F_4	«Ардас» F_4
Эритроциты, млн./мл	14,2±0,3	11,5±0,2	12,7±0,2	13,4±0,3	14,1±0,2
Лейкоциты, тыс./мл	16,2±0,2	14,9±0,3	16,7±0,2	17,5±0,2	16,5±0,1
Гемоглобин, г/%	15,5±0,4	12,8±0,3	13,5±0,3	14,3±0,3	14,8±0,2
Тромбоциты, тыс./мл	540,2±40,1	468,7±32,5	625,9±52,6	569,1±25,3	608,4±38,3
Общий белок, г/%	6.8±0,09	6,2±0,07	6,5±0,08	6,4±0,06	6,5±0,05
Альбумин, %	62,9±0,02	59,4±0,03	62,3±0,03	60,9±0,03	59,9±0,05
Глобулин, %	37,1±0,03	40,6±0,03	37,7±0,03	39,1±0,02	40,1±0,02
Белковый коэффициент, А/Г	1,70±0,04	1,46±0,03	1,65±0,03	1,56±0,04	1,49±0,01

У чистопородных верблюдиц арвана в крови содержится эритроцитов 11,5 млн/мл, лейкоцитов 14,9 тыс/мм и гемоглобина 12,8 г/%.

Установлено, что верблюдицы группы дромедар казахского типа F_4 превосходят арвана по содержанию эритроцитов и лейкоцитов, концентрации гемоглобина, альбумина в общем белке крови.

Концентрация тромбоцитов у верблюдов группы дромедар казахского типа F_4 (569,1-608,4 тыс/мл) достоверно выше, чем у аравана (468,7 тыс./мл) ($P<0,001$), но ниже в сравнении с казахскими дромедарами (625,9 тыс./мл).

Белковый коэффициент крови составил у верблюдоматок казахского бактриан 1,70, арвана – 1,46, казахского дромедара – 1,65, «Айдарамир» -1,56 и «Ардас» - 1,49.

В целом, все показатели крови у подопытных верблюдов соответствовали физиологической норме. Выявленные колебания между группами, вероятно, обусловлены межпородными различиями.

Верблюдоматки группы дромедар F_4 новой генерации «Айдарамир - курт» и «Ардас» имеют продолжительность плодоношения от 405 дней до 442 дней, а средняя продолжительность составила 421,1-422,5 дней. Казахские бактрианы имеют продолжительность плодоношения в среднем 442,4±5,1 дней. Арвана имели продолжительность плодоношения от 412 дней до 442 дней, в среднем 425,1±3,9дней. Казахские дромедары характеризуются продолжительностью плодоношения 395-432 дней, в среднем 417,2±3,1 дней (таблица 7).

Полученные данные по продолжительности плодоношения согласуются с ранее проведенными исследованиями.

Таким образом, верблюдоматки F_4 (56,25%td, 31,25%kb, 12,5%kd) по продолжительности плодоношения ближе к Арвана и казахским дромедарам.

Таблица 7 – Продолжительность плодоношения верблюдоматок, в сутках (n=40, Σ_n=200)

Порода	$X \pm m_x$	δ	Lim
Казахский бактриан	442,4±5,1	4,9	435-458
Арвана	425,1±3,9	3,2	412-442
Казахский дромедар	417,2±3,1	3,5	395-432
«Айдарамир - курт» F_4	422,5±3,2	4,5	405-442
«Ардас» F_4	421,1±2,8	4,5	409-439

Генетика молочной продуктивности верблюдоматок. Живая масса верблюдоматок группы дромедар F_4 (56,25%td, 31,25%kb, 12,5%kd) составила 579,7 – 584,5 кг, что выше показателей казахского бактриана (554,8 кг), арвана (561,2 кг) и казахского дромедара (517,1 кг) (таблица 8).

Таблица 8 – Продуктивность подопытных верблюдоматок (n=40, Σ_n=200)

Порода	Живая масса, кг	Настриг шерсти, кг	Удой молока за 270 дней лактацию	Жир	Белок
Казахский бактриан	554,8±9,2	6,7±0,4	1481,4±30,8	5,31±0,08	3,38±0,03
Арвана	561,2±12,8	2.9±0,3	2911,7±24,6	3,28±0,07	3,09±0,04
Казахский дромедар	517,1±7,3	3,7±0,3	2474,2±18,2	4,42±0,06	3,48±0,04
«Айдарамир - курт» F_4	584,5±16,1	4,2±0,3	2399,1±21,5	4,25±0,08	3,48±0,03
«Ардас» F_4	579,7±14,9	4,3±0,2	2226,5±28,9	4,21±0,07	3,48±0,02

Удой молока за 270 дней лактации составил у верблюдоматок породы казахский бактриан южно – казахстанского типа - 1481,4±30,8 кг, Арвана -2911,7±24,6 кг, казахского дромедара - 2474,2±18,2 кг, «Айдарамир - курт» F_4 - 2399,1±21,5 кг, «Ардас» F_4 - 2226,5±28,9 кг.

По содержанию белка в молоке верблюдоматки новой генерации группы дромедар F_4 ближе к казахским дромедарам, а по содержанию жира в молоке занимают промежуточное положение между арвана и казахскими дромедарами.

По настригу шерсти, верблюдоматки новой генерации группы дромедар F_4 достоверно превосходят Арвана и казахский дромедар ($P<0,01$). Верблюдоматки казахского бактриана имеют в среднем настриг шерсти -6,7±0,4 кг, Арвана - 2,9±0,3 кг, казахский дромедар - 3,7±0,3 кг, «Айдарамир - курт» F_4 4,2±0,3 кг и «Ардас» F_4 - 4,3±0,2 кг.

В таблице 9 приведены результаты исследовании динамики суточных удоев молока у подопытных верблюдоматок в течение шести месяцев лактации.

Установлено, что верблюдоматки группы дромедар казахского типа F_4 в течение шести месяцев лактации в среднем в сутки продуцируют 8,6-8,7 кг, что достоверно выше в сравнении с верблюдоматками породы казахский бактриан (5,6±0,22), но ниже в сравнении с Арвана (11,0±0,23 кг) и казасхкими дромедарами (10,5±0,19 кг).

Таблица 9 – Динамика суточных удоев молока подопытных верблюдоматок (n=40, Σ_n=200), кг

Месяцы года	Группа				
	Казахский бактриан	Арвана	Казахский дромедар	«Айдарами – курт» F_4	«Ардас» F_4
Апрель	5,2±0,19	8,8±0,21	9,2±0,15	7,9±0,19	8,3±0,25
Май	5,6±0,21	9,3±0,24	9,5±0,18	8,2±0,19	8,6±0,23
Июнь	5,9±0,23	11,9±0,22	10,7±0,21	8,5±0,20	8,8±0,23
Июль	6,0±0,22	12,5±0,23	11,5±0,21	9,2±0,20	8,9±0,23
Август	5,4±0,25	11,6±0,24	11,1±0,21	8,9±0,22	8,7±0,23
Сентябрь	5,7±0,22	12,1±0,24	11,4±0,21	9,1±0,20	8,9±0,23
В среднем	5,6±0,22	11,0±0,23	10,5±0,19	8,6±0,20	8,7±0,23

В таблице 10 приведены результаты исследований изучения среднесуточного удоя молока и содержания жира в молоке в зависимости от формы вымени. Верблюдиц по форме вымени распределили на 5 групп: чащевидная, округлая, дольковидная, и примитивная. По каждой опытной группе сформировали подгруппы по форме вымени. В каждой подгруппе изучено по 10 голов дойных верблюдоматок.

Таблица 10 – Среднесуточный удой и содержание жира в молоке у верблюдоматок в зависимости от формы вымени

Группа животных	Показатели	Форма вымени			
		чашевидная	округлая	дольковидная	примитивная
Казахский бактриан (n=10, Σ_n=40)	суточный удой, кг	6,5±0,15	5,8±0,14	4,3±0,17	3,3±0,22
	жир, %	5,34±0,07	5,32±0,06	5,31±0,08	5,31±0,11
	белок, %	3,39±0,03	3,39±0,03	3,38±0,04	3,38±0,04
Арвана (n=10, Σ_n=40)	суточный удой, кг	12,2±0,11	10,3±0,16	8,5±0,24	7,1±0,25
	жир, %	3,3±0,07	3,3±0,07	3,28±0,09	3,26±0,09
	белок, %	3,1±0,04	3,1±0,04	3,09±0,05	3,07±0,05
Казахский дромедар (n=10, Σ_n=40)	суточный удой, кг	11,8±0,12	10,5±0,19	8,8±0,21	6,7±0,28
	жир, %	4,43±0,06	4,43±0,06	4,42±0,04	4,39±0,07
	белок, %	3,48±0,04	3,48±0,04	3,48±0,03	3,47±0,03
«Айдарамир – курт» F_4 (n=10, Σ_n=40)	суточный удой, кг	10,2±0,19	9,7±0,21	7,1±0,26	6,3±0,31
	жир, %	4,27±0,08	4,27±0,08	4,25±0,08	4,22±0,08
	белок, %	3,51±0,05	3,50±0,04	3,48±0,03	3,46±0,03
«Ардас» F_4 (n=10, Σ_n=40)	суточный удой, кг	10,8±0,22	9,4±0,21	8,2±0,27	5,9±0,33
	жир, %	4,21±0,07	4,21±0,07	4,21±0,08	4,21±0,08
	белок, %	3,50±0,05	3,48±0,04	3,48±0,02	3,46±0,02

Установлено, что верблюдицы во всех подопытных группах с чащевидной формой вымени достоверно превосходят особей с округлой (P<0,01), дольковидной (P<0,01) и примитивной (P<0,01) формами вымени по среднесуточному удою молока.

Показатели вариации содержания жира, белка в молоке в зависимости от формы вымени незначительные. Поэтому необходимо усилить селекционную и племенную работу по целенаправленному комплектованию дойных стад верблюдоматок с чашевидной и округлой формами вымени.

В связи с тем, что во всех верблюдоводческих хозяйствах юга Казахстана преимущественно практикуется 210 дневная дойка, нами, проведен анализ молочной продуктивности верблюдоматок подопытных групп с чашевидной, округлой, дольковидной и примитивной формами вымени (таблица 11).

Таблица 11 – Молочная продуктивность верблюдоматок с выменем разной формы за 210 дней лактации

Порода	Показатели	Форма вымени			
		чашевидная	округлая	дольковидная	примитивная
Казахский бактриан	X ± mx	1185,7±27,2	821,2±21,7	698,1±18,9	394,5±28,1
	%	100	67,7	51,8	27,9
Арвана (n=10, Σ_n=40)	X ± mx	2271,4±35,6	1968,8±29,3	1475,3±27,1	1052,1±31,5
	%	100	77,8	64,8	54,0
Казахский дромедар (n=10, Σ_n=40)	X ± mx	1869,2±23,9	1711,7±28,1	1592,3±29,8	1385,6±27,9
	%	100	88,9	65,6	42,7
«Айдарамир курт» F_4 (n=10, Σ_n=40)	X ± mx	1745,3±29,1	1634,2±25,4	1514,6±29,5	1405,8±33,8
	%	100	88,6	63,5	38,4
«Ардас» F_4 (n=10, Σ_n=40)	X ± mx	1806.8±32,3	1618,5±30,1	1485,3±38,2	1374,7±41,2
	%	100	91,5	57,8	45,6

Верблюдоматки с чашевидной формами вымени продуцируют молока на 8,5–32,3% больше в сравнении с особями с округлыми формами вымени, на 44,2–48,2% в сравнении с особями с дольковидной формами вымени, на 46,0–72,9% в сравнении со сверстницами примитивной формами вымени.

На основании проведенных исследований, считаем необходимым комплектовать стадо верблюдоматок для промышленного производства молока с чащевидной и округлой формами вымени.

Верблюдоматки группы дромедар казахского типа F_4 превосходят чистопородных сверстниц по высоте в холке, косой длине туловища, обхвату пясти. У верблюдоматок казахского бактриана высота между горбами составил – 172,4 см, косая длина туловища – 158,8 см, обхват груди – 231,5 см, обхват пясти – 21,2 см (таблица 12).

Таблица 12 – Промеры тела верблюдиц подопытных (n=40, Σ_n=200), см

Группа	Высота в холке	Косая длина туловища	Обхват груди	Обхват пясти
Казахский бактриан	172,4±2,5	158,8±1,3	231,5±2,8	21,2±0,1
Арвана	185,3±2,3	156,5±1,7	215,9±2,5	19,5±0,2
Казахский дромедар	182,2±1,5	152,7±1,4	218,2±2,9	20,0±0,1
«Айдарамир – курт» F_4	186,1±2,1	160,0±1,1	234,5±2,1	20,5±0,2
«Ардас» F_4	188,7±1,8	159,4±1,6	239,3±1,9	20,5±0,1

Промеры тела у арвана составил 185,3-156,5-215,9-19,5 см, казахского дромедара 182,2-152,7-218,2-20,0 см, «Айдарамир – курт» F_4 186,1-160,9-234,5-20,5 см, «Ардас» F_4 188,7-159,4-239,3-20,5 см.

Мясная продуктивность. При достижении 30-ти месячного возраста проведен контрольный убой подопытных верблюдов - самцов (таблица 13).

Таблица 13 – Результаты контрольного убоя подопытных верблюдов - самцов в возрасте 2,5 года (n=5; Σ_n=25)

Признаки	Группа				
	Казахский бактриан	Арвана	Казахский дромедар	«Айдар-амир – курт» F_4	«Ардас» F_4
Предубойная живая масса, кг	343,2±8,1	362,7±6,4	335,9±7,3	394,8±8,5	412,3±9,1
Масса парной туши, кг	162,0±3,8	169,7±3,4	159,5±3,1	192,3±4,2	199,1±3,7
Выход парной туши,%	47,2	46,8	47,5	48,7	48,3
Масса горбового жира, кг	15,4±0,3	17,3±0,4	13,5±0,3	16,6±0,3	17,2±0,3
Выход горбового жира, %	4,48	4,76	4,01	4,20	4,17

Результаты исследований показали, что убойный выход туши без показателя горобового жира составляет у казахских бактрианов 47,2%, арвана - 46,2%, казахского дромедара – 47,5%, «Айдарамир – курт» F_4 - 48,7% и «Ардас» F_4 - 48,3%. Выход горбового жира варьирует от 4,01% до 4,76%. По степени накопления горбового жира верблюды группы дромедар F_4 уступают Арвана, и занимают промежуточный показатель между казахским бактрианом и казахским дромедаром.

4. Селекционно-генетический и продуктивный профиль верблюдов F_5 (28,1%td, 15,6%kb, 56,2%kd). Объектом исследовании послужили гибридные верблюды пятого поколения F_5 Саннак и Айдарамир из верблюдоводческого хозяйства ТОО «Таушык» Тупкараганского района Мангистауской области.

Саннак F_5 – это группа гибридных верблюдов пятого поколения F_5 (28,1% кровности туркменского дромедара, 15,6% кровности казахского бактриана, 56,2% кровности казахского дромедара), получаемых путем поглотительного скрещивания самок – гибридов четвертого поколения Ардас F_4 с самцами-казахский дромедар

Айдарамир F_5 – это группа гибридных верблюдов пятого поколения F_5 (28,1% кровности туркменского дромедара, 15,6% кровности казахского бактриана, 56,2% кровности казахского

дромедара), получаемых путем поглотительного скрещивания самок – гибридов четвертого поколения Айдарамир – курт F_4 с самцами-казахский дромедар.

В таблице 14 приведена зоотехническая характеристика верблюдов – производителей группы дромедар F_5 (28,1%td, 15,6%kb, 56,2%kd).

Таблица 14 – Зоотехническая характеристика верблюдов-производителей

Показатели	F_5 (28,1%td, 15,6%kb, 56,2%kd)		
	«Саннак»	«Айдарамир»	В среднем
Количество, голов	5	5	10
Живая масса, кг	620,8±9,3	612,4±8,5	616,6±17,9
Настриг шерсти, кг	5,5±0,2	5,9±0,3	5,7±0,2
Выход чистого волокна, %	93,5±0,3	93,1±0,3	93,3±0,2
Высота в холке, см	195,7±1,6	195,3±1,8	195,5±2,1
Косая длина туловища, см	168,8±1,2	166,7±1,4	167,7±1,3
Обхват груди, см	223,5±3,7	225,7±3,3	224,6±3,2
Обхват пясти, см	24,8±0,12	25,3±0,11	25,1±0,1

Лек - производители F_5 (28,1%td, 15,6%kb, 56,2%kd) характеризуются живой массой в среднем 616,6 кг, настригом шерсти - 5,7 кг, выходом чистого волокна - 93,3%, высотой в холке - 195,5 см, косой длиной туловища 167,7 см, обхватом груди 224,6 см, обхватом пясти 25,1 см.

Верблюдоматки F_5 (28,1%td, 15,6%kb, 56,2%kd) имеют в среднем живую массу 550,2±19,3 кг, настриг шерсти 3,3±0,09 кг, выход чистого волокна 93,8±0,1%. Промеры тела в среднем составили 188,8 – 164,5 -217,2 – 19,5 см (таблица 15).

Таблица 15 – Зоотехническая характеристика верблюдоматок

Признаки	F_5 (28,1%td, 15,6%kb, 56,2%kd)		
	«Саннак»	«Айдарамир»	В среднем
Количество, голов	50	50	100
Живая масса, кг	565,5±22,1	534,9±16,7	550,2±19,3
Настриг шерсти, кг	3,1±0,1	3,5±0,06	3,3±0,09
Выход чистого волокна, %	93,4±0,2	94,2±0,1	93,8±0,1
Высота в холке, см	188,6±1,6	189,0±1,4	188,8±1,2
Косая длина туловища, см	163,4±1,2	165,6±1,1	164,5±1,3
Обхват груди, см	220,1±2,5	214,3±2,1	217,2±2,3
Обхват пясти, см	19,8±0,2	19,3±0,1	19,5±0,1

Исходя из этого, начали практиковать разведение дромедаров казахского типа F_5 (28,1%td, 15,6%kb, 56,2%kd) в себе.

Молочная продуктивность. Процесс формирования молочной продуктивности у верблюдов разных пород имеет свои особенности (таблица 16).

Таблица 16 – Параметры молочной продуктивности подопытных верблюдов

Порода	Кол-во, голов	Живая масса, кг	Удой молока за 240 дней лактации	Жир	Белок
Казахский бактриан	20	548,2±14,5	1371,9±25,4	5,43±0,08	3,41±0,02
Туркменский дромедар Арвана	20	482,6±7,1	2762,5±37,6	3,22±0,07	3,11±0,04
Казахский дромедар	20	491,9±9,5	2293,7±29,2	4,41±0,06	3,54±0,04
«Саннак» F_5	20	552,5±11,3	1991,4±27,5	4,32±0,07	3,52±0,03
«Айдарамир» F_5	20	548,9±9,1	2217,2±19,1	4,32±0,07	3,51±0,03

По живой массе наблюдается эффект гетерозиса. Все верблюдоматки пятого поколения «Саннак» и «Айдарамир» превосходят своих чистопородных сверстниц по живой массе (P≤0,001). Верблюдоматки «Саннак» F_5 имели в среднем живую массу 552,5±11,3 кг, «Айдарамир» F_5 показали 548,9±9,1 кг. Верблюдоматки казахской породы бактрианов продуцируют более жирное молоко. Дойные верблюдицы породы Арвана дают молоко с меньшим содержанием жира и белка в молоке.

Казахские дромедары, как и верблюдоматки F_5 (28,1%td, 15,6%kb, 56,2%kd) продуцируют молоко с высоким содержанием белка в молоке.

Верблюдоматки «Саннак» F_5 (28,1%td, 15,6%kb, 56,2%kd) за 240 дней дактации дали 1991,4±27,5 кг, со средним содержанием жира в молоке 4,32±0,07% и белка в молоке 3,52±0,03%.

От верблюдоматок «Айдарамир» F_5 (28,1%td, 15,6%kb, 56,2%kd) за 240 дней лактации надоено 2217,2±19,1 кг.

Мясная продуктивность. Постановочная живая масса составила у самцов «Саннак» 328,2 кг, «Айдарамир» - 325,4 кг, в среднем по дромедарам казахского типа F_5 (28,1%td, 15,6%kb, 56,2%kd) 326,3±11,5 кг (таблица 17).

Таблица 17 – Результаты контрольного убоя 30-ти месячных самцов дромедара F_5 (28,1%td, 15,6%kb, 56,2%kd)

Признаки	F_5 (28,1%td, 15,6%kb, 56,2%kd)		
	«Саннак»	«Айдарамир»	В среднем
Постановочная живая масса	328,2±12,6	325,4±9,9	326,3±11,5
Съемная живая масса, кг	432,1±9,5	413,5±7,7	422,8±11,9
Предубойная живая масса, кг	419,5±8,2	388,3±6,8	403,9±6,4
Убойная масса, кг	226,9±5,1	210,8±4,2	218,9±4,7
Убойный выход, %	54,1±0,3	54,3±0,3	54,2±0,2

После нагула живая масса достоверно увеличивается у «Саннак» до 432,1 кг, «Айдарамир» до 413,5 кг. После голодной выдержки живая масса уменьшается в среднем на 6-8%, в частности у самцов «Саннак» до 419,5 кг, «Айдарамир» до 388,3 кг. Убойный выход в среднем составляет 54,2±0,25.

Обсуждение. Развитие племенного и продуктивного верблюдоводства является одним перспективных направлении развития отгонного животноводства, так как предполагает увеличение производства экологический чистой и целебной молочной продукции, верблюжьей шерсти и кожевенного сырья с высоким экспортным потенциалом [35-37].

В настоящее время согласно данным комитета статистки Министерства Национальной экономики Республики Казахстан по состоянию на 1 января 2017 года, численность верблюдов во всех категориях хозяйств превысила 175 тыс. голов, из которых 70,8 % сосредоточены в личных подсобных хозяйствах. Доля племенного поголовья верблюдов в общей структуре не превышает 2,5%, тогда как мировой опыт показывает, что удовлетворение спроса на верблюжатину и молочную продукцию, в достаточном объеме, невозможно без развития племенного стада. Необходимо в ближайшие 20 лет довести долю племенных верблюдов до 50%.

Использование новых достижений генетики и селекции в верблюдоводстве позволит разработать эффективные способы отбора и подбора животных, с дальнейшим формированием уникальных стад дойных верблюдиц группы дромедар и бактриан, с устойчивым генотипом и высоким генетическим потенциалом [38-40].

Казахстан является уникальным центром на Евразийском континенте, где возможно разводить дромедаров (одногорбые верблюды), бактрианов (двугорбые верблюды) путем чистопородного разведения, а также практиковать межпородное скрещивание и межвидовую гибридизацию.

Казахстан является родиной уникальной породы верблюдов – казахский бактриан, который по праву считается национальным достоянием всего народа. Генетическое многообразие верблюдов Казахстана создает все предпосылки для успешного развития как племенного, так и продуктивного верблюдоводства. Путем межвидовой гибридизации верблюдов созданы уникальная коллекция,

включающая 30 генерации, не имеющая аналогов в мире. Некоторые генерации межвидовых гибридов способны давать «себе подобное потомство».

Проводится целенаправленная селекция верблюдов с целью повышения белкового коэффициента [41-43]. Продолжаются исследования по совершенствованию технологии содержания и кормления верблюдов с учетом кормовых ресурсов и природно-климатических зон Казахстана [44-47].

Использование новых достижении генетики и селекции в верблюдоводстве позволит сформировать уникальные стада дойных верблюдиц группы дромедар и бактриан, с устойчивым генотипом и высоким генетическим потенциалом [48-50].

Перспективным направлением является создание новых ассортиментов и наименований молочной продукции с учетом требовании ЕАЭС, потребности населения и экспортного потенциала каждого региона Казахстана.

Верблюдоводство ошибочно считают, малозатратнойподотраслью продуктивного отгонного животноводства, поэтому Господдержка сведена до минимума, в сравнении с молочным и мясным скотоводством, а также овцеводством. Для увеличения производства продукции верблюдоводства для широкого круга потребителей необходимо создать предпосылки для увеличения племенных высокомолочных и мясомолочных поголовья верблюдов до 350 тыс. голов в ближайшие годы. В перспективном будущем довести поголовье верблюдов до 1 миллиона. Следует отметить, что без Государственной поддержки в виде субсидирования племенного верблюдоводства на производство единицы продукции молока, мяса и шерсти невозможно заинтересовать каждого жителя аула, руководителя к(ф)х, кооператива и ТОО, содержать верблюдов, вести планомерную селекционную и племенную работу по повышению генетического потенциала и продуктивности, внедрении разработок отечественных ученых.

Таким образом, верблюдоводство Казахстана необходимо развивать, опираясь на генетические ресурсы созданных высокопродуктивных пород и генотипов верблюдов [51].

В мировом сообществе для производства кисломолочных продуктов, часто используют коровье молоко, а в Казахстане верблюжье молоко вполне может стать основным сырьем в диетологии на ближайшие годы.

Ввыводы. Впервые изучены, в сравнительном аспекте верблюды гибридного происхождения F_2 (25%td, 25%kb, 50%kd), F_3 (12,5%td, 62,5%kb, 25%kd), F_4 (56,25%td, 31,25%kb, 12,5%kd), F_5 (28,1%td, 15,6%kb, 56,2%kd), чистопродные казахские бактрианы южно-казахстанского типа и мангистауской популяции, арвана – туркменский дромедар, казахский дромедар, разводимые в Южно-Казахстанской и Мангистауской областях Республики Казахстан.

Установлен генетический потенциал живой массы и молочной продуктивности. Результаты исследования показали, эффективность разведения гибридных верблюдоматок для производства верблюжьего молока, в виду оптимального соотношения молочного жира и белока.

Верблюды казахского дромедара и гибридного происхождения F_2 (25%td, 25%kb, 50%kd), F_3 (12,5%td, 62,5%kb, 25%kd), F_4 (56,25%td, 31,25%kb, 12,5%kd), F_5 (28,1%td, 15,6%kb, 56,2%kd) мясомолочного направления продуктивности имеют один компактный горб средней величины – 2/3 косой длины туловища. Профиль головы горбоносый. Профиль шеи от основания шеи до головы без изгибов – прямой. Основная масть руна (шерсти) бурая и песчаная, без дополнительной окраски. Основная окраска кроющего волоса - бурая и песчаная, имеется дополнительная окраска, не превышающая 10% от общего поголовья. Толщина кожи в основном толстая 5-7 мм. Длина гривы короткая до 25 см. Оброслость шерстью средняя, 2/3 косой длины туловища. Выход чистого волокна шерсти 90-94%. Челка на голове укороченная. Имеется опушка шерсти на предплечье, так называемое галифе, длиной до 5 см (короткая). Имеется грива на шее, длиной 12-17 см (по классификации короткая до 15 см, средняя 15-25 см). Имеется опушка шерсти на лопатке, так называемый эполет, длиной 3-5 см.

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Д. А. Баймұқанов[1], А. Баймұқанов[2], О. Алиханов[1],
Д. А. Дошанов[1], К. Ж. Исхан[3], Д. С. Сарсенбай[3]

[1]«Агроөнеркәсіптік кешені және су ресурстары мәселелері» ғылыми-зерттеу институты,
М. Әуезов атындағы Оңтүстік Қазақстан мемлекеттік университеті, Шымкент, Қазақстан,
[2]ФАО, Фермадағы жануарлар мен құстарға арналған генетикалық ресурстар жөніндегі
халықаралық комиссия, Рим, Италия,
[3]Қазақ ұлттық аграрлық университеті, Алматы, Қазақстан

ҚАЗАҚСТАНДЫҚ ПОПУЛЯЦИЯДАҒЫ ӨНІМДІ БЕЙІМДЕГІ ӘРТҮРЛІ ГЕНОТИПТІ ТҮЙЕЛЕРДІҢ ГЕНЕТИКАСЫ

Аннотация. Салыстырмалы аспектте түйелердің гибридтік шығу тегі F_2 (25%td, 25%kb, 50%kd), F_3 (12,5% td, 62,5% kb, 25% kd), F_4 (56,25% td, 31,25% kb, 12,5% kd), F_5 (28,1% td, 15,6% kb, 56,2% kd) алғаш зерттелген. Оңтүстіктік Қазақстандық типтегі Маңғыстаулық популяциядағы таза тұқымды қазақтың бактриандары, түркмен дромедары – арвана, қазақтың драмедары Қазақстан Республикасының Оңтүстік Қазақстан және Маңғыстау облысында өсіріледі.

Түйе топтарының генетикалық профилі анықталған, тірілей салмағы, сүт өнімділігі, жүн қырқымы, дене өлшемдері зерттелген. Зерттеудің нәтижесі көрсеткендей, өсіріліп жатқан гибритті драмедар түйе тобының аналықтарынан сүт өндіргенде сүттің майлылығы мен ақуыз арақатынасы тиімді.

Өсіруге жарамды Арада F_5 (28,1% td, 15,6% kb, 56,2% kd) қазақтың дромедар типті түйелерінің фенотиптік профилі анықталды. Тұлғасының қиғаш ұзындығының 2/3 бөлігін шағын өркеш алып жатыр түйенің. Түйе басының пішіні дөңмұрын. Мойынның пішіні, мойынның негізінен басына дейін иілмеген түзу келеді. Негізгі түсі жабағы (шудасы) жүннің қара қоңыр және сұр, және жалпы бастың 10% аспайтыны қосымша түстер.

Түйін сөздер: генетика, сүт өнімділігі, қазақтың бактриандары, арван, қазақтың драмедары, гибриттер.

Сведения об авторах:

Баймуканов Дастанбек Асылбекович – член-корр. НАН РК, доктор сельскохозяйственных наук, заведующий отделом животноводства «Научно-исследовательский институт проблем агропромышленного комплекса и водных ресурсов» Южно-Казахстанского государственного университета имени Мухтара Ауэзова, Шымкент, Казахстан

Баймуканов Асылбек – международный эксперт ФАО, доктор сельскохозяйственных наук, профессор, Рим, Италия

Алиханов Оралбек – кандидат сельскохозяйственных наук, ведущий научный сотрудник отдела животноводства «Научно-исследовательский институт проблем агропромышленного комплекса и водных ресурсов» Южно-Казахстанского государственного университета им. Мухтара Ауэзова, Шымкент, Казахстан

Дошанов Даулет Аскарович – кандидат сельскохозяйственных наук, старший научный сотрудник отдела животноводства «Научно-исследовательский институт проблем агропромышленного комплекса и водных ресурсов» Южно-Казахстанского государственного университета им. Мухтара Ауэзова, Шымкент, Казахстан

Исхан Кайрат Жалелұлы – кандидат сельскохозяйственных наук, доцент кафедры «Технология производства продукции животноводства» Некоммерческого акционерного общества «Казахский национальный аграрный университет», г. Алматы, Республика Казахстан

Сарсенбай Даулетбай Сарсенбайұлы – магистрант кафедры «Технология производства продукции животноводства» Некоммерческого акционерного общества «Казахский национальный аграрный университет», Алматы, Казахстан

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A. A. Genbatch[1] , D. Yu. Bondartsev[2]

[1]Almaty University of Power Engineering and Telecommunications (AUPET), Kazakhstan,
[2]Almaty University of Power Engineering and Telecommunications (AUPET), JS «TrestSredazenergomontazh».
E-mail: d.bondartsev@saem.kz

INVESTIGATION OF THE HEAT EXCHANGE CRISIS IN POROUS STRUCTURES FOR HIGH PRESSURES

Abstract. The crisis of heat exchange in the boiling of water in porous structures is studied. The study relates to heat power plants of power stations. The experiments were carried out on a rocket type burner. The combustion chambers and supersonic nozzles were cooled with various porous structures. The mechanism of the heat exchange processes is described and optimal cell sizes of the porous structures are determined, and the design equation of the critical heat flux for high pressures is obtained.

Keywords: crisis of boiling, capillary-porous structures, cooling systems, the mechanism of heat exchange crisis.

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А. А. Генбач[1] , Д. Ю. Бондарцев[2]

[1]Доктор технических наук, профессор АУЭС,
[2]Докторант АУЭС, ведущий инженер, АО «Трест Средазэнергомонтаж»

ИССЛЕДОВАНИЕ КРИЗИСА ТЕПЛООБМЕНА В ПОРИСТЫХ СТРУКТУРАХ ДЛЯ ВЫСОКИХ ДАВЛЕНИЙ

Аннотация. Исследован кризис теплообмена при кипении воды в пористых структурах. Изучение относится к тепловым энергетическим установкам электростанций. Эксперименты проводились на горелке ракетного типа. Охлаждались камеры сгорания и сверхзвуковые сопла различными пористыми структурами. Описан механизм процессов теплообмена и определены оптимальные размеры ячеек пористых структур, получено расчетное уравнение критического теплового потока для высоких давлений.

Ключевые слова: кризис кипения, капиллярно-пористые структуры, системы охлаждения, механизм кризиса теплообмена.

Введение. Главной задачей в силовых энергетических установках электростанций является создание системы охлаждения восокотеплонапряженных деталей и узлов. К ним можно отнести топочные экраны высокофорсированных котельных агрегатов, камеры сгорания, сопла и лопатки газотурбинных агрегатов [8].

В системах охлаждения протекают процессы пузырчатого кипения жидкости (воды). При высоких тепловых нагрузках не исключается наступление кризисной ситуации с возможным перегревом теплообменной стенки. Для исследования кризиса кипения нами собиралась экспериментальная установка, схема которой и условия проведения экспериментов представлены в работах [6, 7].

Методы. Расчет величины $q_{кр}$ применительно к исследованной пористой системе может производиться в зависимости от недогрева и скорости потока по уравнениям работы [2], из которых следует, что недогрев жидкости позволяет несколько расширить теплопередающие возможности в пористой системе охлаждения. Поскольку процессы теплопередачи протекают в тонких пористых структурах, то даже незначительный избыток свободно стекающей пленки по внешней стороне структуры, определяемый параметром $\tilde{m}$, при данном гидростатическом давлении $\Delta P_д$ и условном

коэффициенте проницаемости $К_у$, создает ядро жидкости, из которого непрерывно будет подсасываться недогретый охладитель за счет разности температур и капиллярных сил.

К тому же гравитационный потенциал способствует разрушению паровых конгломератов в пористой структуре, облегчая транспорт недогретой жидкости. Тепловой поток будет расходоваться дополнительно на подогрев подтекающих относительно холодных порций жидкости.

Избыток жидкости в пористой системе создает направленное движение потоку, что приводит к деформации паровых пузырей в структуре, уменьшению их диаметра, росту частоты образования пузырей [3]. При увеличении скорости потока возрастает энергия, затрачиваемая на вытеснение жидкости из пристенного пограничного слоя, а следовательно, увеличивается скорость генерации пара $V_{кр}$ и величина $q_{кр}$. Однако при некотором значении скорости потока жидкости, определяемой параметром $\widetilde{m}_{кр}$, энергии, затрачиваемой на выдавливание жидкости из двухфазного пристенного слоя, будет недостаточно, и возникает кризис теплопередачи. Конечно, увеличение $q_{кр,v}$ будет достигнуто при больших расходах жидкости, что приведет к росту затрат энергии на привод нагнетательных машин.

По достижению определенной величины расходного влагосодержания $\bar{\varphi}^1_{кр}$ скорость потока не будет способствовать увеличению величины $q_{кр}$, а в некоторых случаях может привести даже к снижению величины $q_{кр}$, поскольку затрудняется эвакуация пара из пристенной зоны. Увеличение скорости жидкостной пленки, прилегающей к стенке, за счет параметра $\widetilde{m}$, начнет уступать доминирующему влиянию падения влагосодержания $\bar{\varphi}^1$ в той же зоне, которое в большей степени скажется на величину $q_{кр}$, даже уменьшая ее. Поэтому требуется в каждом отдельном случае устанавливать оптимальное соотношение избытка жидкости $\widetilde{m}$ в зависимости от вида пористой структуры.

Гидродинамическая модель кризиса кипения жидкости в большом объеме на технической поверхности не отражает влияния теплофизических свойств стенки, хотя оно имеет место, что может быть объяснено колебательным движением границы раздела “пар-жидкость”. Это приводит к волнообразному движению поверхности нагрева. Поэтому в отдельных местах такой поверхности следует ожидать резонансные явления, когда температура стенки будет снижаться за счет большого отбора пара, а это означает, что чем выше теплофизические свойства стенки, тем интенсивнее будет происходить отвод величины q.

Для пористых систем охлаждения практически для всех режимных и геометрических параметров при пузырьковом кипении воды глубина проникновения температурной волны $h_{ср}<\delta_{ст}$, поэтому в расчетные соотношения для $q_{кр}$ в работах толщина стенки $\delta_{ст}$ не вводится [3].

Расчетное уравнение для $q_{кр}$ в случае, когда P≥0,1 МПа, а $b_г>0{,}28\cdot10^{-3}$ м:

$$q_{кр} = 0{,}0347r[g(\rho_{ж}-\rho_n)\rho_n\bar{D}_{о.кр}]^{0,5}\left(\frac{b_г}{b_o}\right)^{0,3}\left(\frac{\delta_ф}{\delta_o}\right)^{0,5}(1+cos\beta)^{0,6} \quad (1)$$

Из уравнения (12) следует, что:

$q_{кр} \sim \bar{D}^{0,5}_{о.кр}$ (p ≥ 0,1 МПа) и $q_{кр} \sim \bar{f}^{0,5}$ (p < 0,1 МПа).

Величина $\bar{D}_{о.кр}$ и $\bar{f}$ зависят от теплофизических свойств теплоотдающей поверхности: $\bar{D}_{о.кр} \sim К_{ст}^{-1}$, $\bar{f}_{кр}^{-1} \sim К_{ст}^{2}$, где $К_{ст} = I + [(\rho c\lambda)_ж/(\rho c\lambda)_{ст}]^{0,5}$. Тогда для поверхностей, выполненных из меди и нержавеющей стали и покрытых сетчатыми структурами, имеем: $\tilde{q}_{кр}$ = 1,07 (p ≥ 0,1МПа), $\tilde{q}_{кр}$ = 1,15 (p < 0,1 МПа).

Материал стенки оказывает влияние на величину $q_{кр}$ посредством комплекса $(\rho c\lambda)_{ст}$, где ρ, c, λ – плотность, теплоемкость и теплопроводность стенки, но однозначно утверждать это вряд ли правомерно, так как практически не возможно выдержать одинаковые условия по чистоте обработки и микроструктуре. При проектировании камеры сгорания и особенно сопла необходимо учитывать некоторый запас на толщину поверхности нагрева. Возникновение кризиса кипения раньше наступит на «тонких» нагревателях, поскольку в предкризисной области кипения начнет возрастать размер «сухого» пятна в основание пузырей, процесс теплообмена резко ухудшится, увеличится температура стенки. Поверхности, имеющие большую толщину, потребуют и больше времени для их разогрева.

Для поверхностей с пористым покрытием этот вопрос особенно актуальный, так как в них время роста пузыря в десятки раз меньше, резко изменяются гидродинамические условия подпитки жидкостью и, следовательно, может увеличиться время пребывания пара у стенки, что исключит контакт жидкости с поверхностью теплообмена, несмотря на большой избыток жидкости $\widetilde{m}$ [3].

Исследование. Описанный процесс является предысторией развития кризиса кипения. Дальнейшая «судьба» процесса при прочих равных условиях определяется теплоаккумулирующей способностью нагрева $(\rho c\lambda)_{ст.}$. Когда величина комплекса будет подобрана большой, возрастает вероятность затягивания кризиса кипения, растечки теплоты вдоль поверхности нагрева возрастут и вновь создадутся благоприятные условия контакта жидкой фазы со стенкой. Увеличение же только толщины стенки в десять раз всего на несколько процентов повышает величину $q_{кр}$, причем это явление заметнее для высокотеплопроводных материалов и при давлении, больше атмосферного.

Одномерное уравнение нестационарной теплопроводности, описывающее динамику температурного поля в парогенерирующей стенке [3], оказалось полезным для рассмотрения предельного состояния поверхности при кризисе кипения, когда на стенке под паровыми пузырями устанавливается «сухое» пятно критического размера. До этого момента протекал развитый пузырьковый процесс кипения, а в основании паровых пузырей находилось «сухое» пятно с радиусом $R_{с.п.}$ [6, 7].

Как показали расчеты [5], за время $\tau \leq 5$ с тепловые потоки достигают значений $\sim 8 \cdot 10^7$ Вт/м^2 для меди и $1{,}3 \cdot 10^8$ Вт/м^2 – для нержавеющей стали. Однако они будут экранированы кривыми плавления через время $\sim 0{,}01$ с. Возникают высокие термические напряжения растяжения в результате резкого увеличения градиентов температур в стенке. Изучено влияние различных материалов и толщин стенки на время начала разрушения поверхности в момент кризиса кипения. С помощью методов голографии и фотоупругости определено наиболее опасное место в момент разрушения пористой поверхности. Явления выброса капель жидкости из ячеек пористой структуры ухудшают интенсивность теплообмена при достижении некоторого граничного теплового потока. Подбором вида структуры это явление может быть сведено к минимуму. Наименьший выброс получен для однослойных сеток с ячейками более $0{,}28 \cdot 10^{-3}$ м.

Возникающие ухудшенные режимы по своему механизму аналогичны процессам, протекающим при движении пароводяной смеси в трубах, не имеющих пористого покрытия. Этим режимам свойственен кризис сопротивления, когда на обогреваемом участке начинает уменьшаться сопротивление трения. Это связано с тем, что вследствие сильного выброса капель сокращается расход жидкости. В начальной стадии процесса выброса жидкости капли турбулизируют процесс, то при критическом выбросе количество жидкости становится недостаточным для орошения теплообменной стенки.

Интенсивный капельный унос нарушает плавное течение жидкости по внешней поверхности сетки, наблюдается разрыв пленки, что также ухудшает притоки свежих порций относительно холодной жидкости к пристенному двухфазному пограничному слою. Подбор опытным путем пористых структур практически исключил выброс капель при данном тепловом потоке, что связано с балансированием сил трения жидкости в сетках и на поверхности сеток с каплями и паровым потоком в сетках и околосеточном пространстве [7].

В результате нарушения баланса действующих сил количество поступающей жидкости становится недостаточным, на поверхности нагрева появляются «сухие» пятна, температура стенки плавно повышается до некоторого значения и процесс протекает при температурных напорах (60–80) К. Пульсирующий режим снабжения стенки жидкостью не приводит к пережогу поверхности, хотя интенсивность теплопередачи снижается. Однако возникают пульсации температуры стенки и связанные с ними термические разрушающие напряжения, сокращающие срок службы поверхности. Поэтому важно правильно оптимизировать вид пористой структуры и не допускать высоких перегревов стенки относительно температуры жидкости.

Кризисное кипение характеризуется потерей устойчивости пульсирующей жидкостной пленки и запиранием паровыми образованиями ячеек структуры. Несмотря на достаточное количество жидкости, наблюдается резкий рост термического сопротивления пограничного слоя, ухудшение эффекта турбулизации за счет затрудненного отвода пара из ячеек пористой структуры. При кризисе кипения, как показали голографическая интерферометрия и скоростная киносьемка [3], переносимый тепловой поток приобретает предельные значения $q_{кр}$, пузыри пара до их отрыва начинают проникать в соседние ячейки структуры, сливаются в конгломераты и образуют очаговые зоны паровых пленок. Содержащиеся пленки жидкости под паровыми конгломератами высыхают и, несмотря на имеющееся большое количество жидкости в пористой структуре и на ее поверхности, охладитель не может проникнуть к стенке.

Наступает предельное значение температурного напора по отношению к температуре насыщения $T_{н,}$ $\Delta T_{кр} = T_{кр} - T_{н}$, где величина $T_{кр}$ соответствует значению $q_{кр}$. При $\Delta T \geq \Delta T_{кр}$ что более вероятно для пористых структур при p<0,1 МПа, когда имеют место наименьшие значения критического перегрева стенки, либо для сеток с ячейками менее $0{,}14 \cdot 10^{-3}$ м, микрослой жидкости испаряется под паровым пузырем, или его конгломератом, резко возрастает температура стенки в окрестности «сухого» пятна, исключая контакт имеющийся порции жидкости со стенкой. Изучение кипения жидкости без пористой структуры показывает, что в случае приближения теплового потока к величине $\sim 1 \cdot 10^{5}$ Вт/м^2 резко увеличивается число центров парообразований, пленка жидкости «набухает». Паровые пузыри начинают взаимодействовать друг с другом, разрушаясь при меньших размерах. Основная доля тепла расходуется на испарение жидкости в пузыри. При наступлении критического режима пленка жидкости распадается на сфероидальные капли и не смачивает поверхность нагрева. Температура стенки начинает резко возрастать, вплоть до его прогара. Увеличение расхода жидкости не приводит к положительным результатам. Кризис наступает в тот момент, когда скорость испарения жидкости превышает скорость ее растекания по поверхности. Происходит высыхание пленки на периферии поверхности нагрева и стягивание ее к центру.

Поскольку размеры пор исследованных сеточных структур можно считать одинаковыми, выход пара из них будет равновероятным. Паровые столбики могут генерироваться в значительно больших ячейках, чем, например, в порошковых материалах, и отстоящих друг от друга на меньшем расстоянии, и даже в ячейках, вплотную прилегающих друг к другу. Для воды при кипении в большом объеме под атмосферным давлением критическая длина волны $\lambda_{кр}$ между паровыми столбиками составляет $(15–25) \cdot 10^{-3}$ м, то для порошкового пористого покрытия она в (5–15) раз меньше. Величина $q_{кр} \sim U_{кр} \sim \lambda_{кр}^{-0,5}$, то значение $q_{кр}$ для порошковых материалов оказывалось в два раза выше, однако при температурном напоре ΔT = (600–800) К. Для сеточных структур, работающих в поле гравитационных сил, несмотря на еще меньшее значение величины $\lambda_{кр}$, величина $q_{кр}$ была близка к значениям, достигнутым при кипении в большом объеме на технической поверхности, однако при величине $\Delta T_{кр}$ = 60 К [3], $U_{кр}$ – критическая скорость пара [6].

Следовательно, определяющим фактором кризиса кипения следует считать гидродинамическую обстановку в объеме и на поверхности сеток, которая, в свою очередь, зависит от вида структуры и организации подвода жидкости. За счет незначительного избытка жидкости (слабого недогрева и скорости потока), как показали визуальные наблюдения, стало возможным управлять паровым фронтом в объёме структуры и, прежде всего, разрушать скапливающиеся паровые образования.

Оценка для кризисного состояния доли поверхности, занятой паром, для p = 0,1 МПа, $\Delta T_{кр}$ = 60 К, $\overline{D}_{о.кр} = 0{,}5 \cdot 10^{-3}$, $\tilde{m} = 1{,}1$, $\overline{n} = 5 \cdot 10^{6}$ м$^{-2}$, дает:

$$\frac{F_n}{F} \approx \frac{\pi \overline{D}_{o.kp}^{2} \overline{n} K_{\min}}{4 \cdot 1} \approx \frac{2{,}5\pi}{16},$$

где $К_{мин}$ – коэффициент, учитывающий наличие «сухого» пятна под паровым пузырем. В момент кризиса величина $К_{мин} \geq 0{,}5$; $F, F_п$ – общая теплообменная поверхность, занятая паром.

Число ячеек для структуры $0{,}4 \cdot 10^{-3}$ м, приходящихся на 1 м^2, составляет $2{,}78 \cdot 10^{6}$ шт., т.е. в момент кризиса в каждой ячейки может находиться по два паровых пузыря. При кипении жидкости в большом объеме для горизонтального нагревателя с технической поверхностью в теории гидродинамического кризиса соотношение $F_п/F = \frac{\tilde{\pi}}{16}$, т.е. в 2,5 раза меньше. При стремлении величины $К_{мин} \to 1$, отношение $F_п/F \to 1$.

Геометрические размеры, существенно влияющие на перераспределение капиллярного и гравитационного потенциалов, оказывают воздействие на величину $q_{кр}$ и требует оптимизации. Набольшее значение $q_{кр}$ получены для вертикальных поверхностей с крупными размерами ячеек (β = 0 град.), где β – угол наклона поверхности к вертикали (см. формулу 1).

Заключение. В сетчатых пористых структурах явление кризиса теплоотдачи протекает более плавно, чем на гладкой поверхности, что аналогично вапотронному эффекту, когда на поверхности нагрева преднамеренно создается определенный рельеф с помощью выступов и углублений. В

кризисной ситуации зона пленочного кипения начинает смещаться от основания ребер к их вершинам, увеличивая интенсивность теплоотдачи и величину $q_{кр}$. Это позволяет растянуть кризис кипения на неизотермической поверхности. В пористой системе охлаждения наличие пор и капилляров на поверхности теплообмена создает искусственную шероховатость, которая в данном случае будет играть роль ребер. К тому же необходимо учесть стабилизирующее действие капиллярных сил, выравнивающих распределение жидкости по теплообменной поверхности.

Таким образом, существенной зависимости теплопередающей способности исследованной системы от ширины ячейки сетки (в десятки раз), как это имеет место в тепловых трубах, не замечено. Это можно объяснить тем, что при малых размерах ячеек при наличии гравитационных сил, высокое гидравлическое сопротивление не столь ограничивает расход жидкости, который может частично стекать по сетчатой поверхности. В то же время повышенный размер ячеек не приводит к значительному уменьшению транспортной способности.

Однако ширина ячейки сетки в рассматриваемой системе оказывает влияние на динамику развития паровых пузырей и, следовательно, на интенсивность теплообмена и величину $q_{кр}$. Протекание процесса пузыреобразования в отдельных (изолированных) ячейках, как это имело место в исследуемой системе, предотвращает преждевременное слияние паровых пузырей и образование сплошной паровой пленки. Наличие крупных ячеек позволяет улучшить отвод легкой фазы от парогенерирующей поверхности. Однако увеличивать ячейки, начиная с ширины $0{,}4\cdot10^{-3}$ м, нецелесообразно, поскольку в таких ячейках, подобно кипению на технической поверхности без пористого покрытия, возникают паровые конгломераты.

Вывод. Проведены исследования кризиса теплообмена в зависимости от недогрева и скорости потока, теплофизических свойств поверхности нагрева и выброса капель жидкости из пористой структуры. Определены принципы конструирования камер сгорания и сопел и расчет критического теплового потока. Исследования имеют практическое значение в области предельного состояния парогенерирующей поверхности, защищаемой охлаждением от пережога.

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А. А. Генбач, Д. Ю. Бондарцев

Алматы энергетика және байланыс университеті, Алматы, Қазақстан

ЖОҒАРЫ ҚЫСЫМҒА АРНАЛҒАН ҚУАТТЫ ҚҰРЫЛЫМДАРДАҒЫ ЖЫЛУ АЛМАСУ ДАҒДАРЫСЫН ЗЕРТТЕУ

Аннотация. Кеуекті құрылымдардағы суды қайнату кезінде жылу алмасу дағдарысы зерттеледі. Зерттеу электр станцияларының жылу электр станцияларына жатады. Эксперименттер зымыран тозаңдатқыштарында жүргізілді. Жану камералары мен дыбыстан шашатын саңылаулар түрлі кеуекті құрылымдармен салқындатылды. Жылулық алмасу процестерінің механизмі сипатталған және кеуекті құрылымдардың оңтайлы ұяшық мөлшері анықталып, жоғары қысымдар үшін есептелген жылу ағыны теңдеуі алынды.

Түйін сөздер: қайнау дағдарысы, капиллярлы-кеуекті құрылымдар, салқындату жүйелері, жылу дағдарысы механизмі.

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**B. B. Benberin[1], G. A. Yermakhanova[2], A. A. Akhetov[2],
T. A. Vochshenkova[2], N. A. Shanazarov[2], A. Y. Naurazbayeva[2]**

[1]Medical Center of President's Affairs Administration of the Republic of Kazakhstan, Astana, Kazakhstan,
[2]Medical Center Hospital of President's Affairs Administration of the Republic of Kazakhstan, Astana, Kazakhstan.
E-mail: valeriy-benberin@mail.ru, ermakhanova@gmail.com, amir.akhetov.a@gmail.com,
vochshenkova@gmail.com, nasrulla@inbox.ru, anar.naurazbayeva@gmail.com

EFFICIENCY OF GRAPE POLYPHENOLS IN PATIENTS WITH METABOLIC SYNDROME (LITERATURE REVIEW)

Abstract. Purpose of the review: to study of the efficiency of grape polyphenols in patients with metabolic syndrome.

Methodology: A literature search was conducted in electronic databases and publications included in Embase, PubMed/Medline, Science Direct, Springer Link, Cochrane Library, eLibrary. The depth of the literature search was 12 years. More than 30 publications were selected and reviewed, including full-text articles, Systematic Reviews and Meta-Analysis that were published in English.

Results and conclusions: Grape polyphenols in supported doses can delay or prevent the onset of metabolic syndrome with reducing body weight, blood pressure and blood glucose levels and improving lipid metabolism. The results indicate that polyphenols are significant metabolic modulators because of their ability to influence different targets of the cellular and molecular pathways. However, some studies have shown inconsistent results and conflicting data on the efficacy of polyphenols in metabolic syndrome management have been obtained. Perhaps, contradictory data are associated with significant limitations of their bioavailability, especially in conditions of progressive metabolic syndrome. Therefore, more extensive and in-depth scientific research are needed to determine more accurately the role of polyphenols in the progression of metabolic syndrome components.

Keywords: grape polyphenols, metabolic syndrome.

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**В. В. Бенберин[1], Г. А. Ермаханова[2], А. А. Ахетов[2],
Т. А. Вощенкова[2], Н. А. Шаназаров[2], А. Е. Науразбаева[2]**

[1]Медицинский центр Управления делами Президента Республики Казахстан, Астана, Казахстан,
[2]Больница Медицинского центра Управления делами Президента Республики Казахстан,
Астана, Казахстан

ЭФФЕКТИВНОСТЬ ПОЛИФЕНОЛОВ ВИНОГРАДА У ПАЦИЕНТОВ С МЕТАБОЛИЧЕСКИМ СИНДРОМОМ (ОБЗОР ЛИТЕРАТУРЫ)

Аннотация. Цель обзора: Изучение эффективности полифенолов винограда у пациентов с метаболическим синдромом.

Методология: Проведен поиск литературы в электронных базах данных и публикациях, вошедших в Embase, PubMed/Medline, Science Direct, Springer Link, Кокрановскую библиотеку, eLibrary. Глубина поиска литературы составляла 12 лет. Были выбраны и рассмотрены более 30 публикации, в том числе полнотекстовые статьи, систематические обзоры и мета-анализы на английском языке.

Результаты и выводы: Полифенолы винограда в поддерживаемых дозах могут задерживать или предотвращать начало метаболического синдрома, уменьшая массу тела, артериального давления и уровень

глюкозы в крови и улучшая обмен липидов. Результаты указывают, что полифенолы являются значительными метаболическими модуляторами в силу их способности влиять на различные мишени клеточного и молекулярного пути. Однако некоторые исследования показали непоследовательные результаты и получены противоречивые данные об эффективности полифенолов в управлении метаболического синдрома. Возможно, противоречивые данные связаны с существенными ограничениями их биодоступности, особенно в условиях прогрессирующего метаболического синдрома. Поэтому необходимы более объемные и глубокие научные исследования, чтобы установить более точно роль полифенолов в прогрессии компонентов метаболического синдрома.

Ключевые слова: полифенолы винограда, метаболический синдром.

Введение. В настоящее время профилактика сердечно-сосудистых заболеваний и сахарного диабета является важной проблемой, так как эти заболевания лидируют среди причин смертности. В основе их профилактики лежит противостояние факторам риска. В медицинской практике на стадии метаболического синдрома (МС) возможно раннее выявление и устранение факторов риска сердечно-сосудистых заболеваний и сахарного диабета. МС представляет собой совокупность метаболических нарушений, таких как инсулинорезистентность, гипертензия, дислипидемия и абдоминальное ожирение. Распространенность МС колеблется от 10 до 84% в зависимости от этнической принадлежности, возраста и пола [1], что делает его важной социально-экономической проблемой во всем мире.

Метаболический синдром. Многие международные организации и группы экспертов, такие как Всемирная организация здравоохранения (WHO), Европейская группа по изучению инсулинорезистентности (EGIR), Международная Федерация Диабета пытались объединить параметры МС [3, 4]. Однако определение консенсуса Международной Федерации Диабета (IDF) представляется наиболее подходящим для практического использования в клинической медицине с учетом включения пороговых значений для разных этнических групп. Согласно этому определению, МС представляет собой группу наиболее опасных факторов риска сердечно-сосудистых заболеваний: центральное (абдоминальное) ожирение, повышение глюкозы натощак в плазме крови и сахарный диабет, высокий уровень холестерина и повышение артериального давления [2].

В процессе прогрессирования МС подкожные брюшные адипоциты сливают свои липолитические продукты (свободные жирные кислоты) непосредственно в портальную вену, тем самым повышая концентрацию жирных кислот в сыворотке крови, увеличивая поглощение жирных кислот печенью, скелетными мышцами и бета-клетками поджелудочной железы и уменьшая потребление глюкозы. Снижение потребления глюкозы повышает уровень глюкозы в сыворотке крови и стимулирует повышенную секрецию инсулина для утилизации глюкозы: отсутствие ответа на дополнительно секретируемый инсулин индуцирует резистентность к глюкозе. Постоянно высокая секреция инсулина, в свою очередь, вызывает метаболический стресс в митохондриях бета-клеток поджелудочной железы, вызывая выделение активных форм кислорода, которые повреждают митохондрию и в числе других причин запускают процесс хронического системного воспалениясо временем митохондрии теряют способность поддерживать клеточные процессы, а бета-клетки подвергаются апоптозу, необратимо уменьшая потенциал секреции инсулина. Снизить нарастание оксидантного стресса и воспалительной реакции, значит управлять наступлением необратимых изменений в организме человека, способствующих преждевременному старению.

Полифенолы винограда. Очевидно, что абдоминальное ожирение, повышенное артериальное давление, нарушение толерантности к глюкозе, дислипидемия и связанные с ними повышенный окислительный стресс и воспаление – взаимовлияющие факторы метаболического синдрома, которые могут быть эффективно модифицированы с помощью диетических мероприятий с участием полифенол-богатых продуктов или напитков [5]. Клинических исследователей все больше привлекают природные лечебные факторы при МС и одним из перспективных факторов являются полифенолы винограда [6].

Полифенолы входят в группу антиоксидантов естественного происхождения и представляют собой растительные пигменты, содержащиеся в больших количествах в винограде и других фруктах и овощах. Кроме того, комплексы растительных полифенольных соединений становятся одними из самых важных пищевых добавок последних десятилетий. Среди растительных полифенолов наибольшее внимание уделяется исследованиям полифенолов красного винограда.

Цель обзора. Изучение эффективности применения полифенолов винограда у пациентов с МС.

Методология обзора. Проведен поиск литературы в электронных базах данных и публикациях, вошедших в Embase, PubMed/Medline, Science Direct, Springer Link, Кокрановскую библиотеку, eLibrary. Глубина поиска литературы составляла 12 лет (2005–2017 гг.). Для поиска были использованы следующие поисковые термины: “metabolicsyndrome”, “grapepolyphenols”, “effectsofgrapepolyphenols”, “grapepolyphenol’s effecton the metabolicsyndrome”, “hypertension”, “bloodpressure”, “lipids”, “insulin”. Были выбраны и рассмотрены более 30 публикаций, в том числе полнотекстовые статьи, систематические обзоры и мета-анализы на английском языке, которые включали клиническое испытание у здоровых взрослых или взрослых, страдающих метаболическим синдромом или близкородственными заболеваниями, такие как ожирение, ишемическая болезнь сердца и сахарный диабет 2 типа.

Влияние полифенолов винограда на метаболический синдром. Как известно, эволюция МС проходит по двум направлениям:развитие дисфункции β-клеток поджелудочной железы и гиперинсулинемия с компенсаторной инсулинорезистентностью. Учитывая, что прооксидантный статус и хроническое системное воспаление сопровождают МС и его тяжесть, полифенолы винограда проявляют себя в качестве хороших диетических препаратов для предотвращения прогрессирования МС [7] с помощью определенных механизмов действия. Путем модификации воспалительного ответа и уменьшения уровней свободных радикалов полифенолы винограда снижают степень выраженности хронического системного воспалительного процесса. Механизмы действия включают в себя и проявление антиоксидантых свойств полифенолов либо усиление экспрессии антиоксидантных генов и белков, а также снижение интенсивности сигналов стресса эндоплазматического ретикулума [8, 9].

Согласно проведенным исследованиям, оксидантный стресс происходит при системном воспалении, эндотелиальной дисфункции, нарушенной секреции клеток поджелудочной железы и утилизации глюкозы в периферических тканях, которые приводят к долгосрочным вторичным осложнениям [10]. Многие данные из эпидемиологических исследований свидетельствуют о положительной связи между снижением метаболических нарушений и потреблением диеты, богатой полифенолами [11].

Так как полифенолы повышают антиоксидантную способность плазмы, обратимость метаболических нарушений может быть объяснена принятием электрона из активных форм кислорода и образованием относительно стабильных феноксильных радикалов. Активные формы кислорода считаются токсичными побочными продуктами и представляют угрозу для клеток, вызывая перекисное окисление липидов, окисление белков и повреждение нуклеиновых кислот, ингибирование фермента и активацию запрограммированной гибели клеток [12]. Полифенолы защищают составные части клетки от окислительного повреждения и ограничивают риск различных дегенеративных заболеваний, связанных с оксидантным стрессом.

Эффективность применения полифенолов винограда у пациентов с метаболическом синдромом. В настоящее время существует ряд исследований по эффективности и безопасности применения полифенолов винограда у пациентов с МС, сердечно-сосудистыми заболеваниями, сахарным диабетом. Результаты клинических исследований показывают, что полифенолы снижают инсулинорезистентность [13], уменьшают артериальное давление [14] и массу тела [15], а также улучшают липидный обмен [16]. Однако диетические стратегии могут быть менее эффективными для пациентов с группой факторов риска МС в целом, чем для пациентов с одним или двумя факторами риска. Эффекты приема полифенолов на здоровых добровольцев или пациентов с низкой степенью риска сердечно-сосудистых заболеваний могут отличаться от эффектов у пациентов с МС. Таким образом, результаты таких клинических исследований могут быть несовместимы и метаболические преимущества от применения полифенолов могут сильно зависеть от изученной популяции.

Систематический обзор [17] влияния полифенолов винограда на компоненты МС показывает различие эффектов полифенолов винограда на компоненты МС в зависимости от их количества у каждого пациента. А также, в данном обзоре отсутствуют убедительные данные о том, что полифенолы винограда могут положительно влиять на уровень гликемии, артериального давления и липидов у лиц с МС.

В недавнем систематическом обзоре [18] также постулируется, что полифенолы эффективны в снижении некоторых особенностей МС, но нет ни одного пищевого продукта, экстракта или полифенола, способного воздействовать на все признаки МС. Учитывая их низкую биодоступность и метаболизм, защитные функции полифенолов могут стать эффективными только за счет частого и продолжительного потребления в долгосрочной перспективе, в контексте здоровой и диверсифицированной диеты.

Проведен обзор о влиянии применения полифенолов у пациентов с МС, полученных из интервенционных исследований человека с использованием полифенолов в качестве богатых полифенолом продуктов и диетических моделей [19].Убедительные доказательства данного обзора свидетельствуют о том, что полифенолы в поддерживаемых дозах могут задерживать или предотвращать начало МС. А именно, попадая в организм, человека они контролируют и нормализуют процессы обмена веществ на клеточном уровне, а также поглощают и нейтрализуют свободные радикалы и останавливают цепные реакции. Кроме того, в данном обзоре многие эпидемиологические и интервенционные исследования показали непоследовательные результаты, только небольшое количество интервенционных исследований свидетельствует о преимуществах приема полифенолов в улучшении фенотипа МС.

Многие долгосрочные рандомизированные исследования оправданы, чтобы оценить возможные превентивные эффекты более высокого потребления полифенолов путем сочетания их разнообразных диетических источников, как это было предложено некоторыми эпидемиологическими наблюдениями [20, 21].

Касательно влияния полифенолов на компоненты МС, некоторые исследования показали, что полифенолы винограда потенциально действуют на липидный обмен и снижение массы тела. Проведено исследование [22] с целью изучения влияния полифенолов на обмен липидов у пациентов с сахарным диабетом 2 типа на фоне избыточной массы тела и результаты подтверждают, что полифенолы винограда улучшают показатели липидного обмена, снижая плазменную концентрацию общего холестерина, липопротеидов низкой плотности и повышая концентрацию липопротеидов высокой плотности.

Несмотря на потенциальное воздействие полифенолов на снижение массы тела, в недавнем систематическом обзоре отмечается, что потеря веса, вызванная полифенолами, не является клинически значимой у людей с избыточным весом и ожирением [23]. Многие интервенционные исследования имеют продолжительность менее трех месяцев. Поэтому необходимы долгосрочные рандомизированные интервенционные исследования для правильного выяснения роли полифенолов в потере веса и профилактике ожирения.

В последние годы проводится значительное количество рандомизированных исследований, направленных на оценку профилактических мер относительно сахарного диабета 2 типа и данные одного из таких исследований [24] показывают защитные эффекты полифенолов винограда наоксидативный стресс и инсулинорезистентность.

Относительно влияния диетических полифенольных соединений исследования in vitro и in vivo свидетельствуют об улучшении гомеостаза глюкозы через потенциальные множественные механизмы действия в кишечнике, печени, мышечных адипоцитах и β-клетках поджелудочной железы, а также через пребиотические эффекты в пищеварительном тракте. В целом, большинство эпидемиологических исследований показывают, что диетические полифенолы ассоциированы с более низким риском развития сахарного диабета 2 типа.

Если результаты некоторых клинических исследований по эффективности полифенолов продемонстрировали значительное снижение артериальной гипертензии [25-27], то в других исследованиях не было обнаружено существенных изменений [28, 29]. Мета-анализ [30] показал, что ежедневное потребление полифенолов винограда может значительно снизить систолическое артериальное давление. Более значительное снижение артериального давления было отмечено при приеме низкой дозы полифенолов винограда (<733 мг/сут). Однако диастолическое артериальное давление не было значительно снижено у пациентов в исследуемой группе по сравнению с контрольной группой. Поэтому указанное исследование подтверждает гипотезу о том, что ежедневное потребление полифенолов винограда может влиять на систолическое артериальное давление, но не на диастолическое артериальное давление.

Заключение и выводы. Актуальные клинические исследования свидетельствуют о том, что полифенолы винограда в поддерживаемых дозах могут задерживать или предотвращать начало МС, уменьшая массу тела, артериального давления и уровень глюкозы в крови и улучшая обмен липидов. Их результаты указывают, что полифенолы являются значительными метаболическими модуляторами в силу их способности влиять на различные мишени клеточного и молекулярного пути, которые были доказаны в качестве потенциальных мишеней для полифенольной группы соединений.

Однако некоторые эпидемиологические и интервенционные исследования показали непоследовательные результаты. Таким образом, на основании проведенного обзора клинических исследований по эффективности полифенолов винограда на МС получены противоречивые данные об эффективности полифенолов в управлении МС. Возможно, в числе других причин, их противоречивость связана с существенными ограничениями их биодоступности, особенно в условиях прогрессирующего МС. Поэтому необходимы более объемные и глубокие научные исследования, чтобы установить более точно роль полифенолов в прогрессии компонентов МС, а также определить лучшую дозу, идеальную пищевую матрицу и способ приема. В таком случае весьма вероятно получить эффективный продукт для снижения риска сердечно-сосудистых заболеваний у человека и продления активного долголетия.

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В. В. Бенберин[1], Г. А. Ермаханова[2], А. А. Ахетов[2],
Т. А. Вощенкова[2], Н. А. Шаназаров[2], А. Е. Науразбаева[2]

[1]Қазақстан Республикасы Президенті Іс Басқармасы Медициналық орталығы, Астана, Қазақстан;
[2]Қазақстан Республикасы Президенті Іс Басқармасы Медициналық орталығы Ауруханасы, Астана, Қазақстан

МЕТАБОЛИКАЛЫҚ СИНДРОМЫ БАР ПАЦИЕНТТЕРДЕ ЖҮЗІМ ПОЛИФЕНОЛЫНЫҢ ТИІМДІЛІГІ (ӘДЕБИЕТТЕРДІ ШОЛУ)

Аннотация. Мақсаты: Метаболикалық синдромы бар пациенттерде жүзім полифенолының тиімділігін зерттеу.

Әдістеме: Embase, PubMed/Medline, Science Direct, Springer Link, Кокран кітапханасы, eLibrary кіретін жарияланымдарда және электрондық дерекқорларында әдебиеттерді іздеу жүргізілді. Әдебиеттерді іздеу тереңдігі 12 жыл болды. 30-дан астам жарияланымдар қарастырылды, соның ішінде ағылшын тіліндегі толық мәтінді мақалалар, жүйелі шолулар мен мета-анализдер таңдап алынды.

Нәтижелер мен қорытындылар: Қолданылатын дозаларда жүзім полифенолы дене салмағын, қан қысымын және қан глюкозасының деңгейін төмендетумен және липидті метаболизмді жақсартумен метаболикалық синдромның басталуын болдырмайды немесе алдын алады. Нәтижелер полифенолдардың жасушалық және молекулалық жолдардың әртүрлі нысаналарына ықпал ету қабілетіне байланысты маңызды метаболикалық модулятор болып табылатынын көрсетеді. Алайда, кейбір зерттеулер метаболикалық синдромды емдеуде полифенолдардың тиімділігі туралы келісілмеген нәтижелерді және қайшы деректерді көрсетті. Мүмкін, қарама-қайшы деректер биожетімділіктің елеулі шектеулерімен байланысты, әсіресе прогрессивті метаболикалық синдром жағдайында. Сондықтан метаболикалық синдромы компененттерінің прогрессиясында полифенолдардың рөлін дәлірек анықтау үшін неғұрлым кең және терең ғылыми зерттеулер қажет.

Түйін сөздер: жүзім полифенолдары, метаболикалық синдром.

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A. A. Genbach[1], K. K. Shokolakov[2]

[1]Doctor of technical sciences, professor of «Almaty university power engineering and telecommunication», Almaty, Kazakhstan,
[2]Doctoral student AUPET, design engineer JSC «Kazakh institute oil and gas», Almaty, Kazakhstan.
E-mail: kudash@bk.ru

DEVELOPMENT OF AN EXPERIMENTAL PLANT OF A NON-NOZZLE POROUS FOAM GENERATOR FOR PRODUCING OF AIR (STEAM) AND MECHANICAL FOAM

Abstract. On the basis of studies of heat-mass exchange processes by boiling of pure liquids and with the addition of surface-active agents, a new class of non-nozzle porous foam generator for producing of air (steam) and mechanical foam was developed. The results of the experiment are generalized by the criteria equations of heat-mass exchange with an accuracy of ± 20% with respect to the processes of bubbling, foam generation, pseudo-fluidization and boiling. The combined action of capillary and mass forces for capillary-porous structures of the 3x0,4 type made it possible to boost the operating mode of the foam generator by 1,5-2 times and reduce the consumption of the foam generating agent and reduce the hydraulic resistance tenfold.

Key words: porous foam generator, foam generation, heat-mass exchange, capillary-porous structures.

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А. А. Генбач[1], К. К. Шоколаков[2]

[1]Доктор технических наук, профессор, кафедра «Тепловые энергетические установки», Алматинский университет энергетики и связи, Алматы, Казахстан,
[2]докторант Алматинского университета энергетики и связи, специальность «Теплоэнергетика», кафедра «Тепловые энергетические установки», инженер-проектировщик АО «Казахский институт нефти и газа», Алматы, Казахстан

РАЗРАБОТКА ЭКСПЕРИМЕНТАЛЬНОЙ УСТАНОВКИ БЕЗФОРСУНОЧНОГО ПОРИСТОГО ПЕНОГЕНЕРАТОРА ВОЗДУШНО (ПАРО) – МЕХАНИЧЕСКОЙ ПЕНЫ

Аннотация. На основе исследований процессов тепло-массообмена кипением чистых, жидкостей и с добавкой поверхностно-активных веществ разработан новый класс безфорсуночных капиллярно-пористых пеногенераторов воздушно (паро)-механической пены. Результаты эксперимента обобщаются критеристыми уравнениями тепло- и массообмена с точностью ±20% применительно к процессам барботажа, пеногенерации, пвсевдоожижения и кипения. Совместное действие капиллярных и массовых сил для капиллярно-пористых структур вида 3x0,4 позволило форсировать в 1,5-2 раза режим работы пеногенератора, сократить расход пенообразователя и в десятки раз уменьшить гидравлическое сопротивление.

Ключевые слова: пористый пеногенератор, пеногенерация, тепломассообмен, капиллярно-пористые структуры.

Исследование процессов тепломассообмена при кипении чистых жидкостей в капиллярно-пористых структурах, разработка способов управления этими процессами [1] позволило обобщить эксперименты с чистыми пенными и запылёнными пенными потоками и изучить единое уравнение

для расчета теплообмена и массообмена с точностью ±20 % [2], причем обобщались процессы кипения, барботажа, псевдоожижения и пеногенерации.

На основе таких исследований разработан новый класс безфорсуночных пеногенераторов и пенопылегазоуловителей с барботажными капиллярно-пористыми решетками [3], так и с пеногенерирующими и пеногасящими структурами, ориентированными вертикально. За счет управления внутренними характеристиками двухфазных потоков [4] сконструированы различные устройства пено-пылеулавливания [5-13]. Стало возможно повысить эффективность пылегазоулавливания за счет управления геометрией микроканалов пористого материала [6], разделение потока на энергию волны и энергию газов (паров) [7,11], создание генератора пены путем подвода электроэнергии (без набегающего потока) [8], разработки турбулизаторов в виде пеногенерирующих и пеногасящих пористых структур, использующих совместное действие гравитационных и капиллярных сил, сил давления и вибрации.

В а. с. №358012, 1972 описан способ электростатической очистки газов, где электризацию осадительных элементов производят, используют трибоэффект. Данный эффект использовали и ранее, однако при электризации фильтрующих элементов на них образовывался проводящий слой, который снижал электростатическую составляющую фильтрации. В рассматриваемом способе будет повышена эффективность электростатических фильтров, поскольку электризацию предлагается осуществить путем циркуляции взвешенного, тонкодисперсного электризующего агента в полых осадительных элементах.

Способ электростатической очистки газов /а.с. 358012, 1972/ по эффективности пылеосаждения превосходит известные способы, однако в отличие от них он имеет низкую производительность пылеосаждения.

Таким образом, используя трибоэффект, можно увеличить эффективность электризации пыли в воздушном потоке, однако необходимо решить задачу по увеличению производиетльности пылеочистки.

Дополнением к способам очистки газов от пыли является способ /а.с. 247241, 1969/, в котором предлагается улавливать тонкие аэрозоли путем зарядки частиц аэрозоля при осаждении на них электростатически распыляемой легко испаряющейся жидкости, причем пар жидкости конденсируют для повторного использования. Такой способ имеет преимущество над способом пылеулавливания зарядкой частиц электростатически распыленной водой, так как при взаимном притяжении частиц пыли и капелек распыленной воды, происходит их слипание, укрупнение частиц с нейтрализацией зарядов.

Общим недостатком электрических способов является незначительный размер и рыхлая структура образующихся конгломератов пылевых частиц. При соударении они могут легко разрушаться. Особенно низкую эффективность процесса пылеподавления следует ожидать при осаждении мелкодисперсной пыли. Следовательно, необходимо разработать способ осаждения выли, который бы позволил существенно повысить прочность и устойчивость разрушению образующихся пылевых конгломератов при обработке воздушного запыленного потока электрическим полем при сохранении высокой производительности пылеочистки.

Интересен способ обеспыливания воздуха с применением пористых полотен /а.с. №368413, 1973/. Для повышения эффективности улавливания пыли запыленной поток пропускают между параллельно расположенными полотнами, которые смачивают жидкость. Движущийся поток воздуха приводит полотна в колебательные движения из-за неоднородности профиля скоростей. Частички пыли, находясь в турбулентном потоке воздуха, увлажняются, подвергаясь столкновениям и коагулируются. Увлажнение ткани осуществляется путем подачи воды к трубчатой раме, на которой закреплены полотна.

Для достижения необходимой эффективности пылеулавливания потребуется проведение многочисленных экспериментальных исследований при различных режимных параметрах, а также новые конструктивные разработки для формирования аэродинамической структуры запыленного воздушного потока.

Известен способ пылеподавления, основанный на использовании насыщенного водяного пара. При конденсации пара возникает область пониженного давления, в которую устремляются пылинки, и могут быть уловлены. К недостаткам данного способа можно отнести его низкую

эффективность, обусловленную нерациональным использованием генерируемого пара в целях пылеподавления. К тому же, для достижения требуемых норм запыленности, необходимы большие расходы пара, а, следовательно, неоправданные затраты на выработку пара.

Близким к описанному способу можно считать способ (а.с. №130461), где производится смешение пылевоздушного потока со струей пара с последующим осаждением паропылевого потока распыленной водой.

При такой организации процесса также следует ожидать низкую степень пылеулавливания. Конденсационный эффект будет проявляться нестабильно, носить вероятностный характер, зависящий от случайных столкновений распыленных капелек воды с молекулами водяного пара и будет определяться степенью турбулентности пылевоздушного потока. При насыщении пылевоздушного потока паром эффективность коагуляции пыли следует ожидать незначительной. Поэтому водяной пар и распыленная вода используется нерационально, имеются повышенные расходы пара и воды.

При изучении движения аэрозольных частиц в поле диффузии пара показано, что аэрозольные частицы особенно интенсивно удаляются вблизи холодной поверхности. Аэрозоли со скоростью I м/с пропускали через конденсатор длиной 0,5 м и шириной $5 \cdot 10^{-3}$ м. Металлическая стенка омывалась водой с температурой на входе в конденсатор 20°С и на выходе из него около минус 70°С. Концентрация частиц составляла 1012 частиц/м^3. Степень улавливания колебалась в больших пределах (75-95%). Механизм процессов пылеулавливания объяснен двумя положениями: I) конденсационным укрупнением аэрозольных частиц как на ядрах конденсации; 2) направленным движением молекул пара преимущественно к холодной поверхности.

Механизм процесса осаждения пыли очень сложный, хотя можно указать основные действующие факторы: движущей силой аэрозольных частиц является стефановский поток конденсирующегося пара, к тому же она усиливается наличием диффузионных, термофоретических сил и конвективных потоков, крупные частицы удаляются из потока за счет гравитационных и центробежных сил; некоторое число частиц в паровоздушном потоке уменьшается за счет процесса коагуляции.

Исследование механизма процесса пылеулавливания в поле диффузии пара требует дальнейшего развития, особенно это относится к интенсификации процессов конденсации пара, равномерности распределения жидкостной пленки, разработке новых устройств питания пылевого воздушного потока насыщенным паром.

Некоторая интенсификация процессов пылеулавливания может быть достигнута за счет наложения дополнительных источников энергии /а.с. №1032197, 1983/. Предлагается водяной пар и диспергированную воду заряжать разноименно, причем воду необходимо предварительно омагнитить. В бункер с горной массой по ходу ее движения подается пар, который проходит через электрическое поле, сформированное на выходе из парового сопла. Паропылевоздушный поток, покидая бункер, конденсируется на распыленных форсункой каплях электрически заряженной, предварительно омагниченной воды.

При весовом расходе пара, равном $7 \cdot 10^{-3}$ кг/с и более, относительная запыленность воздуха достигает 3-6% и становится автомодельной относительно расхода пара. Увеличение эффективности процесса в описанной конденсационной системе пылеподавления происходит в 1,5-2 раза (видимо, по отношению к конденсационной системе без электрической зарядки пара, воды и омагничивания воды). Также неясно, как влияет процесс омагничивания воды, и какой вклад электрической зарядки отдельно для пара и воды.

Полученный эффект объясняется тем, что при подаче в очаг пыли разноименно электрозаряженных аэрозолей пара и воды из-за электрических сил притяжения между молекулами пара и каплями воды происходит более интенсивная и упорядоченная конденсация пара на каплях воды. У поверхности конденсации возникает большее, чем при незаряженных аэрозолях, гидродинамическое течение запыленной среды, направленное к каплям, которое притягивает пылинки и способствует их захвату каплями, за счет чего происходит коллективное осаждение пылинок. Коэффициент захвата частичек пыли каплями воды также возрастает за счет уменьшения сил поверхностного натяжения электрозаряженных капель.

Описанный способ пылеподавления имеет дополнительный эффект по осаждению пылевых частиц, однако достигается это большой ценой: необходима электрическая зарядка пара, воды, омагничивание воды, что серьезно усложняет схему конденсирующей системы пылеподавления, требует дополнительных затрат на создание электрических полей и на обеспечение условий электробезопасности работающих.

Таким образом, дальнейшие теоретические и экспериментальные исследования процессов пылеулавливания должны быть направлены на создание новых конструктивных решений, в основе которых могут быть положены рассмотренные способы с применением испарительно-конденсационных многофазных систем пылеулавливания и поверхностно-активных веществ.

Главным образом, при существующих типах пенообразующих веществ возлагаются надежды на новые аэрогазодинамические схемы и конструкции, которые будут определять протекание процесса пылеосаждения, существенно увеличивая степень очистки запыленного потока, явятся надежными, простыми в изготовлении и эксплуатации, удовлетворяющие требованиям техники безопасности при эксплуатации оборудования [8-13].

На рисунке 1 представлен новый класс безфорсуночного пеногенератора с пеногенерирующей капиллярно-пористой структурой 2. Экспериментальная установка по исследованию процессов генерации воздуха (паро) – механической пены показана на рисунке 2.

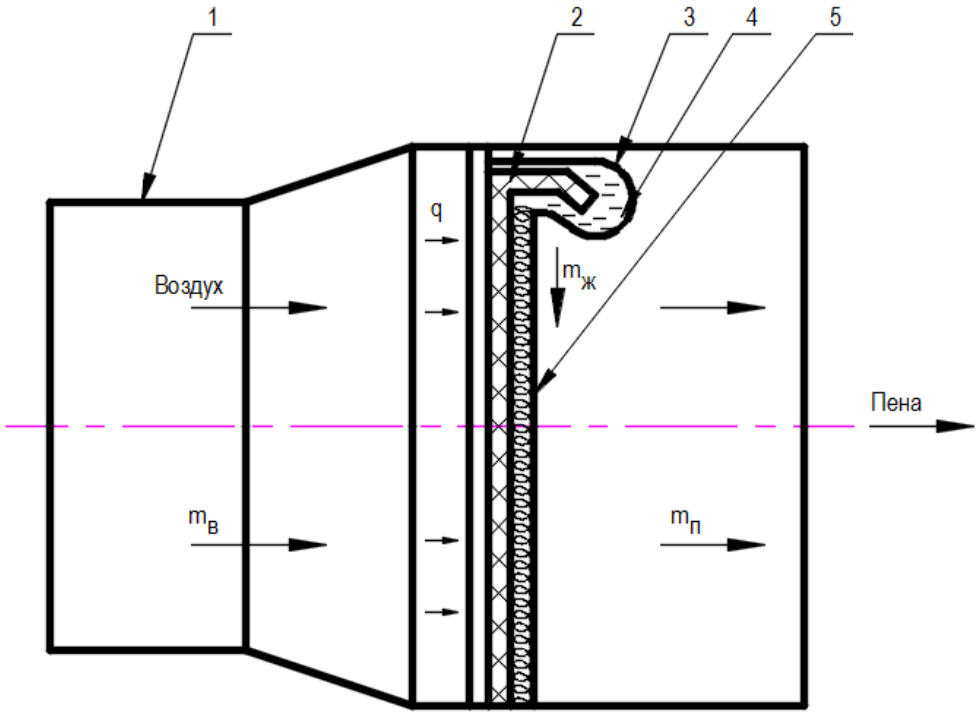

Рисунок 1 – Безфорсуночный капиллярно-пористый пеногенератор воздушно (паро) – механической пены: 1 – цилиндрический корпус; 2 – капиллярно-пористая структура; 3 – распылитель (питающая артерия); 4 – пенообразающий раствор; 5 – воздушно (паро) – механическая пена; mв, mж, mп – расходы воздуха (пара), жидкости (пенообразующего раствора), пены; q – плотность энергии набегающего (пенообразующего) потока.

Комбинированное использование массовых и капиллярных сил обеспечивает создание равномерного и устойчивого распределения пленки пенообразующего раствора по всей капиллярно-пористой структуре вида 3х0,4 (три слоя сетки с шириной ячейки в свету $0{,}4 \cdot 10^{-3}$ м). Это позволяет форсировать в 1,5-2 раза режим работы пеногенератора, сократить расход пенообразователя при сохранении стойкости, дисперсности и высокократности пены.

Величина гидравлического сопротивления будет в десятки раз меньше (нет форсунки), чем в пеногенераторах ГВПВ-400 или ПГГ-4.

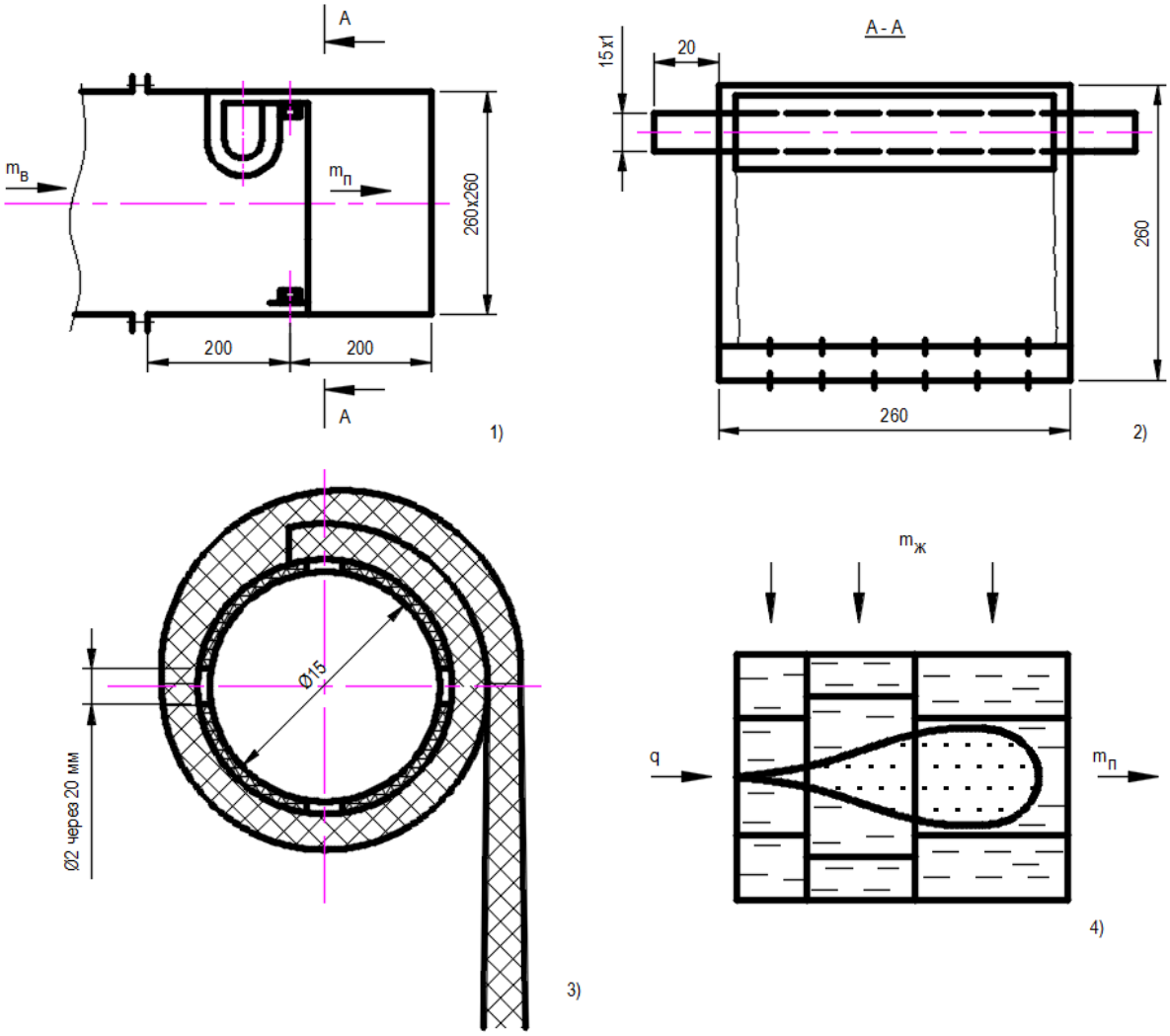

Рисунок 2 – Экспериментальная установка по исследованию процессов генерации пены:
1 – пеногенератор; 2 – распылитель; 3 – соединение капиллярно-пористой структуры;
4 – динамика пузыря в структуре.

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А. А. Генбач[1], К. К. Шоколаков[2]

[1]Алматы энергетика және байланыс университеті, Алматы, Қазақстан,
[2]«Қазақ Мұнай және Газ Институты» АҚ, Алматы, Қазақстан

АУА (БУ) - МЕХАНИКАЛЫҚ КӨПІРІКТІҢ БҮРІККІШСІЗ БОРҚЫЛДАҚ КӨПІРІК ГЕНЕРАТОРЫН ЭКСПЕРИМЕНТАЛДЫ ОРНАТУДЫ ӘЗІРЛЕУ

Түйін сөздер: борқылдақ көпірік генераторы, көпірік генерациясы, жылу салмақ алмастырғыш, капиллярля-борқылдақ құрылымдар.

Аннотация. Таза сұйықтықтарды қайнатумен және қабатты-белсенді заттарды қосумен жылу-салмақ алмастырғыш үдерісті зерттеу негізінде ауа (бу) – механикалық көпірікті бүріккішсіз капиллярлы-борқылдақ көпірік генераторларының жаңа класы әзірленді. Эксперимент нәтижелерін жылыну мен масса тасымалының критикалық теңдеулеріне көбік, поролон жасау, псевдоожолдау және қайнау процестеріне қатысты ±20% дәлдікпен қорытылады. Капиллярлы-бұрқылдақ құрылымдар үшін 3х0,4 түріндегі капиллярлы және салмақты бірыңғай әрекеттер көпірік генераторының жұмыс режимін 1,5-2 есе тездетуге, көпірік қалыптастырушының шығындарын қысқартуға және гидравликалық қақтығысты он есе азайтуға мүмкіндік берді.

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A. B. Baeshov[1], E. Zh. Tuleshova[2], A. K. Baeshova[3]

[1]Institute of Fuel, Catalysis and Electrochemistry named after D. V. Sokolsky, Almaty, Kazakhstan,
[2]Kh. A. Yassavi Kazakh-Turkish University, Turkestan, Kazakhstan,
[3]Al-Farabi National University, Almaty, Kazakhstan.
E-mail: elmira.tuleshova@ayu.edu.kz

ELECTROCHEMICAL BEHAVIOR OF SILVER IN ACID SOLUTIONS OF POLARIZATION BY UNSYMMETRICAL CURRENT

Abstract. In the scientific work, the effect of the magnitude of the current amplitude of the anodic and cathodic half-cycles on the current yield and the dissolution rate of silver during polarization by nonstationary currents in solutions of sulfuric and hydrochloric acids are considered. In this study, the current density in the cathode half-period was maintained at a constant value of 1000 A/sq.m, and in the anode half-cycle the current density varied from 0 to 1000 A/sq.m and vice versa. A special installation was used to convert the alternating current, which consists of an alternating current source, two diodes D1 and D2, one of which is connected in the transmission mode, and the other in the locking, two variable resistors R1 and R2, to control the magnitude of the cathode and anode half- R3 constant resistance, two ammeters A1 and A2, to control the current in the process of electrolysis in the cathodic and anodic half-cycle, electrolytic cell and oscillograph. The electrodes were silver and graphite plates. It has been established that in solutions of acids with the increase of size of amplitude of anodic semiperiod current output and speed of dissolution rise, and with the increase of size of cathode current there is a decline current output and speeds of dissolution of silver.

Key words: electrochemistry, electrolysis, not symmetric current, polarization, electrochemical dissolution, closeness of current.

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А. Б. Баешов[1], Э. Ж. Тулешова[2], А. К. Баешова[3]

[1]АО «Институт горючего, катализа и электрохимии им. Д. В. Сокольского», Алматы, Казахстан,
[2]Международный казахско-турецкий университет им. Ходжи Ахмеда Ясави, Туркестан, Казахстан,
[3]Казахский национальный университет им. аль-Фараби, Алматы, Казахстан.
E-mail: elmira.tuleshova@ayu.edu.kz

ЭЛЕКТРОХИМИЧЕСКОЕ ПОВЕДЕНИЕ СЕРЕБРА В КИСЛЫХ РАСТВОРАХ ПРИ ПОЛЯРИЗАЦИИ НЕСИММЕТРИЧНЫМ ТОКОМ

Аннотация. В научной работе рассмотрены влияние величины амплитуды тока анодного и катодного полупериодов на выход по току и скорость растворения серебра при поляризации нестационарными токами в растворах серной и соляной кислот. В данном исследовании величина плотности тока в катодном полупериоде поддерживалась постоянная, равная 1000 А/м^2, а в анодном полупериоде плотность тока менялась в интервале от 0 до 1000 А/м^2 и наоборот. Для преобразования переменного тока использовалась специальная установка, которая состоит из источника переменного тока, двух диодов $Д_1$ и $Д_2$, один из которых подключен в пропускающем режиме, а другой – в запирающем, двух переменных резисторов R_1 и R_2, для регулирования величины токов катодного и анодного полупериодов, R_3 постоянное сопротивление, два амперметра A_1 и A_2, для контролирования силы тока в процессе электролиза в катодном и анодном полупериоде, электролити-

ческой ячейки и осциллографа. Электродами служили серебряная и графитовая пластинки. Установлено, что в растворах кислот с увеличением величины амплитуды анодного полупериода ВТ и скорость растворения повышается, а с увеличением величины катодного тока наблюдается снижение ВТ и скорости растворения серебра.

Ключевые слова: электрохимия, электролиз, несимметричный ток, поляризация, электрохимическое растворение, плотность тока.

Серебро обладает самой высокой (из всех металлов) тепло- и электропроводностью и широко используется в электронике и электротехнике. Легированное тугоплавким металлом, например, вольфрамом, серебро оказывается идеальным материалом для изготовления высоковольтных переключателей и электропрерывателей. Серебряные контакты в сенсорных переключателях стали непременной принадлежностью компьютерных клавиатур, панелей управления микроволновыми печами, кнопок вызова лифтов и др. Электрические цепи в микропроцессорных чипах, применяемых в микрокалькуляторах, электрических приборах, автомобилях и т.д., представляют собой проводники из сплавов серебра и палладия. Серебряно-цинковые (на основе оксида серебра) гальванические элементы имеют вдвое большую электрическую емкость, чем свинцовые (кислотные) элементы такого же размера, поэтому они все чаще применяются как в аккумуляторах для авиакосмической техники и подводного флота, где уменьшению массы оборудования придается огромное значение, так и в миниатюрных батарейках для часов и калькуляторов [1, 2].

Металлическое серебро служит для изготовления высококачественных оптических зеркал путем термического испарения. В пищевой промышленности применяются серебряные аппараты, в которых готовят фруктовые соки и другие напитки. В медицине известен ряд фармацевтических препаратов, содержащих коллоидное серебро [3-5].

Сплавы серебра широко применяются для изготовления монет, зубных пломб, мостов и протезов, столовой посуды, в холодильной химической промышленности. Таким образом, процессы окисления, восстановления с участием серебра и его соединений, а также реакции его ионизации в различных водных растворах представляет определенный теоретический и практический интерес.

Быстрое развитие точных наук в современном мире приводит к возникновению новых методов исследования. В последнее время в электрохимических исследованиях уделяется особое внимание процессам, протекающим с участием электрода при наложении переменного или совокупности переменного и постоянного токов [6-12]. Применение нестационарного режима электролиза расширяет возможности исследования механизма катодных и анодных процессов, открывает принципиально новые возможности применения их для решения различных технологических вопросов.

В работах [13-17] представлены данные поляризации серебряного электрода промышленным переменным током частотой 50 Гц. Было установлено, что в сернокислом растворе серебро растворяется с высоким выходом по току при низких плотностях тока, а в растворе соляной кислоты ВТ растворения серебра составляет лишь 10,4%.

Необходимо отметить, что детальные исследования, проведенные нами на серебряном электроде и другими исследователями, изучавшими титан, хром, молибден, свинец и т.д. при поляризации переменным током промышленной частоты, показали, что электродные процессы, протекающие при поляризации переменным и постоянным токами, резко различаются как по механизму, так и по количественным характеристикам [18, 19]. В этой связи мы предполагали, что на результаты электролиза, проведенного под действием переменного тока, значительное влияние оказывает смена направления токов, т.е. электрод пребывает попеременно то в катодном, то в анодном полупериоде, поэтому возможно, что он претерпевает определенные структурные изменения. Для того чтобы убедиться в этом нами были проведены исследования при поляризации асимметричными токами.

Целью данной работы явилось изучение электрохимического поведения серебра при поляризации асимметричным током.

Изменение соотношения величин амплитуд анодного и катодного полупериодов переменного тока дает возможность установить зависимость выхода по току растворения серебра от доли тока одного из полупериодов при постоянном значении величин тока другого полупериода.

Для изучения влияния величин анодного и катодного полупериодов на растворение серебра были проведены эксперименты при поляризации асимметричными и импульсными токами в 0,5 М растворах серной и соляной кислот. Для преобразования переменного тока использовалась специальная установка, которая состоит из источника переменного тока, двух диодов $Д_1$ и $Д_2$, один из которых подключен в пропускающем режиме, а другой в запирающем, двух переменных резисторов R_1 и R_2, для регулирования величины токов катодного и анодного полупериодов, R_3 постоянное сопротивление, два амперметра A_1 и A_2, для контролирования силы тока в процессе электролиза в катодном и анодном полупериоде, электролитической ячейки и осциллографа [20].

Эксперименты проводились в электролизере объемом 50 мл без разделения электродных пространств. Электродами служили серебряная и графитовая пластинки. Выход по току растворения металла рассчитывался на анодный полупериод переменного тока по изменению веса серебряного электрода.

Далее нами исследовано влияние соотношения величин амплитуд токов анодного и катодного полупериодов промышленного переменного тока частотой 50 Гц.

Рассмотрено влияние величины амплитуды тока анодного полупериода на выход по току и скорость растворения серебра при поляризации нестационарными токами в растворах серной и соляной кислот. В данном исследовании величина плотности тока в катодном полупериоде поддерживалась постоянная, равная 1000 А/м^2,а в анодном полупериоде плотность тока менялась в интервале от 0 до 1000 А/м^2. В сернокислом растворе с увеличением величины амплитуды анодного полупериода выход по току растворения серебра начинает возрастать и при соотношении i_a/i_k = 0,6 достигает 2,2%. При дальнейшем увеличении величины тока анодного полупериода выход по току и скорость растворения серебра снижаются, и при симметричном переменном токе ВТ равняется 0,4% (рисунок 1). Это, видимо, объясняется увеличением доли реакции образования кислорода.

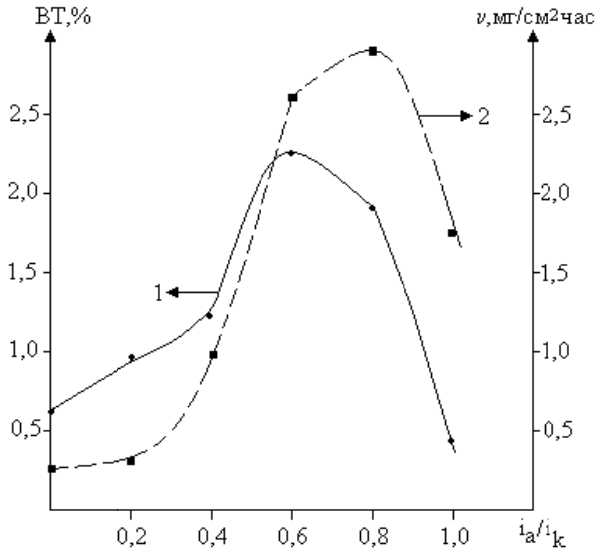

Рисунок 1 – Влияние соотношений величин амплитуд анодного и катодного полупериодов (i_a/i_k) на ВТ растворения серебра в 0,5 М растворе серной кислоты: $i_к$=1000 А/м^2, τ=0,25 ч

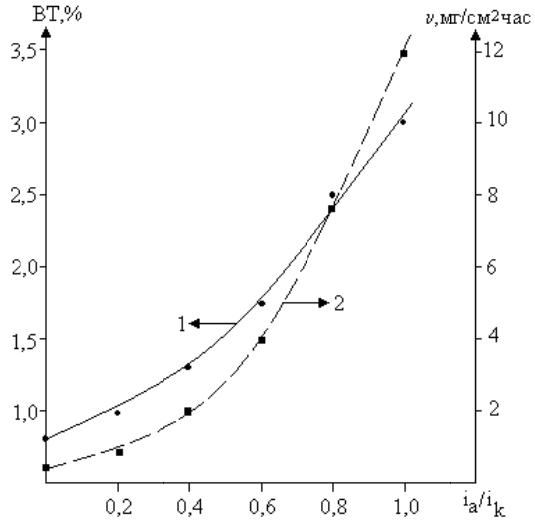

Рисунок 2 – Влияние соотношений величин амплитуд анодного и катодного полупериодов (i_a/i_k) на ВТ растворения серебра в 0,5 М растворе соляной кислоты: $i_к$=1000 А/м^2, τ=0,25 ч

С увеличением величины амплитуды анодного полупериода в растворе соляной кислоты выход по току растворения серебра растет и при соотношении i_a/i_k = 1 достигает 3% (рисунок 2). Как и следовало ожидать, с увеличением величины амплитуды анодного полупериода ВТ и скорость растворения повышается до значений, т.е. до соотношения величин анодного и катодного полупериодов равной единице, т.е. отвечающего симметричному переменному току. Как видно из рисунков 1 и 2, анионы оказывают определенное влияние на электрохимические процессы.

На рисунках 3 и 4 представлены результаты изучения влияния соотношений величин амплитуды токов катодного и анодного полупериодов на выход по току и скорость растворения серебра при поляризации нестационарными переменными токами в растворах серной и соляной кислот соответственно. Плотность тока в катодном полупериоде изменяли от 0 до 1000 А/м^2, поддерживая в анодном полупериоде плотность тока, равную 1000А/м^2.

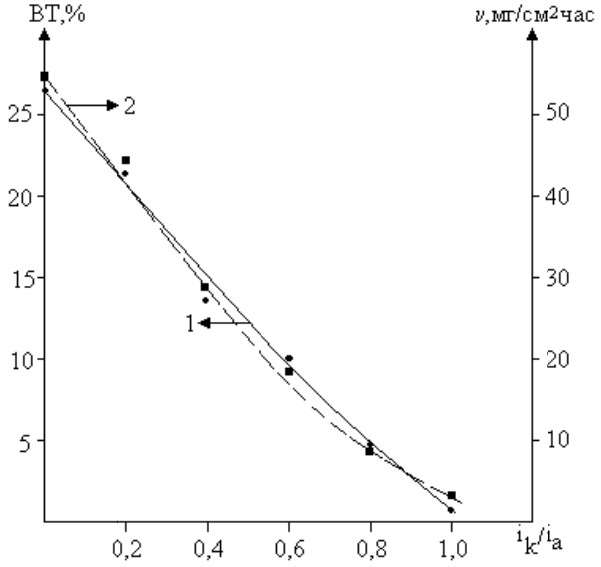

Рисунок 3 – Влияние соотношений величин амплитуд катодного и анодного полупериодов ($i_к/i_a$) на ВТ растворения серебра в 0,5 М растворе серной кислоты: i_a=1000 А/м^2, τ=0,25 час, t=25 ^{0}C

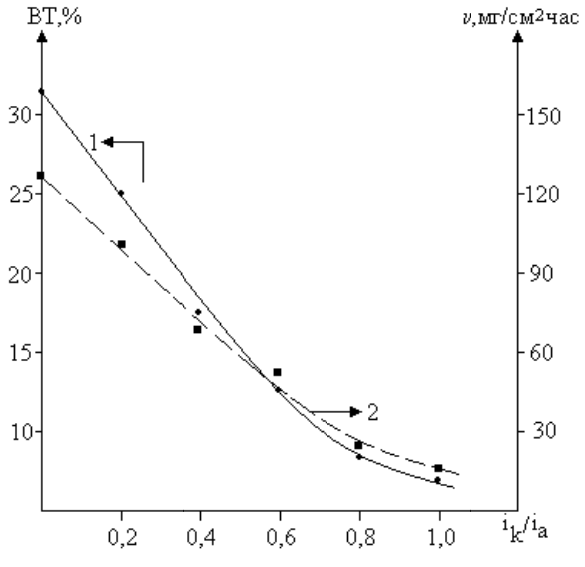

Рисунок 4 – Влияние соотношений величин амплитуд катодного и анодного полупериодов ($i_к/i_a$) на ВТ растворения серебра в 0,5 М растворе соляной кислоты: i_a=1000 А/м^2, τ=0,25 час, t=25 ^{0}C

При этом выход по току растворения металла с увеличением плотности тока в катодном полупериоде, постепенно уменьшается. Если при анодном импульсном токе ВТ растворения равнялся 26%, то при постепенном переходе к симметричному переменному току, т.е. при $i_к/i_a$ = 1, он убывает, достигая 0,4% в растворе серной кислоты.

Аналогичный ход кривой зависимости ВТ – $i_к/i_a$ отчетливо проявляется в растворе соляной кислот. Здесь также можно наблюдать снижение ВТ и скорости растворения серебра с увеличением величины катодного тока. Это видимо, связано с тем, что с увеличением величины тока в катодном полупериоде увеличивается скорость обратного восстановления образовавшихся ионов, оксидов, сульфатов или хлоридов серебра в анодном полупериоде.

Таким образом, нами впервые исследовано электрохимическое окисление серебра при поляризации асимметричным и импульсными токами в растворах серной и соляной кислот и установлено, что на ВТ и скорость растворения серебра существенное влияние оказывает соотношение величин амплитуды токов анодного и катодного полупериодов.

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А. Б. Баешов[1], Э. Ж. Тулешова[2], А. К. Баешова[3]

[1]«Д. В. Сокольский атындағы жанармай, катализ және электрохимия институты» АҚ,
Алматы, Қазақстан,
[2] Қожа Ахмет Ясауи атындағы Халықаралық қазақ-түрік университеті, Түркістан, Қазақстан,
[3]Аль-Фараби атындағы Қазақ ұлттық университеті, Алматы, Қазақстан

ҚЫШҚЫЛ ЕРІТІНДІЛЕРІНДЕ СИММЕТРИЯЛЫ ЕМЕС ТОКПЕН ПОЛЯРИЗАЦИЯЛАҒАНДА КҮМІСТІҢ ЭЛЕКТРОХИМИЯЛЫҚ ҚАСИЕТІ

Аннотация. Ғылыми жұмыста стационарлы емес токпен поляризациялағанда күкірт және тұз қышқылдарының ерітінділерінде анодты және катодты жартылай периодтарындағы ток амплитудасының шамасының күмістің еруінің ток бойынша шығымына және еру жылдамдығына әсері қарастырылды. Бұл зерттеуде катодты жартылай периодта ток тығыздығының шамасы тұрақты 1000 А/м^2, ал анодты жартылай периодта ток тығыздығы 0-ден 1000 А/м^2 аралығында өзгертіліп тұрды. Айнымалы токты түрлендіру үшін арнайы қондырғы пайдаланылды, ол айнымалы ток көзінен, екі диодтардан Д1 және Д2, катодты және анодты жартылай периодтардағы токтың мәнін реттеу үшін екі айнымалы резисторлар R1 және R2, R3 тұрақты кедергі, анодты және катодты жартылай периодтардағы ток күшін бақылау үшін екі амперметр А1 және А2, электролиттік ұяшықтан және осциллографтан тұрады. Электродтар ретінде күміс және графит пластинкалары қолданылды.

Қышқыл ерітінділерінде анодты жартылай периодтың шамасының артуымен күмістің еру жылдамдығы және ток бойынша шығымы жоғарылайды, катодты жартылай периодтың шамасы артуымен күмістің еруінің ТШ және еру жылдамдығы төмендейтіні анықталды.

Түйін сөздер: электрохимия, электролиз, симметриялы емес ток, поляризация, электрохимиялық еру, ток тығыздығы.

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A. T. Tleuberdinova[1], D. M. Salauatova[2]

[1]Karaganda State University named after academician E. A. Buketov, Kazakhstan,
[2]Karaganda Economic University Kazpotrebsoyuz, Kazakhstan.
E-mail: tat404@mail.ru, [2]Di_kz010@mail.ru

FEATURES OF ENTREPRENEURSHIP ACTIVITIES IN TOURISM

Abstract. The purpose of the work is to identify the peculiarities of entrepreneurial activity in the tourism sphere. The work is a theoretical and empirical research. The article analyzes different points of view to determining the role and importance of entrepreneurship in the sphere of tourism, their interrelations. There are given the specific characteristics of the entrepreneur of tourism and its motives.

The result of the work was the identification of the distinctive features of the tourism industry, tourism services and the nature of the demand for tourism services. Measures have been developed to take into account these features and determine their impact on the development of the tourism industry. The field of application of the research results is the activity of the subjects of the tourism industry. It is necessary to take into account specific features of the industry for successful entrepreneurship activity and increasing entrepreneurial activity in the field of tourism, which in turn should contribute to the development of the industry as a whole.

Key words: entrepreneurship activity, tourism, tourist business, features.

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А. Т. Тлеубердинова[1], Д. М. Салауатова[2]

[1]Карагандинский государственный университет им. академика Е. А. Букетова, Казахстан,
[2]Карагандинский экономический университет Казпотребсоюза, Казахстан

ОСОБЕННОСТИ ПРЕДПРИНИМАТЕЛЬСКОЙ ДЕЯТЕЛЬНОСТИ В ТУРИЗМЕ

Аннотация. Цель работы – выявить особенности предпринимательской деятельности в туристской сфере. Работа представляет собой теоретико-эмпирическое исследование. В статье проанализированы различные точки зрения к определению роли и значения предпринимательства в сфере туризма, их взаимосвязи. Приведены отличительные характеристики предпринимателя сферы туризма и его мотивов.

Результатом работы стало определение отличительных особенностей туристкой отрасли, туристских услуг и характера спроса на туристские услуги. Разработаны мероприятия по учету этих особенностей и определено их влияние на развитие туристской отрасли. Областью применения результатов исследования является деятельность субъектов туристской индустрии. Для успешной предпринимательской деятельности и повышения предпринимательской активности в сфере туризма необходимо учитывать специфические особенности отрасли, что в свою очередь должно способствовать развитию отрасли в целом.

Ключевые слова: предпринимательская деятельность, туризм, туристское предпринимательство, особенности.

Современный туристский бизнес является одним из крупнейших и наиболее быстрорастущих секторов экономики. Индустрии туризма отводится значительная роль в создании рабочих мест, снижении уровня безработицы. Часто индустрия туризма рассматривается в качестве посредника экономических и социальных изменений в обществе. Кроме того, туризм способен поддержать

общенациональное объединение путем притока иностранной валюты, поощрять культурную деятельность и традиционные ремесла, оказать существенное влияние на выживание различных секторов услуг.

Считается, что туристское предпринимательство способно устранить социальные проблемы, дать толчок развитию страны и пополнению бюджета, приводящему к росту ВВП. Так, по данным исследования агентства World Travel&Tourism Council (WTTC) общий вклад туризма в мировой валовый внутренний продукт в 2016 году составил 7 613,3 млрд долларов США, что соответствует 10,2% ВВП. Согласно прогнозам, к 2027 году данный показатель вырастет на 3,9% годовых и составит 11 512,9 млрд. долларов США (11,4% ВВП). Кроме того, в 2016 году в туристской отрасли было задействовано 108 741 000 рабочих мест, что составило 3,6% от общей мировой занятости населения. По мнению экспертов агентства, к 2027 году ожидается рост индикатора до 138 086 000 рабочих мест (4,0% от общей занятости [1].

Постоянное изменение туристских мотивов и предпочтений, постоянный характер развития туристских направлений, увеличение спроса на новые туристские продукты и услуги, рост числа новых туристов и, наконец, увеличение конкуренции способствуют развитию туристского предпринимательства [2]. Главными составляющими успеха и развития туристской отрасли, как в глобальном, так и в региональном масштабе, считаются именно предпринимательство и инновации [3]. По мнению многих ученых, индустрия туризма, гостеприимства и досуга в первую очередь, основывается на предпринимательстве [4-7], а предпринимательство в сфере туризма является одним из способов оказания стратегической поддержки стабилизации развития бизнеса [8].

Туристское предпринимательство определяется как деятельность, связанная с созданием и функционированием юридического туристского предприятия, работающего на основе получения материальной выгоды посредством удовлетворения потребностей туристов [9]. Современное предпринимательство в сфере туризма имеет множество различных форм от традиционных предприятий до инновационных малых и средних предприятий, предлагающих, местный гастрономический туризм, сельский приключенческий туризм, устойчивые региональные пакеты экотуризма, событийный туризм и фестивали, аутентичные и этнические семейные рестораны, семейные пансионаты, услуги типа «постель и завтрак», гостиницы эконом-класса, бутики-отели, домашние номера, местные магазины сувениров, компании по аренде автомобилей, сельскохозяйственные фермы, аттракционы и торговые точки, предназначенные для удовлетворения конкретных потребностей различных типов туристов [10, 11].

Исторически отдельные примеры туристского предпринимательства наблюдались в основном в небольшом по размерам семейном бизнесе [12], но в течение последнего десятилетия предпринимательство стало обычной практикой не только для глобальных сетей туризма, но и для малых и средних предприятий (МСП). Поскольку в индустрии туризма преобладают МСП, работающие в основном на основе семейных предприятий и не демонстрирующие таких предпринимательских характеристик, которые свойственных крупным корпорациям, очень важно различать корпоративное предпринимательство и предпринимательство МСП [13, 14]. Как правило, корпоративное предпринимательство исходит из систематически разработанного плана, известного как Корпоративная предпринимательская стратегия (CES), что не свойственно МСП. В привлечении капитала, найме сотрудников, поиске рынков сбыта, получении поддержки для бизнеса малые предприятия в значительной степени полагаются на социальные и семейные сети [15].

Кроме того, предпринимательство распространено среди МСП, специализирующихся на этническом нишевом туризме в сельских районах, в котором обязательным условием успеха являются местные культурные факторы. Предпринимательство важно на ранних этапах развития регионального городского туризма в тех случаях, когда глобальные гостиничные сети и международные франшизы не стремятся инвестировать средства в дестинации [16].

Предпринимательство играет важную роль в реализации возможностей отдыха и рекреационных возможностей. Предпринимательство рассматривается как важный фактор развития туризма как на региональном, так и на глобальном уровне. С. Ханка определяет предпринимательство в сфере туризма, как лицо или группу лиц, производящих и управляющих продуктами туризма [17]. Туристское предпринимательство признано в качестве основного способа оказания стратегической поддержки развития бизнеса, особенно в сельских районах. К. Кох и Т. Хальттен определили

значение предпринимателей в развитии туризма, утверждая, что рождение туристского бизнеса не является актом природы, а является актом туристского предпринимателя. Они отмечают, что окружающая среда, рельефы, флора и фауна, исторические артефакты и ангары культурного наследия становятся туристскими ресурсами только тогда, когда существуют предприниматели, которые могут преобразовать их в туристские достопримечательности и дестинации [18].

В первых трудах, посвященных анализу моделей формирования дестинаций, присутствовала недооценка исторически важной роли предпринимателя в развитии туризма. В частности, В. Кристаллерс определил им роль только в развитии инфраструктуры [19]. Работы Д. Миозекс и Д. Лундгрена в основном касались роли доступности и транспорта, географического положения и физических атрибутов [20, 21]. В соответствии с моделью Р. Батлера «жизненного цикла туристских зон» (TALC), роль местных предпринимателей определена только в развитии туристских услуг, объектов, рекламных мероприятий на ранних стадиях развития. [22]. Р. Тинслей и П. Линч рассматривают систему TALC как статическую, без динамического элемента, не учитывающую важные нематериальные элементы [23]. Данные упущения были отмечены и Г. Ховиненом, признавшем преуменьшение важности предпринимательской деятельности, как потенциального стимула изменений в туризме [24]. Аналогично рассуждает Т. Колес, критикующий существовавшие модели, рассматривавшие человека как пассивного субъекта [25].

Такие критические замечания могут быть применены и к моделям И. Гормсенса и С. Келлера, подчеркивавших в первую очередь контроль со стороны местных органов власти [26, 27]. Две модели, которые дают некоторое представление о том, как влияют местные предприниматели, – это Д. Льюиса и Д. Ритчи-Г. Кроуха. Д. Льюис определил предпринимателей как триггеров перемен при динамичной роли власти [28]. Модель Д. Ритчи и Г. Кроуха обеспечивает более динамичное понимание того, что предприниматели и малые предприятия играют значительную роль в создании конкурентных преимуществ, объясняя, что «…они имеют фундаментальное значение для развития туризма, как отрасли», способствуют развитию и конкурентоспособности дестинаций посредством своих стратегий, межфирменной конкуренции и сотрудничества. По их мнению, конкуренция, возникающая между малыми предприятиями в местах назначения, создает среду для совершенства, в то время, как взаимозависимость между фирмами поощряет межфирменное сотрудничество [29].

Позже в широкой литературе более очевидным стало влияние предпринимательства. Такие авторы, как А. Шаперо и Д. Пирс предполагали, что предпринимательство предоставляет сообществам разнообразие и динамизм, обеспечивающие непрерывное развитие, а его влияние может выходить за рамки отдельного проекта и стимулировать другие [30, 31]. С. Бриттон считает, что строительство только одного отеля в местности может спровоцировать дальнейшее развитие туристской сферы, поскольку сигнализирует о доверии к дестинации и толкает на дальнейшее строительство [32]. З. Моттиар и Х. Туккер подчеркнули рост числа исследований, демонстрирующих, как небольшие туристские фирмы могут оказать существенное влияние на развитие и функционирование дестинаций [33]. Они обеспечивают платформу, которая делает регион доступным и привлекательным. Идея предпринимателей, влияющих на развитие, выходящая за рамки их собственного индивидуального вклада, может иметь основополагающее значение для понимания степени их влияния на развитие туризма.

В последние годы теме роли предпринимательства в туризме стало уделяться больше внимания. Даже в тех областях, которые выгодно обеспечены ресурсами, сомнительно развитие индустрии туризма без влияния предпринимателей. Р. Рассел признает, что «современный туризм сформирован инновациями, талантом и видением предпринимателей», а Л. Ли, что «индустрия гостеприимства и туризма стала плодородной сферой предпринимательского бизнеса» [35]. Ряд исследователей указывают на то, что определенный круг «ключевых предпринимателей имеет решающее значение для туризма и развития сообщества» [36].

В сравнении с предпринимательским процессом в других отраслях, туристские предприниматели имеют определенную особенность: они очень мотивированы стилем жизни и неэкономическими стимулами [37, 38]. Исследования в области предпринимательства в сфере туризма показывают, что и для предпринимателей сферы туризма свойственны характерные черты предпринимателей, работающих и в других отраслях: рискованность, финансовая независимость,

стратегическое видение, инновационность, ориентация на потребности клиента и стремление к адаптации [39]. Но предприниматели сферы туризма и гостеприимства отличаются от других предпринимателей в таких вопросах, как владение специальными методами PR, маркетинговыми и коммуникационными навыками [40], а также ориентацией на высокое качество обслуживания [41]. Поэтому инновационные управленческие и маркетинговые способности и отличные коммуникативные навыки предпринимателей оказывают огромное положительное влияние на успешное применение процессов предпринимательства [42].

На рисунке 1 показаны отличия мотивов туристских предпринимателей, поскольку их мотивы больше связаны с достижением более высокого уровня жизни, нежели просто максимизация прибыли.

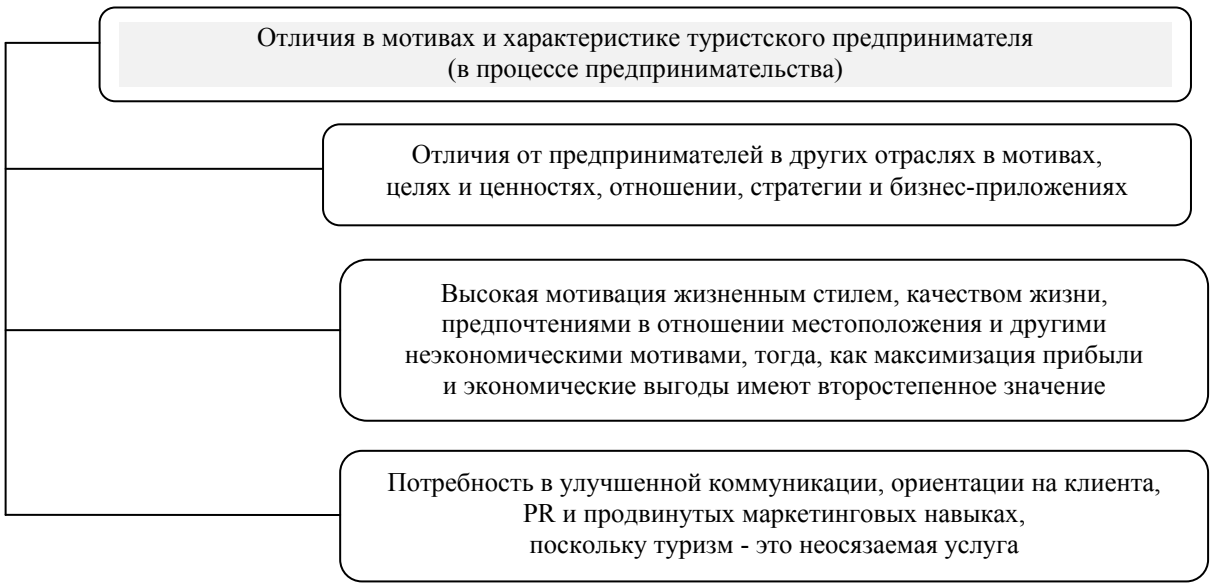

Рисунок 1 – Отличия мотивов и характеристики туристского предпринимателя.
Источник: [49-51]

Туризм дает хорошие возможности формирования ценностей для предпринимателей там, где ранее их не было [43]. Он рассматривается как один из способов преодоления барьеров для регионального развития, за счет роста рыночного спроса, путем привлечения туристов [44]. Несмотря на то, что основным моментом в планировании сообщества является экономическое развитие, в последнее время становится популярным так называемая «тройная линия» экономического, экологического и социального развития [45]. Для местных сообществ данные пути развития всегда будут иметь сильное экзогенное влияние.

Задача для регионов любой страны заключается в том, чтобы наилучшим образом использовать возможности, связанные с туризмом, не будучи чрезмерно зависимыми от сектора, поскольку чрезмерная зависимость подвергает местную экономику воздействию острого экзогенного давления посредством колебаний спроса [46-48]. Регионы должны активировать свой положительный местный социальный капитал и связать цели экономического развития с другими целями сообщества, основным движущим ресурсом которого является предпринимательство.

Процесс предпринимательства приносит много положительных результатов не только отдельным лицам и компаниям, но и обеспечивает значительный вклад туризма в развитие регионов.

Неразрывная связь между туризмом и региональным развитием как на местном, так и на национальном уровнях является темой многих исследований [52-54]. Д. Сааринен с региональным развитием Северной Европы связал следующие три фактора: политику ЕС, ориентированную на перспективу; растущую тенденцию к природному туризму и реальное или предполагаемое отсутствие альтернатив туризму. Туризм остается «важным инструментом политики, посвященным

изменениям, реконструкции социальной и физической среды» [55]. Растущее осознание экономической роли туризма сделало его социально-политической проблемой, даже если экономический вклад распределяется неравномерно. В ряде исследований по туризму основное внимание уделяется местностям, в которых туристские предприятия основаны на теории кластеров [56-58].

Однако реальность такова, что не везде развитие туризма связывается с общей стратегией развития страны. Чаще всего это сопряжено с рядом общих проблем, оказывающих решающее воздействие на формирование и выживание малого бизнеса. Д. Мюллер перечисляет ряд общих проблем, обычно влияющих на инициативы развития туризма:

– отсутствие местного контроля над принятием решений. Сообщества пытаются сосредоточиться на эндогенном росте в целях снижения зависимости от внешних субъектов;

– слабые внутренние экономические связи и информационные потоки, что делает индивидуальное экономическое развитие более привязанным к центру или другим регионам и не поощряет местное сотрудничество;

– географическая удаленность от рынков и плохая инфраструктура – растущая проблема, вызывающая обеспокоенность в отношении туризма;

– стареющие общества с сокращением численности населения;

– отсутствие инноваций и человеческого капитала, что снижает вероятность положительных изменений [59].

Специфика туристской отрасли имеет значительное влияние на особенности предпринимательской активности и определяет особенности методов ее измерения, анализа экономического влияния на развитие индустрии (рисунок 2).

В первую очередь особенность туристского сектора определена широким спектром деятельности смежных отраслей: транспортной (авиакомпании, железные дороги, такси и автобусы, прокат автомобилей, судоходные линии), сферы размещения (отели, мотели, гостевые дома, квартиры и виллы, кемпинги, депозиты кондоминиума, туристские караваны), индустрии питания (рестораны, кафе, бары, закусочные, столовые, кейтеринг), индустрии развлечений (природные и культурные достопримечательности, тематические парки, музеи, национальные парки, парки дикой природы, объекты наследия, развлечения, события); торговли, сектора организации туров (туроператоры, турагенты, организаторы стимулирующих поездок, туристские ассоциации и т. д.), сферы бытовых услуг, связи и др. Поэтому часто турпродукт называют амальгамой, т.е. смесью всего, что турист получает и использует в местах назначения, композитором которой может стать любой предприниматель, занятый в сфере туризма [60-62].

Плохая производительность одного подсектора влияет на рентабельность других секторов, различные поставщики всегда выигрывают, объединения свои усилия, поэтому в сфере туризма очень важна хорошая взаимосвязь между предпринимателями. Туристские предприниматели должны формировать устойчивые отношения с соответствующими заинтересованными сторонами, способствующие повышению деловой активности. Многие исследователи определяют, что туристский предприниматель занимается проактивным созданием, развитием и поддержанием совершенных, интерактивных и выгодных обменов с выбранными клиентами и партнерами, основанных на шести компонентах: доверии; интеграции; связи; общих ценностях; сопереживании и взаимности [63].

Кооперативный и взаимодополняющий характер туристских фирм развивается через собственные потребности и ценности сообщества. Это взаимодействие усиливает их специализацию, улучшает их рыночный потенциал и создает возможности для других. Этот микрокластерный подход призван стимулировать новый рост на уровне, понятном и контролируемом местным. А. Моррисон определил такую взаимосвязь, как межорганизационное обучение и обмен знаниями с чувством общности и целенаправленной сплоченности. Основным элементом этих сообществ является то, что они исторически формировались в результате различных социально-политических и экономических взаимодействий между участниками в стремлении поддерживать конкурентное преимущество назначения [64].

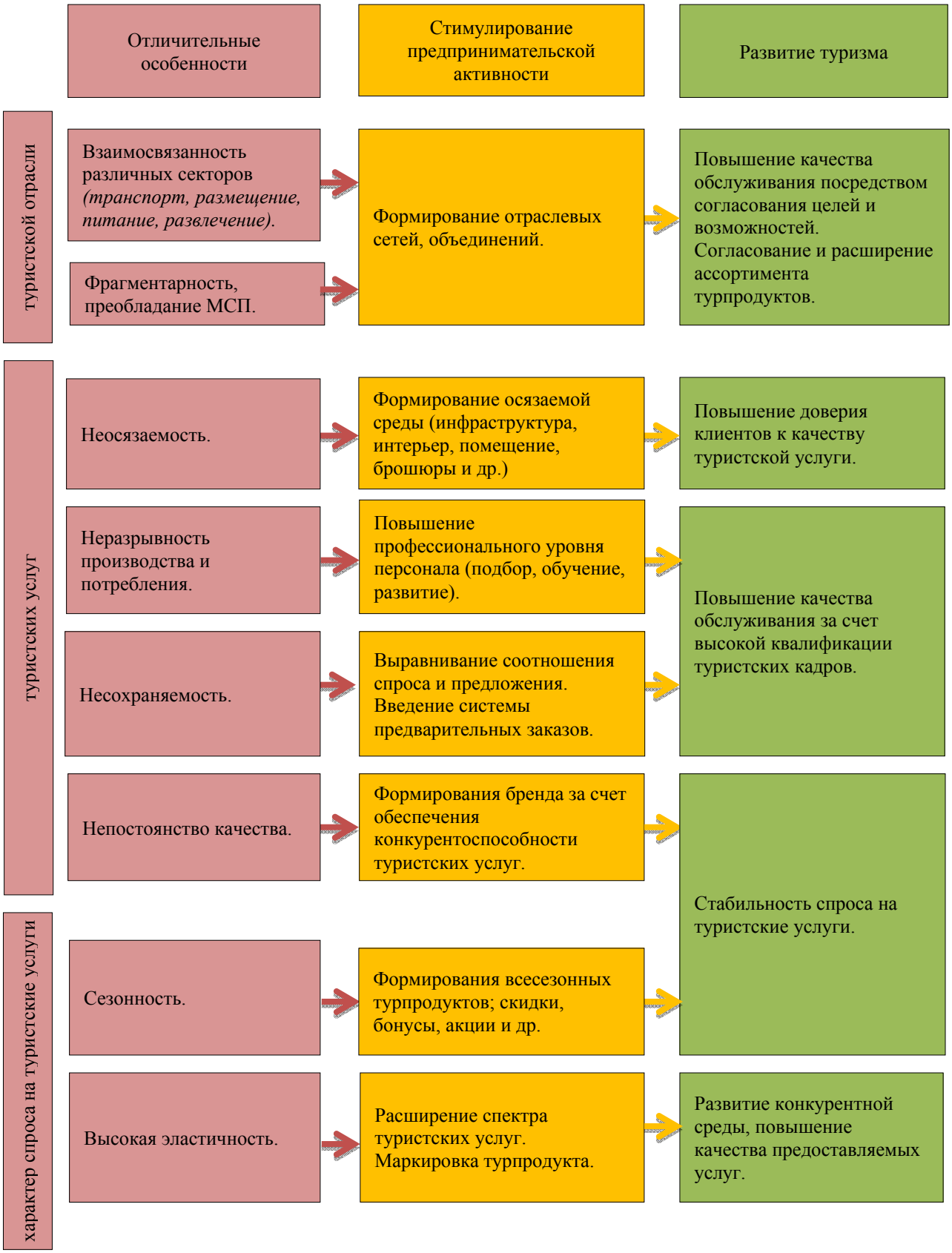

Рисунок 2 – Особенности предпринимательской деятельности в туризме.
Примечание: составлен авторами

Еще одной экономической особенностью туризма является преобладание малых и средних предприятий (МСП) в индустрии туризма. В. Миддлтон, назвавший их «микропредприятиями», перечисляет ряд их экономических преимуществ и недостатков:

– деньги, полученные микропредприятиями, как правило, остаются в местном сообществе и являются частью структуры местного цикла денежной циркуляции;

– они являются жизненно важным элементом в создании рабочих мест в сельских районах и менее развитых регионах в целом;

– для них не характерно коммерческое обоснование, доминирующее на крупных предприятиях;

– микропредприятия уникальны и не могут быть стандартизированы, что делает их аморфными и сложными для определения их, как единого сектора [65].

Высокая доля МСП обусловлена быстрыми изменениями в тенденциях отрасли, туристского поведения и предпочтений. Кроме того, мотивы, цели и ценности, отношения, стратегии и требования к успеху для туристских предпринимателей различаются. Тем не менее, туристские предприниматели, по-видимому, высоко мотивированы жизненным стилем, предпочтениями в отношении местоположения и другими неэкономическими мотивами, которые не являются обычными для предпринимателей в целом, основным мотивом которых является максимизация прибыли и финансовая независимость.

Туризм – это деятельность сферы услуг, которой свойственны все характеристики услуг. Во-первых, все туристские услуги неосязаемы, а с точки зрения международной торговли и баланса платежей, входящий и исходящий туризм – это соответственно невидимый экспорт и импорт. По существу, приобретая туристскую услугу, клиент получает право ее использовать в определенное время в определенном месте. Об услуге до ее использования клиент может судить только по осязаемым признакам, которые могут уменьшить неопределенность. Например, о качестве туристских услуг можно судить по различным признакам: инфраструктуре, рекламным материалам, дизайну и интерьеру, профессионализму сотрудников, сформированному имиджу и т.п. Для предприятий сферы туризма положительный имидж фирмы и известность торговой марки являются одним из путей материализации туристских услуг.

Неотделимость туристских услуг от производителя является второй важной характеристикой. Производство и потребление их происходит в месте нахождения производителя, а не в резиденции туриста. Качество и производительность обслуживания определяется отношением персонала. Поэтому для туриста сотрудники поставщиков туристских предприятий, находящиеся в постоянном вербальном контакте с потребителями, являются неотъемлемым аспектом турпродукта. Клиент не просто потребляет услугу, он подключается к ее производству. Участие покупателя в сфере обслуживания означает, что производитель должен заботиться о том, что он производит и как. Поведение производителя туристской услуги, его профессиональный опыт и знания во время потребления клиентом услуги определяют вероятность ее повторения.

Третьей особенностью туристских продуктов является несохраняемость. В отличие от материальных товаров, невозможно сохранить на конкретную дату непроданные номера отелей, билеты на проезд, сеанс развлечений и т.д. Поставка в туризме имеет негибкий характер: все отели с фиксированным количеством комнат, транспортные операторы, операторы сферы услуг и питания – с фиксированным количеством мест. Поэтому предпринимательская деятельность в этих сферах требует более интенсивного контроля соотношения спроса и предложения, управления доходностью, поскольку сезонность вызывает рост постоянных затрат, а мощности, не использованные в определенный день, теряются и не могут быть восстановлены. В этом случае необходимо поддерживать соотношение спроса и предложения путем дифференциации цен, скидок, разработки новых туристских продуктов и других мероприятий по стимулированию.

Непостоянство качества туристской услуги определяется внутренними и внешними факторами. Внутренние факторы зависят от людей, осуществляющих обслуживание. Внешние факторы включают погодные условия во время проведения тура, неожиданные задержки рейсов и т.п. Здесь необходимы соблюдение стандартов обслуживания и разработка собственной политики контроля за качеством обслуживания потребителей; разработка бренда за счет обеспечения конкурентоспособности туристских услуг.

Характер спроса на туристские услуги также имеет свои особенности. Это сезонность и высокая эластичность.

Сезонность спроса на туристские продукты тесно связана с несохраняемостью туристских услуг, неравномерное временное распределение. Данное явление различается между странами, между дестинациями. Так, если для Турции сезон длится 9 месяцев, то для отдельных регионов Казахстана – максимум шесть недель. Основными факторами, определяющими сезонные пики, являются климат, период отпусков жителей стран и школьных каникул.

Сезонная структура спроса влияет на уровень занятости в сфере туризма, на загруженность туристской инфраструктуры, на рост эксплуатационных расходов, вызывающий рост цен, на снижение качества обслуживания в пиковый сезон и, как результат – неудовлетворенность туриста. Все это создает определенные трудности для осуществления предпринимательской деятельности.

Для сглаживания сезонных колебаний спроса рекомендуется применять методы стимулирования сбыта: предоставление скидок и бонусов за определенный объем покупки и ее регулярность; предварительное заключение контрактов с туристскими компаниями на более выгодных условиях; снижение цены на полисы в месяцы с пониженным спросом; продажа услуг в кредит; разработка и презентация новых портфелей услуг.

Со второй половины 20-го столетия туризм стал одним из наиболее значимых и быстрорастущих секторов мировой экономики, что значительно облегчает поиск целевых сегментов, позиционирование собственных туристских услуг. Кроме того, характерной особенностью мирового туристского рынка становится спрос на новые направления, что еще более мотивирует предпринимательство в развивающихся дестинациях, к каковым относится и Казахстан.

Относительно высокие темпы роста спроса на туризм отчасти являются результатом высокой эластичности доходов международных прибытий и поступлений. В соответствии с исследованиями И. Смераль, спрос на туризм показывает высокую степень чувствительности к изменениям в доходах, а спрос на туризм чувствителен к колебаниям цен [66]. Поскольку туристский бизнес характеризуется высокой конкуренцией, коэффициенты ценовой эластичности имеют отрицательный знак. Высокая эластичность спроса на туристские услуги демонстрирует зависимость потребления туристских услуг от доходов потребителей и цены турпродукта. Расширение спектра туристских услуг позволит сделать выбор потребителем, исходя из размера своих доходов.

Кроме того, специалисты отмечают относительно низкие инвестиционные затраты сектора туризма, поскольку инвестиции, приходящиеся на одного занятого человека, относительно низки. Кроме того, природные достопримечательности имеют свободный доступ либо требуют лишь незначительных инвестиций для включения в турпродукт. Большинство культурных достопримечательностей, построенные не для туристских целей, лишь позже становятся туристскими достопримечательностями. Можно говорить о том, что такие объекты, как аэропорты, воздушные суда, автомагистрали, железные дороги, круизные суда, круизные терминалы, гидротехнические сооружения и кабельные железные дороги требуют высоких инвестиционных затрат, но большинство из них призваны обслуживать не только туристский сектор, но и другие виды деятельности национальной экономики.

Но во многих развивающихся странах туризм является своеобразными воротами к «предпринимательству», и это считается одним из положительных моментов туризма в процессе развития многих стран и регионов [67, 68].

Таким образом, для успешной предпринимательской деятельности и повышения предпринимательской активности в сфере туризма для обеспечения успешности бизнеса необходимо учитывать специфические особенности отрасли, что в свою очередь должно способствовать развитию отрасли в целом.

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А. Т. Тлеубердинова[1], Д. М. Салауатова[2]

[1]Академик Е. А. Бөкетов атындағы Қарағанды мемлекеттік университеті,
Қарағанды, Қазақстан,
[2]Қазтұтынуодағы Қарағанды экономикалық университеті,
Қарағанды, Қазақстан

ТУРИЗМДЕГІ КӘСІПКЕРЛІК ҚЫЗМЕТТІҢ ЕРЕКШЕЛІКТЕРІ

Аннотация. Жұмыстың мақсаты туристік саладағы кәсіпкерлік қызметтің ерекшеліктерін анықтау болып табылады. Баяндама теориялық-эмпирикалық зерттеу болып табылады. Мақалада туризм саласында кәсіпкерліктің рөлі мен маңыздылығын, олардың өзара қарым-қатынасын анықтау мақсатында түрлі көзқарастар талданады. Туризм саласындағы кәсіпкердің ерекшеліктері мен оның уәждемелері анықталды.

Жұмыстың нәтижесі туристік саланың, туристік қызметтердің, туристік қызметтерге сұраныстың сипатының айрықша ерекшеліктерін анықтау болды. Осы ерекшеліктерді есепке алу шаралары әзірлеіп, олардың туристік саланың дамуына әсері анықталды. Зерттеу нәтижелерін қолдану саласы туристік индустрия субъектілерінің қызметі болып табылады. Табысты кәсіпкерлік қызмет және туризм саласындағы кәсіпкерлік белсенділікті арттыру мақсатында саланың ерекшеліктерін ескеру қажет, бұл өз кезегінде саланы дамытуға ықпал етуі тиіс.

Түйін сөздер: кәсіпкерлік қызмет, туризм, туристік кәсіпкерлік, ерекшеліктер.

Сведения об авторах:

Тлеубердинова Айжан Тохтаровна – д.э.н., профессор, зав.кафедрой «Маркетинг» КарГУ им.академика Е.А. Букетова, tat404@mail.ru

Салауатова Динара Муслимовна – докторант 1 курса Карагандинского экономического университета Казпотребсоюза, Di_kz010@mail.ru

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S. A. Azhayev, I. A. Ishigov, B. T. Tastemirova

International Kazakh-Turkish University named after H. A. Yassawi
Faculty of medicine, Turkestan, Republic of Kazakhstan

THE CULTURE OF SPEECH IN THE MEDICAL EDUCATIONAL SYSTEM

Abstract. The paper considers the state of the speech culture of medical students of the third class of study in practical classes in private histology. The following empirical methods of scientific and pedagogical research were used: 1) observation of oral speech of students during a survey on the topics studied and fixing errors in their speech; 2) studying the products of students' learning activities, in particular, written answers to assignments (for knowledge, understanding and application) of two boundary controls conducted at intervals of 2.5 months. A total of 187 written works in the Kazakh language and 120 works in Russian were analyzed.

As a result of the analysis of written works of the first boundary control, errors in written speech that distort the meaning of the statement were found in 75% of Kazakh-speaking students and 70% in Russian-language teaching. After analyzing and grouping mistakes in oral and written speech, students were informed about them, and they were given the opportunity to work on the errors. In addition, during the whole semester, the teacher systematically corrected the most frequent mistakes in the students' oral speech during practical sessions. By results of the second boundary control errors in written speech were 53% in the groups of the Kazakh language of instruction and 51% in the groups of the Russian language of instruction.

The received results testify to the necessity and effectiveness of work on correcting speech of trainees. Identifying and correcting mistakes in written and oral speech of students should become an integral part of the pedagogical process in all academic disciplines, beginning with the first training courses.

Keywords: speech culture, medical communication, speech mistake (error), correction of mistake (error), shaping speech culture, medical terminology, lexicon.

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С. А. Ажаев, И. А. Ишигов, Б. Т. Тастемирова

Международный казахско-турецкий университет им. Х. А. Ясави,
Медицинский факультет, Туркестан, Республика Казахстан

КУЛЬТУРА РЕЧИ В СИСТЕМЕ МЕДИЦИНСКОГО ОБРАЗОВАНИЯ

Аннотация. В работерассмотрено состояние речевой культуры студентов-медиков 3-го курса обучения на практических занятиях по частной гистологии. Использованы следующие эмпирические методы научно-педагогических исследований: 1) наблюдение за устной речью студентов в ходе опроса по изучаемым темам и фиксирование ошибок в их речи; 2) изучение продуктов учебной деятельности студентов, в частности письменных ответов к заданиям (на знание, понимание и применение) двух рубежных контролей, проведенных с интервалом в 2,5 месяца. Всего проанализировано 187 письменных работ на казахском языке и 120 работ на русском.

В результате анализа письменных работ первого рубежного контроля ошибки в письменной речи, искажающие смысл высказывания, выявлены у 75% студентов казахскоязычного и 70% – русскоязычного обучения. После анализа и группировки ошибок в устной и письменной речи студенты были информированы о них, а также им была предоставлена возможность работы над ошибками. Кроме того, преподаватель в

течение всего семестра на практических занятиях систематически осуществлял коррекцию наиболее частых ошибок в устной речи студентов. По результатам второго рубежного контроля ошибки в письменной речи составили 53% в группах казахского языка обучения и и 51% – в группах русского языка обучения.

Полученные результаты свидетельствуют о необходимости и эффективности работы над исправлением речи обучаемых. Выявление и коррекция ошибок письменной и устной речи студентов должны стать неотъемлемой частью педагогического процесса на всех учебных дисциплинах, начиная с первых курсов обучения.

Ключевые слова: культура речи, врачебное общение, речевые ошибки, коррекция ошибок, формирование культуры речи, медицинская терминология, словарный запас.

Культура речи – это умение точно, ясно и ярко выражать свои мысли и чувства, свободно владеть речью, использовать юмор, средства выразительной речи (жесты, мимика) в разных условиях общения, владеть нормами устного и письменного литературного языка.От всего этого зависит насколько будем мы правильно поняты окружающими. «Неправильную речь или трудно понять, или можно ошибочно понять, а неправильно поймешь – неправильно и поступишь» [1].Исследование, проведенное выпускниками одного из американских университетов, показало большое несоответствие между тем, что врачи имели в виду, говоря с пациентами, и тем, что последние услышали [2]. Культура речи – это также проявление культуры мышления. «Кто ясно мыслит – ясно излагает» [3].

Безусловно, во врачебном образованииочень важна роль изучения специальных медико-биологических и клинических дисциплин, однако не менее важным является и умение будущего доктора хорошо владеть своей речью, умение слушать и слышать пациента и его родственников.О целительной силе врачебного общения(речи и слушания), своевременного и умно подобранного исходя из ситуации слова, говорили и писали многие выдающиеся деятели медицины. Так, В.В. Вересаев, биография которого была связана с двумя призваниями – врача и литератора, писал: «Врач может обладать огромным распознавательным талантом, уметь улавливать детали своих назначений, но все это остается бесплодным, если у него нет способности покорить и подчинить себе душу больного».Больной человек ищет и возлагает большие надежды на целительное, пусть хотя бы успокоительное слово врача. Таким образом, речевое общение, языковое мастерство является важнойсоставнойчастью профессиональной деятельности врача. Владение высококультурной речью значительно повышает профессионализм любого специалиста, в особенности врача, ибо «слово – самый главный терапевт», «слово исцеляет и губит». Удовлетворенность пациента лечением зависит от того, было ли общение с доктором положительным, что прямо пропорционально зависит от культуры речи врача [4]. Наиболее часто встречающаяся жалоба, поступающая от пациентов, – неспособность практикующих врачей внимательно выслуши-вать, давать ясные и понятные ответы, и, в первую очередь, точно выявить те проблемы, с которым пациент пришел к врачу [5].

Целью настоящей статьи является анализ состояния речевой культурысовременных студентов-медиков,выявитьосновные виды ошибок в их речи и наметить путиисправления и предупреждения речевых ошибок в условиях системы медицинского образования.

Одним из важнейших видов речевой деятельности является чтение. В настоящее время в силу рядапричин (широкое вхождение в жизнь телевидения, интернета и мобильной связи, экзаменыпо окончании школыв форме ЕНТ и т.д.) у молодого поколения упал интерес к чтению книг – источнику информации и источнику грамотного употребления слов в речи. Кроме того, имеют место и социальные причины – безразличное отношение взрослых к речи ребенка, длительное пребывание его в среде неправильно говорящих сверстников. Положение усугубляется также недостаточным вниманиемк культуре речи со стороны преподавателей теоретических и клинических дисциплин на протяжении всех лет обучения в высшем медицинском учебном заведении.И как результат – небрежное обращение как с устной, так и с письменной речьюне только на языке межнационального общения, но и на родном языке, которое можно заметить в ходеповседневного учебно-воспитательного процесса.Снижение интереса к книге также негативно отражается на абстрактном мышлении, способности понимать прочитанное и размышлять над его смыслом. Даже на 3-м курсе обучения, когда завершается изучение циклов общеобразовательныхи фундаментальных медико-биологических дисциплин, мы сталкиваемся с тем, что у части студентов все еще

не сформированыправильноепонимание и употреблениемедико-биологической терминологии, умение ясно и полно выразить свою мысль.

Анализ речи студентов часто свидетельствует о наличии в ней разного рода ошибок, состоящих не только в отклонении от норм казахского или русского языка, но и в искажении смысла сказанного, что неизбежно снижает в сознании слушающих и читающих уровень достоверности излагаемой им информации [6]. Вследствиеэтого происходит разрушение общения между студентом и преподавателем. Несомненно, что в перспективе эти недостатки речибудущего врача скажутся на коммуникации между ним и пациентом с его родственниками и коллегами, могут послужить причиной конфликтов между ними.

В работе использованы эмпирические методы педагогических исследований: 1) метод наблюдения за устной речью студентов в ходе текущих практических занятий в течение семестра; 2) метод изучения продуктов учебной деятельности студентов, в частности их письменных ответов на задания двух промежуточных контролей знания, проведенных с интервалом 2,5 месяца.

Систематическое наблюдение за правильностью устной речи обучающихся осуществлялось в 14 группах (около 160 студентов) в ходе устного опроса по темам практических занятий гистологии. Материалом для исследования по выявлению ошибок письменной речи послужили 93 письменные работы на казахском языкеи 69 работ на русском языке первого промежуточного контроля и, соответственно 94 и 71 работа – второго контроля. В обоих случаях фиксировались наиболее повторяющиеся и существенные ошибки, т.е. те, которые искажали смысл излагаемой информации, либо затрудняли ее понимание. Выявленные ошибки были сгруппированы в соответствии с языковыми нормами устной и письменной речи [7].

Вустной и письменной речи студентовчасто встречались следующиеошибки: 1) произносительные – манера глотать начало, конец или середину слова, невнятное, неправильное произношение слов (косноязычие); 2) лексические – употребление слов в несвойственных им значениях; 3) морфо-логические – неправильное образование форм слова; 4) синтаксические – нарушения конструирования предложений, правил сочетания слов. Как правило, эти ошибки приводили к логической неполноте высказываний, непоследовательности суждений, неправильному построению речи и т.д.

В ходе анализа письменных работ первого промежуточного контроля подобные ошибки выявлены в 75% письменных работ студентов казахского языка обучения и 70% – русского языка обучения. В последующем студенты были информированы о структуре типичных ошибок в их речи, и, кроме того, им была предоставлена возможность работы над ошибками, даны конкретные рекомендации по формированию правильной речи. По итогам устных опросов систематически проводилась коррекция типичных речевых ошибок.

Результаты второго рубежного контроля знаний студентов, проведенного спустя 2,5 месяца, оказались следующими: ошибки выявлены в 53% письменных работ студентов казахского языка обучения и 51% – русского языка обучения.

При посещении занятий в рамках внутрикафедрального контроля качества обучения нередко наблюдаются случаи безучастного, равнодушного отношения преподавателей к подобным ошибкам в речи студентов. Хотя известно, что исправление ошибок – часть процесса обучения, поэтому их надо замечать, объяснять, добиваться исправления. Это отнюдь не означает, что надо перебивать студента на каждом слове, что может отрицательно влиять на ход общения, вызывая у него психологический дискомфорт, скованность и боязнь говорить. Существуют различные приемы коррекцииустной речи, например, можно выслушать все высказывание, не перебивая говорящего, но фиксируя ошибки [7]. При этом следует обращать особое внимание на те ошибки, которые искажают или делают непонятным смысл высказывания, а также повторяются в ответах разных студентов. Целесообразно предложить студенту исправить ошибки самому. Если студент не может исправить ошибки, преподаватель обращается за помощью к другим студентам группы, а отвечавший студент повторяет правильный ответ после исправления. Если ни студент, ни группа не могут исправить ошибку, в этом случае это должен сделать преподаватель. Таким образом, проводя коррекционную работу, преподавателю необходимо проявлять тактичность, терпение и методическую грамотность.

Специфической особенностью воспитания культуры речи является то, что его нельзя обособить от процесса обучения и медицинской практики [8]. Оно должно стать необходимой органич-

ной частью педагогической деятельности, интегрированной в общий процесс обучения и развития. Формирование грамотной речи будущего врача возможно только в непосредственном контакте с преподавателем и в процессе практической деятельности, общении с пациентом. В связи с этим педагог должен предъявлять высокие требованияне толькок речи студента, но и к своей речи. Если преподаватель не следит за своей речью, невнимательнои безразлично относится к речевым ошибкам студента, то это в совокупности отрицательно сказывается на формировании культуры речи обучаемого в целом. Если наша речь непонятна студенту, наши слова легко могут быть перетолкованы на другой лад. Преподаватель должен демонстрировать образец правильного произношения звуков речи и в целом – правильной речи. Врач в разговоре с пациентом должен избегать банальных фраз, избитых выражений сочувствия, не злоупотреблять специальными медицинскими терминами, особенно латинскими, которые могут быть не такистолкованы и вызвать необоснованную тревогу у другого человека.

Речь – важнейший показатель общей культуры человека, его интеллекта и мышления. Врач априори должен быть интеллигентным, воспитанным человеком. Огромную роль в формировании культуры речи играют книги.Великий русский хирург Н.И. Пирогов высказывал мысль о том, что врач, не имеющий общего образования и не интересующийся произведениями великих писателей и поэтов, не врач, а ремесленник. Станислав Лем, М.А. Булгаков, И.Ф. Шиллер, А. Конан Дойль, А. Чехов, В.В. Вересаев были врачами, значит, медицина действительно связана с литературой. Художественная литература не только открывает и объясняет читателю жизнь общества и природы, но и закладывает основы нравственности, развивает мышление и воображение, обогащает словарный запас новыми словами и выражениями. Художественное произведение действует на эмоции человека – вызывает у него чувство удовлетворения и гордости, возмущения и негодования, эстетического наслаждения и т.д. Эмоциональная деятельность подталкивает и ускоряет мыслительные процессы; мысли стремятся к речевому оформлению [9, 10]. Следовательно, хорошая книга учит думать, развивает речь, память, побуждает к творчеству.

Говорить правильно и красиво – престижно, так как это умение свидетельствует об общекультурном уровне врача, уровне его мышления, повышает доверие к нему пациентов и родственников. Краеугольный камень культуры речи, свободной и убедительной речи – это богатый словарный запас. У каждой учебной дисциплины, представляющей собой область научного познания, есть свой специфический язык – система понятий-терминов, символов; задача обучаемого заключается в усвоении этого языка.«Речь – канал развития интеллекта, чем раньше будет усвоен язык, тем легче и полнее будут усваиваться знания» [11]. Тогда слова как бы сами приходят на ум, без особого умственного напряжения можно заменить одно слово другим, более точным и уместным. При скудности словарного запаса мучительно трудно найти вовремя нужное слово, такому человеку нелегко изложить свою мысль [9]. Чтобы заполнить паузы в речи и недостающие слова, говорящий вынужден употреблять слова-паразиты, дежурные фразы. У эрудированного, начитанного человека активный запас слов, как установлено, насчитывает не менее 6–7 тысяч.

Какие же существуют наиболее рациональные пути работы над своей речью, пополнения и расширения словарного запаса? Это, конечно, в первую очередь чтение художественной литературы. Важно учитывать, что чтение только тогда приносит пользу, когда человек осмысливает прочитанное, «всматривается» в слова, анализирует структуру предложений. В КазНУ им. аль-Фараби в 2012 г. разработан список «100» лучшихкнигвсех времен,которые должен прочитать каждый уважающий себя студент [12]. Такие списки разрабатываются и в других вузах РК и СНГ[13]. Прекрасные возможности для самообразования предоставляет интернет (специальная литература по развитию речи, статьи по своей отрасли в научных сайтах,справочное пособие Википедия и т.д.). Можно рекомендовать студенту с 1-курса обучения завести карманный словарик, в который следует записывать все новые или непонятные слова и термины. Большую пользу принесет общение с образованными людьми – обладателями чистой речи, изучение жизни и деятельности выдающихся мыслителей, ученых, общественных деятелей, которые могут стать примером для молодежи. Немаловажным средством совершенствования является посещение (в том числе и виртуальное) театров, музеев и выставок. Все это в совокупности формирует высокую общую культуру, которая служит благоприятным фоном для развития речи.

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С. А. Ажаев, И. А. Ишигов, Б. Т. Тастемирова

Қ. А. Ясауи атындағы Халықаралық қазақ-түрік университеті,
Медицина факультеті, Түркістан, Қазақстан

МЕДИЦИНАЛЫҚ БІЛІМ БЕРУ ЖҮЙЕСІНДЕГІ ТІЛ МӘДЕНИЕТТІЛІГІ

Аннотация. Мақалада 3-курс медиктердіңжеке гистологияның тәжірибелік сабақтарында тіл мәдениеттілігінің күйі қарастырылған. Жұмыста ғылыми-педагогикалық зерттеудің мына эмпиризмдік әдістері қолданылған: 1) өқып біліп жатқан тақырыптар бойынша сұрау кезінде студенттердің ауызекі тілін бақылау және сөйлеуіндегі қателерді жазып алу; 2) студенттердің оқу әрекеттерінің өнімдерін зерттеу – аралығы 2,5 ай құрайтын екі аралық бақылаудың тапсырмаларына (білім, түсіну және қолдану) берген жазбаша түрінде жауаптарын зерттеу. Барлығы қазақ тілінде 187 жазбаша жұмыс және орыс тілінде 120 жұмыс талданды.

Бірінші аралық бақылаудың жазбаша жұмыстарын талдау нәтижесінде айтайын деген пікірлерінің мағынасын бұрмалайтын қателер қазақ тілді студенттердің 75% және орыс тілді студенттердің – 70% жұмыстарында анықталды. Ауызекі және жазбаша тіліндежіберілген қателерді талдаудан және топтастырудан кейін студенттерге олар туралы мәлімет берілді және бұл қателерді түзетуге мүмкіндік берілді. Бұдан басқа, оқытушы тәжірибелік сабақтарда студенттердің ауызекі тілінде ең жиі ұшырасатын қателерді семестр бойы жүйелі түрде және белгілі әдістер негізінде коррекция жасап отырды. Екінші аралық бақылау нәтижесінде жазбаша тіліндегі қателер қазақ тілді топтарда – 53% және орыс тілді топтарда 51%болды.

Бұл нәтижелер білімгерлердің тілін түзету жұмыстың қажеттілігін және тиімділігін дәлелдейді.Медик-студенттердің ауызекі және жазбаша тіліндекездесетін қателерді айқындау және түзету оқытудың алғашқы курстарынан бастап педагогикалық процестің ажыратылмайтын бөлігі болуы тиіс.

Түйін сөздер: тіл мәдениеттілігі, дәрігерлік қатынас, тіл қателері, қателерді түзету (коррекция), тіл мәдениеттілігін қалыптастыру, медицина-лық терминология, сөздік қор.

Сведения об авторах:

Ажаев С.А. – к.м.н., профессор МКТУ им. Х. А. Ясави, доцент кафедры морфологии и физиологии человека медицинского факультета МКТУ им. Х.А. Ясави. E-mail: genetic.soviet@mail.ru;

Ишигов И.А. – д.м.н., профессор кафедры морфологии и физиологии человека медицинского факультета МКТУ им. Х. А. Ясави. E-mail: ibragim.49@mail.ru;

Тастемирова Б.Т. – магистр биол. наук, преподавателькафедры морфологии и физиологии человека медицинского факультета МКТУ им. Х. А. Ясави. E-mail: bibka-097@mail.ru.

ҚР ҰҒА-сының президенті академик М. Жұрыновтың ҰҒА Жалпы жиналысының сессиясындағы баяндамасы

Алматы қ., 31.01.2018 ж.

Құрметті әріптестер! Академияның 262 тұрақты мүшелерінен (173 акад., 89 корр. мүше) 94 адам уәжді себептермен – іссапарлар (командировка)мен денсаулықтарына байланысты қатыса алмайды. Жиналысқа қатысып отырғандардың саны 168 адам, демек 3/2 қажетті мөлшерден асып тұр. Кворум бар. Академияның Жалпы жиналысының кезекті сессиясын ашық деп жариялауға рұқсат етіңіздер.

Құрметті әріптестер, ҚР ҰҒА академиктері, корреспондент-мүшелері мен құрметті мүшелері, қымбатты қонақтар!

Өткен жылдың маусым айында өткізген ҰҒА Жалпы жиналысының соңғы сессиясынан бергі уақыт аралығында Ұлттық ғылым академиясы, жалпы Қазақстан ғылымы, ауыр қазаларға ұшырады – ҰҒА академигі, ауыл шаруашылығы ғылымының докторы, профессор Нечаев Игорь Николаевич (23.10.17 ж.), талантты ғалым, ҰҒА академигі, техника ғылымдарының докторы, профессор Рогов Евгений Иванович (22.11.17 ж.), фәни дүниеден озды. Осы ардақты азаматтарымыздың рухына тағзым етіп, орындарыңыздан тұрып, бір минут үнсіз еске алуларыңызды өтінемін. *(Үнсіздік).*

Құрметті әріптестер! ҰҒА Төралқасының өткен жылғы Жалпы жиналысында қаралған есепті баяндамасынан кейінгі уақытта ҰҒА Төралқасының аппараты көптеген жұмыстарды атқарды. Оларды електен өткізіп, тек қана ірі істерді тізетін болсақ – ол мыналар: ҰҒА-сының босаған вакансияларына сайлау өткізіп, жаңа мүшелерін сайлау; ҰҒА-ның тұрақты қаржыланып, жыл сайын дайындалатын ғылым туралы Ұлттық баяндаманы ұйымдастырып, даярлау (биыл 14 том); Көп жылдар бойы созылған үзілістен кейін ҰҒА-сына қайта берілген ғылым саласындағы Қ.И. Сәтбаев, Ы.Алтынсарин, Д.Қонаев, М.Әуезов, Ш.Уәлиханов, Күлтегін атындағы мемлекет тарапынан берілетін 75 ғылыми стипендияларды тағайындау; 1946 ж. бері шығарылып келе жатқан, 73 мемлекетке таратылатын 8 журналды тұрақты түрде уақтылы (жылына 6 рет) жоғары сапалы етіп шығару; республикадағы басым ғылыми бағыттарды анықтау ісіне қатысу; Ұлттық ғылыми Кеңестің құрамына ҰҒА академиктерінің көптеп кіруіне және сараптама жасауға, белсенді қатысуына ықпал жасау; ҰҒА-сының барлық мүшелерінің мемлекет және халықаралық ұйымдар тарапынан марапатталуына, олардың мерейтойларының және т.б. жағдайларда елеулі, биік дәрежеде өтуіне ықпал жасау. Өткен жылы жаңадан сайланған ҰҒА корреспондент-мүшелерін Президент Әкімшілігінің Поликлиникасы мен Емханасына мемлекетіміздің дамуына ерекше еңбегі сіңген азаматтар ретінде тіркеу.

ҚР ҰҒА-сы – Еліміздегі жалғыз классикалық әмбебап академия, барлық атақты, маңдайалды, дүниежүзіне белгілі ғалымдардың жиынтық академиясы. Сондықтан біздің академияның күрделі мәселелері Елбасының тікелей назарында болып келеді. Өткен жылдардың нәтижелері ҰҒА-сының ең таңдаулы, ең ардақты ғылыми ұжым екендігін көрсетті. Майталман академик-ғалымдарымыздың қатары талантты жас ғалымдармен – ҰҒА корреспондент-мүшелерімен толықты. Академияға еліміздің ең алдыңғы қатардағы, таңдаулы ғалымдары конкурспен сайланады. Соңғы өткен 2017 жылдың маусым айында Академияға корреспондент-мүшелерді сайлау осыны көрсетті, 1 орынға 10 үміткерге дейін барды. Оны біз өткен жылғы ҰҒА-ның Жалпы жиналысында да айтқан едік. Бұл көрініс біздің қоғамымызда ҚР ҰҒА-сының беделі бұрынғыдай жоғары екенін тайға басқан таңбадай етіп көрсетті. Ал қазір біздің академия әлемдегі мүшелері ең жас (орта жасы – 60!) классикалық академия болып тұр.

Осы аталып өткен, қол жеткізген жетістіктеріміздің ешқайсысы оңайлықпен келген жоқ, көпшілігі шиеленіскен күреспен келді. Өздеріңізге белгілі, 2017 жылдың 22-ақпанында ҰҒА академигі, Елбасы Н.Ә. Назарбаев ҰҒА-сының 70 жылдық мәртебелі мерейтойына келіп, баяндама жасады. Елбасы өз баяндамасында Академияның жұмысына оң баға беріп, академиктермен кездесіп, отандық ғылымды дамыту жолдарын айтып өтті. Академияның бұл мерейтойына дүниенің төрт тарапындағы елдерден (Ресей, АҚШ, Украина, Беларуссия, Қырғызстан, Грузия, Молдова және т.б.) атағы әлемге жайылған айтулы академиксол елдердің ҰҒА-ларының президенттері келіп қатысты.

Сондықтан мұндай ірі шараға үлкен дайындықпен, ең бастысы ауызбіршілікпен бардық деп ойлаймын. Үлкен ұйымдастыру жұмыстарын жүргізіп, ҰҒА айналасына барлық академиялық институттар мен медицина және ауылшаруашылығы салаларындағы ірі ғылыми-зерттеу институттарын топтастырып, ҰҒА бөлімшелері орналасқан Ұлттық университеттермен бірге ірі Ұлттық ғылыми-техникалық консорциум немесе Ассоциациялық қоғам құруды қолға алдық. Түпкі мақсат – ҚР ҰҒА-сының мәртебесін жоғарылатып, тиісті, биік орнына келтіру.

Ең бастысы – өз арамызда ауызбіршілік болуы қажет. Мемлекетіміз Елбасы, академик Н.Ә. Назарбаевтың басшылығымен жүргізіп жатқан игі іс-шараларға да үн қосып, қолдау көрсетіп отыру да біздің азаматтық борышымыз.

Уважаемые коллеги! 2017 год как для Казахстана, так и для нашей Академии,стал временем выхода на новые горизонты развития, связанные с масштабными реформами в стране.

Как вы знаете, знаковым событием уходящего года стало избрание Казахстана членом Совета Безопасности при ООН и затем успешное проведение в Казахстане международной выставки «ЭКСПО-2017» с главной темой -«Энергия будущего».Следует отметить, что наши академики и члены-корреспонденты приняли в ней посильное участие.

В прошлом году была запущена **Третья модернизация Казахстана**. Однимиз важных элементов стратегии модернизации становится – наряду с экономическими и политическими изменениями – трансформация общественного сознания в духе времени. Развернувшийся широкий и заинтересованный общенациональный диалог по поднятым в ней вопросам идентичности, традиций, языка, национальной истории продемонстрировал своевременность и востребованность подобной программы в обществе.

В рамках программы «Руханижаңғыру» также началась реализация проектов «Новое гуманитарное знание. 100 лучших учебников на казахском языке», «100 новых лиц Казахстана», «Туганжер», «Сакральная география Казахстана», «Современная казахстанская культура в глобальном мире». В реализацию этих программ значительный вклад вносят наши ученые – академики и члены-корреспонденты, ученые вузов и НИИ.

Конкретными мерами по реализации заявленных Президентом целей стали начало перевода казахского алфавита на латинскую графику, когда 27 октября Указом Президента был утвержден проект казахского алфавита на основе латинской графики, а также образована Национальная комиссия по переходу государственного языка на латиницу, перед которой поставлена задача организации данного процесса до 2025 года, а также программа развития трехъязычия (владение казахским, русским и английским языками) и проект «Цифровой Казахстан».Во всех этих программах члены нашей Академии приняли активное участие.

Послание 2018 года определяет, **что нам предстоит сделать** для успешной навигации и адаптации в новом мире – мире **Четвертой промышленной революции.** В решении этих поистине грандиозных задач активное участие принимают ученые Казахстана, в том числечлены нашей Академии, причем на первых рубежах.

2017 отчетный год для нашей Академии стал особенным. Как я уже отметил, 22 февраля текущего года состоялось торжественноесобрание, посвященное 70-летию Национальной академии наук Республики Казахстан,на котором с приветственной речью выступил Глава государства Нурсултан Назарбаев, поставивший перед учеными страны ряд новых задач. К сегодняшнему дню многие из них уже реализованы.

Так, Глава государства поручил принять меры по привлечению академиков НАН РК к процессу проведения государственной научно-технической экспертизы, обеспечить участие НАН

РК на договорной основе в проведении конкурсов по присуждению именных премий в области науки.

Во исполнение этих поручений при активной поддержке министра образования и науки РК Сагадиева Е.К. в этом году впервые за много лет в НАН РК прошел конкурс по присуждению именных премий в области науки и государственных научных стипендий в 2017 году. Всего поступило 528 заявок, из них 54 – на именные премии; 474 – на государственные стипендии для молодых ученых и ученых, внесших значительный вклад в развитие науки. Выделено 50 государственных стипендий молодым ученым и 25 – для ученых, внесших значительный вклад в развитие науки.

Таким образом, в 2017 году присуждены именные премии в области науки следующим ученым:

1) имени К.И.Сатпаева за лучшее научное исследование в области естественных наук академику НАН РК БейсеновойАлиеСарсеновне.

2) имени Ч.Ч.Валиханова за лучшее научное исследование в области гуманитарных наук профессору, почетному члену НАН РКСапарбаевуАбдижапаруДжумановичу;

3) имени Ы. Алтынсарина за лучшее научное исследование в области педагогики профессору ОспанұлыСерикбаю;

4) имени Кюль-тегина за выдающееся достижение в области тюркологии профессору ЖалмахановуШапагатуШарапатулы;

5) имени Д.А.Кунаева для молодых ученых за лучшую работу в области естественных наук PhD-доктору ЖабагинуМаксатуКизатовичу;

6) имени М.О.Ауэзова для молодых ученых за лучшую работу в области гуманитарных наук PhD-доктору Ахметову АрмануСериковичу.

Приказом Министра образования и науки РК от 22 декабря 2017 года во исполнение поручения Президента Республики Казахстан по итогам торжественной сессии Общего собрания НАН РК создан Совет по этике при Национальной академии наук РК. Состав Совета формируется из представителей научных организаций, образовательных учреждений высшего профессионального образования, а также представителей общественных организаций. Совет по этике является постоянно действующим органом для проведения этической экспертизы научно-образовательной деятельности, результатов конкурсов на реализацию научных, научно-технических программ и при реализации научных работ на практике.

Разумеется, что главным событием за отчетный год был юбилей НАН РК и выборы, которые состоялись после юбилейной сессии Общего собрания в соответствии сУставом и решением Президиума в маепрошлого года. Как вам известно, были избраны новые академики и члены-корреспонденты НАН РК на 28 освободившихся мест со времени последних выборов, состоявшихся в 2013 году. Я только вкратце остановлюсь на этом вопросе, поскольку мы его уже обсуждали.

Для участия в конкурсе на членов-корреспондентов подали документы 68 человек, на действительных членов (академиков) – 60 человек.

Выборы прошли открыто и прозрачно: в республиканских газетах и на сайте НАН РК были даны объявления о проведении конкурса, о претендентах, проведены обсуждения их на заседаниях профильных Отделений, опубликован список избранных.Наша Академия пополнилась учеными, достойных звания академика и члена-корреспондента.

Подготовка ежегодного Национального доклада по науке выполняется в соответствии с Правилами подготовки ежегодного Национального доклада по науке, утвержденного Указом Президента Республики Казахстан.

Реализация научных исследований в отчетном году проводилась в соответствии с одобренными на заседании ВНТК пятью приоритетами развития науки: Рациональное использование природных ресурсов, переработка сырья и продукции; Энергетика и машиностроение; Информационные и телекоммуникационные технологии; Науки о жизни; Интеллектуальный потенциал страны. В конце 2017 года окончательно принято решение Правительства о новых семи приоритетах развития науки.

Как известно, в подготовке Национального доклада принимают участие академики и члены-корреспонденты НАН РК, а также ведущие ученые – доктора наук, работающие под научным руководством или в соавторстве с академиками и членами-корреспондентами НАН РК в лабораториях научно-исследовательских институтов и на кафедрах высших учебных заведений страны.

В Докладе приводится сравнительная оценка состояния науки в стране и мире, рекомендуемые приоритетные направления, отрасли и подотрасли науки, которые необходимо развивать в целях научного обеспечения индустриально-инновационного развития экономики страны в русле постмодернизма, востребованной 4-ой промышленной революцией. Большинство развитых стран концентрирует свои усилия на новых направлениях исследований, связанных с потребностями инновационнойиндустрии, аграрии, биотехнологии и др. Это позволяет сформировать крупные научные школы, способные заниматься конкурентоспособными разработками с целью создания наукоемких производств с доминантой автоматизации и робототехники, цифровых платформ и искусственного интелекта. Кроме того, в Докладе даются общая характеристика казахстанской науки, анализ состояния научного потенциала, финансирования научных исследований и разработок, тенденций развития мировой и казахстанской науки, развития национальной инновационной системы, деятельности отраслевых уполномоченных органов по научно-технической части, выводы и предложения по дальнейшему развитию национальной научной системы. Доклад в 2017 году был обсужден на заседании ВНТК при Правительстве РК и принят Администрацией Президента РК.

Как вам известно, НАН РК продолжает выпуск 8 академических научных журналов, тем самым информируя ученый мир о достиженияхказахстанской науки. Напомню, что в конце 2016 года журнал «Известия НАН РК. Серия геологии и технических наук был индексирован в международной базе данных Scopus. В октябре прошлого года научные журналы были отмечены медалью Международной издательской кампанииSpringerNature(Шпрингер нейча) как лучшие научные издания Казахстана.В этом году мы ожидаем, что в Международную базу Skopus войдут еще 5 журналов, которые стоят на 10-ой – последней ступени экспертизы.

Следует отметить, что в 2017 году в наших журналах увеличилось количество статей, опубликованных на английском языке. Если раньше количество таких статей не превышало 30 %, то в настоящее время мы добились увеличения до 50 % и больше, что является одним из 4-х поручений Президента РК, данное правительству в докладе к 70-летию НАН РК –«проработать вопрос и внести предложение по обеспечению опубликования не менее половины всех научных статей на английском языкеи их включению в мировые базы данных».Это, бесспорно, является одним из путей интеграции казахстанской науки в общемировую.

Академия придает большое значение укреплению международных связей. В связи с этим необходимо отметить Договор о сотрудничестве между нашей академией и Академией Беларуси, который был подписан мной и президентом академии Беларусь, академикомГусаковым В.Г. в рамках государственного визита Президента РК Н.А.Назарбаева 29-30 ноября 2017 года. Кроме того, в прошлом году мы активно сотрудничали с Академиями наук России, Украины,Франции, КНР,Турции, Азербайджана, Кыргызстана, Молдовы, Татарстана.

Құрметті әріптестер! 2017 жылы ҰҒА ғалымдарының Қазақстан Республикасының әл-Фараби атындағы ғылым мен техника саласындағы Мемлекеттік сыйлығымен марапатталуыбіздің аса үлкен жетістігіміздің бірі. Марапатталғандардың қатарында: ҰҒА академигі Байпақов Карл Молдахметұлы, ҰҒА корреспондент-мүшелері Мырзақұлов Ратбай, Бенберин Валерий Васильевич, ҰҒА құрметті мүшесі Ахетов Әмір Амантайұлы.

Алдағы жыл – Елбасы Жолдауын жүзеге асыру жылы. Бұл нақты тәжрибелік істер бағдарламасы барлық қазақстандықтарға және бірінші кезекте зиялы қауымның ең алдыңғы қатарлы ғалымдарына қатысты. Ондағы айтылған барлық 10 мәселе еліміздің ғалымдарының күш салуын талап етеді, әсіресе инновациялық индустриализацияны ғылыми сүйемелдеусіз жүзеге асыру мүмкін емес.

2018 жылы алдағы Мақсатты-бағдарламалық қаржыландыруды (ПЦФ), ғылыми жобаларды мемлекеттік ғылыми-техникалық сараптамадан өткізу жұмысына толық түрде жаңа методикалық дайындықтар жасау керек.

ҚР ҰҒА жанынан коллегиалды орган – этика Кеңесі құрылды, бұл орган 2018 жылы белсенді түрде өз қызметіне кірісуі қажет.

Одан басқа, ҚР ҰҒА алдында әлемдік және отандық ғылымның басты жетістіктерінің терең талдамасы мен олардың даму тенденциясы және отандық ғылым дамуын қамтамасыз етуге арналған тұжырымдар мен ұсыныстар берілетін жылдық Ұлттық баяндаманы даярлау мәселесі тұр.

Қазақстандық ғалымдардың алдағы уақыттағы әрекет өрісі осындай, біздің академияның жұмысы осы тұрғыдан құрылатын болады.

Біздің академиямыз жыл сайын халықаралық беделі өсіп, қанатын кеңінен жайып, өзінің бұрынғы жоғарғы лауазымына қарай көтеріліп келеді. Бұл біздің бәріміздің ортақ табысымыз. Келешекте де осылайша ғылымның бұлақ суындай таза, әрі биік идеалдарына, Отандық ғылымды одан әрі дамыту үшін қызмет ете берейік! Сіздерге үлкен шығармашылық табыстар тілеймін.

Зейін қойып тыңдағандарыңызға рахмет!

Глобалдық 30 экономикаға апарар жол

Қазақстан Республикасы Президенті Нұрсұлтан Назарбаев «Төртінші өнеркәсіптік революция жағдайындағы дамудың жаңа мүмкіндіктері» атты жыл сайынғы Жолдауын Қазақстан халқына арнап, еліміздің алдағы уақытта қарыштап дамуының басты 10 бағытын нақтылап белгілеп берді.

Жолдау – жаңа цифрлық дәуірде егемен еліміздің тұрақты дамуын қамтитын, мемлекетіміздің барлық саласына серпін беріп, халқымыздың игілігін көздеген шынайы іс-жоспарға құрылған құнды құжат.

Биылғы Елбасы Жолдауының ерекшелігі – ел дамуының түбегейлі тұстарын зерделеп, оның сан қырлы салаларын жүйелі түрде жаңғырту мәселесіне мән беруінде. Тәуелсіздіктің ширек ғасырын артқа тастаған мемлекет үшін болашаққа сенімді қадам жасау өте маңызды. Стратегиялық мазмұны жоғары бұл құжатта анықталған он міндеттің әрқайсысы еліміздің бүгіні мен ертеңі үшін қажет. Елбасы мемлекетті жаңа сатыға көтеретін ауқымды реформаларға үлкен үміт артып, ондағы басымдықтардың бүгінгі қоғамға сәйкес келетін өзіндік ерекшеліктеріне тоқталды. Демек, қазіргі заманның нағыз дамыған өркениетті елдерінің қатарына қосылуы үшін ескі экономикалық жүйені ғана емес, қоғамдық сананы да өзгертуге тиіспіз деген ойды ортаға салды. Мәселен, соңғы жылдары қолға алынған «Нұрлы жол», «Нұрлы жер» бағдарламалары, сондай-ақ «100 нақты қадам» Ұлт жоспары секілді реформалардың мәні зор, маңызы ерек. Осы ізгілікті бастамаларды жалғастырып, ұлттық келбетімізді, рухани мәдениетімізді жоғалтпай, кемелденуге бағыт алуымыз қажет.

Президент өз Жолдауында инновациялық индустрияландыру саясаты экономиканың флагманына айналуы тиіс деген тапсырма жүктеді. Расында да, Қазақстанның бүгінгі жеткен жетістігі, алдымен Елбасы пәрменімен іске асырылған индустрияландыру бағдарламасының арқасында мүмкін болып отыр. Міне, соның нәтижесінде қаншама жаңа өндіріс орындары пайда болды, ол өз кезегінде мыңдаған қазақстандық үшін тұрақты жұмыс көзіне айналды. Мәселен, бір ғана өткен жылдың өзінде индустрияландыру картасы бойынша 12633 жұмыс орны ашылды. Осы бағыттан таймасақ, еліміздің келешегі кемелді болары сөзсіз. Өйткені, қазіргі дамыған мемлекеттердің бәрі де осы жолмен жүріп өткен. Маңызды стратегиялық қадамдарсыз экономикамыз да өрге баспайды, алдыңғы қатардағы отыз елдің глобалдық экономикасына кіру қиын. Елбасының қоғамды ұстап тұрған барлық салаларға сандық технологияны енгізіп, сол арқылы әлемдік бәсекеге қабілетті болуымыз керек деген мағынадағы сөздері ерекше.

2017 жылы еліміз әлемдік дағдарыстың қолайсыз салдарын еңсеріп, сенімді өсу жолына қайта түсті. Жыл қорытындысы бойынша ішкі жалпы өнімнің өсуі 4 пайызға, ал өнеркәсіптік өнімнің өсуі 7 пайыздан асты. Бұл орайда, өнеркәсіптің жалпы көлемінде өңдеуші сектордың үлесі 40 пайыздан асты. Қазақстанның қолайлы дамуы орта топтың қалыптасуына мүмкіндік берді. Кедейшілік 13 есе қысқарып, жұмыссыздық деңгейі 4,9 пайызға дейін төмендеді. Еліміздің әлеуметтік-экономикалық табыстарының негізі – азаматтық бейбітшілік, ұлтаралық және конфессия аралық келісім – біздің басты құндылықтарымыз ретінде қала бермек. Ең басты құндылығымыз – Тәуелсіздігімізді сақтай отырып, Президентіміз алға қойған нақты ұлт жоспарын іске асыру – біздің басты міндет.

Елбасы жариялаған басымдықтар мен міндеттер Қазақстанның әлеуметтік-экономикалық және технологиялық тұрғыда жаңғыртудың логикалық жалғасы іспеттес. Еліміз егемендік жылдарында үнемі жаһандық жаңа үрдістерді қолдап келеді. Кез келген мемлекет өз билігінің тұрақтылығын қамтамассыз ету үшін бұқара халықтың әл-ауқаты мен тұрмыстық жағдайын ұдайы жақсартып отырады. Бұл – аксиома. Адами капиталдың сапасын арттыру – мемлекет дамуын қамтамасыз етудің басты алғышарты.

Көпшілікке белгілі, кезінде М.Горбачев КСРО-ны жаңа демократиялық бағытқа бұрып, халықтың тұрмыстық деңгейін еңбек өнімділігін арттыру арқылы көтермекші болды. Ол үрдісті «Перестройка» деп атады. Бірақ оның қоғамды «қайта құруының» бағдарламасының негізінде «ұлттық (немесе қоғамдық) сананың» өзгеруі, оның даму жолдары қаралмады. Осы терең

гуманитарлық мәселені М.Горбачев технократиялық жолмен шешіп тастауға болады деген жалған пікірден шыға алмады. Сол жылдары, бірде мені Облыстық партия комитетінің хатшысы шақырып алып «Сіз қаламыздағы (Қарағанды) ғылыми-зерттеу институтын басқарасыз ғой, ірі ғалым ретінде мына «перестройканы» бұқараға қарапайым тілмен алдымыздағы болатын партиялық конференцияда түсіндіріп беріңізші» – деді. Мен көптеген кітап-журналдарды оқып шығып, гуманитария саласындағы ғалымдармен ақылдаса отырып, өз баяндамамда «перестройка» әрбір жеке адамның сана-сезімінен құралатын «ұлттық, немесе қоғамдық, сананың» өзгеруінен соң бүкіл елдің жаңаша бет-бейнесі айқындалатынын айттым. Менен кейін сондағы шұлық фабрикасының бір тоқымашысы шығып былай деді: «Мен мына ғалым-кісінің айтқан сөздерін онша түсінбедім. Мен жақында Москвадағы біздің Бүкілодақтық жиналысымызға қатыстым, сонда М.С. Горбачев перестройканы былай түсіндірді: «Сіз әр ай сайын 3 мың шұлықтың орнына 3,5 мың шұлық тоқып шығарсаңыз, міне осы нағыз перестройка» – деді. КСРО Президентінің перестройкасының немен біткені белгілі.

Бұл жердегі астын сызып тұрап айтатын мәселе, біздің Елбасымыз Н.Ә. Назарбаев өзінің фундаменталды еңбектерінде елімізді бірінші кезекте ұлттық кодты (тіл, діл, әдет-ғұрып, дін, рух) сақтай отырып, ұлттық сананы жаңғыртудан бастау керектігін алға тартты. Осылайша мемлекетімізде меритократиялық, яғни біліктілер билігі орнаған, экономикасы дамыған, әлеуметтік тұрмысы жетілген, бірегей ұлт қоғамын құру процесі басталды. Еліміздегі ұлтаралық достық, ерекше статусы мен Парламентке депутат сайлау құқығы жекеше Қазақстан халқының Ассамблеясы, діни конфессиялары арасындағы түсінстік пен келісім, жыл сайын жақсарып келе жатқан әлеуметтік-экономикалық жағдай және т.б. игіліктер Қазақстанды Евразиядағы үлгілі мемлекет дәрежесіне жеткізді. Сондықтан халқаралық аренада Қазақстанның беделі жоғары.

Біздің Елбасымыз Нұрсұлтан Назарбаев Кеңес Одағы құламай тұрып, Москвадан бүкіл КСРО басқарып отырған М.С. Горбачевтің қарсы болуына қарамастан өзінің батылдығымен Жарлық шығарып, Семей ядролық полигонын тырп еткізбей жауып тастады. Бұл тарихи Жарлықтың әсері тек Қазақстан емес, барлық ядролық полигондары бар АҚШ, Қытай, Франция сияқты алпауыт елдерге де тиді. Бәрі де тоқтады. Адамзатты, төбесінен төніп тұрған атом өлімінен құтқару ісіндегі таңқаларлық жеңіс болды. Сондықтан өркениет әлемі Нұрсұлтан Назрбаевты Кіндік Азиядан шыққан Лидер ретінде таниды. Оның ОБСЕ, ШОС, ОИС, Сирияға байланысты бітімгершілік мәселесіне байланысты қызметі, кеше ғана АҚШ президенті Трамптың оны үстіміздегі жылда шақырылған шет ел президенттерінің арасынан бірінші кезекте қабылдап, Қазақстанды АҚШ-тың өте маңызды стратегиялық серіктес дәрежесінде тануы және оған қоса БҰҰ жанындағы Қауіпсіздік Кеңеске мүше болып сайланып, артынша оған Төрағалық ету деңгейіне көтерілуі Қазақстан халқы үшін теңдеусіз мақтаныш.

Н.Ә. Назарбаевтың БҰҰ Қауіпсіздік Кеңесінің төрағасы ретінде Нью-Йорктан бүкіл әлемге таралған, 25 баптан тұратын нақты мәлімдемесіне барлық мемлекеттерден жоғары баға беріліп, бұл салада жаңа леп пайда болғанын мойындап жатыр. Әлемдегі жойқын-қауіп ядролық қаруды тізгіндеуде, халықаралық қатынастарда туындайтын проблемаларды тек қана келісімдік жолмен шешу арқылы жер бетінде тыныштықты сақтау қызметінде біздің Елбасымыз Нұрсұлтан Назарбаевтың еңбегі Бейбітшілік қызметі үшін берілетін «Нобель» сыйлығына әбден лайықты екенін тағы бір айтып кеткім келеді. Бұл тек қана біздің Академияның пікірі емес, бізбен қарым-қатынас жасап, араласып жүрген Ресей, Украина, Беларусь академиктерінің де пікірі.

Тәуелсіздіктің әу-басынан бастап Елбасы мемлекеттің индустрия саласын дамытуды ешуақытта назардан шығарған жоқ. Себебі, мемлекетті байытудың бірден бір тиімді жолы ол ауыр индустрияны дамыту және инновация жетістіктерімен толықтырып отыру. Дамыған Батыс мемлекеттерінде мұны «Scientific support» (ғылыми көмек) деп атайды, яғни өндіріске ғылыми көмек көрсету, дұрысы – ғылыми сүйемелдесу (научное сопровождение). Сатылып алынған ең жаңа технология (трансферт) әрі кетсе 5 жылда ғылымның тез дамуына байланысты тиімділік үстемдігінен айырылады. Сондықтан кез келген зауытты немесе фабриканы ғылыми сүйемелдеу арқылы алғы шепте ұстап тұру керек. Мысалы АҚШ, Батыс Европа, Жапония, Оңтүстік Корея сияқты мемлекеттерде өндеу, тауар шығару өндірісі осылайша жұмыс істейді. Ал керісінше Оңтүстік-Шығыс Азия мемлекеттері ауыл шаруашылық дақылдарынан жыл сайын 4-5 рет өнім алатынына қарамай кедейшілік өмір кешуде. Себебі ол елдерде индустрия дамымаған, ал ол

жағдай өз кезегінде жоғары техникалық білім мен ғылымның жетілмегендігіне байланысты орын алып отыр. Сондықтан «Ғылымсыз даму (прогресс) жоқ» - деген аксиоманы естен шығармау керек.

Дегенмен Тәуелсіз Қазақстанда өндіріс тарапынан ғылымға Кеңес үкіметі кезіндегідей сұраныс жоқ. Оның негізгі екі себебін атап кеткім келеді. *Біріншісі* – көптеген ірі өндіріс орындары шет елдік инвесторлардың қолында, ол компаниялардың өз елдерінде көптеген ғылыми-зерттеу институттары бар, ғылымға бөлінетін шығындары сонда кетеді. Ал одан төмендеу өндіріс орындары – монополистер, қандай тауар шығарса да өтімді, арасында бәсекелестік жоқ. Ғылымсыз-ақ табысты күреп жатыр, қоршаған ортаны да аямай бүлдіріп жатыр. Шексіздік орын алған, қанағат жоқ. *Екінші себебі* – ғылыми лаборатория мен өндіріс цехтарынының арасын жалғап тұратын көпір бұзылған. Ғалымдардың жаңа, әрі озық тәсілмен грамдап алған заттарын өндіріс басшысы өз зауытына ендіру үшін, тонналап болмаса да килограммдап шығаруды талап етеді. Онысы дұрыс, бірақ ол үшін жартылай өндірістік ірі қондырғы керек. Бұрын ірі зауыттарда тәжірибелік немесе эксперименталдық цехтар болатын. Олар Кеңес Үкіметімен бірге жоқ болды. Қомақты қаражат талап етуіне қарамастан оларды жобалау және конструкторлық бөлімдермен қоса қайта құру керек. Жаңадан өріс алып келе жатқан мемлекеттік-жекеменшік серіктестігін құру арқылы бұл мәселені толық шешуге болады. Ондай игі бастамалар да жоқ емес. Мысалға, Алматы қаласының жанында «Байсерке» атты көп салалы әмбебап ауыл шаруашылық өндіріс орнында, оның басшысы белгілі мемлекет және қоғам қайраткері, ҚР ҰҒА-сының құрметті мүшесі, профессор Темірхан Досмұхаметов Ұлттық ғылым академиясының бір топ ғалымдарының сүйемелдеуі арқылы ең озық технологияларды енгізіп, өнімділігі жағынан (бидай, жүгері, соя, т.б.) дүниежүзілік рекордтар беріп жатыр. Байсеркенің тағы бір айта кететін ерекшелігі ҰҒА академиктерімен бірге «Болашақ» бағдарламасымен шет елдерде оқып келген мамандар да қатарласа жұмыс істейді. Еңбекқорлыққа, таза пиғылмен ғылымның биік идеалдарына ұмтылып аянбай қызмет етуге үйренеді.

Реті келген соң айта кетейін, біздің еліміздің білімінің де ғылымының да көптеген шет елдерден еш кемдігі жоқ. Сондықтан өз ғалымдарымызды жермен жексен етіп, шет ел ғалымдарының аяғына бас ұруды тоқтату керек. Бұл көргенсіздік. Мен Білім министрі лауазымында жүрген кезімде 1996 жылы Батыс Европа, АҚШ білім ошақтарын қызмет бабымен араладым. АҚШ-қа барғанымда олардың Білім министрінің маған қойған бірінші сұрағы «Сіздің еліңізде азаматтардың қанша пайызы сауатты, хат таниды?» – дегені болды. Біздің хақымызда сауатсыздық баяғыда жойылып, орта білім барлық азаматтарымызға Конституция талабы бойынша міндетті екенін айтқанымда, таң қалып, АҚШ халқының 8 пайызы сауатсыз, төлемақы айлығын алғанда бас бармағының ізімен қол қоятынын айтқан еді.

Ұлттық ғылым академиясының 2004 ж. бастап, мемлекеттік статустан бас тартып, Республикалық қоғамдық бірлестік болғаны барша ғалымдарға белгілі. Бұл Кеңес моделінен бас тартып біздің Академияның Батыс Европа, АҚШ моделіне ауысуына байланысты болды. Жаңа бастамада қиыншылықтар кездесе беретіні белгілі. Бірақ Академияның жұмысы Елбасының назарынан еш уақытта тыс қалған емес. Н.Ә. Назарбаев ҰҒА академигі, «Ғасыр Ғұламасы» – атты ҰҒА-сының ең жоғары ғылыми дәрежесінің иегері, Академияның 70-жылдық мерейтойына арналған мерекелік сессиясында сөйлеген сөзінде Академияның қызметіне жоғары баға беріп, республикамызда ғылыми-зерттеу жұмыстарын жүргізуде, инновациялық ғылыми жетістіктерді өндіріске енгізуде кездесетін мәселелерге көңіл бөліп, тиімді нұсқаулар берді.

Қоғамның зияткерлік әлеуетін ілгерілетуді жүзеге асыру педагог кадрларға тікелей байланысты. Осы орайда Елбасы Жолдаудың жетінші негізгі міндетінде білім беру жүйесінің барлық деңгейі заман шындығы мен экономика сұраныстарына жауап беруі тиіс екендігін және бұл арада мұғалім мамандығының беделін арттыру қажеттігін алға тартты. Мұнда, әсіресе, ақпараттық технологиялар бойынша білім беруді барынша дамыту, жоғары оқу орындарына білім беру бағдарламаларын жасауға көбірек құқық беріп, олардың академиялық еркіндігін заңнамалық тұрғыдан бекіту қажеттігі айтылды. Осы арада оқытушылардың қайта даярлықтан өтуіне күш салып, жоғары оқу орындарына шетелдік менеджерлерді тартып, әлемдік университеттердің кампустары ашылуы қажет. Сондай-ақ қазақ тілін оқыту, орыс және ағылшын тілдерінде білім беру арқылы жастарымыздың интеллектуалдық қабілетін жоғарылату мәселесі де назардан тыс қалмады. Білім беру жүйесінің барлық деңгейі экономиканың бүгінгі қажеттілігіне сай болуға тиіс.

Жолдауда айтылғандай, алдағы кезде, әсіресе, жас ғалымдарға мемлекет тарапынан қолдау көрсету жандана түспек. Оларға мемлекеттік гранттар бөлу, квота беру көлемі ұлғайтылмақ. Елдегі жоғары оқу орындары ой-өрісі дамыған, талантты, зерделі және ұлтжанды ұстаз дайындауды одан әрі жаңа деңгейге көтере түсуі қажет. Өйткені, жаңа мыңжылдықта өз кәсібінің қыр-сырын жете меңгерген мамандардың бәсі басым болмақ. Бұны уақыттың өзі айқындап отыр.

Елбасы жолдауының тоғызыншы міндетінде «Заң үстемдігі мен жемқорлықпен күрес мемлекеттік саясаттың басым бағыттары болып қала беретінін» тағы да баса көрсетті. Кейінгі кезде БАҚ саласы жөнге келе бастады, жақсы, қатаң заң қабылданды. Кейбір газеттер мен журналдарда киллер тілші-корреспонденттер оларға қоса елге еңбек сіңіріп, үлкен абыройға ие болған асыл азаматтарымызды іштарлықтан көре алмайтын бәлекөр кітап-жазғыштардың заманы тарыла бастады. Енді олар масқара болып соттала бастайды. Елдегі осындай қоқыстарды тазалауды құқық-сот органдары мықтап қолдарына алулары тиіс. Құран хадистеріне, шариғат заңына сүйенсек олар дозақ отына түсіп күйеді. Бірақ олар түптің түбінде әділдіктің жеңіп шығатынына сенбейді, сондықтан олардың жазасын баршаға көрсетіп тұрып осы заманда беру керек. Жалпы барлық салада заң үстемдігін орнатпай біз алға басып, өрістей алмаймыз. Қазір TV-ның қай каналын басып қалсаныз да әртістерді көресіз, тіпті «Қазақстан» мен «Хабарды» ешкімге беретін емес. Олардың 3-4 арнайы каналдары («Гәкку», «Жұлдыз», «Той-думан» және т. б.) бар емес пе? Барлық өсек-аяң, жалаңаш әдепсіздік, бір сөзбен айтқанда жын-шайтан сол жерде. Ал еңбек-озаттары қайда?, ірі зауыттарда маңдай терін төгіп жүріп, ел экономикасы үшін сақтап қалған директорлар, дүние жүзін мойындатқан ғалымдар мен жазушылар қайда?, оларға ерген талантты жас мамандар қайда? Мен жалпы әртістерге қарсы емеспін, халқымыздың абыройын көтеріп жүрген ұлы азаматтар бар. Ал бірақ мыналардың басым көпшілігін ешкім білмейді, естіуіміз бойынша жоғарыдағы біреудің қарындасы, біреудің тоқалы… Жеркенішті, басым көпшілігінде дауыс та, талант та атымен жоқ.

Тағы бір келеңсіз орын алған жағдай-рушылдық. Жапан дала жерімізде ат төбеліндей қазақ ұлты руға, жүзге бөлініп ара-дара болсақ, Қазақстан халқын қалай біріктіреміз, өз басымызды біріктіре алмай жүріп? Тарих саласындағы жетекші ғалымдарымыздың пікірінше жүзге бөлінудің қандық (туыстық) негізі жоқ, тек территориялық маңызы болған. Ресей Патша үкіметінің «бөліп ал да билей бер» саясатын іске асыру үшін әдейі қазақтарды үш жүзге бөліп, ру-тайпаларды бір-біріне қарсы қойып, жауластырып отырды. Ресей империясының жәрдемімен қару-жарақ (мылтық, пушка т.б.) жинап алған Жоңғарлармен болған жойқын соғыстарда 1723-1752 жж. «балапан басымен, тұрымтай тұсымен» заманы болды. Рулар, тайпалар қуғын-сүргінде жүріп әбден араласты. Кейін бастары бірігіп, жоңғарларды тас-талқан қылып жеңді. Бірақ өздері де 70-80% пайызынан айрылды. 1920, 1932-1933, 1937 жылдарда нәубет тағы да қазақтың басына орнады. Қазақ халқы тағыда өзінің 60-70% -ынан айырылды. Демография заңына сәйкес өзінің 3/2 -сін жоғалтқан ұлт ассимилицияға ұшырап жоқ болып кетуі әбден мүмкін. Құдайға шүкір Керей мен Жәнібектің, Бұрындық пен Хақназар, Қасым-хан мен Есім-хан, Тәуке-хан, Абылайхан мен Кенесары хандар «Елім үшін, жерім үшін – жан пида» – деп жүріп қорғап қалған жерімізде қайтадан басымыз қосылып, аман-есен, тыныштық, бейбіт өмір сүріп жатырмыз. Елбасы Н.Ә. Назарбаевтың осы Жолдауында Қазақстан халқын біріңғай, біртұтас ұлт болуға шақырады. Сондықтан әрбір руға төбе-би (президент) болып алған азаматтар осы қисық жолдан өз еркімен бас тартып, елді біртұтастыққа жұмылдыруы керек.

Алдымыздағы үлкен мақсат 2050 жылға дейін дамыған 30 елдің ішіне кіру екені белгілі. Бұл шаруа оңай емес. Алға ұмтылмай жүрген мемлекет жоқ. Бірінші 30-дыққа кіру үшін біз Испания, Италия сияқты мемлекеттермен жарысып, олардан озуымызға тура келеді. Ол үшін ел іші татутәтті, жоғары саналы мәдениетті, біртұтас ел болуымыз керек. Керей мен Жәнібек Әбілқайырдың Өзбек хандығынан (Жошы-ханның ұрпағы Өзбек хан билеген түркілер мемлекеті осылай аталады) бөлініп шыққан соң өзге тараптардан келіп бас қосқан ру-тайпалармен ақылдаса отырып жаңа мемлекетті «Қазақ хандығы» - деп атады. Демек мемлекет аты, ұлт атынан (түркілер) бөлек. Жаңа мемлекеттің атымен ендігі жерде ұлт аты бірігіп, сол мемлекеттегі түркілер сол заманнан бастап қазақтар болып, ал мемлекет «Қазақия» болды. Бұл жағдай көптеген өркениетті елдерде бар. Сондықтан «Қазақия», «Қазақстан Республикасы» деген аттың баламалы түрі әбден бола алады және Ұлы далада бас қосып, тағдырлас болған барша Қазақстан халқы «қазақ» деген атпен біртұтас ұлтқа айналса құба-құп болар еді.

Мемлекет басшысы ұсынған елімізді төртінші өнеркәсіптік революция жағдайында дамытуға арналған 10 негізгі міндет – Қазақстан дамуының жаңа бағыты. Сонымен қатар Жолдау Қазақстанның әлемдегі технологиялық, экономикалық және әлеуметтік салалардағы терең және қарқынды өзгерістерге бейімделуіне сеп болады. Осы орайда, Елбасының 2018 жылға арнаған Жолдауын ҚР ҰҒА академиктері мен корреспондент-мүшелері, жалпы барлық ұжымы толығымен қолдап, оны жүзеге асыру барысында аянбай еңбек ететіндеріне сеніміміз мол.

Жолдауда сөз болған маңызды міндеттерді жүзеге асыру Қазақстанның әлемдік аренадағы орнын биіктетіп, айқындап берері даусыз. Демек, Мәңгілік ел қалыптастыру жолында Жолдау жүктеген міндеттерді орындау болашағымызды жарқын етуге негіз болмақ.

Мұрат ЖҰРЫНОВ,
ҚР ҰҒА президенті, академик,
Қазақстан Республикасының
Мемлекеттік сыйлығының
Лауреаты

ДАМЫҒАН 30 ЕЛ ҚАТАРЫНА ЖОЛ

Еліміз егемендік жылдарында Тұңғыш Президентіміз, Елбасы Нұрсұлтан Назарбаевтың кеменгерлік басшылығымен үнемі жаһандық жаңа үрдістерді қолдап, мемелекетіміздің экономикасын жыл сайын ұлғайтып келеді. Кез келген мемлекет өз билігінің тұрақтылығын қамтамассыз ету үшін бұқара халықтың әл-ауқаты мен тұрмыстық жағдайын ұдайы жақсартып отырады. Бұл – аксиома. Адами капиталдың сапасын арттыру – мемлекет дамуын қамтамасыз етудің басты алғышарты.

Біздің Елбасымыз Н.Ә. Назарбаев өзінің фундаменталды еңбектерінде елімізді бірінші кезекте ұлттық кодты (тіл, діл, әдет-ғұрып, дін, рух) сақтай отырып, ұлттық сананы жаңғыртудан бастау керектігін алға тартты. Осылайша мемлекетімізде меритократиялық, яғни біліктілер билігі орнаған, экономикасы дамыған, әлеуметтік тұрмысы жетілген, бірегей ұлт қоғамын құру процесі басталды. Еліміздегі ұлтаралық достық, ерекше статусы мен Парламентке депутат сайлау құқығы жекеше Қазақстан халқының Ассамблеясы, діни конфессиялары арасындағы түсінстік пен келісім, жыл сайын жақсарып келе жатқан әлеуметтік-экономикалық жағдай және т.б. игіліктер Қазақстанды Евразиядағы үлгілі, беделді мемлекет дәрежесіне жеткізді.

Осы жеткен жетістіктерімізді сақтай отырып, одан әрі ілгерлеп дамуымыз үшін Қазақстан халқы жерлестікке, рушылдыққа бөлінбей, бәріміз тағдырлас, бірыңғай ұлт болуымыз қажет. Жапан дала жерімізде ат төбеліндей қазақ ұлты руға, жүзге бөлініп ара-дара болсақ, Қазақстан халқын қалай біріктіреміз, өз басымызды біріктіре алмай жүріп? Тарих саласындағы жетекші ғалымдарымыздың пікірінше жүзге бөлінудің қандық (туыстық) негізі жоқ, тек территориялық маңызы болған. Ресей Патша үкіметінің «бөліп ал да билей бер» саясатын іске асыру үшін әдейі қазақтарды ылғи үш жүзге бөліп, ру-тайпаларды бір-біріне қарсы қойып, жауластырып отырды. Ресей империясының жәрдемімен қару-жарақ (мылтық, пушка т.б.) жинап алған Жоңғарлармен болған жойқын соғыстарда 1723-1752 жж. «балапан басымен, тұрымтай тұсымен» заманы болды. Рулар, тайпалар қуғын-сүргінде жүріп әбден араласты, барлығы дерлік құрама. Кейін бастары бірігіп, жоңғарларды тас-талқан қылып жеңді. Қазір жер бетінде жоңғар деген халық жоқ. Бірақ өздеріміз де 70-80% пайызымыздан айрылдық. Одан кейін, 1920, 1932-1933, 1937 жылдарда нәубет тағы да қазақтың басына орнады. Қазақ халқы қолдан жасалған аштық қырғыннан тағыда өзінің 60-70% -ынан айырылды. Демография заңына сәйкес өзінің 3/2 -сін жоғалтқан ұлт ассимилицияға ұшырап жоқ болып кетуі әбден мүмкін. Құдайға шүкір Керей мен Жәнібектің, Бұрындық пен Хақназар, Қасым-хан мен Есім-хан, Тәуке-хан, Абылайхан мен Кенесары хандар «Елім үшін, жерім үшін – жан пида» – деп жүріп қорғап қалған жерімізде қайтадан басымыз қосылып, аман-есен, тыныштық, бейбіт өмір сүріп жатырмыз. Егер тарихымыздағы осы екі қырғын кезеңдері болмаса, қазақ халқының саны қазір 100 миллионнан кем болмас еді. Елбасы Н.Ә. Назарбаевтың осы Жолдауында Қазақстан халқын біріңғай, біртұтас ұлт болуға шақырады. Сондықтан әрбір руға төбе-би (президент) болып алған азаматтар осы қисық жолдан өз еркімен бас тартып, елді біртұтастыққа жұмылдыруы керек.

Алдымыздағы үлкен мақсат 2050 жылға дейін дамыған 30 елдің ішіне кіру екені белгілі. Бұл шаруа оңай емес. Алға ұмтылмай жүрген мемлекет жоқ. Бірінші 30-дыққа кіру үшін біз Испания, Италия сияқты мемлекеттермен жарысып, олардан озуымызға тура келеді. Ол үшін ел іші татутәтті, жоғары саналы мәдениетті, біртұтас ел болуымыз керек. Керей мен Жәнібек Әбілқайырдың Өзбек хандығынан (Жошы-ханның ұрпағы Өзбек хан билеген түркілер мемлекеті осылай аталды) бөлініп шыққан соң өзге тараптардан келіп бас қосқан ру-тайпалармен ақылдаса отырып жаңа, еркін, тәуелсіз мемлекетті «Қазақ хандығы» – деп атады. Демек мемлекет аты, ұлт атынан (түркілер) бөлек. Қазақ хандығының негізін құраған тегі түркі тайпалардың жаңа бірлестігі қазақ ұлтына айналды. Сол мемлекеттегі түркілер ендігі жерде қазақтар болып, ал мемлекет «Қазақия» болды. Бұл жағдай көптеген өркениетті елдерде бар. Сондықтан «Қазақия», «Қазақстан Республикасы» деген аттың баламалы түрі әбден бола алады және Ұлы далада бас қосып, тағдырлас

болған барша Қазақстан халқы дамыған жетекші 30 елдің қатарына қосылар ұзақ жолда қолайлы жағдай түзілген кезде, «қазақ» деген бір атпен біртұтас ұлтқа айналса құба-құп болар еді.

Кеңес Одағы құламай тұрып, Нұрсұлтан Назарбаев Москвадан бүкіл КСРО басқарып отырған М.С. Горбачевтің қарсы болуына қарамастан өзінің батылдығымен Жарлық шығарып, Семей ядролық полигонын тырп еткізбей жауып тастады. Бұл нағыз батырлық болды. Өйткені бұл тарихи Жарлықтың әсері тек Қазақстан емес, барлық ядролық полигондары бар АҚШ, Қытай, Франция сияқты алпауыт елдерге де тиді. Бәрі де тоқтады. Адамзатты, төбесінен төніп тұрған атом өлімінен құтқару ісіндегі таңқаларлық жеңіс болды. Сондықтан өркениет әлемі Нұрсұлтан Назрбаевты Кіндік Азиядан шыққан Лидер ретінде таниды. АҚШ президенті Дональд Трамптың Нұрсұлтан Назарбаевты ерекше ылтипатпен қабылдап, Қазақстанды АҚШ-тың өте маңызды стратегиялық серіктес дәрежесінде тануы Қазақстан халқы үшін ерекше мақтаныш, тарихи жетістік.

Н.Ә. Назарбаевтың БҰҰ Қауіпсіздік Кеңесінің төрағасы ретінде Нью-Йорктан бүкіл әлемге таралған, 25 баптан тұратын нақты мәлімдемесіне барлық мемлекеттерден жоғары баға беріліп, бұл салада жаңа леп пайда болғанын мойындап жатыр. Әлемдегі жойқын-қауіп ядролық қаруды тізгіндеуде, халықаралық қатынастарда туындайтын проблемаларды тек қана келісімдік жолмен шешу арқылы жер бетінде тыныштықты сақтау қызметінде біздің Елбасымыз Нұрсұлтан Назарбаевтың еңбегі Бейбітшілікке бағытталған қызметі үшін берілетін «Нобель» сыйлығына әбден лайықты екенін тағы бір айтып кеткім келеді. Бұл тек қана біздің Академияның пікірі емес, бізбен қарым-қатынас жасап жүрген ТМД елдерінің академиктерінің де пікірі.

Қазақстан Республикасының Ұлттық ғылым академиясы 2004 ж. бастап, мемлекеттік статустан бас тартып, Республикалық қоғамдық бірлестік болғаны барша ғалымдарға белгілі. Бұл Кеңес моделінен бас тартып біздің Академияның Батыс Европа, АҚШ моделіне ауысуына байланысты болды. Академияның жұмысы Елбасының назарынан еш уақытта тыс қалған емес. Н.Ә. Назарбаев ҰҒА академигі, «Ғасыр Ғұламасы» – атты ҰҒА-сының ең жоғары ғылыми дәрежесінің иегері, Академияың 70-жылдық мерейтойына арналған мерекелік сессиясында сөйлеген сөзінде Академияның қызметіне жоғары баға беріп, республикамызда ғылыми-зерттеу жұмыстарын жүргізуде, инновациялық ғылыми жетістіктерді өндіріске енгізуде кездесетін мәселелерге көңіл бөліп, тиімді нақты нұсқаулар берді. Білім және ғылым министрі Е.К. Сағадиев, Елбасы тапсырмаларын бұлжытпай орындап, ҰҒА-сын барынша қолдап, экспертиза жұмыстарына қосып, бұрынғы Министрліктің құзырындағы сыйлықтарды, ғылыми стипендияларды тағайындау құқығын ҰҒА-сына толығымен берді.

Жолдауда сөз болған маңызды міндеттерді жүзеге асыру Қазақстанның әлемдік аренадағы орнын биіктетіп, Мәңгілік елдің жарқын болашағын жақындата түседі.

Мұрат ЖҰРЫНОВ,
ҚР ҰҒА президенті, академик,
Қазақстан Республикасының
Мемлекеттік сыйлығының
Лауреаты

ИНДУСТРИЯ ДАМЫМАЙ ЕЛ ДАРЫМАЙДЫ

Мемлекет басшысы Елбасы – Нұрсұлтан Назарбаев ұсынған елімізді төртінші өнеркәсіптік революция жағдайында дамытуға арналған 10 негізгі міндет – жаңа цифрлық дәуірде егемен еліміздің тұрақты дамуын қамтитын, мемлекетіміздің барлық саласына серпін беріп, халқымыздың игілігін көздеген жаңа бағыт.

Биылғы Елбасы Жолдауының ерекшелігі – ел дамуының түбегейлі тұстарын зерделеп, оның сан қырлы салаларын жүйелі түрде жаңғырту мәселесіне мән беруінде. Президент өз Жолдауында инновациялық индустрияландыру саясаты экономиканың флагманына айналуы тиіс деген тапсырма жүктеді. Расында да, Қазақстанның бүгінгі жеткен жетістігі, алдымен Елбасы пәрменімен іске асырылған индустрияландыру бағдарламасының арқасында мүмкін болып отыр. Міне, соның нәтижесінде қаншама жаңа өндіріс орындары пайда болды, ол өз кезегінде мыңдаған қазақстандық үшін тұрақты жұмыс көзіне айналды. Мәселен, бір ғана өткен жылдың өзінде индустрияландыру картасы бойынша 12633 жұмыс орны ашылды. Осы бағыттан таймасақ, еліміздің келешегі кемелді болары сөзсіз. Өйткені, қазіргі дамыған мемлекеттердің бәрі де осы жолмен жүріп өткен. Маңызды стратегиялық қадамдарсыз экономикамыз да өрге баспайды, алдыңғы қатардағы отыз елдің глобалдық экономикасына кіру қиын. Елбасының қоғамды ұстап тұрған барлық салаларға сандық технологияны енгізіп, сол арқылы әлемдік бәсекеге қабілетті болуымыз керек деген мағынадағы сөздері ерекше.

2017 жылы еліміз әлемдік дағдарыстың қолайсыз салдарын еңсеріп, сенімді өсу жолына қайта түсті. Жыл қорытындысы бойынша ішкі жалпы өнімнің өсуі 4 пайызға, ал өнеркәсіптік өнімнің өсуі 7 пайыздан асты. Бұл орайда, өнеркәсіптің жалпы көлемінде өңдеуші сектордың үлесі 40 пайыздан асты. Қазақстанның қолайлы дамуы орта топтың қалыптасуына мүмкіндік берді. Кедейшілік 13 есе қысқарып, жұмыссыздық деңгейі 4,9 пайызға дейін төмендеді. Еліміздің әлеуметтік-экономикалық табыстарының негізі – азаматтық бейбітшілік, ұлтаралық және конфессия аралық келісім – біздің басты құндылықтарымыз ретінде қала бермек. Ең басты құндылығымыз – Тәуелсіздігімізді сақтай отырып, Президентіміз алға қойған нақты ұлт жоспарын іске асыру – біздің басты міндет.

Тәуелсіздіктің әу-басынан бастап Елбасы мемлекеттің индустрия саласын дамытуды ешуақытта назардан шығарған жоқ. Себебі, мемлекетті байытудың бірден бір тиімді жолы ол ауыр индустрияны дамыту және инновация жетістіктерімен толықтырып отыру. Дамыған Батыс мемлекеттерінде мұны «Scientific support» (ғылыми көмек) деп атайды, яғни өндіріске ғылыми көмек көрсету, дұрысы – ғылыми сүйемелдесу (научное сопровождение). Сатылып алынған ең жаңа технология (трансферт) әрі кетсе 5 жылда ғылымның тез дамуына байланысты тиімділік үстемдігінен айырылады. Сондықтан кез келген зауытты немесе фабриканы ғылыми сүйемелдеу арқылы алғы шепте ұстап тұру керек. Мысалы АҚШ, Батыс Европа, Жапония, Оңтүстік Корея сияқты мемлекеттерде өңдеу, тауар шығару өндірісі осылайша жұмыс істейді. Ал керісінше Оңтүстік-Шығыс Азия мемлекеттері ауыл шаруашылық дақылдарынан жыл сайын 4-5 рет өнім алатынына қарамай кедейшілік өмір кешуде. Себебі ол елдерде индустрия дамымаған, ал ол жағдай өз кезегінде жоғары техникалық білім мен ғылымның жетілмегендігіне байланысты орын алып отыр. Сондықтан «Ғылымсыз даму (прогресс) жоқ» – деген аксиоманы естен шығармау керек.

Дегенмен Тәуелсіз Қазақстанда өндіріс тарапынан ғылымға Кеңес үкіметі кезіндегідей сұраныс жоқ. Оның негізгі екі себебін атап кеткім келеді. Біріншісі – көптеген ірі өндіріс орындары шет елдік инвесторлардың қолында, ол компаниялардың өз елдерінде көптеген ғылыми-зерттеу институттары бар, ғылымға бөлінетін шығындары сонда кетеді. Ал одан төмендеу өндіріс орындары – монополистер, қандай тауар шығарса да өтімді, арасында бәсекелестік жоқ. Ғылымсыз-ақ табысты күреп жатыр, қоршаған ортаны да аямай бүлдіріп жатыр. Шексіздік орын алған, қанағат жоқ. Екінші себебі – ғылыми лаборатория мен өндіріс цехтарының арасын жалғап тұратын көпір бұзылған. Ғалымдардың жаңа, әрі озық тәсілмен грамдап алған заттарын өндіріс басшысы өз

зауытына ендіру үшін, тонналап болмаса да килограммдап шығаруды талап етеді. Онысы дұрыс, бірақ ол үшін жартылай өндірістік ірі қондырғы керек. Бұрын ірі зауыттарда тәжірибелік немесе эксперименталдық цехтар болатын. Олар Кеңес Үкіметімен бірге жоқ болды. Қомақты қаражат талап етуіне қарамастан оларды жобалау және конструкторлық бөлімдермен қоса қайта құру керек. Жаңадан өріс алып келе жатқан мемлекеттік-жекеменшік серіктестігін құру арқылы бұл мәселені толық шешуге болады.

Алдымыздағы үлкен мақсат 2050 жылға дейін дамыған 30 елдің ішіне кіру екені белгілі. Бұл шаруа оңай емес. Алға ұмтылмай жүрген мемлекет жоқ. Бірінші 30-дыққа кіру үшін біз Испания, Италия сияқты мемлекеттермен жарысып, олардан озуымызға тура келеді. Ол үшін ел іші тату-тәтті, жоғары саналы мәдениетті, біртұтас ел болуымыз керек. Қазақстанның жыл сайын тәуелсіздігі нығайып, экономикасы өсіп, алпуыт елдермен тең дәрежеде стратегиялық әріптестік құруға беделі жетіп отыр. Бұл Елбасы – Н.Ә. Назарбаевтың АҚШ-қа барған сапарының нәтижесінен айқын көрініп тұр.

Мұрат ЖҰРЫНОВ,
ҚР ҰҒА президенті, академик,
Қазақстан Республикасының
Мемлекеттік сыйлығының
Лауреаты

СИМБИОЗ НАУКИ И ПРАКТИКИ

Досмухамбетов Темирхан Мынайдарович

Имя Досмухамбетова Темирхана Мынайдаровича хорошо известно в нашей стране и за его пределами. Это один из известных политиков, государственных и общественных деятелей страны. В разные годы занимал высокие посты в Правительстве – дважды был министром туризма и спорта, дважды – управляющим делами Президента, акимом города Астана. Заслуженный тренер СССР и Республики Казахстан. Кандидат педагогических наук. Профессор, по специальности педагогика. Почетный член Национальной академии наук Республики Казахстан.

Начав трудовую деятельность с должности преподавателя кафедры физвоспитания вуза и тренером по самбо, он сумел вырасти до уровня государственного деятеля.

Сегодня Темирхан Мынайдарович – один из немногих, кого волнует судьба сельского хозяйства страны. С 2015 года, являясь Председателем совета директоров агрохолдинга «Байсерке», Досмухамбетов Т.М. смело взялся за развитие аграрного сектора и в короткий срок построил агрохолдинг, который на сегодняшний день является передовым по внедрению инноваций и сотрудничеству не только с казахстанскими учеными, но и с учеными зарубежных стран.

Многопрофильный агрохолдинг «Байсерке-Агро» практически в каждом сегменте работает по принципу полного цикла сельскохозяйственного производства – от выращивания собственных семян, до глубокой переработки молока и мяса. Помимо этого, на базе агрохолдинга создан учебный научно-производственный центр, позволяющий ученым испытывать собственные разработки в реальных условиях сельского хозяйства.

В 2014 году Президент Казахстана после посещения учебного научно-производственного центра «Байсерке-Агро» дал поручение аграрным ученым: "Все университеты должны заниматься наукой. Следует создавать в них лаборатории, а также техническую базу для проведения опытно-промышленных работ, что необходимо для последующей организации производства". Спустя 3 года, в 2017 году, Глава государства вновь отметил агрохолдинг: "Я небольшой пример хочу привести. Здесь есть хозяйство "Байсерке". Возглавляет его Темирхан Мынайдарович Досмухамбетов. Там работают академики Сагитов, Оразалиев, Измухамбетов, Камбулин и из НИИ земледелия и растениеводства академик Иванов Н.П., Садыкулов, Рахимбаев. Они там своими руками, внедряя собственные разработки, чудо сотворяют. Они получают пшеницу 50 центнеров с гектара. А другие, когда 13 получают, радуются, что это успех".

Общепризнано, что эффективными составляющими высокой урожайности любой культуры считается сочетание следующих пунктов: качественный посевной материал, правильно подобранная технология возделывания в зависимости от требований сорта или гибрида, а также почвенно-климатических условий, своевременное исполнение работ, предусмотренных календарным планом и технологическими картами, и качество исполняемых операций, которое напрямую зависит от качества, износостойкости и ремонтопригодности сельскохозяйственных машин и оборудования.

Так, для обеспечения технической базы руководством холдинга была организована совместная работа с заводами по производству сельхозтехники и оборудования. В настоящее время в «Байсерке-Агро» используются последние модели сельскохозяйственной техники ведущих европейских производителей.

Вся эта техника в совокупности с инновационными решениями и технологиями дает положительные результаты, например: использование современных сеялок дает равномерность высева, которая позволяет повысить урожайность до 20%, а специальные форсунки на прицепных опрыскивателях позволяют минимизировать снос рабочей жидкости и быстрого испарения рабочей жидкости до попадания на растение, что повышает в разы качество работы со средствами защиты растений, ресурс работы современного пресс-подборщика для заготовки сена составляет 70 000 рулонов до капитального ремонта, что в 10-15 раз больше, чем у стандартных машин такого типа.

Что касается современных систем орошения, то в холдинге есть что показать, к примеру, подпочвенное орошение, которое позволяет не только экономить поливную воду до 70-75%, но и экономить удобрения и средства защиты растений, при этом увеличивая качество и количество урожая. На сегодняшний день в агрохолдинге для подпочвенного капельного орошения задей-ствовано 525 га земли, а показатели урожайности кукурузы, сои и люцерны выше традиционного в 1,7-2 раза.

При правильном и своевременном исполнении технологии средняя урожайность кукурузы на силос составляет 700-900 ц/га, кукурузы на зерно 140-160 ц/га, сои 45-50 ц/га, зерновых культур 70-85 ц/га, люцерны до 120-150 ц/га сухой массы при традиционном орошении и 250 ц/га сухой массы при подпочвенном орошении. Причем на отдельных полях зафиксированы рекордные показатели урожайности данных культур: кукуруза на силос 1200 ц/га, кукурузы на зерно 200 ц/га при подпочвенном орошении, сои 65 ц/га, зерновых культур 110 ц/га, люцерны – до 280 ц/га сухой массы. В 2017 году на опытных полях агрохолдинга удалось получить 6 укосов люцерны, при традиционных 3-4 в Алматинской области, и это не предел – считают сотрудники агрохолдинга.

Все полученные высокие результаты свидетельствуют о проницательности руководителя многопрофильного Агрохолдинга «Байсерке Агро» профессора Т.Досмухамбетова и правильности принятых им решений по привлечению науки в производство, так как именно симбиоз науки и производства позволил разработать и провести правильный трансферт технологий и техники в условиях реального производства на полях ТОО «Байсерке Агро».

Агрохолдинг «Байсерке-Агро» один из первых в Казахстане внедрил систему добровольного доения на роботизированной ферме. Робот обеспечивает автоматическое промывание вымени в целом и каждой ее доли отдельно, строгое выдаивание секрета молочной железы из каждой доли вымени с последующим орошением по окончанию дойки. Доение каждой коровы осуществляется добровольно. Они сами заходят на дойку 5-7 раз в сутки.

В случае получения некачественного молока от коров с начальными формами мастита или по причине неудовлетворительного ухода содержания оно автоматически поступает в отдельную емкость для утилизации или использованию по другому назначению. Все данные о получении молочной продукции, поедаемости кормов, кратности доения и т.д. регистрируются на компьютере и выводятся на монитор. При этом показатели суточных надоев молока от каждой фуражной коровы составили в среднем 30 литров, а у отдельных коров они доходили до 78 литров в сутки. Показатель воспроизводства стада колебался от 90-95 телят на 100 коров, а деловой выход молодняка составляет 90 процентов.

На сегодняшний день продукция молочного завода и мясокомбината «Байсерке-Агро» представлена на рынке Алматы под торговой маркой «Разия» и практически не имеет конкурентов по качественным показателям среди производителей натуральных продуктов питания.

Агрохолдинг «Байсерке-Агро» активно ведет инвестиционную деятельность, привлекая партнеров со всего мира. Равноправные отношения с одинаковой степенью ответственности и равнозначным распределением расходов и прибыли привлекают инвесторов из Южной Кореи, Италии и США. Совместно с южнокорейской компанией в Алматинской области построен уникальный тепличный комплекс с системой обогрева от термальных источников. Правильный подход и соблюдение технологического процесса позволяет получать урожай до 50 тонн помидоров с гектара. Помимо этого, с партнерами из Южной Кореи ведется строительство двух комплексов: по производству яиц и выращиванию кур-бройлеров. Для этих целей агрохолдинг «Байсерке-Агро», совместно с южнокорейскими инвесторами, построил собственный комбикормовый завод.

В 2017 году «Байсерке-Агро» подписал соглашение с американскими компаниями Trans Ova и Interxon о создании совместного предприятия и строительстве селекционно-генетического центра. Такой центр позволит при помощи эмбрионов и технологии суррогатного материнства получать высокогенетический породистый скот мясного и молочного направлений, причем без затрат на транспортировку и стресса от перевозки скота. С компанией Global Beef Investment подписан меморандум намерений на строительство откормочной площадки на 10 000 голов КРС.

Таким образом, достигнуты поистине небывалые успехи. Не случайно, опытом работы Досмухамбетова Т. заинтересовались ученые и бизнесмены ближнего и дальнего зарубежья, а Глава государства поручил Правительству изучить опыт Досмухамбетова Т., сделать его достоянием всех сельхозпроизводителей Казахстана.

Темирхан Мынайдарович полон новых планов и замыслов, а то, что задумано им, без сомнения, найдет свое достойное воплощение. Пожелаем ему больших творческих успехов и благополучия в жизни.

Президиум НАН РК

85-летие академика Национальной Академии наук Республики Казахстан В. Н. ОКОЛОВИЧА

Владимир Николаевич Околович родился 1 января 1933 г. во Владивостоке. После окончания средней школы в 1950 г. в г. Алма-Ате поступил на физико-технический факультет Томского политехнического института, по окончании которого в 1956 г. приступил к работе в должности лаборанта в лаборатории высоких энергий Физико-технического института Академии наук КазССР. В 1957-1958 гг. был прикомандирован в качестве стажера в Институт атомной энергии им. И.В.Курчатова для практического изучения вопросов управления и совершенствования атомных реакторов. В 1958-1960 гг. работал младшим научным сотрудником в лаборатории космических лучей Института ядерной физики АН КазССР.

Начало научно-исследовательской деятельности В.Н. Околовича совпало с периодом развития атомной энергетики и реакторостроения, основой которых является процесс деления ядер. Огромное желание принять участие в этих исследованиях, интенсивно ведущихся в то время в Физико-энергетическом институте АН СССР, привело молодого исследователя в г. Обнинск. Встречи с видными учеными – лауреатами Ленинской премии академиком А.И.Лейпунским и профессором И.И.Бондаренко, профессором Г.Н.Смиренкиным, учеба в целевой аспирантуре (1960-1963 гг.), участие в семинарах и дискуссиях сыграли решающую роль в становлении В.Н. Околовича как ученого и организатора науки. По окончанию аспирантуры в 1964 г. он защитил кандидатскую диссертацию«О зависимости средней кинетической энергии осколков деления от энергии возбуждения и нуклонного состава делящегося ядра».

После возвращения в 1964 г. в Казахстан Владимир Николаевич с присущей ему энергией создает и развивает в ИЯФ АН КазССР новое научное направления – исследование структуры и свойств аномально-деформированных доактинидных ядер в реакции деления. Исследование этих проблем в совершенно не изученной ранее области ядер оказалось весьма плодотворным как для проверки и уточнения представлений о самом процессе деления, так и в более широком плане – для углубления знаний о свойствах ядерной материи.По результатам этих исследований В.Н.Околовичв 1977 г.защитил докторскую диссертацию «Исследование процесса деления доактинидных ядер в реакциях с заряженными частицами».

Одновременно с проведением фундаментальных исследований В.Н. Околович большое внимание уделяет созданию материально-технической базы ядерно-физических исследований в республике. Под его руководством в 1967 г. был осуществлен физический пуск реактора ВВР-К в ИЯФ АН КазССРи проведена последующая реконструкция, что позволило сделать его одним из лучших реакторов подобного типа в СССР. По его инициативе и при непосредственном руководстве был создан измерительно-вычислительный комплекс на циклотроне ИЯФ, существенно поднявший уровень автоматизации эксперимента и эффективность работы изохронного циклотрона У-150.

Многочисленные работы В.Н.Околовича, которых насчитывается более 250, опубликованы в отечественных и зарубежных журналах и широко известны мировой научной общественности. В этих трудах нашли отражение результаты многолетних исследований вероятности деления, массовых и энергетических характеристик осколков деления для широкого круга ядер второй половины таблицы Менделеева.

Научные изыскания ученого позволили обнаружить и объяснить новые явления. К их числу относятся: аномальное влияние углового момента на делимость доактинидных ядер при низких энергиях возбуждения; нерегулярности в энергетической зависимости сечения деления, обусловленные фазовым переходом; резкий рост угловой анизотропии вблизи барьера деления. Созданная в этих исследованиях систематика барьеров деления доактинидных ядер играет важную роль в прогнозировании свойств сверхтяжелых , синтезируемых в реакциях с тяжелыми ионами.

Большое внимание В.Н. Околович уделял подготовке научных кадров. Под его руководством защищены 2 докторские и 15 кандидатских диссертаций. С 1997 г. Владимир Николаевич работал в Тверском государственном университете в должности профессора кафедры общей физики физико-технического факультета.

В.Н.Околвич принадлежит к числу видных научных и общественных деятелей Казахстана, избирался академиком-секретарем Отделения физико-математических наук, главным ученым секретарем Президиума Академии наук Республики, депутатом местных Советов,Вице-президентом Национальной Академии Казахстана (1987–1995 гг.), председателем Спецсовета по присуждению ученой степени кандидата физико-математических наук, членом Комитета по присуждению Государственных премий в области науки и техники при Кабинете Министров Республики Казахстан, Полномочным представителем Казахстана в Объединенном институте ядерных исследований (г. Дубна).

Трудовые заслуги В.Н. Околовича отмечены медалями и Почетными грамотами Верховного Совета КазССР.

Сердечно поздравляем Владимира Николаевича с юбилеем, желаем ему крепкого здоровья, бодрости, благополучия и многих лет творческой работы во славу науки.

Институт ядерной физики
Министерства энергетики Республики Казахстан

МАЗМҰНЫ

Ғылыми мақалалар
(ағылшын тілінде)

Ғылыми мақалалар
(орыс тілінде)

Хроника

Мерейтойлар

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