

*Medical sciences*  
*Article*

CHARACTERISTIC FEATURES OF ETHNIC DISTINCTIONS OF YOUNG FAMILIES NEEDS IN TYPES OF THE MEDICAL AND SOCIAL AID <i>Anafjanova T., Kapitonov V., Susloparova R.</i>	4
MARKERS OF MENSTRUAL DISCHARGE IN THE DIAGNOSTICS OF GYNECOLOGICAL DISEASES <i>Dikareva L.V., Shvarev E.G., Abzhalilova A.R., Tishkova O.G., Ukhanova Y.Y., Gviniashvili G.G.</i>	7
UP-TO-DATE APPROACHES TO DIAGNOSTICS OF PREMATURE RUPTURE OF FETAL MEMBRANES IN PREGNANTS <i>Ismailova S.S.</i>	11
LIPID PEROXIDATION AND ACTIVITY OF ENZYMES OF ANTIOXIDANT DEFENSE IN MITOCHONDRIAL FRACTIONS OF LIVER AND KIDNEYS OF LEUKEMIC RATS <i>Zaribbaev U.</i>	13

*Materials of Conferences*

TACTICS OF REHABILITATION UNDER A COMPLETE ADENTIA <i>Ashuyev Z.A.</i>	16
TECHNOLOGIES OF ORTHOPEDIC TREATMENT WITH IMPLANTS IN DENTOLOGY <i>Ashuyev Z.A., Ildarov R.B.</i>	17
THE DENTAL HYGIENIST LOAD CALCULATION <i>Kalininskaya A.A., Ildarov R.B.</i>	18
INCREASE IN QUALITY OF REGIMES OF THREE-DIMENSIONAL VISUALIZATION OF COMPUTER GRAPHICS WHILE STUDYING PATIENTS WITH ULTRASOUND <i>Kovalev A.S., Shalimova O.A.</i>	20
CARDIOVASCULAR ACCIDENTS AND NERVOUS BREAKDOWNS AS THE RESPONSE TO THE GEOPHYSICAL CONDITIONS <i>Sterlikova I.V.</i>	21
SOME CEREBRAL FEATURES OF METABOLISM IN PATIENTS WITH COGNITIVE DISORDERS WITH BACKGROUND PSYCHO-VEGETATIVE SYNDROME <i>Shmyrev V.I., Sokolova L.P., Knyazeva I.V., Obmanov I.V.</i>	22

*Chemical sciences*  
*Article*

MODIFICATION OF BUTYL RUBBERS AND ITS GALOID ANALOGUES BY CARBON FULLERENES <i>Chichvarin A.V., Igumenova T.I., Kraht L.N.</i>	23
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*Materials of Conferences*

APPROACH FOR THE MASS OF H BOSON <i>Dubas L.G.</i>	26
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*Pedagogical sciences*  
*Article*

SHAPING CULTURAL TOLERANT BESIDE FUTURE TEACHERS AS ONE OF THE PROSPECTS OF THE DEVELOPMENT OF THE HIGHER EDUCATION <i>Ahmedov F.M.</i>	27
INTERACTIVE TECHNOLOGIES, BASED ON COMPETENT APPROACH IN THE PREPARATION OF BACHELORS <i>Asaul A.N.</i>	29
MOTIVATION OF THE FACILITIES OF THE SHAPING COMMUNICATION COMPETENCE ON ENGLISH LESSON <i>Ilhamova I.N.</i>	31

THE UNIAR APPROACH TO COMPUTER SCIENCE AND INFORMATION TECHNOLOGIES TEACHING FOR HEALTH PROFESSIONALS <i>Ovsyanitskaya L.Y.</i>	33
<i>Materials of Conferences</i>	
OVERCOMING COMMUNICATION FAILURES IN TEACHING CHEMISTRY IN BILINGUAL CONTEXTS <i>Davydenko L., Butenko L.</i>	37
<i>Technical sciences</i> <i>Article</i>	
THE METALLURGICAL PROCESSES EFFICIENCY EVALUATION: THE PROCESS ROBUSTNESS MEASUREMENT OF THE SHAFT RETRACTIVE MELTING <i>Dosmukhamedov N.K.</i>	38
USEGE OF MILK PRODUCTION WASTE FOR OBTAINING FUNCTIONAL FOOD PRODUCTS FOR BABY AND DIETETIC NUTRITION <i>Ostroumov L.A., Prosekov A.Y., Babich O.O., Milenteva I.S., Linnik A.I., Sutormina M.M.</i>	41
<i>Materials of Conferences</i>	
THE SUDDEN CHANGE IN THE MODELS OBJECT FORM ON THE COMPUTER <i>Beysembayev K.M., Shmanov M.N., Zhetesov C.C., Mendikenov K.K., Abdugaliyev G.B.</i>	46
MODELLING PROCESSES WASHING, WEIGHING, AND DEPOSITION OF SOLID FRACTIONS IN SLITS <i>Turkin A.A., Sibinina T.F.</i>	47
PROTECTING SLITS FROM DANDING WITH AN ARTIFICIAL FILTER <i>Turkin A.A.</i>	49
<i>Art Criticism</i> <i>Materials of Conferences</i>	
THE THEATRICAL EXCURSION SPECIFICITY (BASED ON THE THEATRICAL MUSEUMS EXPOSITIONS) <i>Portnova T.V.</i>	51
<i>Biological sciences</i> <i>Materials of Conferences</i>	
THE SEMITHIN SECTIONS USE OF VARIOUS HUMAN AND ANIMALS ORGANS IN THE PARTICULAR HYSTOLOGY BASES STUDIES FOR MBF STUDENTS OF THE RNRMU – RUSSIAN NATIONAL RESEARCH MEDICAL UNIVERSITY NAMED AFTER N.I. PIROGOV <i>Pavlovich E.R., Ryabov S.I., Prosvirnin A.V., Fedoseev V.A., Pistzova T.V.</i>	55
BUILDING THE MODELS INCORPORATING POPULATION DYNAMICS OF FISH-EATING BIRDS AND DEPLETION OF FISH RESOURCES <i>Podolsky A.L., Bobyrev S.V., Kislov S.A.</i>	55
IDENTIFYING PRIORITIES IN STUDYING SOIL CONTAMINATION OF THE NATURAL AREAS ADJACENT TO BIG CITIES <i>Podolsky A.L., Kozlyakevich E.Y., Lobachev Y.Y., Titov O.Y.</i>	56
<i>Economic sciences</i> <i>Article</i>	
SYSTEM OF VALUES, AS CONDITION OF INNOVATIVE MODERNIZATION PROCESSES DEVELOPMENT <i>Beljakova G.J., Batukova L.R.</i>	58
THE ACTIVITY OF CONSTRUCTION ORGANIZATIONS. PRIVATE ISSUES OF COST ACCOUNTING <i>Dolgova A.V.</i>	59

THE SCIENCE AND TECHNOLOGY PARKS, AS THE REGION'S INVESTMENT POTENTIAL IMPROVING TOOLS <i>Semin A.N., Tashkinov E.A., Nepp A.N., Samsonova E.A., Ibatullina E.N.</i>	61
INDICATORS OF DEVELOPMENT INNOVATIVE REGIONAL CLUSTERS IN MODERN ECONOMY <i>Stepanova E.V.</i>	63
<i>Ecological and conservancy Materials of Conferences</i>	
MAJOR GEOECOLOGICAL PROBLEMS OF PERM REGION <i>Kopylov I.S.</i>	66
WIND ENERGY IN TURKEY <i>Okuyan Cemal, Zholdasbekov A., Sihinbaeva Z.</i>	66
THEORETIC EXPLANATION OF INCREASING OUTPUT AND BIOLOGICAL QUALITY OF CONSUMABLE WATER FROM SLITS <i>Turkin A.A., Sibirina T.F.</i>	67
<i>Short Reports</i>	
LANDSCAPE APPROACH TOWARDS DEVELOPING NATURE-PRESERVING MEASURES IN THE POOL OF THE RIVER KOLYMA OF SAKHA REPUBLIC (YAKUTIYA) <i>Nikolayeva N.A.</i>	70
<i>Historical sciences Materials of Conferences</i>	
LABOUR EDUCATION IN RUSSIA OF THE END OF XIX MIDDLE OF THE XX-TH CENTURY <i>Lyapah S.N.</i>	72
<i>Philosophy Materials of Conferences</i>	
LOVEOLOGY (STUDY OF LOVE): THEORETIC-METHODOLOGIC FOUNDATION <i>Kolesnikova G.I.</i>	74
<i>Legal sciences Short Reports</i>	
THE WOMEN'S INTERESTS PROTECTION LEGAL ASPECTS <i>Almenov B.A.</i>	76

## CHARACTERISTIC FEATURES OF ETHNIC DISTINCTIONS OF YOUNG FAMILIES NEEDS IN TYPES OF THE MEDICAL AND SOCIAL AID

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In the article the authors analyze deferent variants of characteristic features of young families needs in types of the medical and social aid. A young family is an object of the scientific research and practical activities of healthcare because today it is necessary to protect it and to maintain its health. Due to the necessity to plan various forms of the support and the help to a young family in territories with various ethnic families, it is important for government bodies and the health system to know in what concrete services and the type of the help an ethnic family needs. The received results note that in the structure of the requirements of a young family primarily the needs in the medical and social help are increasing according to the period and the duration of a marriage. Ethnic distinctions of needs of a young family are revealed in all studied cohorts, they are found in the structure of less significant types of the help – the help of parental families which are temporary in an initial stage of development of a young family. The development prospect of activity of the medical and social services should be taken into account in practical activities of healthcare institutions working by the family principle in territories with ethnic heterogeneity of the population as studying of various characteristics of the health of young families in ethnic populations will allow to use them as starting base for complex development of programs on maintenance and development of health of the ethnic population.

**Keywords:** a young family, ethnic, medical and social aid

**Research objective:** to define the characteristic features of young families needs in types of the aid.

### Materials and methods of research

For the detection of the ethnic distinctions of the medical and social characteristic of the young families prospective cohort research was carried out in the Republic of Khakassia (1997–2006). In total 395 young families were studied: 220 city (55,7%) and 175 rural (44,3%). A mononational or a mixed marriage was the criterion of the division of the families on cohorts, thus, the young families were divided by us into the following cohorts: Russians; Russian-speaking (Belarusians, Ukrainians); Khakases; mixed with Khakases (Khakases with Russians, Belarusians, Germans); mixed with Russians (Russians with Ukrainians, Germans, Tatars); other (Germans, Armenians, Azerbaijanians, Georgians). Research of the ethnic distinctions of the needs in the medical and social help of young families was conducted separately in the ethnic cohort for the periods: 1 years, 2–4 years, 5–7 years and 8–10 years of marriage. The statistical processing of the data was carried out by means of the method of analysis of variance.

In modern researches in the field of public health and health care which has been executed in recent years, the features of formation of modern public health requirements of the population are revealed and priorities of the rendering of the medical aid to various groups of the population are defined [5, 9, 10]. A young family is an object of a scientific research and practical activities of the healthcare institutions and so the young family represents developing system not only concepts of incidence and prevalence of diseases of youth, but also the protection of its health, taking into account medical and social requirements of a young family [4, 6] and its ethnic origin [3].

The need of a family in the medical and social aid is estimated by the complex of indicators characterizing the health of a family, its structure, age and education of family members, level of economic security, sanitary and hygienic behavior, ratio of the family and out of the family forms of activity, a way of life of the family as a whole

and its certain members [1]. In connection with these characteristics, various families demand specific differentiated forms and methods of the medical and social help. Modern requirements of a young family, undoubtedly, define an individual approach when forming a complex of the interconnected actions for medical and social, social and psychological and legal aid to a young family. [2, 5]. Such approach creates favorable preconditions for prevention of somatic and psychological health disorders and also manifestations of social deviations. In this case the state economic and social policy has a defining value. The population employment in spheres of social activities, welfare and family income depends on the state policy. More and more young families seek to build a career, relying on their own forces and, as a result there is a need of every second family for crediting for the solving not momentary, but perspective tasks: vocational training, qualifications, acquisitions of housing, receiving credits for business activity, etc. As a rule, some of the young families need in the state support owing to the developed circumstances such as: a family foundation, the birth of children in student's years at the lowest income; single-parent family (one mother, wife of the serviceman); presence in a family of the disabled child that demands care from one of the parents and limits the family income; unemployment of one or both young partners; employment of one or both partners in the budgetary sphere with low level of a salary. Planning various forms of support and the help to a young family, it is important to the government bodies and public organizations to know, in what concrete services and in what type of the help the family needs. In this regard for the poll of respondents the appropriate question was put: «What types of the help does your family need in?»

### Results of research and their discussion

In our research types of needs of a young family in the help were divided into 3 groups and defined as: *need for the help of parents* (including both financial support, and moral, including the help in education of grandsons); *help of the state* (granting social housing, social

benefits, monetary compensations, financing of programs on compensation of expenses for housing acquisition on a mortgage) and *medical and social* (medical control of the health state, psychological assistance and social consultation).

The analysis of the data of the research of requirements of a young family in types of the help showed that in their structure needs in the medical and social help initially prevail (47,8%) and *parents help* (44,2%). Distinctions in the structure of the requirements of a young family taking into account the location showed, that the share of the requirement in the medical and social help increases in dynamics during the period from 1–10 years of marriage by 1,6 times from 39,1% up to 61,9% with the prevalence in the urban area [(the city – from 43,2% up to 68% and the village—from 34,9% up to 55,9% respectively;  $p < 0,05$ ), and the share of the requirement in the help of *parental families* decreases during the period from 1–10 years of marriage by 1,9 times with prevalence in an urban area [(the city – from 48,9% up to 24,8% and the village—from 39,4% up to 20,4% respectively;  $p < 0,05$ ).

In the structure of the state help to a young family the insignificant need for granting social housing initially prevails – 5%, and on a result of the supervision over families – other monetary compensations (4,4%). The share of the requirement in a housing mortgage increased only during 5–7 years of marriage of a young family from 0,3 up to 0,8% and again decreased to the initial level of 0,3%. Distinctions in structure of the requirements of a young family taking into account the location showed that the share of requirement in the *help of the state* doesn't exceed 11% in the general structure of all requirements of a young family and also it is characterized by the increase in the dynamics during 2–7 years of marriage by 1,2 times from 16,8 up to 19,7% with prevalence in the rural territory [(the city – from 8 up to 10,9% and the village—from 25,7 up to 28,5% respectively;  $p < 0,05$ ). According to the result of the supervision over families in the structure of the help the need for monetary compensations prevails: in the cities – 4,4%, and in villages – 3,6%.

In the structure of the medical and social requirement for the help to a young family the need for granting a psychological assistance initially prevails – 5%, and according to the result of the supervision over families – medical control (7,9%) and a psychological assistance (7,3%) initially prevails. The share of requirement in social consultation keeps the level ranging from 2 up to 2,7% from 1 up to 7 years of marriage and decreases to 1,8% at the end of the supervision over families. The analysis

of the territorial distinctions in the structure of the requirements of a young family in an urban area showed that in an urban area the need for a psychological assistance dominates (7,9%), and for the rural area medical control dominates (6%). The research of the ethnic distinctions of the needs of young families in types of the help taking into account distinctions on residing territory has shown following results:

1. In the all living territory: in all ethnic cohorts the need for *the medical and social help* dominates (from 50,8 up to 95%), among all ethnic cohorts the big requirement with «Russians» (78,9%), «Russian-speaking» (73,7%) and «other» is shown (76,7%); the great requirement is distinguished among all ethnic cohorts with «Russians» (78,9%), «Russian-speaking» (73,7%) and «other» (76,7%); young families of cohorts mainly need the help of *parental families* «ref. with Russians» (38,7%) and «ref. with Khakases» (32,7%); young families of cohorts mainly need the help of *parental families* «ref. with Russians» (38,7%) and «ref. with Khakases» (32,7%); young families of cohorts Khakases mainly need the *help of the state* (17,2%), «ref. with Russians» (10,9%) and «other» (10,8%)

2. In an urban territory of living: in all ethnic cohorts the need for the *medico-social help* (from 50,4% to 78,9%) dominates, among all ethnic cohorts a great requirement is shown at «Russian-speaking» (95%), and «other» (74,7%); young families of cohorts «ref. with Russians» (49,2%) and «ref. with Khakases» (40,8%) mainly need the help of *parental families*; young families of a cohort «other» mainly need the *help of the state* (7,2%).

3. In a rural territory of living: in all ethnic cohorts the requirement for the *medical and social help* (from 62,1 up to 72%) dominates; from all ethnic cohorts the greatest requirement is shown at «other» (72%); young families of cohorts «Russian-speaking» (27%), «Khakases» (27,6%) and «ref. with Khakases» (29,4%) mainly need the *help of parental families*; young families of cohorts «Khakases» (10,1%), «ref. with Khakases» (16,6%) and «other» (14%) mainly need the *help of the state*.

So we can state, in the structure of the requirements of a young family the needs in the medical and social help prevail initially. The needs are increasing according to the period and duration of a marriage. The structure of medical and social requirements has considerable distinctions in ethnic families, living both in urban territories and in rural territories. The help of parents and the state is temporary in an initial stage of development of a young family and, undoubtedly, is caused by distinctions in reproductive activity of a young ethnic family.

### Acknowledgments

We consider development prospect of activity of the medico-social services working by the family principle in the territories with ethnic heterogeneity of the population, in practical activities of healthcare institutions. Studying of various characteristics of young families' health in ethnic populations will allow to use these characteristics as starting base of healthcare institutions for complex development of programs on maintenance and development of health of the ethnic population. Detection of young families' ethnic features in the medical and social help allows to determine significant for the health care organization questions concerning optimization of the medical and social help in ethnic population.

### Reference

1. Artyukhov I.P. Family Medicine. Social and hygienic problems 62–68 (2005) / I.P. Artyukhov, V.F. Kapitonov, A.A. Modestov, O.M. Novikov. – Novosibirsk: Science.
2. Grinina O.V. Problems of Social Hygiene and Medicine History. Health and the way of life of families of various social groups of the population having children of an early age. 6–9, № 6, (1996).
3. Granin Yu.D. Ethnoses, national state and formation of the Russian nation: Experience of philosophical and methodological research 168 (2007) – M.: IF RAH.
4. Demytyeva I.F. First years of marriage: Problems of a young family formation 349 (1991). – M.: Science.
5. Denisov I.N. Development of family medicine – a basis of reorganization of primary medical and sanitary help to the population of the Russian Federation № 5 (2007) // *Glav. Vrach.* [Internet resource]. Access mode:URL: <http://rudocor.net/medicine2009>. Passed for printing 23.04.2007].
6. Kicha D.I. Scientific justification of the comprehensive program of a medico-social assessment of health and requirements of a family as patients of the service 34 (1995) // Synopsis of a thesis of M.D. D.I. Kicha.
7. Kicha D.I. A family as a patient of the general practitioner (family doctor) Medical chair 35–39, № 2 (2003).
8. The concept of a state policy concerning a young family of May 08, 2007 № АФ-163/06.
9. Martynenko A.V. The concept of medico-social work in Russia in the 90th RAMS Messenger 44–50 № 8. (2002).
10. World statistics of health care of 2010 Publishing house: World Health Organization 177 (2010).



## MARKERS OF MENSTRUAL DISCHARGE IN THE DIAGNOSTICS OF GYNECOLOGICAL DISEASES

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Menstrual discharge is the complex in structure and biochemical indicators biological fluid which is cyclically secreted into the uterine cavity, and then released from its. Laboratory study of menstrual discharge is up till now poorly studied, non-invasive, promising method of early diagnosis of diseases of female reproductive organs. Investigation of menstrual discharge gives an integrated assessment of both local and systemic homeostasis at physiological and pathological processes of the genitals. In this article we made an attempt to summarize the data presented in current literature which relate to the above topics.

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**Keywords:** menstrual discharge, Gynecological Diseases

Menstruation – physiological, cyclically repeated hemorrhage from the uterine lining occurring in women and females of certain mammal species from the reaching of the age of puberty until the end of reproductive life.

Menstruation usually begins between the ages of 12–14 years (menarche), is stabilized immediately or within a few months, lasts 3–5 (rarely to 7) days. The first experience of menstruation in 15 years and later, the painful period, as well as long period (more than 5–6 months) before a regular menstrual cycle is stabilized allow us to think about the inferiority of its regulation, which is often observed in the infantilism and genital hypoplasia.

The average volume of menstrual fluid during a monthly menstrual period does not exceed 70,0–80,0 ml. Changing in the amount of blood lost, and the frequency of menstruation may indicate the presence of some gynecological diseases.

Normal menstrual cycle is characterized by successive changes in the endometrium of four phases: desquamation, which is manifested in menstrual bleeding, regeneration, proliferation and secretion

The mucus dominates in the early days of the desquamation phase in the menstrual discharge. This mucus is rich by epithelial cells with a small admixture of blood, the content of which gradually increase. By the end of menstruation endometrial mucus dominates again in the menstrual discharge.

A characteristic morphological feature of desquamation phase is the presence in the menstrual discharge collapsed, penetrated with hemorrhage of star-shaped endometrial glands and glomus of the spiral arteries. On the first day of menstruation the separate groups of predecidual cells and tiny particles of the endometrium, having the viability and ability to implant can be still recognized in the compact layer in areas of hemorrhage.

Accumulate, and then arising from the uterus the menstrual discharge mixed with en-

dometrial secretion, which has an alkaline environment, and as a rule, cannot coagulates and has the characteristic dark color.

Biochemical markers of the menstrual discharge have great interest for the diagnosis of pathology of the reproductive function of women. The  $\alpha_2$ -microglobulin of fertility is the most studied among them and it is a dimeric glycoprotein with a molecular weight ranging from 42 to 56 Kd. Using the method of immune diffuse analysis, D.D. Petrunin and co-authors (1976) found the  $\alpha_2$ -microglobulin of fertility in extracts of tissues of secretory endometrium and in the menstrual discharge during ovulatory menstrual cycles. It was found that  $\alpha_2$ -microglobulin of fertility synthesize in the epithelium of endometrial glands during the luteal phase, as well as in decidual tissue of the placenta in the first trimester of pregnancy [12].

According to the content of the  $\alpha_2$ -microglobulin of fertility in the menstrual discharge L.V. Posiseeva (1991) proposed to evaluate the functional state of the endometrium: thus, the number of  $\alpha_2$ -microglobulin of fertility in menstrual discharge of women with two-phase menstrual cycle is hundred times higher than in peripheral blood serum and the majority of women (81,7%) are in the range from 16000 to 70000 ng/ml [14].

Determining the level of the  $\alpha_2$ -microglobulin of fertility in the menstrual discharge may be one of methods to diagnose of a particular form of female sterility – habitual miscarriage in the early periods from 2 to 4 weeks of pregnancy. This form of sterility, the identification of which requires special methods of investigation, unfortunately, is not always objectively assessed in routine clinical practice. In cases of early, with subclinical variant of the course of spontaneous abortions, the concentration of  $\alpha_2$ -microglobulin of fertility in the menstrual discharge is 50–100 times higher than the concentration of this protein in normal menstrual discharge, and reaches 80 000 ng/ml or more.

The analysis of the relationships between the characteristics of menstrual cycle, the functional changes of the endometrium and content  $\alpha_2$ -microglobulin of fertility in the menstrual discharge making by L.V. Posiseeva and co-authors (1991) was the basis for the diagnosis of inadequate luteal phase. It was discovered that the level of  $\alpha_2$ -microglobulin of fertility in the menstrual discharge in such cases reduces, and is 2000–12000 ng/ml [14].

Assessment of  $\alpha_2$ -microglobulin of fertility in the menstrual discharge of women with abnormal hormonal status, with perinatal loss in their anamneses, showed that the average  $\alpha_2$ -microglobulin of fertility was 3 times lower than in the control group. During the correlation analysis a direct connection was noted between the number of  $\alpha_2$ -microglobulin of fertility in the menstrual discharge, level of progesterone during the second phase of the cycle, luteinizing hormone in periovulatory period and an inverse relationship between the content  $\alpha_2$ -microglobulin of fertility and prolactin level [14].

E.G. Shvarev (1993) showed that in the menstrual discharge of fertile women, as a rule,  $\alpha_2$ -microglobulin of fertility was determined, in contrast to samples of endometrial swabs in women with endometrial hyperplasia and endometrial cancer [18]. Resynthesis of  $\alpha_2$ -microglobulin of fertility in endometrial secretion of patients in postmenopause with endometrial cancer of second pathogenic variant [2, 3] is an early marker of the sensitivity of adenocarcinoma to hormone therapy [20].

Soluble antigen of leukocyte-2 was first described by D.D. Petrunin (1982). In the endometrium, menstrual discharge and cervical

mucus soluble antigen of leukocyte-2 was detected in small quantities and its index was not associated with the phase of the menstrual cycle and the characteristics of ovaries function. An important property of soluble antigen of leukocyte-2 is its high resistance to enzymatic action. With its high resistance to the action of proteolytic enzymes, soluble antigen of leukocyte-2 can carry out its biological function in the focus of destruction and inflammation, where lysosomal proteolytic enzymes are concentrated from the leukocytes [13].

L.V. Posiseeva and co-authors (1995) proposed a method for diagnostics of chronic endometritis on the basis of determining the level of soluble antigen of leukocyte-2 in menstrual discharge. So, the content of soluble antigen of leukocyte-2 in menstrual discharge is equal to or greater than 640 mcg/ml indicated the presence of chronic metroendometritis [16].

In a number of publications there are data on the study of fibrinolytic proteins in the menstrual discharge. So, S.A. Cederholm-Williams et al. (1984) studied the content of fibrinolytic proteins in the menstrual discharge and in the peripheral blood serum in women with normal menstrual blood loss (80 ml) in 1–2 days desquamation phase. In this case, the active plasmin, which slows down platelet aggregation and formation of fibrin fibers, was absent in the peripheral blood serum, while in menstrual discharge its concentration reached 1,8 mmol/l. The authors pointed out the lack of  $\alpha_2$ -antiplasmin in menstrual discharge, which prevents the binding of plasminogen with fibrin and has antiplasmin action, it was shown that in the peripheral blood serum its concentration did not exceed 1  $\mu$ m (Table 1) [4, 11].

**Table 1**

The activity of fibrinolytic proteins in menstrual flow, and peripheral blood serum  
S.A. Cederholm-Williams, C.P. Margaret Rees, A.C. Turnbull (1984)

	Menstrual Discharge	Peripheral Blood Serum
Active plasmin (mmol/l)	0,83 ± 0,97	0
Plasminogen activator (IU/ml)	1,04 (0–3,5)	0,15 (0–0,2)
$\alpha_2$ -antiplasmin (%)	0	100 ± 20 %

The concentration of  $\alpha_2$ -macroglobulin involved in the physiological regulation of blood coagulation, clot lysis and complement did not practically differ in the menstrual discharge and in the peripheral blood serum (3,49 and 3,68 mmol/l, respectively) [4].

In addition to studying of the fibrinolytic activity of proteins, the researchers compared the concentrations of albumin, IgG and  $\alpha_2$ -antiplasmin, which rates were similar both in

the menstrual discharge and in the peripheral blood serum (Table 2).

In the few studies devoted to the study of lipid peroxidation and oxidative modification of proteins at the obstetrical and gynecological pathology, the most often object of study was peripheral blood serum. In the scientific literature there are practically no studies on the levels of markers of oxidative stress in the menstrual discharge – in the biological fluid, flowing directly from the uterus.



Table 2

The concentration of proteins in the menstrual discharge, and in peripheral blood serum S.A. Cederholm-Williams, C.P. Margaret Rees, A.C. Turnbull (1984)

	Menstrual Discharge		Peripheral Blood Serum	
	g/l	mmol/l	g/l	mmol/l
IgG	12,5 ± 2,3	84,5	12,0 ± 2,3	81,1
albumin	43,6 ± 11,8	641	44 ± 8,8	647
fibrinogen	3,71 ± 2,3	10,9	2,25 ± 0,54	6,62
plasminogen	0,17 ± 0,05	1,88	0,15 ± 0,03	1,67
α <sub>2</sub> -antiplasmin	0,56 ± 0,12	0,81	0,70 ± 0,14	1,0
α <sub>2</sub> -macroglobulin	2,51 ± 0,37	3,49	2,65 ± 0,61	3,68

It should be noted that in the case of oxidative stress there is not an isolated damage of proteins, lipids, nucleic acids, as there is a close structural and functional interaction in biological membranes of cells between them [10]. And at the same time the antioxidant system of the body is involved in the process that regulates lipid peroxidation and oxidative modification of proteins. Increase of reactive oxygen species in cells is accompanied by a relative decrease in the level of the main non-enzymatic and enzymatic components of antioxidant protection [1, 9, 10].

In the pathogenesis of both benign and malignant tumors the processes of lipid peroxidation have a considerable place. Taking in the consideration the instability of the primary products of lipid peroxidation, the object of the study were secondary or end products, including malon dialdehyde, which has the most damaging effect on the cell.

The researches of L.V. Dikareva and co-workers (2009) have shown that the oxidative stress is pathogenetically important in the formation of the endometrial hyperplasia, and that the oxidative stress is characterized by the depletion of antioxidant protection, and by the levels of catalase and the content of total antioxidant activity as well. The level of catalase in the menstrual discharge in patients with uterine myoma with the normal structure of the endometrium (with the slow growth rate) was practically the same as in healthy women. The level of catalase in the menstrual discharge in the group of patients with uterine myoma with in combination with the endometrial hyperplasia has a clear downward trend –  $0,7 \pm 0,03$  y.e. ( $p < 0,001$ ) [5].

The level of malon dialdehyde in the menstrual discharge in patients with uterine myoma with the normal structure of the endometrium in combination with ovarian tumors increased to  $1,7 \pm 0,04$  nmol, and in patients with uterine myoma in combination with the endometrial hyperplasia, the level reached maximum val-

ues ( $2,8 \pm 0,08$  nmol) compared with the level of healthy women ( $p < 0,01$ ,  $p < 0,001$ ) [5].

The content of carbonyl groups of the protein in menstrual discharge in patients with uterine myoma in combination with the endometrial hyperplasia was also increased: from 4,3 to 8,2 nmol/mg ( $5,7 \pm 0,63$  nmol/mg), which was higher compared with the similar index in healthy women [5].

A fundamentally new scientific direction in the diagnosis is the theory of V.N. Shabalin and S.N. Shatokhina of the functional morphology of the biological fluid, evaluation of its self-organization processes (the method of wedge dehydration, Litos – system). In the biological fluid there are highly dynamic changes of molecular composition, the changes in nature of the interaction of various components under physiological and pathological conditions, which are the basis for the diagnosis of various diseases at the earliest stages of development [17].

To identify the endometrial hyperplasia L. Dikareva and co-workers (2008) were the first to suggest making a structural analysis of the menstrual discharge and endometrial secretion, and described three facies morphotype: radial mixed and triradial. It is shown that the pathogenomic marker of formation of endometrial pathology is a decrease in the material the area of radial cracks with simultaneous increase of the area of triradial cracks [8].

E.G. Shvarev and co-workers (2008, 2011) studied in comparison by microscopy the structural features of facies of the menstrual discharge in patients with inflammatory diseases of the small pelvis and in patients with ovarian tumors. It was found that in 38% of cases the emergence of «tongue» structures in the peripheral zone of facies was marked in women with inflammatory diseases and the combination of «tongue» structures in the peripheral and the triradial cracks in the central part of facies was marked in 62% of cases [19]. Increasing the area of triradial cracks points to the likelihood

of forming of ovarian tumors in the patients, what requires in-depth checkup [21].

S.Yu. Sotnikova and co-workers (2001) proposed a way to diagnostics of internal endometriosis by determination of number of CD95 + lymphocytes in the menstrual discharge. So we can determine the relative number of CD95 + lymphocytes in the women's menstrual discharge and if the values of this parameter equal to 15% and less we can with 80% accuracy the internal endometriosis was revealed [22].

Using of the menstrual discharge in diagnostics of gynecological pathology allows non-invasive, in small amounts of biological fluid with minimal material costs (!) in a women's clinic, in a short time to get objective information about the status of the female reproductive system. Atraumatic sampling of the material, ease of processing and storage give a wide opportunities to do an effective prophylactic medical examination of women. To date the menstrual discharge is by-way, but it has a large amount of information on the functional and morphostructural status of female genital biological fluid. The ability to decode this information is one of the major aims of modern medical practice.

#### References

1. Aldebel M.M., Kirillova N.V. Oxydative damage to proteins in experimental glomerulonephritis // *Nephrology*. – 2002. – T. 6, № 2. – P. 73–76.
2. Bohman Y.V. Uterine cancer – L.: Medicine, 1972. – 220 p.
3. Bohman Y.V., Pryanishnikov V.A., Chepik O.F. Comprehensive treatment of hyperplastic and endometrial cancer. – M.: Medicine, 1979. – 272 p.
4. Cederholm-Williams S.A., Rees Margaret C.P., Turnbull A.C. Consumption of fibrinolytic proteins in menstrual fluid from women with normal menstrual blood loss // *J Clin Pathol*. – 1984. – № 37. – P. 879–881.
5. Dikareva L.V. Hyperplastic processes of the uterus: clinical and diagnostic value of markers of biological fluids: avtoref. dis. Dr. med. science. – Volgograd, 2009. – 33 p.
6. Dikareva L.V., Shvarev E.G., Aupova A.K. Clinical and diagnostic aspects of hysteroomyomas fast growing // *Problems of reproduction*. – M., 2008. – T. 14, № 6. – P. 20–25.
7. Dikareva L.V., Shvarev E.G., Aupova A.K., Ovodenko D.L. Way to assess the condition of endometrial tumors of female genitalia: pat. RF № 2290639 IPC G 01 N 33/48 appl. 28. 07. 2005, publ. 12. 27. 2006.
8. Dikareva L.V., Shvarev E.G., Aupova A.K., Ovodenko D.L. Diagnostic method of the endometrial pathology in patients with hysteroomyoma: pat. RF № 2334987 IPC G 01 N 33/68; appl. 12. 04. 2007, publ. 27. 09. 2008.
9. Dubinina E.E. Products of oxygen metabolism in the functional activity of cells. Life, death, creation and destruction. Physiological and clinical and biochemical aspects. – SPb., 2006. – 394 p.
10. Frolova M.Yu. The possibilities of the method of determine the carbonyl groups of serum proteins to assess the state of «oxidative stress» in clinical practice. – SPb., 2003. – 24 p.
11. Hahn L., Rubo G. Fibrinogen-fibrin degradation products in menstrual blood from women with normal and excessive menstrual blood loss. *Acta Obstet Gynaecol Scand* 1975. – № 54. – P. 119–27.
12. Petrunin D.D., Granova I.M., Petrunina Y.S., Tatarinov Y.S. Immunochemical identification of specific alpha2-globulin of human placenta and its concentration in amniotic fluid // *BEB and M*. – 1976. – № 7. – P. 803–804.
13. Petrunin D.D., Lopukhin Y.M., Mladenkov M.N., Olefirenko G.A. Immunochemical identification of thermally stable alpha-glycoprotein in the blood serum in some diseases of the immune system with pathology // *Bull. exper. biology*. – 1982. – № 4. – P. 66–68.
14. Posiseyeva L.V. «New» placental proteins in the assessment of normal and impaired human reproduction: dis. Dr. med. science. – Ivanovo, 1991. – 326 p.
15. Posiseyeva L.V., Borzova N.Y., Malishkina A.I. Purpose of PAMG-2 in the assessment of menstrual function in women with perinatal deaths child. *Problems of endocrinology in obstetrics and gynecology*. – Moscow: Academia, 1997. – P. 91–92.
16. Posiseyeva L.V., Boiko L.V., Borzova N.Y., Malishkina A.I. Diagnostic method of the chronic endometritis: patent № RU 2108750; publ. 25. 09. 1995.
17. Shabalin V.N., Shatohina S.N. Morphology of Biological Fluids. – M.: Chrysostome, 2001. – 204 p.
18. Shvarev E.G. Tumor markers in the diagnosis and evaluation of hormonal therapy for endometrial cancer: diss. Dr. med. Science. – St. Petersburg, 1993. – 263 p.
19. Shvarev E.G., Dikareva L.V., Zasuha Yu.S., Aupova A.K. Method of sphenoid dehydrotation biological fluids – the new way of diagnostic in pelvic inflammatory diseases // *Topical issues of modern medicine – Astrakhan, 2008*. – T. 37 (LXI). – P. 108–109.
20. Shvarev E.G., Volodin M.A., Bohman Y.V., Kostina L.A. Method for determining hormone-endometrial cancer // *Authors certificate № 1674407*, publ 01. 05. 1991.
21. Shvarev E.G., Ovodenko D.L., Dikareva L.V., Zaitseva O.E. Morphostructural and biochemical properties of biological fluids of patients with ovarian tumors // *Astrakhan Medical Journal*. – 2011. – T.6, № 1. – P. 155 – 159
22. Sotnikova N.Y., Solovyov T.A., Bogatova I.K., Anciferova Y.S., Bukina E.A. Method for the diagnosis of internal endometriosis: pat. № 2173466 RF; publ. 10. 09. 2001.
23. Tatarinov Y.S., Posiseeva L.V., Petrunin D.D. Specific alpha2-microglobulin (glycodelin) of human reproductive system: 20 years of basic research to clinical practice, – M.: Ivanova, 1998. – 127 p.

## UP-TO-DATE APPROACHES TO DIAGNOSTICS OF PREMATURE RUPTURE OF FETAL MEMBRANES IN PREGNANTS

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To put an accurate diagnosis is a key moment for further obstetric tactics. Mistakenly fixed diagnosis may lead to unfounded hospitalization on the one hand, and to unjustified long wait and see attitude of obstetrician on the other hand.

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**Keywords:** premature, rupture, fetal, membranes

In spite of much progress of modern medicine, miscarriage problem remains one of unsolved problems all over the world [1, 4]. Prenatal mortality from prematurity takes the first place in the structure of the cause, the indexes of mortality are the highest in newborns with extremely low and very low of body mass [1, 2, 3, 4].

Premature rupture of fetal membranes (PRFM) in pregnant presents one of the most important problems in obstetrical practice. This is more often cause of premature birth and severe complications in newborns. Incorrect diagnosis of premature rupture of fetal membrane of pregnant may lead to unfounded actions (for example, hospitalization or pre-term delivery), but late diagnostics results delayed reaction of obstetricians and growth of infectious-inflammatory complications. It is impossible to forget, that conducting the pregnancy which complicated PRFM is the most expensive [3].

PRFM in pregnant unavoidably leads to the development of birth activity during some days. Particularly this complication is especially dangerous in incompletely pregnancy: adaptive possibilities of immature fetus are low but risk of premature birth is high, equally as and danger of respiratory distress-syndrome of the fetus, infectious-inflammatory complications in newborns and women in childbirth. In the USA premature rupture of fetal membrane makes conditional 18–20% cases of prenatal mortality [4].

The rate of neonatal complications depends on in what term of pregnancy was PRFM. Presence of PRFM in incomplete pregnancy increases prenatal mortality in 4 times, morbidity of newborns in 3 times, including respiratory distress-syndrome (appears in 10–40% cases of PRFM in incomplete pregnancy), but in 40–70% cases appears the cause of death of newborns. Unfortunately, the rate of them is increased in PRFM, concerned also hypoxia of the fetus and asphyxia of newborns, anomalies of birth activity, premature detachment of placenta. Intra-amniotic infection develops in 15–30% pregnant, which is realized postnatal endometritis in 2–13% women with PRFM in incomplete pregnancy. Chorioamnionitis is often manifested after prolonged waterless period, oligohydramnios, multiple vaginal investigations [1, 4].

There is no clear presentation about diagnostics and treatment of PRFM in women with incomplete pregnancy yet. In spite of extensive knowledge about causes and mechanisms of PRFM no one country did not solve this problem until now.

### Materials and methods of research

Selection of optimal method of premature rupture of fetal membranes diagnostics

### Results of research and their discussion

Study is based on clinical-laboratory examinations of 124 pregnant women with premature rupture of fetal membranes in different gestational terms, who have been under the care of doctors and have been admitted to the obstetrician department of Andijan regional prenatal centre from 2009 to 2011. Pregnant women with PRFM were divided into 3 groups by continuance of waterless period:

– 1 group of 41 (33,1%) women with PRFM, who have been prolongation of pregnancy in the condition of waterless period, continuance which composed to 24 hours.

– 2 group – 43 (34,7%) women with PRFM, who have been performed prolongation of pregnancy in the condition of waterless period, continuance which composed to 72 hours.

– 3 group – 40 (32,3%) women with PRFM, who have been performed prolongation of pregnancy in the condition of waterless period, continuance which composed more than 72 hours.

In diagnosing were used methods: cough impulse test, fern phenomenon, nitrasin test, test AmniSure®.

Cough impulse sample has low sensitivity, affirmative response was observed about in half of examined pregnant. Amniotic fluid admixture on the subject glass, which is taken for sample of vaginal contents forms pictures look like to the leaves of fern (fern phenomenon). This method may give more quantity of false-positive results enough because of admixture of sperm elements, separating cervical channel and even in the presence of fingerprints on the subject glass. False –positive results might be taken because of blood admixtures or as a result of deficient quantity of material sampling («dry tampon»). Phenomenon «fern» was observed in

1 group in 17 (41,5%) pregnant, in 2 group in 19 (44,2%) and in 3 group – in 24 (60,0%).

Amniotic fluid has normal or slightly alkaline environment (pH 7,0–7,7), whereas vaginal medium is acid (pH 3,8–4,2). At entrance amniotic fluid in vagina acidity of vaginal contents is decreased, that is detected by nitrasin test-stria.

Nitrasin test may also give false –positive results because of decreasing the acidity of vaginal secretion (in inflammation of genitals), the presence of urine, sperms in vagina, and also applying the antiseptic agents. Nitrasin test was positive in 22 (53,7%) in 1 group, in 2 group 25 (58,1%), in 3 rpyrme – in 19 (47,5%) (Table 1).

Table 1

Objective examination results of pregnant women with premature rupture of fetal membranes

Indexes	1 group (n = 41)		2 group (n = 43)		3 group (n = 40)	
	abs	%	abs	%	abs	%
Cough impulse sample	21	51,2 ± 7,8	22	51,2 ± 7,6	18	45,0 ± 7,9
Fern phenomenon	17	41,5 ± 7,7	19	44,2 ± 7,6	24	60,0 ± 7,7
Nitrasin test	22	53,7 ± 7,8	25	58,1 ± 7,5	19	47,5 ± 7,9***
Test amnisure	41	100,0	43	100,0	40	100,0

Note: \* – significantly regarding the indexes 1 group (\* –  $P < 0,05$ ; \*\* –  $P < 0,01$ ; \*\*\* –  $P < 0,001$ ).

It is known, that informativity of nitrasin test and fern phenomenon are decreased by increase the time from moment of rupture of fetal membranes. In prolonged PRFM cases these tests give not much information than routine obstetrician investigation.

Threshold of AmniSure® test sensitivity composes ng/ml that provides 99% pre-

cision of PRFM definition even in incompletely pregnancy. But in our studies positive response was in all investigated pregnancies (100,0%).

In the Table 2 were given results of specificity and sensitivity of used methods, the highest sensitivity has test Amnisure.

Table 2

Comparative efficacy assessment of noninvasive tests for the diagnostics of premature rupture of fetal membranes

Method of diagnostics	Result	Sensitivity	Specificity, %	Positive predictive value	Negative predictive value
Cough impulse sample	Yes/no	48–77	65–73	88–91	78–86
Fern phenomenon	Yes/no	51–98	70–88	94–100	91–94
Nitrasin test	Yes/no	90–97	16–70	63–75	80–93
Test Amnisure	Yes/no	99–98	88–100	98–100	91–99

Diagnosis of PRFM is based on pouring out much quantity of clear fluid without color and odor (amniotic fluid). In little, as called subclinic ruptures when only insignificant flow of amniotic water has, diagnostics may cause expressed difficulties.

Insignificant flow of amniotic water does not decrease the development risk of complication, on the contrary increases danger. It is connected with this, which from the moment of integrity disorder of fetal membranes until defining this complication may pass much time.

### Conclusion

The most effective test is AmniSure®, threshold of sensitivity which composes

5 ng/ml, which provides 99% precision of defining premature rupture of membranes even in incompletely pregnancy.

### References

1. Obstetrics: national leadership / E.d. Ailamazyan E.K., Kulakov V.I., Radzinsky V.E., Saveleva G.M. – M.: GEOTAR Media, 2007. – 1200 p.
2. Aleev I.A. Premature rupture of membranes. Call for Papers / Ed. V.E. Radzinsky, I.M. Ordilyants. – M.: Mediabyuro Status Praesens, 2011. – 20 p.
3. Boking Alan D. Chelis John R.J., Korbrits K. New approaches to the diagnosis of premature birth // Intern. honey. magazine. – 1999. – № 7–8. – P. 449–450.
4. Bolotskih V.M. New approaches to the management of pregnancy and childbirth, complicated by preterm rupture of membranes at term time // Proceedings of the All-Russian scientific-practical seminar «The reproductive potential of Russia: the version and kontraversii». – M.: Mediabyuro Status Praesens, 2010. – 32 p.



## LIPID PEROXIDATION AND ACTIVITY OF ENZYMES OF ANTIOXIDANT DEFENSE IN MITOCHONDRIAL FRACTIONS OF LIVER AND KIDNEYS OF LEUKEMIC RATS

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In the dynamics of development of leukemia in the mitochondrial fractions of liver and kidneys is noted intensification of lipid peroxidation and inhibition of antioxidant defense enzymes. In liver, an imbalance in the LPO/AOD system is observed at 6 and 8 months, whereas in kidneys processes of lipid hyperperoxidation begin later (at 7 month of experiment), increasing with progression of the disease. The enzyme activities of SOD and catalase are particularly reduced. Compensatory possibilities of AOD in the removal of active forms of radicals in liver changes in waves, whereas in kidneys are progressively inhibited.

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**Keywords:** leukemia, experiment, liver, kidney, mitochondria, lipid peroxidation, antioxidant defense

The existence of cells under aerobic conditions is associated with constant risk of uncontrolled formation of toxic forms of molecular oxygen as in the body due to products of oxidative metabolism, as in the environment, in particular as a result of negative anthropogenic impact of modern civilization. Interaction of active forms of oxygen with organic molecules leads to the formation of organic free radicals [4, 13, 16]. Several researchers [4, 13, 16, 17] established their pathogenic function for many diseases and at different degrees for any pathological conditions. One of the most terrible consequences of prolonged effects of increased number of highly active oxidants on the body is known to be neoplastic transformation of cells, leading to the development of malignant tumors [13, 17]. However, it should be noted that active forms of oxygen have a wide range of physiological actions. In particular, oxygen free radicals are one of the mechanisms of apoptosis [3, 6, 16]. However, induction of apoptosis requires low physiological concentrations of free radicals, whereas excessive radical formation causes metabolic and functional disorders, leading to serious adverse consequences, including cell death or malignant transformation [3, 4, 16]. In leukemias, the total concentration of bound and physically dissolved oxygen is reduced. Hemoglobin oxygen saturation is decreased. This leads to development of metabolic acidosis, which is aggravated during massive chemotherapy [8, 11]. In these conditions develops mitochondrial dysfunction in various organs and tissues, as major consumers of oxygen in the cells are the mitochondrial respiratory chain, leakage of active forms of oxygen and intensification of lipid peroxidation. This is conditioned also by low capacity of antioxidant protection. All above-mentioned leads to decline of receptor apparatus of cell membranes. However, there are no published data on lipid peroxidation (LPO) and antioxidant defense (AOD) in mitochondria of main detoxifying organs – liver and kidneys – in experimental leukemia.

**Objective:** to estimate the intensity of lipid peroxidation and activity of antioxidant defense enzymes in the mitochondrial fractions of liver and kidneys of leukemic rats.

### Materials and methods of research

We improved benzyl model of leukemia which was performed in 157 male rats by subcutaneous injection of 40% oil solution of benzyl (0,01 ml per 100 g of body weight) throughout the experiment [7, 18]. Common mortality was 40,1%. Development of leukemia was assessed by changes in peripheral blood and bone marrow each month within 8 months from onset of the experiment by method of Anderson and Poulsen [2]. By the end of 6 month, 50% of animals had leukemia, which rate was increased to 77,4 and 86,4%, respectively at 7 and 8 months. At these terms, animals with signs of leukemia were sacrificed under Rausch-anesthesia, according to the rules outlined by the European Convention for the Protection of Vertebrate Animals (Strasbourg, 1986). Mitochondrial fractions of liver and kidneys were isolated by differential centrifugation. The intensity of lipid peroxidation was assessed by the level of malondialdehyde (MDA) [1]. The antioxidant defense activity was estimated by the levels of superoxide dismutase (SOD) [12] and catalase [9].

The data obtained were processed using statistical computer program Statistica 5. The significant difference was established at  $P < 0,05$ .

### Results of research and their discussion

Studies have shown that in the mitochondrial fractions of kidneys of intact animals, the levels of MDA, SOD and catalase were, respectively, 1,27 ( $P < 0,05$ ), 1,45 ( $P < 0,01$ ), and 1,23 ( $P < 0,05$ ) times lower than in liver. Based on these results, we assume that possibility of enzymatic AOD of liver mitochondria is slightly higher than in kidneys. In the dynamics of leukemia development (6 months), in liver mitochondrial fraction of experimental animals, the level of MDA was significantly increased in 1,28 ( $P < 0,05$ ) times, whereas enzyme activities of SOD and catalase were significantly reduced in 1,35 ( $P < 0,05$ ) and 1,63 ( $P < 0,01$ ) times, respectively, indicating an imbalance in the system LPO/AOD. Later, (at 7 months), possibly due to development of compensatory processes, we noted trend to restore of balance



in the system LPO/AOD. By the final deadline (after 8 months), MDA level was increased in 1,77 ( $P < 0,001$ ) times, activities of SOD and

catalase were reduced in 1,89 ( $P < 0,001$ ) and 1,78 ( $P < 0,001$ ) times, respectively, in comparison with intact animals (Table 1).

Table 1

Parameters of lipid peroxidation and activity of AOD enzymes in liver mitochondrial fractions of leukemic rats,  $M \pm m$ ,  $n = 6-7$

Groups and periods of investigation	The level of MDA, nmol/mg protein	SOD, CU/min·mg protein	Catalase, mcmolH <sub>2</sub> O <sub>2</sub> /min·mg protein
Intact	0,271 ± 0,011	0,412 ± 0,015	0,288 ± 0,016
Leukemia, at:			
6 month P	0,348 ± 0,018 < 0,01	0,305 ± 0,024 < 0,01	0,177 ± 0,009 < 0,001
7 month P	0,314 ± 0,021 < 0,05	0,329 ± 0,017 < 0,01	0,215 ± 0,020 < 0,01
8 month P	0,479 ± 0,029 < 0,001	0,218 ± 0,012 < 0,001	0,162 ± 0,011 < 0,001

Imbalance in the system LPO/AOP is confirmed by reduction of (SOD + catalase)/MDA to 1,38; 1,73 and 0,79 CU in leukemic rats after 6; 7 and 8 months, respectively, whereas in intact rats this parameter was 2,58 CU. However, these changes had compensatory nature, as after 7 months the existing imbalance tended to recover. This was evidenced by higher values of (SOD + catalase)/MDA by this period and further decline of this compensation, contributing to the processes of membranolysis in sub-cellular structures of the liver.

Analysis of processes LPO/AOP in renal mitochondrial fractions of rats with leukemia revealed activation of lipid peroxidation, manifested by increase of MDA level in 1,3 and 1,81 times at 7 and 8 months, respectively, decreased activities of SOD and catalase in 1,33 ( $P < 0,05$ ) and 1,65 ( $P < 0,01$ ) times at 7 months, and in 2 ( $P < 0,001$ ) and 2,02 ( $P < 0,001$ ) times at 8 months of experiment, respectively (Table 2).

Table 2 shows that during progression of tumor, activities of AOD enzymes, especially

activity of catalase than SOD, in renal mitochondrial fraction are inhibited. This is proved by reduction of (SOD + catalase)/MDA to 1,9; 1,3 and 0,67 CU in leukemic rats after 6; 7 and 8 months, respectively, whereas in intact rats this parameter was 2,42 CU. Our findings suggest that if at 6 month of experiment onset, compensatory potential of AOD system in kidney mitochondrial fraction is still existed, preventing sharp increase of LPO, so at 7 and 8 months we note decompensation of enzymatic antioxidant system and failure of its capabilities. This promotes sharp activation of free radical processes, causing labilization of membranes and risk of renal failure, which can be exacerbated during massive chemotherapy. We can assume that in the process of leukaemogenesis, liver is involved in the disease process earlier than kidney. Our findings are similar with results of Pospelova [14] and Lasure et al. [19] who also reported earlier damage of liver, than kidney, in patients with leukemia because of liver leukemic infiltration.

Table 2

Parameters of lipid peroxidation and activity of AOD enzymes in renal mitochondrial fractions of leukemic rats,  $M \pm m$ ,  $n = 6-7$

Groups and periods of investigation	The level of MDA, nmol/mg protein	SOD, CU/min·mg protein	Catalase, mcmolH <sub>2</sub> O <sub>2</sub> /min·mg protein
Intact	0,214 ± 0,016	0,284 ± 0,018	0,234 ± 0,011
Leukemia, at:			
6 month P	0,253 ± 0,013 < 0,05	0,263 ± 0,014 > 0,05	0,217 ± 0,012 > 0,05
7 month P	0,273 ± 0,018 < 0,01	0,213 ± 0,011 < 0,01	0,142 ± 0,008 < 0,01
8 month P	0,387 ± 0,022 < 0,001	0,142 ± 0,009 < 0,001	0,116 ± 0,007 < 0,001

Based on the analysis of data obtained and available literature [4, 6, 16], we suggest that biological effects of LPO on membranes can be divided into two groups:

(1) effects caused by direct oxidation of unsaturated fatty acids of membranes phospholipids;

(2) result of interaction of LPO products with protein molecules.

In the inner membrane of mitochondria, first is oxidized cardiolipin, which is involved in the electron transport chain, stabilization of complex I, molecular organization of the inner membrane, anion transport, binding of cytochrome C and functioning of the inner membrane enzymes in the synthesis of ATP, as well as controls apoptosis. This increases permeability of membrane, changes its charge and conformation of lipoprotein complexes, leads to formation of hydrophilic sites and calcium leakage. Peroxidation of membrane proteins leads to increase of microviscosity of membranes, changes of their surface charge, as well as appearance of oxidized hem-containing proteins and amino acid derivatives. The totality of these events causes uncoupling of oxidation and phosphorylation in mitochondria, creating a vicious cycle of bioenergy hypoxia in the investigated organs.

Voltage of erythrocyte germ of blood formation in leukemia leads to decompensation of erythropoiesis, changes in the structural and functional states of erythrocyte membranes, impairment of microrheological blood properties [5, 15]. According to Kopteva et al. [8], rheological blood dysfunction is an important pathogenic factor for development of complications in hematologic diseases, determining in particular conditions of survival after severe complications. Studies by Maslennikova et al. [11] reported that hypoxia is an independent predictor for tumor progression due to its influence on various metabolic, molecular-genetic and pathophysiological processes: proliferation, apoptosis, angiogenesis and metastasis. In this case, Orevic et al. [20] observed expression of factor HIF-1 $\alpha$  in hypoxia, which is a natural marker of tumor hypoxia [20]. Studies by Makeshova et al. [10] showed that patients with acute leukemia at all stages of the disease develop hypoxia and increased HIF-1 $\alpha$  level in leucocytes. According to authors [10], this may be associated with occurrence of favorable conditions for tumor, increase of glycolysis and the need of tumor tissue for energy.

### Conclusions

In liver mitochondrial fraction of leukemic rats, the level of MDA is sharply increased at 6 month, and then it is reduced due to compensatory processes and is sharply increased again by the final deadline. The AOD enzyme activity is reduced. Compensatory possibilities of AOD in the removal of active forms of radicals in liver are changed in waves.

Processes of lipid hyperperoxidation in kidneys start later (at 7 month of experiment), and are intensified with progression of the disease. The enzyme activities of SOD and catalase are particularly reduced. Compensatory possibilities of AOD in the removal of active forms of radicals in kidneys are progressively inhibited. Uncoupling of oxidation and phosphorylation in mitochondria in the investigated organs develops a vicious cycle of bioenergy hypoxia, leading to liver and renal failure, which can be exacerbated during massive chemotherapy.

### References

1. Andreeva L.I., Kozhemyakin L.A., Kushkin A.A. Modification of the method for determining lipid peroxides in the test with thiobarbituric acid // [Laboratornoye Delo], (Laboratory work). – 1989. – № 1. – P. 41–43.
2. Anderson S.K., Poulsen K.B. Atlas of Hematology. – M., 2007. – P. 453–489.
3. Vladimirov Y.A. Biological membranes and non-programmed cell death // [Sorovskiy Obrazovatel'niy Zhurnal]. – 2000. – № 9. – P. 2–9.
4. Vladimirov Y.A. The role of impaired properties of lipid layer of membranes in development of pathological processes // Pat. Physiology. – 1989. – № 4. – P. 7–9.
5. Hematology. The latest book. Ed. Abdulkadyrov K.M. – M., St. Petersburg: Owl, 2004. – 901 p.
6. Ibragimov U.K., Khaybullina Z.R. Biological membranes. – Tashkent, 2009. – 134 p.
7. Karimov K.Y., Kasimova G.G., Zaribbaev U.Z., Kurbonova N.N., Inoyatova F.K. Development of benzyl model of leukemia in rats // Pathology. – 2010. – № 2–3. – P. 23–27.
8. Kopteva V.D., Pospelova T.I., Soldatova G.S. Comprehensive assessment of blood flow in patients with hematological malignancies // [Aktualniye Voprosy Sovremennoy Meditsiny] (Urgent issues of modern medicine). – Novosibirsk, 1997. – P. 252.
9. Koralyuk M.A., Ivanova L.I., Majorova I.G. Determination of catalase activity // [Laboratornoye Delo], (Laboratory work). – 1988. – № 1. – P. 16–19.
10. Makeshova A.B., Levina A.A., Mamukova Y.I. et al. Regulatory mechanisms of iron metabolism in leukocytosis in the disease onset in patients with acute leukemia // [Ter. Arch.] – 2011. – № 10. – P. 22–27.
11. Maslennikova A.V., Orlova A.G., Pryanikova T.I. et al. Clinical and diagnostic value of tumor hypoxia // [Voprosy Onkologii]. – 2011. – Vol. 57, № 4. – P. 413–420.
12. Mkhitarian V.G., Badalyan G.Y. Effect of peroxidized and non-peroxidized unsaturated fatty acids on the activity of superoxide dismutase // [Zhurnal Eksperimentalnoy i Klinicheskoy Meditsiny] (Journal of Experimental and Clinical Medicine) – 1978. – № 6. – P. 7–11.
13. Nemtsova Y.R., Sergeeva T.V., Bezborodova O.A., Yakubovskaya R.I. Antioxidants – the place and role in oncology // [Rossiyskiy Onkologicheskii Zhurnal] (Russian Journal of Oncology). – 2003. – № 5. – P. 48–53.
14. Pospelova T.I. Clinical, functional, and metabolic features of liver damage in some forms of leukemia. – Synopsis of thesis for Dr. Med. Sciences. – Novosibirsk, 1998. – 48 p.
15. Guideline on Hematology: Volume 2 of 3 / Ed. Vorobyov A.I. – 3<sup>rd</sup> ed., revised and add. – Moscow: Nyudiamed, 2003. – 280 p.
16. Saatov T.S., Ibragimov U.K., Khaibullina Z.R. et al. Mechanisms of lipid peroxidation and antioxidant protection. – Tashkent, 2006. – 127 p.
17. Frantsiyants E.M., Sidorenko Y.S., Rozsiko L.Y. Lipid peroxidation in the pathogenesis of neoplastic disease. – Rostov-on-Don, 1995. – 176 p.
18. Blair A., Purdue M.P., Weisenburger D.D., Baris D. Chemical exposures and risk of lymphocytic leukaemia // Br J Haematol. – 2007. – Vol. 139, № 5. – P. 753–761.
19. Lasure T., Miceli-Richard C., Sellam J. et al. Small hepatic vein involvement in IgG multiple myeloma: a very unusual pattern of liver infiltration // Virchows Arch. – 2007. – Vol. 450, № 1. – P. 127–129.
20. Orevic G., Matusan-Ilijas K., Babarovic E. et al. Hypoxia inducible factor-1 $\alpha$  correlates with vascular endothelial growth factor A and C indicating worse prognosis in clear cell renal cell carcinoma // J. Exp. Clin. Oncol. – 2009. – Vol. 28. – P. 40–48.

*Materials of Conferences***TACTICS OF REHABILITATION UNDER A COMPLETE ADENTIA**

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The article represents a scientific foundation of optimal prosthesis' constructions with usage of tooth implantation.

In almost all countries dental pathology remains one of the most spread. Teeth loss is reflected in an overall health condition of a man (Kalininskaya A.A., Sadikov M.K., Kunitsyna N.M. 2012).

One of the prior objectives of planning dental orthopedic treatment is selection of prosthetics technology. We should clearly define in what cases implantation for fixing removable implants should be implemented, when it is reasonable to carry out non-removable prosthetics with usage of cement, and when one should construct conditionally-removable implants.

It is necessary to pay an increased attention to introduction of adequate orthopedic methods of treatment for persons with a complete teeth loss who need modern constructions of teeth implants in order to restore chewing function.(A.V. Aimkiy, 2012).

The objective of this research is a scientific approval of selecting prosthetics tactics under a complete adentia.

Central scientific-research institute of stomatology and maxillary-facial surgery of the Ministry of healthcare of RF served as a research base.

In order to select a prosthetics method under a complete adentia we can use the following criterions:

1. Removable prosthetics with fixing on implants can be used in case when a patient has already used a tooth implant, but, due to an atrophy and worsening of terms for anatomic retention, fixing became unsatisfactory.

2. If a patient hasn't used removable implants, implantation for fixing removable implants should not be planned as a priority.

If, due to any reasons, removable prosthetics and fixing with implants is considered as a the most favourable treatment method, it reasonable to construct a removable implant first and give a patient 3–4 months for adaptation, besides, this decision should be conscious; further treatment with implants can lead to the desired result. Otherwise, there is a significant risk of that a patients will not be able to adapt to a removable implant, even if its fixing is provided reliably with implants and locks.

3. Non-removable and conditionally-removable prosthetics are the most rational approaches for a functional and social rehabilitation of patients with a complete adentia. These approaches can be

implemented practically in all cases, even under unfavourable anatomic-topographic conditions due to a significant maxillary atrophy. Nowadays there is a sufficient arsenal of surgery methodics and technologies of making teeth implants for carrying out implantation and non-removable or conditionally-removable prosthetics under a complete adentia.

4. Non-removable prosthetics can be reasonable on nonseparable implants, when there is a possibility for a direct functional strain, in other words, prosthetics after 7–10 of implantation.

However, non-removable prosthetics cannot be considered as a main, most favourable approach.

We should consider the fact that fixing implants with cement does not give us a possibility to manoeuvre in case of problems. For example, re-cementing on an implant can lead to a functional overloading of bone tissue that surrounds other implants. Such implant should be knocked off and re-cemented. However, knocking off an implant, fixed with a cement on other implants (as well as on teeth) can lead to a dislocation or even removal of implants that were not re-cemented. Therefore, non-removable prosthetics can be used in cases when it is impossible to use conditionally-removable implantation. Clinic situations when conditionally-removable prosthetics represents significant complications, we can observe:

- under a significant vestibular inclination of alveolar sprouts and placed implants in combination with insufficient inter-alveolar space for placing inclined heads. In such situation screw vints and holes that fix an implant can appear on vestibular side of the implant even with usage of inclined heads of implants that is unacceptable from an aesthetic point of view;

- under protrusive bite, when there is no place for fixing screw vints. Such situation can be observed under an adentia of lower jaw and presence of one or several teeth in frontal department of upper jaw.

5. Conditionally-removable prosthetics can be considered as an optimal method of rehabilitating patients with a complete adentia. Such variant can be realized in a suppressing number of cases, even under a significant atrophy of bone tissue of jaws and unfavourable anatomic-topographic conditions.

Thus, while planning treatment of patients with a complete adentia we can implement the following approaches and their sequence:

a) conditionally-removable prosthetics on two-stage implants of screw or cylindrical shape as an optimal method of treatment;

b) non-removable and combined prosthetics on one- and two-stage implants of different shape as an additional way of treatment;

c) making complete removable teeth prosthetics with their fixing on two-stage implants of screw of cylindrical shape as a palliative method of treatment.

Apart from planning a final, constant prosthetics of patients with a complete adentia one should also solve the problem what a patient will do and how he will live during 2–3 months, and sometimes more time, while the process of reparative regeneration of bone around the placed implants is underway. Many patients cannot and don't want to be placed in social isolation due to lack of teeth, disturbance of speech and appearance. Therefore, while planning treatment, if a patient desires, one should consider temporal prosthetics that would allow the patient to restore speech function and correct facial features, and at least a partial chewing function.

#### References

1. Kalininskaya A.A., Sadikov M.K., Kunitsyna N.M. Organization forms of prevention in dentistry // *European journal of natural history*. – 2012. – № 6. – P. 13–14.

2. Alimskiy A.V. Gerontostomatology // Moscow, Federal State institution Central scientific-research institute of stomatology and maxillary-facial surgery.

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#### TECHNOLOGIES OF ORTHOPEDIC TREATMENT WITH IMPLANTS IN DENTOLOGY

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The article represents a scientific foundation of optimal prosthesis' constructions with usage of tooth implantation.

High rates of worsening in dental health of the population, significant increase in teeth loos frequency, disturbance of occlusion find a reflection in general level of dental health of the population (A.A. Kalininskaya, L.M. Aliyeva, A.E. Ivanova, 2012).

Dental implantation is used quite efficiently for restoring dental function (A.V. Alimskiy, 2012).

Plan of technologies of orthopedic treatment using implants should define a sequence of implants' loading in earlier and later terms. A possibility to define initial anatomic-topographic terms of implantation, optimal prosthesis period, and reasonability of facilitating a certain methodic of surgery and prosthesis construction emerges.

The objective of this research is clinical foundation of optimal constructions of prosthesis using teeth implantation.

Federal State institution Central scientific-research institute of stomatology and maxillary-facial

surgery of Ministry of healthcare of RF served as a research base.

A final selection of prosthesis method, construction, and methodic of placing implants is made according to a balance of the mentioned factors in each specific situation.

Thus, if definition of a volume of bone tissue gives us information on which implant we can use, type of adentia and type of maxillary bone architectonics, and also prosthesis construction predetermine what implant should be used in a specific clinic situation.

Naturally, factors that define prosthetic method and type of implants should serve as a premise in planning treatment. A volume of the possessed bone can be considered as a secondary factor that defines initial conditions, needed for implantation. Bone volume is a variable value, as concepts «sufficient» of «insufficient» implies different qualitative characteristics for different types of adentia and prosthetic methods. For example, bone tissue height of 10,0 mm and its width of 3,5–4,0 mm in the area of lacking corner tooth is insufficient for placing an implant and further fixing of tooth on the implant itself, as in such clinic situation, an implant 10,0 mm high and 3,5–4,0 mm in diameter should be used. At the same time such bone volume cannot be considered as an unfavourable anatomic premise for implantation for some different types of adentia.

Inadequate volume of bone tissue cannot serve as a sufficient foundation for denying implantation or using a different type of implant, usage of which is unreasonable in a certain clinic situation. In order to create adequate anatomic-topographic conditions direct regeneration and bone transplantation, methods of distraction osteogenesis, can be utilized.

Apart from defining optimal prosthesis construction, type, size, and amount of implants, needed for realizing an acceptable prosthetics, a tactics of introducing surgical stage of treatment should be developed.

Besides, first of all, it is necessary to define implantation method and period of removing implants from functional loading in a certain clinic situation.

One-stage methodic of placing implants with early functional loading can be used for types I and II of bone architectonics and anatomic-topographic conditions, favourable for implantation:

- sufficient volume of bone tissue, adequate alveolar and inter-occlusion height, normal bite;
- presence of conditions for careful adaptation of surgery wound edges in implant area;
- lack of evident risk of inflammatory process in oral cavity during post-operation period (periodontitis).

In other cases two-stage method of implantation should be preferred.

Factors that influence period of removing an implant from function are: type of architectonic, variant of placing implant in relation to compact bone layer, and anatomic situation.



A direct functional loading over implants and the surrounding bone can be placed in case when implants have an inter-bone height no less than 10 mm, is architectonic of bone tissue corresponds to type I or II. In other cases implants should be involved into functional loading after 2–3 months of their placing. Under regressive transformation of bone (types V–VI of architectonics), unfavourable anatomic conditions, and usage of unusual methods, period of removing implants from functional loading should be increased up to 4–6 months, and sometimes even 10 months.

Treating single teeth row defects using teeth implants.

Two approaches can be used in replacing single defects of teeth rows:

1. Prosthetic on an implant preserving intact teeth.
2. Introduction of one of intact teeth into a prosthesis as an implant support.

Both approaches imply usage of implants of screw and cylindrical shape

Medical observation was carried out on 78 patients.

While replacing defects in area of one-root teeth, using implants with inter-bone diameter less than 4 mm, and height – 10–14 mm with joining temporal orthopedic construction with intact teeth should be considered as an optimal way of action; surplus micro motion over the system «implant-bone tissue» should be excluded.

In case a prosthesis has two points of support (two implants or an implant and an intact tooth), implants of any, even minimal height of inter-bone part can be used (8 mm for two-stage and 10 mm for one-stage implants).

#### References

1. Alimskiy A.V. Organization basics of mass introduction of method of detail implantation // Materials of XXVII and XVIII All-Russian scientific-practical conferences. – M., 2012. – P. 92–94.

2. Kalinskaya A.A., Aliyeva L.M., Ivanova A.E. Preliminary losses in relation to death rate in the country // International magazine of experimental education. Materials of international conference «Urgent problems of science and education». – Italy-Chroatia-Greece. – № 6. – P. 43–44.

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#### THE DENTAL HYGIENIST LOAD CALCULATION

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The forms of work and the results of the work quota setting of the dentist hygienist have been presented in the paper.

According to the WHO and the various authors' data, the dental diseases prevalence among the children population is being reached up 75–95%, among the adult one – 100%. So, the challenges, having associated with the teeth and the mouth cavity diseases, are being come in the first place, in the age groups of the population, who is older, than 35 years old.

Its citizens' dental health is constantly being deteriorated, having increased the medical, the social, and the economic damage.

The stomatology development intensive way with the predominant focus on the increase in the clinical and the medical work volume is not quite able to be solved the main challenge – the population dental morbidity reducing. The medical technologies care and the further improvement treatment, and the earlier prevention of the dental diseases is one of the challenges in the further dental care improving (e.g. A.V. Alimsky, 1999, Z.A. Ashuev, 2007).

So, the development and the further implementation of the individual programs of the hygienist education, the population education and the implementation of the measures for the dental disease prevention is the dental hygienist's work main purpose. Thus, the development and the further implementation of the individual programs, the basic hygienic prevention of the dental diseases is the dental hygienist's main objective. So, during the process of the research, the three main groups of the basic activities, having realized and carried out by the dental hygienist, have already been identified by us: the treatment, the prevention, and the training ones.

• The Treatment and Preventive Measures: the anti – inflammatory treatment: the applications, the gum bands, the films, and etc.; the physiotherapy treatment: the gums hydro – massage, the depoferez, the vacuum therapy, and etc.; the immature fissures filling by the temporary filling materials; the fissures sealing (e.g. the invasive and the non – invasive methods), all the fluorination methods; the patients' prophylactic medical clinical examination and the rehabilitation with the decompensated form of the caries, with the diseases of the oral cavity mucosa and the periodontal; the hygienic preparation just before the surgery operation for the periodontal disease, the implantations and the rehabilitation measures implementation in the post – operative period; the teeth whitening; the teeth hyperesthesia treatment; the occlusion test, the preliminary contacts identification, the selective teeth lapping.

• The Preventive Measures: the patient's examination survey with the certain hygienic indices definition; the mouth cavity irrigation (e.g. the abluion) by the antiseptic solutions; the local application or the injection anesthesia conducting; the deposits removal of the dental tartar and the soft incrustation or the dental deposit; the dental



cervices and the sites available of the teeth roots grinding and the polishing after the dental tartar deposits removing; the hygienic indices control definition; the fluorinated content drugs and the preparations use to be improved the remineralization processes of the enamel and the dentin, in the form of the gels, the lacquers, and the rinses, the deep fluoridation.

- The Education Activities and the Training Measures: the studies conducting with the patient by the mouth of cavity individual hygiene method, and the healthy lifestyle.

The dental hygienist work time expenditures have been determined, by means of the methodological approaches, having developed in the Scientific Research Institute of Social Hygiene, Health Economics and Management after N.A. Semashko. The position normative has been designed, in accordance with the steps, having recommended by V.M. Shipova (1998).

So, the primary information has been collected, by means of the observation sheet of the photo – chronometer observations, the conducting of which are preceded the works classifier development – «The Dictionary of Activities Types and Labor Operations of the Dental Hygienist».

*The Structure of the Dental Hygienist's Working Time Expenditures.* All the specialist's activities we, in accordance with the SRI SGiOZ after N.A. Semashko, have divided into 2 main groups:

a) The Production one, which is included the main and the basic activities (e.g. the survey, the patients' examination, the medical treatment, the prophylactic manipulations, the mouth cavity hygiene health education and the etc.), the work with the documentation (e.g. the getting acquainted with the medical records, the filling primary medical care documentation in the primary medical treatment, and the repeated visits, the references, the certificates, the directions completion and etc.);

b) The Non – production one.

The activities types not directly related to the patients are included the following: the support activities (SA) (e.g. the gown dressing, the redressing; the hands washing; the workplace preparation and its cleaning; the equipment inspection; the sterile table covering; the medicines and the dental equipment preparing; the disinfection and the pre-sterilized treatment tools, tips carrying out; the transitions into the central sterilization department; the nurses' work supervision), the service talks, the personal time needed, the other activities types; the idle time.

The structure of the dental hygienist's working time expenditures has been presented below.

In the structure of the specialist's working time the maximum share is made the main activity (e.g. 64%), further the auxiliary work is followed (e.g. 21,7%), the work with the documentation (e.g. 7%), the service talks, and the personal time necessary to 2,6%, the other activities 1,4%.

Since the time it was idle, due to being late for the work, it was excluded just from the calculation. In the expenditures structure of the most of the work, the maximum percent are made up the medical manipulations and the mouth of cavity hygiene education (e.g. respectively, 35,3 and 17%).

Having characterized the specialist's time expenditures structure, as a whole, we can say, that the working time is being used rationally and efficiently by the dental hygienist.

**Table 1**  
The Structure of the Dental Hygienist's Working Time Expenditures (in % of the total)

The Elements of Activities:	The Expenditures structure (%)
<i>I. The Main Activities:</i>	64,7
– talk with the patient	5,0
– examination	2,5
– medical checkup and diagnosis	4,9
– medical treatment and prophylaxis	35,3
– mouth of cavity hygiene education	17,0
<i>II. The Auxiliary Activities:</i>	21,7
– gown dressing, redressing	1,9
– hands washing	2,5
– working place preparation and its cleaning	6,4
– equipment inspection	0,8
– sterile table covering	0,8
– medicines and dental equipment preparation	1,54
– disinfection and pre-sterilized treatment tools, tips carrying out	5,36
– transition into the central sterilization department	2,4
<i>III. The Work with Documentation:</i>	7,0
– introduction to the medical records and the research results review	0,3
– entry into the medical records (e.g. the initial visit)	3,8
– entry into the medical records (e.g. epy follow-up visit)	1,9
– other types of the work with documentation	1,0
<i>IV. The Service Talks:</i>	2,6
– talk with the medical staff	2,6
<i>V. Other Activities:</i>	1,4
– reading of the literature	1,4
<i>VI. The Private Time Necessary:</i>	2,6
– short break, food intake	2,6
<b>Total:</b>	<b>100,0</b>

Table 2

The Dental Hygienist's Time Expenditures, Not Related to the Direct Medioprophyactic

Care for the Patients Provision

The Activities Type:	The Actually Spent Time (min)	The Time, Taken for the Calculations (min)
Service Talks	42	100
Other activities	55	55
Personal time necessary	87	100
Idle time	62	-
Auxiliary activities	846	846
Total:	1,092	1,100

Some correction of the labor expenditures has been made by the experts, so the personal time has been regulated by the rate of 10 minutes per day, as it is taken its place in the other sectors and the branches of the national economy. Thus, the time has been added for the service talks, and the idle possible time has been excluded.

So, the average estimated time for the 1 patient's service by the dental hygienist has been made up 40 minutes. It should be emphasized, that the specialist conducts the admission in the adult dental polyclinic, where he accepts both, as the adults' patients, well as the children ones, that is he works on the family lines.

And it has been conditioned the mixed reception doing, as the activities types structure, their execution frequency, as well as the temporary costs on them.

*The load calculation (e.g. the service) of the dental hygienist.* The live standard workload of the dental hygienist will be made up 1,5 visit per hour (e.g. 60 min: 40 min).

### Conclusion

The dental hygienists will allow to be improved the quality of the primary medical and sanitary care provision, which has a positive impact on the dental health of the population.

### References

1. Alimsky A.V. On the Planning and Regulatory, and Qualitative Indices in the Pediatric Dentistry // Dentistry. – 1999. – Vol. 78. – № 1. – P. 63–68.
2. Ashuev Zh.A., Kulakov A.A. The Early Rehabilitation Justification of the Patients with the Partial or Complete Teeth Loss, at the Dental Implants Use in the Experiment. – 2007. – C. 59.
3. Shipova V.M. The Fundamentals of Valuation Work in the Public Health Care // The Textbook. – 1998. – P. 320.

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## INCREASE IN QUALITY OF REGIMES OF THREE-DIMENSIONAL VISUALIZATION OF COMPUTER GRAPHICS WHILE STUDYING PATIENTS WITH ULTRASOUND

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Intense development and improvement of medical ultrasound technics is founded on using scientific basics of radio and echo ranging, digital electronics, semiconductor technics. Modern medical ultrasound scanners allow us to receive three-dimensional pictures of objects with a resolution of 0,1 mm, Doppler methods allow us to evaluate blood flow in vessels, motion of heart walls and other tissues of the organism with a speed of lower than 1 cm/s.

A reasonability of using volume ultrasound nowadays does not cause any apprehensions while demonstrating images of organs or objects on PC monitor. Nevertheless, two-dimensional ultrasound is a basis of modern echo ranging that provides for a solution of a number of clinical problems of obstetrics, diagnosing diseases and defects of an embryo development. Therefore, a possibility to obtain three-dimensional images of high quality with US will allow us to receive an image for a visual evaluation quickly and increase its real quality.

In order to optimize two-dimensional picture on PC screen one should increase its resolution via increasing a number of channels. However, in this case, frequency of frames of raster scan decreases. While setting a high density, a number of scanning lines increases, and it increase an image resolution.

In order to decrease grain of an image and simplify diagnosing it is recommended to overlap several frames. An increase in an index of average image makes motion of picture on PC screen smooth and slow. At the same time, the real frame frequency does not decrease. However, while studying highly mobile organs, for example, in an obstetrics program, or echocardiogram, we recommend to turn this option off. In order to make an image smoother and clearer it is necessary to set a value of dynamic range in an interval of 40 to 180.

While selecting the option FSI (visualizing a complete range), it is recommended to set the value from 1 to 3. Thus, it will be possible to receive a clearer resolution at less deep areas and then use a resolution with a higher penetration to study deeper structures. One should consider the fact that is control volume is set for 2D image, it will show, at which part Doppler specter is studied. Changing a position of control volume should be done with a trackball. A position is represented in the format xx.x@yy.y mm.

In 3D mode tissues and body parts are presented as three-dimensional (volumetric), not two-dimensional images. In 3D mode data on volume structures is used. It is received by a sensor as a consequent series of two-dimensional images, and three-dimensional images are formed on their basis, it simplifies the process of diagnosing. Forming

volumetric images is a process of calculation that is used to define 3D structure according to two-dimensional sectors. Using intensity of grey for each pixel of two-dimensional image a corresponding voxel – volumetric element of three-dimensional image is defined. An algorithm of forming an image defines a method of visualizing three-dimensional structure.

To increase a quality of three-dimensional reconstruction it is necessary to adjust contrast of the selected structures in 2D mode and set a lower limit value. A clear image from the border of inquiry window to a certain surface can be provided via removing noise in case values of grey surface are lower than values of surface. An upper limit should be selected of value no more than 255. In case values of surface reconstruction algorithm exceed a limit value, surface borders should be marked and adjusted with a scroll box of the upper limit value.

A regime of multiplane reconstruction of three-dimensional image provides for an observing frontal, sagittal, and axial sectors of volumetric image.

- plane A: frontal sector;
- plane B: sagittal sector;
- plane C: axial sector.

#### References

1. Callen P.W. Ultrasonography in obstetrics and gynecology. – 5 th edition. – 2010. – 1239 p.
2. Benacerraf B.R. Three-dimensional ultrasound: use and misuse // J. Ultrasound in Medicine. – 2012. – Vol. 21. – P. 1029.
3. Merz E., Bahlmann F., Weber G. Volume scanning in evaluation of fetal malformations: a new dimension in perinatal diagnosis // Ultrasound in Obstet. Gynecol. – 2011. – Vol. 5. – P. 222.
4. Kovalev A.S., Shalimova O.A. New technologies of computer graphics of volumetric 3D modeling. – Oryol, 2011. – 120 p.

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### CARDIOVASCULAR ACCIDENTS AND NERVOUS BREAKDOWNS AS THE RESPONSE TO THE GEOPHYSICAL CONDITIONS

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The heliobiological communications research draws the attention of the scientists for a long time [Chizhevsky A.L.1934, Novikova K.F., Ryvkin B.A.1971]. This problem has the big urgency in the connection with the advancement of the persons in a space. The ionospheric spherical waveguide (the walls are formed by an ionosphere and a surface of the Earth) is a source of five resonant frequencies theoretically calculated by Schuman [Balser M. and Wagner C. 1960]. The ionospheric waveguide is excited by thunder-storms in the low geomagnetic latitudes. The waveguide frequencies of 8 and 14 Hz are close to frequencies of one of the

rhythms of the biopotentials of a brain of the person (an alpha rhythm: 8–13 Hz), measured by the German doctor of the psychiatry G. Berg in 1924. In my opinion, the ionospheric waveguide is not the unique natural resonator. The excitation sources can have the various physical nature. According to the geophysical researches presented by [Sterlikova I.V., Ivanov A.P. of 1997], the plasmosphere (one of the structural areas located higher than the ionosphere) can be the amplifier of the high-frequency geomagnetic pulsations. It is necessary to notice the American researchers have registered the Schuman's resonant frequencies by the sputnik on the distances from the Earth above an ionosphere [Simoes F. et.al., 2011] – 450–800 km that corresponds for the plasmosphere. The plasmosphere is dynamical, its dynamics depends on the geomagnetic activity. According to the geophysical net of the stations on the ground surface, the region of the projection plasmapause on the ground surface is displaced to the south with growth of the geomagnetic activity that testifies to approach of the boundary of the plasmosphere to the Earth. The plasmosphere decreases in sizes. The above geomagnetic activity, the above strengthening high-frequency a component of the geomagnetic pulsations in the plasmosphere. According to photo from the American automatic space vehicle IMAGE (NASA) for 31.01.2001 [www. astronnet.ru/db/msg/1167179], the configuration of the plasmapause becomes complicated in the indignant geomagnetic conditions, there is a tail towards the Sun in evening sector.

Murom located in region of the middle-latitude geomagnetic can test whims of the space weather on itself under defined geophysical conditions developing in the plasmosphere. The article purpose is to check concept of the heliobiological communications in the middle-latitude region removed from so-called auroral geophysical zones of the intrusion of the plasma of a solar wind up on a statistical material. The researches of the interrelation of the sudden death from the cardiovascular illnesses and from the nervous breakdowns and the presence or the absence of the geomagnetic pulsations are conducted in the article. The data of the station of the first medical aid and the data of the middle-latitude geophysical observatory in Borok of Yaroslavl region are used in the article. The geomagnetic pulsations have been chosen with the frequency range close to biorhythms: PC1 (regular pulsations, pearls), IPDP (irregular pulsations with the decreasing period), Pi1 (irregular pulsations with the period from 1 to 40 s). Sudden death was observed in most cases at a long absence of the high-frequency geomagnetic pulsations in a frequency range close to the basic biorhythms of the person. The conclusions in the article coordinate by [Sterlikova I.V., 1990 and 2012] and with results of the Australian scientists [Buxton J.R. et.al., 1987] who have achieved simplification of a syndrome of Parkinson on the rabbits irradiated by artificial pulsations of the electric and magnetic fields with the frequency of 8 Hz and with the amplitude 0,7 V and 1000 nTl, accordingly. As



it is known, an alpha rhythms of biopotentials of a brain of the person, a cat and a rabbit coincide.

#### References

1. Novikova K.F., Ryvkin B.A. Solar activity and cardiovascular diseases // Influence of solar activity on atmosphere and biosphere of the Earth. – M.: the Science, 1971. – P. 164–178.
2. Sterlikova I.V., Ivanov A.P. Magnitosfernye subburi v geomagnitnykh pulsatsiyakh. – M.: OIFZ im. O.Ju. Schmidt RAN, 1997. – 108 p.
3. Sterlikova I.V. Issledovanie vliyaniya korpuskularnogo agenta solnechnoy aktivnosti na organism cheloveka // Fundamentalnye issledovaniya. – 2012. – № 11 (chast.3). – P. 715–721.
4. Sterlikova I.V. Rol geomagnitnykh pulsatsiy s chastotnym diapazonom blizkim k bioritmam v statistike serdechno-sosudistykh zabolevaniy. (Role of geomagnetic pulsations in frequency band close to biorhythms for the statistics of cardiovascular and nervous diseases). Publ. VNIIMI (Publ. Of the Union scientific investigations institute of the medical information). – 1990. – no. D. – 18353. 24 p.
5. Balser M., Wagner C. Observations of Earth – ionosphere cavity resonances // Nature. – 1960. – 188. – P. 638–641.
6. Buxton J.R., Gazibarich G.J., Ellyett C.D., White S.W., Fraser B.J., McNabb P.W. Effects of environmental ultra-low frequency electric and magnetic oscillations on central nervous and arterial pressure in the rabbit // Preprint University of Newcastle. – Australia, 1987.
7. Chizhevsky A.L. Traite de climatologie biologique et medicale // Publ. par M. Piery. – Paris, 1934. – № 2. – P. 1042.
8. Simoes F., Pfaff R., Freudenreich H. Satellite observations of Schumann resonances in the Earth's ionosphere. Geophysical Research Letters. – 2011. – Vol.38. L22101. – 5 p.

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#### SOME CEREBRAL FEATURES OF METABOLISM IN PATIENTS WITH COGNITIVE DISORDERS WITH BACKGROUND PSYCHO-VEGETATIVE SYNDROME

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In the environment of intense rhythm of modern life, emotional and information overload the cognitive disorders develop in background of psycho-vegetative syndrome (PVS) not infrequently in frames of anxiety or anxiety depressive disorders. Usually, cognitive deficit presents with mild to moderate disorders. Accordingly to statistics, more than 25% of patients of the somatic network have PVS [1]. In some patients the vegetative symptoms are leading in clinical presentation, in others the mental disorders come to the fore [2]. Cognitive disorders coexist with anxiety and depressive conditions, and later they can aggravate resulting in professional and social disadaptation. These studies of cerebral metabolism in pre-dement impairments with background PVS will allow to make patient's complaints objective, and to improve the treatment and prevention of cognitive disorders.

**Purpose of the study:** to investigate cerebral metabolism in patients with PVS to improve the treatment and prevention of cognitive disorders.

**Materials and method.** To study cerebral metabolism, 29 patients with age under 55 with mild to moderate pre-dement cognitive disorders and 20 healthy volunteers without signs of cognitive disorders as a control were examined. Cerebral metabolism was estimated with help of neuroenergy mapping (NEM), the electrophysiological method based on the detection of level of constant potentials (LCP), slowly varying potential of millivolt range reflecting membrane potentials of neurons, glia and hematoencephalic barrier.

**Results.** Normal results of LCP were obtained in 17,2% (5 of 29) patients. Increased metabolism was observed in 58,6% (17 of 29) patients with PVS. Decreased metabolism was seen in 24% (7 of 29) patients. Background metabolism in patients with PVS significantly differed from the reference values. In control group of healthy volunteers the background metabolism didn't differ from the reference values.

**Discussion.** NEM method estimates glucose metabolism in the brain [4]. Unlike PET, NEM reflects the state of backup pathways, i.e. anaerobic glycolysis, catabolism of ketone bodies, amino acids. With chronic or severe stress the anxiety or anxiety depressive disorders develop resulting in increase of functional cerebral activity, activating of anaerobic glycolysis, and developing of acidosis. The lower pH, the higher the level of constant potential [5].

Increase of metabolism corresponds to the first stage of stress by Selye (increase of adaptation), and decrease of metabolism corresponds to the third stage of stress (exhaustion of adaptation). Thus the most profound impairments of cerebral functional activity appeared in the group of patients with decreased metabolism.

**Conclusions.** Assuming all the data on increased metabolic processes in 58,6% of the examined subjects that indicate to the activation of backup pathways, it is reasonable to recommend sedation in combination with antioxidants and non-stimulating neurometabolic drugs to the patients with pre-dement impairments with background PVS.

#### References

1. Akarachkova E.S. On the diagnosis and treatment of psycho-vegetative disorders somatic practice // Physician. – 2010. – № 10. – P. 5–8.
2. Autonomic dysfunction / Ed. A.M. Veyna. – M.: 1998. – P. 752.
3. Fokin V.F., Ponomareva N.V. Energy physiology of the brain // Antidoron. – 2003. – 288 p.
4. Sokoloff L. Energetics of functional activation in neural tissues // Neurochem. Res. 1999. – Vol. 24, № 2. – P. 321–329.
5. Schmitt B., Marshall L., Nitsche M., Hallschmid M., Eulitz C., Born J. (2000) Slow cortical DC – potential responses to sweet and bitter tastes in humans // Physiol Behav. – 2000. – № 71(5). – P. 581–587.

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## MODIFICATION OF BUTYL RUBBERS AND ITS GALOID ANALOGUES BY CARBON FULLERENES

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In this article consider influence modifier of fullerene mix on the butyl caoutchouc different functional group. Take comparative research infrared spectrum of analyze polymers. For interpretation result use discriminate analysis. Noted that the introduction of polymers in fullerene compound made of polyisobutylene contributes to the restructuring of halogenated only forms, found the seal structure in chlorine-butyl and bromine-butyl rubbers, with corresponding declines in solubility.

**Keywords:** synthetic butyl rubber, fullerene, infrared spectrum, discriminate analysis

Using nanomaterials allows you to get new carbon materials with improved performance, which is important for the development of science and technology. As a promising application of carbon fullerenes as a modifier of polymers in the process of mixing with the solid phase. Of particular interest is the fact that its unique property of polymer modifier as fullerenes mixture is used in traces [1].

### Materials and methods of research

As a subjects of study were selected: coal – a mixture of fullerenes fraction C50–C92, composition: C50–C58 (14,69%), C60 (63,12%), C62–C68 (5,88%), C70 (13,25%), C72–C92 (3,06%) and synthetic butyl rubber from low-temperature polymerization catalysts for liquid Friedel-Crafts (methylene bromide under the action of aluminum chloride). Considered industrial butyl rubber: BR-1675 (BR), brombutyl BBR-239 (BBR), HBR-139 hlorbutyl (HBR).

Modification of polymers by mix of fullerenes was carried out by making the necessary concentration of toluene-soluble fullerene in solution a mixture of 3% solution of homogenous solution of rubbers, so that the mass ratio polymer – modifier in terms of dry substance was 1: 0,03.

As the primary method of research used infrared Fourier transform spectroscopy of total internal reflection, used a spectroscopy NICOLET6700. The spectral range of 400 to 4000  $\text{cm}^{-1}$ . To record the optical characteristics of monolithic microfiche were received thick

rubbers, order 20 microns from the aluminum substrate of the 1% toluene solution. Oxidation of microfiches held in low-temperature laboratory electric furnace SNOL 58/350 at temperature 100°C, duration 24 h.

For accurate interpretation of data obtained by IR-spectroscopy regression analysis was conducted. For processing the results obtained were canonical comparison of spectres, which consists in finding the dependencies of the photometric characteristics of one spectrum (1)  $A_1(\nu)$  as a function of a different range (2)  $A_2(\nu)$ :

$$A_1(\nu) = f(A_2(\nu)) \Rightarrow A_1 = f(A_2),$$

excluding the frequency (wave number)  $\nu$  from consideration.

Advantage of this method of analysis of spectrums is that the spectral information is used to interpret the structure and interactions of substances. Spectrums can be represented as a linear superposition of approximating the single strip of Gauss functions (Gaussian):

$$A = A^0 \exp[-\ln 2(\lambda_{\max} - \lambda)^2/\Delta^2],$$

or Lorentz functions (Lorentzian):

$$A = A^0/[1 + (\lambda_{\max} - \lambda)^2/\Delta^2],$$

$A^0$  – intensity/optical density, otherwise, the amplitude of the strip at  $\lambda_{\max}$  (or  $\nu_{\max}$ ),  $\Delta$  – band-width. [2, 3].

### Results of research and their discussion

Fig. 1–3 shows the canonical discriminant analysis comparing spectrum.

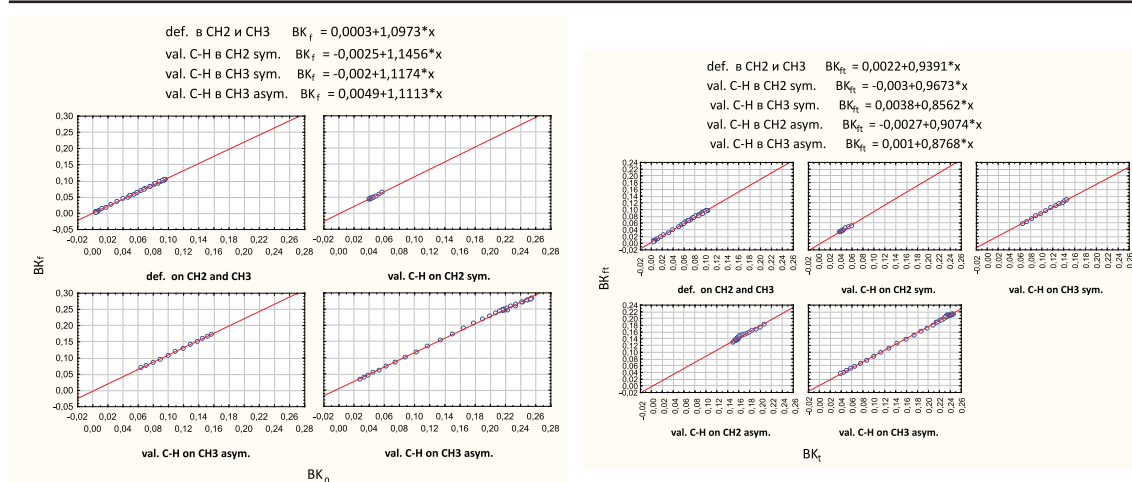


Fig. 1. The regression equation and graphical interpretation of canonical comparison of characteristic frequencies on IR spectrum of BR



As can be seen from Fig. 1, where are the equations of the straight line regression, tangent slope is characterized by an overall increase in amplitude in system (CH<sub>3</sub> and CH<sub>2</sub>-groups) in butyl rubber modified fullerenes. According to the law Lambert-Bouguer-Baer

total concentration of these groups increases the scan layer, indicating that the microfiche seal. On the other hand, linear dependence on the lack of changes to indicate electronic structure, i.e. on the quantum level effects do not appear.

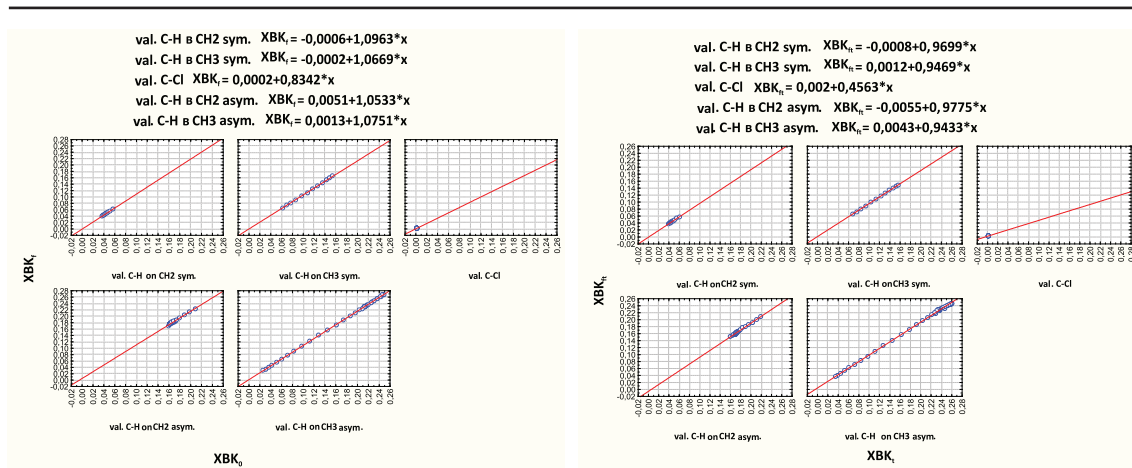


Fig. 2. The regression equation and graphical interpretation of canonical comparison of characteristic frequencies on IR spectrum of HBR

As can be seen from Fig. 2, for HBR the electronic vibrational effects are not increase, but the amplitude decreases during thermal treatment, indicating partial aeration packing of macromolecules in polymer.

Slopes indicate direct seal structure in hlorbutyl rubber. Valence fluctuation of C–Cl weakened,

but this interpretation may be incorrect due to the very small peak and high density of points of equal amplitude in compared spectra. Amplitude of aliphatic groups in heat shrink, aeration packing of macromolecules in hlorbutyl rubber. Inclination in C–Cl are difficult to interpret because of the very small strip oscillation of this group.

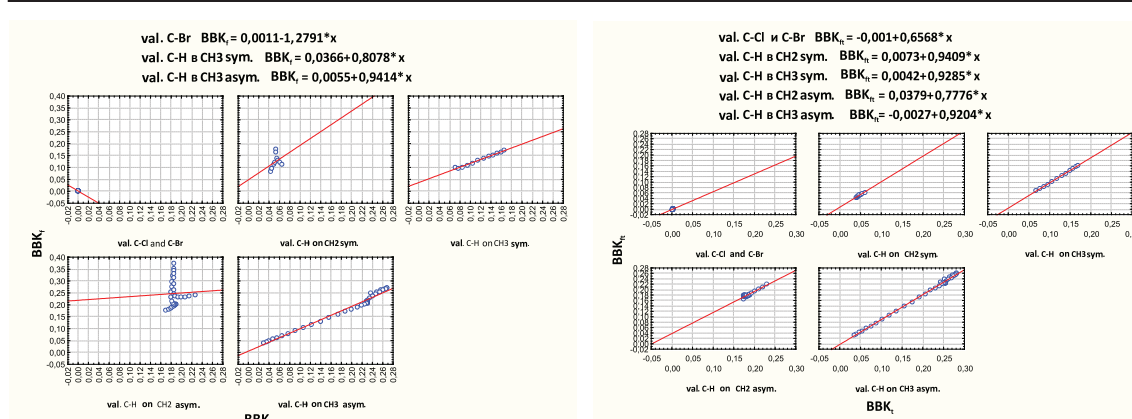


Fig. 3. The regression equation and graphical interpretation of canonical comparison of characteristic frequencies on IR spectrum of the BBR

In brombutyl rubber, the modified fullerenes are electronic measuring vibrational state of linear groups-CH<sub>2</sub>- for both types of variations – symmetric and asymmetric and there are two new peaks that can be associated with removing fluctuations degeneracy H–C–H. Polymer struc-

ture as a whole is loosened, as slopes with transformation C–H in CH<sub>3</sub>, is less than one. Heat loosens the polymer structure, partly also suppressed effects associated with electronic vibrations. Comparison of infrared spectra of ternary and higher orders are given in Fig. 4.

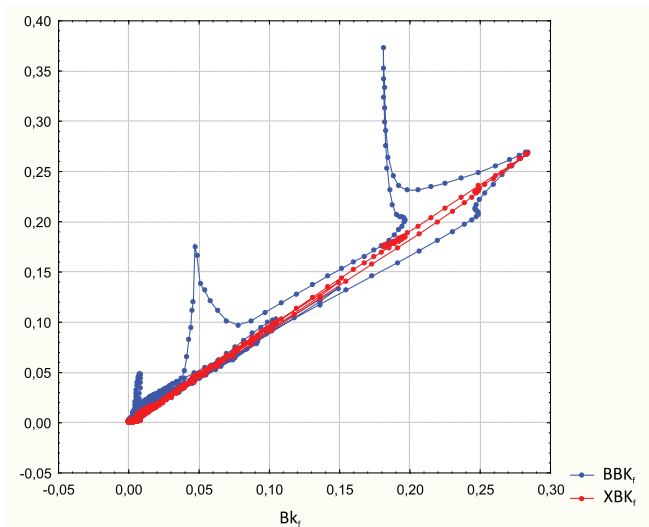


Fig. 5. Comparison of infrared spectra of ternary modified fullerenes rubbers: BR, HBR, BBR

In Fig. 5, it makes sense to discuss primarily the approximate angle tangents in direct dependence on the chemical nature of the polymer and influence of modification. These tangents are directly proportional to the «concentrations» of the undecided in a thin layer of structural fragments passing beam method. Here is a small overview of valence fluctuations with widening the peaks of HBR on butyl rubber and removal of degeneracy in symmetric and asymmetric stretching vibrations of C–H is the emergence of two new peaks in brombutyl.

To clarify the effect of the mixture of fullerenes in gas kinetics of rubbers was swelling. The experiment was to measure the mass of rubber, at regular intervals (1, 3, 5, 10, 20, 30 minutes) during his swelling and subsequent solubility in toluene. Rubber submerged in toluene, at certain intervals, removed it and dragged toluene weighed. The obtained data are presented in tabular form.

The ratio of velocity of dissolution rubbers.

Rubber	Speed of dissolving ratio of rubber modified to not modified
BR-1675 (F)/BR-1675	6,8
HBR-139 (F)/HBR-139	0,134
BBR-239 (F)/BBR-239	1,01

Thus, it can be concluded that the imposition of a mixture of fullerenes in polymers made of polyisobutyl class helps the restructuring only galoid forms. Effect of fullerenes increases resistance elastomeric to polar solvents and allows for some way to predict the movement of gases increases by a polymer structure.

### Conclusions

Studies lead to the following conclusions:

1. The interaction of carbon fullerenes with macromolecules of polymers when exposed to temperatures in the presence of oxygen, occurs through its consistent adherence to the chain of the macromolecule through oxygen, resulting in a partial aeration structure of polymers.
2. Change of the spatial structure of galoid forms of butyl rubber when modifying a mixture and formation of supramolecular fullerene structure is confirmed by decline-specific swelling of modified polymers and solubility in toluene, basic physico-chemical indicators are stable.

### References

1. Mischenko S.V. Carbon nanomaterials: production, properties, application / S.V. Mishchenko, A.G. Tkachev. – M.: Mashinostroenie, 2008. – 320 p.
2. Smagunova A.M. Methods of mathematical statistics in analytical chemistry: Stud. Allowance /A. Smagunova, O. Karpukova. – Rostov n/a: Phoenix, 2012. – 346 p.
3. Smith A. Applied infrared spectroscopy: basics, technology, analytical application. – M.: Mir, 1982 – 328 p.

*Materials of Conferences***APPROACH FOR THE MASS OF H BOSON**

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The result is presented through experimental searches in LHC, with use of samples of the data, which hypothetically correspond to exemplary approach for the mass of H boson equal to  $125,979 \pm 0,017 \text{ GeV}/c^2$ , where it is supposed that the mass of Z boson is equal to two differences between masses of H boson and of W boson.

Physicists of the ATLAS and of the CMS at Large Hadron Collider (LHC) in CERN could investigate an interval of masses of particles, in which detection of Higgs boson particle is probable enough. Recent experiments on LHC have learnt a particle with mass nearby  $\approx 126 \text{ GeV}/c^2$ . Employees LHC have submitted data the analysis of proton collisions with energy 8 TeV [1]. The perspective area of detection Higgs boson has been declared as a range of masses nearby  $\approx 126 \text{ GeV}/c^2$ , where experiments signal production of new particles.

Researchers in LHC have concentrated efforts to two channels: Higgs boson, decaying to two photons and to four electrons or to four muons. Both these channels have an excellent permission to mass, thus, the channel with two photons has a comprehensible signal at the big level of a background, and channels with four leptons have a smaller signal, but very low background. Statistical combinations of these and other channels define them in local statistical value of five standard deviations, and it means, was possible to confirm efficiency detection Higgs boson.

Let's consider the data about bosons masses presented in reports of Particle Data Group [2]

and reports of ATLAS and CMS Collaborations in CERN [1].

$$\begin{aligned} M_Z &= 91,1876 \pm 0,0021 \text{ GeV}/c^2; \\ M_W &= 80,385 \pm 0,015 \text{ GeV}/c^2; \\ M_H &\approx 126 \text{ GeV}/c^2, \end{aligned} \quad (1)$$

where  $M_Z, M_H, M_W$  – these are masses of bosons (Z, H, W bosons).

Let's assume that masses of three these bosons are connected with each other by some hypothetic «trifecta» equality with coefficients of prime number.

$$M_Z = 2(M_H - M_W). \quad (2)$$

Then we will receive following approach for the mass of H boson.

$$\begin{aligned} M_H &= M_Z/2 + M_W; \\ M_H &= 125,979 \pm 0,017 \text{ GeV}/c^2. \end{aligned} \quad (3)$$

This mass value corresponds to the heaviest H boson which used in aforementioned hypothetical approach in model trifecta (2) masses of Z boson and of W boson.

This mass of a copy H boson, corresponds to some experimental results messages [1], for the mass of H boson equal to  $125,979 \pm 0,017 \text{ GeV}/c^2$ .

**References**

1. Reports of ATLAS and CMS. Seminars at CERN, (6/4/2012) (URL: <https://cern.ch>).
2. Beringer J. et al. (Particle Data Group), PR D86, 010001 (6/18/2012) (URL: <http://pdg.lbl.gov>).

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## SHAPING CULTURAL TOLERANT BESIDE FUTURE TEACHERS AS ONE OF THE PROSPECTS OF THE DEVELOPMENT OF THE HIGHER EDUCATION

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Given article is dedicated to problem of the shaping beside future teachers in system of the higher education. In connection with than in the article is described new approaches and requirements, necessary modern future teacher

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**Keywords:** cultural, tolerant, teacher, education

The Majority state whole world, including Republic Uzbekistan multinational, consequently, the most important condition to toughness state is a shaping the friend multinational relations on base flexible national politicians, first of all, in the field of formation.

Importance problem of the deepening the interaction folk and their cultures, tolerant, respects to one another, to people other accessories. So on modern level in condition world integrations necessary education in spirit of the tolerances to culture different, but this possible only within the framework of cultural of the formation. Cultural formation is called create in educational institutions such favorable social-psychological ambience, in which each training, regardless of its, has alike with all possibility for realization of its constitutional right on reception of the equivalent formation, for realization of their own potential possibilities and social development at period of the training.

One of the most important integer of the formation – an orientation child on human of value. So today so it is important to find the efficient mechanisms of the education in spirit of the tolerances, respects of the rights of the people of all races and folk. Much massive problem – a teacher and his role in education tolerant to personalities. It is Difficult to present that in tolerant to the other teacher will be able beside schoolboy attitude to the other people, the other culture. Considered by us ways of the education tolerances to personalities only then will be reproducible, when their will realize the teacher, intelligently pertaining child to particularity in his dialogue with other culture.

In pedagogical practical person much often appear to situations, when teacher inadequate, values to abilities, level of the knowledge's people only on the grounds of accessories people to other culture. The Teacher must know how to take into account not only individually-larval particularities people. National-psychological particularities can promote or prevent adapting the representatives to one or another nations to requirements of the teacher. So

teacher is necessary to get acquainted with disposition, custom, tradition of folk, who representatives fall into people group. The Ignorance national-psychological particularity brings not only to reduction of efficiency to scholastic activity, but also appearance nationality friction, to mutual estranging.

So very important is a shaping tolerant beside future teachers already in step of preparation to professional-pedagogical activity in high school. For development beside future teacher's cultural tolerant necessary to introduce them with varied culture, углубленно study them. Thereby, students will learn to value and respectfully yours pertain to representative of other cultures.

Preparation skilled teacher, ready to realize the educational strategy must begin as far back as pedagogical educational institutions: pedagogical high school, college. Follows to note, as beside student themselves not is always formed an tolerant relations. Moreover speech goes not only about intolerances of the future teachers to representative some national or social group, but about intolerances to personalities child in general. The Headwaters this in incomprehension of the nature child; in not developed to keenness's in absence of the pedagogical directivity. Here, the decision of the problem dares the positions of the future teacher social and psychological service in goal-directed correcting.

Symptomatic intolerances of the teacher to child are: the irritation; raised sensitivity; the sharp emotional blasts behavior; the tactics; aggressive and hostile position to child, to person, unlike on teacher.

The Similar manifestations impossible and don't compare with activity of the teacher, with one of the most humane, peaceful type to activity -a forming the person. The students must form the following skills:

- a contacts with pupils different ethnic a group;
- a finding the problems when adapting pupils, turned out to be by blame ethnic a group;
- a rendering help in adaptation such pupils;

– a forecasting's appearing ethnic a group to confrontations in baby group and rendering preventive help;

– a provision of protection pupils from violence, mockery, humiliations on the part of and peer, and adult;

– an organizations of the public playing leisure; the organizations of the leisure public holiday.

In modern pedagogics is worded new exploratory problem – ethnic a group competency teacher and the public, which reflects not only determined level to preparedness's for entering in national contact, but also provides to a considerable extent possibility to optimization of the relations with representative other этнокультурных tradition [1; 2; 3]. Is it here-with provided accessibility and receivership all type formation to pupil of any nationalities and faith in religion, democratization are taken into account cultural and ethnic factors [3; p. 43].

The system of the training of the teacher for work with pupil include the following components: mastering by student by professional culture; preparing the teacher-researcher; shaping to personalities of the teacher; fundamental formation; provision broad humanitarian formation; technology humanitarian formation; provision high level practical holdings by professional skill; the integration course pedagogic, psychologies and methods of the foreign language; the possibility individual realization; the differentiated estimation not knowledge's, but professional skills, professional skill. The development of the contents and methods to realization of the principle in larval-oriented system, having lumpy on national composition contingent pupils, revealing the requirements

to preparing the teacher for functioning in such system.

In context larval-oriented formation education is considered as humanitarian practice, directed on care and help pupil to feel itself unique personality regardless of national accessories. Cutler larval-oriented ambience is a necessary condition of the reduction and partial reach social-psychological tension, existential vacuum, awe, hopelessness's and other stressful conditions, in which are found pupils.

The Study of the discriminating particularities, development of the general scheme mintalitate creates the premieres for shaping larval significant quality pupil and national ideal. Creation for learning cultural space, orientating child to ideal of the person, striving to самореализации and possessing feeling to responsibility, knowing how critically think and value spiritual and material wealth, dug by mankind, respect the personality keen to constantly changing world and promote creative to enrich his – here is main of the problem, which must adopt the future teacher.

#### References

1. Zlobina E.A. The Track record of the development гражданственности future teachers// Letter in Emission. Of-flayn (TheEmissia.OfflineLetters): electronic scientific zhurnal. – June 2011, ART 1590. – SPb., 2011. – URL: <http://www.emissia.org/offline/2011/1590.htm>. – Gos.reg. 0421100031. ISSN 1997-8588. – a Volume 0.5 p.1. [date of the address 09.06.2011].
2. Kravchenko A.I. Kuliturologiya: Scholastic allowance for vuzov. – M.: Academic project, 2002. – 496 p. Series (Gaud-eamus).
3. Pedagogika: Ucheb. posobie for cool. High. Ped. ucheb. zavedeniy / V.A. Slastenin, I.F. Isaev, E.N. Shiyanov; Under ред. V.A. Slastenina. – M.: Publishing centre «Academy», 2002. – 576 p.



## INTERACTIVE TECHNOLOGIES, BASED ON COMPETENT APPROACH IN THE PREPARATION OF BACHELORS

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The main goal of innovation in education is to prepare people for life in a changing world. Given the transition to a global society and informative ubiquity of the Internet, the creation of teaching materials based on information technology, using computers and telecommunications networks, including the interactive testing and evaluation of students' knowledge in the global network is a vital and urgent task. In work the essence, a role and value of system on the example of discipline studying «Real estate economy» reveals. That interpretation Competence quality of learning lies in the developed system.

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**Keywords:** global network, system of interactive testing, competence, information and telecommunication systems

Modern society confronts the Russian system of education a number of new problems caused by political, social, economic, philosophical, and other factors, among which highlight the need for qualified specialists [7].

Certainly, the leading specialized universities that have strong scientific and educational traditions, train specialists and economists of high class [2]. But lately, businesses and the real economy are increasingly voicing criticisms of the fact that the level of knowledge of college graduates do not meet the requirements of a market economy. We, as members of university sphere, we will not unconditionally defend the current system of professional training in higher education, however, we note that there is a problem, and it is due to the contradiction between the obsolete structure of educational training programs in economics and management in our universities and the economic reality of today i.e. slowly come out of the «historical track» [1] The system of higher education in the country is addressing this problem, for example, since 2010, all public schools in the decision-making procedure translated into a two-tier system of education (bachelor and master) as it is in the developed countries of the West. The modern system of education must develop mechanisms of innovation, to find creative solutions to critical problems, help to turn creativity into shape and form of human existence. Innovative learning technologies should be seen as a tool with which the new educational paradigm can be put into practice [8].

The adequacy of education socio-economic needs of the present and the future can only speak in the event that its modernization will be based not only and not so much on the organizational innovations than on substantive change – in the content and technology training and the training of scientific research. One of the effective ways to implement innovation in education is the creation of teaching materials based on information technology, using

computers and telecommunication networks. Information and communication technologies allows students to form a competence-oriented.

Members of the scientific school «Methodological problems of the effectiveness of regional investment and construction systems as self-organizing and self-managing systems» at the St. Petersburg State University of Architecture and Civil Engineering is developed and offered in the Internet online system testing and evaluation of students' knowledge in the discipline of «commercial property». The project involved not only the staff members of the University, but the researchers of different age groups and academic qualifications, including graduate and undergraduate students, conducting research related to the general scientific direction and integrated joint research activities [3].

Creation of interactive technologies in education not only increases the creative and intellectual potential of students through self-organization, the pursuit of knowledge, the ability to interact with computers and to make decisions, but also forms a competent person with the necessary subject-oriented. But the transition to interactive teaching methods and real-time technologies requires significant telecommunications resources that can provide the necessary link participants in the educational process, support for multi-technology, high-performance telecommunications equipment and network capacity data [4].

Interactive Technology in Education (electronic version of the textbook with interactive testing system) have a number of advantages that make them the most popular use, in particular: the opportunity to engage in a convenient time, in a convenient location and temperature, the ability to access sources of educational information online; unregulated period of time to develop the theme. Interactive technologies enable every student, regardless of the level of training to actively participate in the educational process, to individualize their learning, exercise self-control. Not be a passive observ-

er, but actively acquire knowledge and assess their capabilities. Students begin to enjoy the process of teaching, regardless of external motivational factors.

Creating a system of verification and assessment for the subject «Real Estate Economy» forms the subject-matter jurisdiction, which promotes an integrative educational competence of graduates.

Of interactive testing and assessment for the subject «Real Estate Economy» is tested on site <http://asaul.com>. To enter the system should move the tab «Test» and register with your username (email address) and password. Page opens testing. Next, the student should select subjects testing and begin the task. Assessing students automatically puts the system itself, which completely eliminates the subjectivity estimate. Test result itself can look into the option «My results».

Theoretical questions interactive testing student knowledge control materials contained in the book of Professor A.N. Asaul «Real Estate Economy». The book is marked «Recommended by the Ministry of Education and Science of the Russian Federation as a textbook for university students enrolled in «Economics and Management (in branch)» [5]. Direct questions themselves mostly duplicate tests in the textbook «Real Estate Economy. Practical work: textbook for higher education» [6].

The developed system testing and evaluation of students' knowledge is an open online access to the Internet, allowing students to use it for self-study at any time. The system allows you to make certain issues, but the fundamental theoretical basis of the economy and the real estate described in the textbook «Real Estate Economy» will remain unchanged. System testing and evaluation of students' knowledge is used in the learning process in teaching the subject «Economics estate» not only at the St.

Petersburg State University of Architecture and Civil Engineering, but also in the educational process of the Tuvan State University.

Pronounced competence approach to a new vision of goals and evaluation of vocational education, addressing the key issues of modern higher education – to bridge the gap between knowledge of graduates and the requirements to a specialist in real market conditions in Russia and promote the training of competitive specialists.

*The material is based on research carried out by «The development of the theory and methodology of training and education specialists for investment and building complex of Russia in the system of higher education, postgraduate and further education» on state orders Russian Ministry of Education in 2012 under the guidance of the author.*

#### References

1. Asaul A.N. Internal crisis of university management education / A.N. Asaul, L.F. Manakov // Economic revival of Russia. – 2009. – № 2 (20). – P. 70–81.
2. Asaul A.N. Prestigious economic education for Russia // Economic revival of Russia. – 2006. – № 1 (7). – P. 3–6.
3. Asaul A.N. Role of school of sciences in preparation of scientific shots // Regional aspects of integration of science and education: problems, development prospects. Materials of the All-Russia scientific and practical conference. – Kyzyl: Publishing house of TuvSU, 2011. – P. 91–98.
4. Asaul A.N. Creation and introduction of remote heuristic education // Innovative technologies of training at the higher school. – 2009.
5. Asaul A.N. Real estate economy. – 2nd prod. – SPb.: St. Petersburg, 2007. – 624 p.
6. Real estate economy. Practical work: the manual for higher education institutions / A.N. Asaul, S.N. Ivanov, P.B. Lyulin. – SPb: Publishing house SPbSUACE, 2008. – 285 p.
7. Sergeeva M.G. Training of specialists of an economic profile by means of development of model of professional competence on a way of economic revival of Russia // Economic revival of Russia. – 2004. – № 1 (15). – C. 50–55.
8. Pchelintseva A.S. Criteria and principles of design of innovations in education // Economy and management. – 2005. – № 2 (19). – P. 39–43.

## MOTIVATION OF THE FACILITIES OF THE SHAPING COMMUNICATION COMPETENCE ON ENGLISH LESSON

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Problem of the study of the foreign language in conditions of communication-oriented education is considered in the article. Communication-oriented learning of foreign language means shaping the communication competency language, colloquial, practical, social linguistic and thinking in students, when student ready to use the foreign language as instrument speech and thought to activity.

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**Keywords: motivation, communication, competence**

The Modern condition of the theory of learning the foreign language and gained knowledge makes it more necessary to return to competencies of the communication education.

The Foreign language as an instrument of the cognition in condition communication-oriented education becomes also one of the means of socio-cultural formation. Communication-oriented education of foreign languages means shaping in student of the communication competency language, colloquial, practical, social linguistic and thinking, when student ready to use the foreign language as instrument speech and thought activity.

Regrettably, it can't be said that all regularities are already known and formed, allowing train speech activity effectively, but the only thing that possibly can be confirmed with confidence is that the base of the methodical contents of the modern lesson must be communicativeness. Before speaking about the problem of the shaping communication of competence, it's very important to analyze the determinations, communication data in psycho-pedagogical literature, and reveal its essence.

Necessary to note that the term «communication» has been broadly spread, along with term «contact». For the first time, the term «communication» came up in scientific literature at the beginning of XX century and was considered by foreign researchers in context of two main general theoretical buildings:

1) behaviorism (the base to communications is direct speech signals, manipulating those possibly develop a person; the representative of this approach is D. Uotson);

2) symbolical interactionism (personalism), where communication is internal metaphysical ability of a person to open in himself the feeling of others (Dzh. Mid).

A.B. Dobrovich selects four main phases in process of the realization to communications:

- 1) impetus to action;
- 2) revision to situations of the action;
- 3) action itself;
- 4) rolling up actions.

In history of the education foreign language two main ways were practically checked:

a) study language on base of the rule at use shortened communication;

b) mastering the language phenomena on base of the communications mainly.

The First way is well presented in the known grammatical and translating system of the education of foreign language. According to this methods, the education was built on research of grammatical (and somewhat other language) of the rules and lexicon with the following transition to product (construction) and decoding (reading and understanding spoken speech) speech. The Perennial experience has shown that this way is not effective. Using rules and vocabulary of the language, trainings were to reconstruct (generate) new language for them. The Way of the assimilation lay through huge amount of mistakes, slowing the rate of the assimilation of the language and lowering interest to study.

The Second way to learn the language (through communication) turned out to be more efficient though such education also contained much defects. The underestimation of the realization mechanism language, formed in the manner of rules, reduced the quality of holding foreign speech, enlarged the periods of the learning of the foreign language. In total, modern literature was marked rapprochement these two ways of the education language. The fact is significant to the extent that that he empirical way has proved the unity of the language rules and action.

The Main action, by means of which the foreign language is obtained, is a process of the contact, oral communication. In process of the communications occurs not only exchange of thoughts and feelings, but also mastering the language facilities, giving the generalized nature to them

The use of the communication methods – objective necessity, dictated regularity of any education as such. As it is well known, everything that a person trains to, he gains it to use in future activity. It is also known that the use the knowledge, abilities, skills is founded on carrying, but carrying depend, first of all, on adequacy of conditions of the education that

condition, in which these knowledge, skills, and abilities are expected to use. Consequently, preparing the student to participation in process of the foreign contact it is necessary in condition of the foreign contact, created in auditoriums. This defines the essence of the communication contact, which is concluded in that process of the education is a model of the process of the contact. In this case communicativeness is considered not as methodical principle, even if it's leading, but as methodological principles, which defines, on one hand, methodical principles of the education, but on the other – choice of general scientific methods of the cognition source for building of the process of the education.

In accordance with communication method education varies depending on level trained. First of all, scholastic process is oriented on contents, which helps to orientate in the world of the foreign culture, develops the own world of the vision of the different cultures. Trainees emerge as active partners on contact; they spur to realized and independent use of language and speech facilities. The trainings have a social nature, frontal work is changed to partner work, the individual and group.

Working on communication method, active use of textbooks on communication directivity in education and learning process gives the positive results when learning foreign language.

1. The Organization of the contact -skills to interpersonal communication.

2. The Maintenance of the contact, determination to feedback, plasticity of communication actions – skills of the interpersonal interaction.

3. The Analysis results contact, reflection – skills of the interpersonal perception.

Forming communication of competence is characterized presence of the following criterion: desire to enter in contact with surrounding, know how to estimate the situation of the contact, ability to organize move of the communication act itself, ability of the manifestation of empathy, reflexive behavior.

For organization of the process of the shaping communication competence it is important use the communication methods. In this connection the observance of the following features is necessary, allowing to name the educational process communication: foreign formation; the real contact; the larval sense; motivations of any actions; speech and thought activity; the relationship of the contact with the other type of speech activity; the situations as systems of the relations; функциональность; novelty and heuristic; content-richness; problematic.

#### References

1. Appatova R.S., Korzhachkina O.M. Language and communication aspects of the mastering english by verb in generalising course // Foreign languages in shkole. – 2007. – № 1. – P. 7–14.
2. Bondarevskaya E.V., Kulinevich S.V. Pedagogika. – M., Rostov-on-Don, «Teacher», 2009. – 87 p.
3. The Bug YU.M., Petrovskaya L.A., Rastyannikov P.V. Diagnostics and development компетентности in obschenii. – Kirov, 1991. – 142 p.
4. Winter I.A. Psychology of the education foreign language in shkole. – M.: Enlightenment, 2001. – 222 p.
5. The Study of the foreign language in school: new perspectives // Pedagogika. – 2008. – №1. – P. 46–48.
6. Lomakina O.E. Shaping professional компетентности future teacher of the foreign language: Diss. on soisk. uchen. step. kand. ped. sciences. VGPU. – Volgograd, 2002.



## THE UNIAR APPROACH TO COMPUTER SCIENCE AND INFORMATION TECHNOLOGIES TEACHING FOR HEALTH PROFESSIONALS

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The analysis of the situation of post-graduate and additional education in the field of computer science and information technology of professionals in the health care system under the condition of the uniform state information system creating has been introduced. The author issues the reasons for the radically changing of the approach to education, participating in the field of both health care management and in the field of proved of the health care. Developed by the author uniar approach for computer science teacher to organize the educational process, within the framework of classical training to get the information on current situation and needs in medicine, and using this information as feedback to integrate the experience, knowledge and skills of the teacher and students to create the optimal, efficient and qualitative information technology education.

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**Keywords:** uniar approach, Computer Science, Information Technology, Health Informatics, additional and post-graduate education of physicians

The order of the Health Ministry of Russia from 28.04.2011 № 364 approved the concept of the creating a unify state information systems in health care [1]. One of the major factors contributing to the successful development of the program is to increase the current level of health care workers at all levels concerning information technology. Therefore, one of the most urgent tasks of Public Health is the organization of computer science and information technology teaching in the postgraduate and additional education of health professionals system.

Beginning from 2000s, increasing the growth rate of health information, are both quantitative and qualitative changes in the application of information technology by physicians and patients.

The number of hours is provided for the teaching of computer science in the cycle of postgraduate and additional education of physicians is low, but at that time the most important aspects, from the introduction of high-tech digital equipment to transition to paperless document management technology must be considered. The problems of the informational security must be obligatory considered, because the most of the information in medicine can be classified as confidential and must be secured in accordance with the law.

The information in this article is based on the experience of the author as a teacher of the Ural State Medical Academy of the additional education.

Let's present the situation. There are 20–30 health professionals on the classes of the information technology. There can be medical specialists in various fields of medicine and doctors, representing the various territories, administrative and geographical formations, rural hospitals, major federal facilities, with different levels of information competence. All the

students are the practical medicine representatives, and the main purpose of their training is the reception new information and answers to their production problems [5].

The theory and practice of adult education as a separate phenomenon, or androgogics, began to develop in the mid of 30-ies of the XIX century. The andragogical learning specification is determined by psycho-physiological and social peculiarities of the adult learner, described by (Begnel R.G., Brendedzh V.G., Griffin K., Maklegen P.A., Knowles M.Sh., Savicevic D.M., Jones E., Vershlovsky S.G., Darinskii A.V., Zmeev S.I., Maron A.E., Monakhova L.Y., Kolesnikova I.A., etc.).

Indeed, adult learners are differentiated with the existence of life and professional experience, willingness to learn and quick implementation of the knowledge, skills. The training process is organized as a joint activity of learning and teaching in all its phases [4]. Andragogical approach is the general scientific level, in terms of which our research is issued.

Queries of the adult in the training are mainly related with the desire to raise the level of professional competence. However, in all the studies the axiomatic is the educational and professional competence of the teacher. Therefore, one of the most serious problems is the question of erudition and understanding of the medical needs in the field of computer science by teachers of the postgraduate and additional medical education cycles.

To cover the particular questions professionals are invited, programmers or professionals to track the specific software, introduces the work of medical institutions. But when you need to teach the general application of information technology, the question is: where can the teacher of computer science get training in the field of the health care?

We believe that computer science lessons for health professionals will be really high-quality and useful only when the teacher:

1. Is a professional in the field of information technology.
2. Knows medical needs in information technology. The content of the lecture material and the selection of issues for the seminars anticipate the needs of the learners.
3. Able to predict emerging needs in the products of Computer Engineering and he himself makes that contribution to form the needs health professional for new software, hardware, and software-hardware technologies.

At present the situation is changing so quickly that in order to follow the above points, the teacher must always be ready to know a wide variety of aspects of the application of information technology in medicine. The only available source of reliable, relevant, comprehensive and competent information is the health professionals trained in the cycle of postgraduate and additional education of physicians.

Therefore, a relevant question of formation approach in teaching with feedback:

- containing elements of mutually beneficial conversations created in the classroom atmosphere of partnership and mutual assistance;
- allowing the teachers to learn about the current medical needs in information technology from the «first-hand» and, according to the information received, to modify and adapt the content of the following classes of groups;
  - the integrating of the context, framing, partisipar, competent and holographic approaches, process of the facilitation, and the principles of andragogy, at certain stages of providing leadership to students, and not to the teacher.

The result should be to achieve a high level of information competence for health professionals, which ultimately leads to the higher quality of medical services to the population.

#### The socio-historical context of the uniar approach

Medicine and science are sciences far from each other, one of them for thousands of years, the other – the centuries evolved independently. In the mid of the 20th century with the advent of electronic data processing have a common ground of science. Joint development began to appear, however, we cannot talk about the integration of these disciplines.

Integration – from the Lat. *integrum* (integer), Lat. *integratio* (restoration,) implies a mutual penetration of any element or combination of them in the whole. Therefore, the integration of science – is an association of various

sciences to study some phenomena in different aspects. Using this approach, we establish common scientific concepts related to the general meaning of disciplines and teaching methods that promote the integrity of the students received scientific and technical knowledge. Certainly, the use the integrated approach to ensure the integrity of the educational activities of professional and personal growth expert, integrating knowledge into practice [2]. However, the transfer of concepts and definitions from other fields is not always successful: the technical terms in another science often becomes distorted sense.

The transdisciplinary approach to any extent (multidisciplinary or interdisciplinary) also involves the joint research or study, or one subject, object, environment, or transfer of a science research methods to study another science in order to obtain the result. The interpretation of the results is always done from the perspective of the leading discipline, which leads to a change in the image of the subject of a disciplinary investigation. Therefore, these approaches contribute to the accumulation of disciplinary and interdisciplinary knowledge, but it does not help in identifying common patterns and mechanisms of their interaction within the subject of the study [7].

In our case (science and medicine) can be seen another aspect, **which consists of the fact that we have two sciences and one of them helps the other to receive a higher level of quality, while not penetrating to the core of the parallel developing science. Moreover, the initiator of the development of the future technologies can be the inner needs only.**

The health workers do not study the database or computer architecture, and computer science cannot make diagnoses. However, being aware of the needs of physicians in clearer images obtained diagnostic equipment, computer science specialists and engineers are beginning to study the use of new and existing methods, such as mathematical filtering of the data, or creation new formats of digital data.

On the other hand, knowing the needs for the new computer architecture, based not on the classical scheme proposed in 1945 by John von Neumann, on the basis of which now operate all existing computers (with the exception of a small number of laboratory neurocomputers), specialists in the field of medicine and biology begin the study of biological neurons, the DNA cells, bacteria, which in the future may become the basis for building a new generation of computers. Implementation architectures and storage devices, cell-based DNA and bacteria, in the future transfer modern technology to a new level.

We have introduced the term uniar (unio (lat) – the union; -ar (lat) – suffix carrying value of «affiliation, attitude») indicating the principle of parallel science developing through mutual finding solutions to emerging needs. The result is the emergence of a qualitatively new technology in each of the communication sciences.

#### The uniar approach to education

As medicine and computer science are evolving uniarly, the doctors in training informatics and computer science elements medicine (for example, in the preparation of programmers to work in health care), it is appropriate to use this approach in teaching. The uniar approach helps in the framework of classical training to form the structure of employment in such a way that the information received by students and teachers, acted as a feedback to allow:

to the students –  
– knowing the opportunity to study science, contribute (using their business and professional opportunities) implementation in

health care practice new therapeutic and diagnostic devices and technologies;

– knowing the needs of other sciences, to initiate research in the own field and contribute to the global goal: the advancement of science in general;

– improve their information competence: not only to possess the modern means of information transfer (computer, office equipment, etc.) and information technology (communication through modern digital devices and online services), but also possess erudition, which applies these devices and technologies to solve any emerging problems in practice, including the uncertainty situations and using the intelligent and heuristic methods.

To the teachers –

– learn about current needs of practical medicine in information technology and in accordance with the received information quickly modify and adapt the content of the following classes of groups.

Let's schematically represent the described approach (Figure).



Scheme of the uniar approach

The uniar approach can be represented in the form of the control process with the obligatory feedback. The task of the teacher is to organize the learning process so that the information obtained during initiated discussions, presentation of work performed by the students independently on specific health issues and their organizations and institutions, public process solutions situational problems, became that the correction module, which makes the class really relevant, useful and highly professional.

Research principles and procedures used in the determination and theoretical basis of the concept of substantive content of the uniar ap-

proach to the specific scientific level are context, framing, partisipar, competence and holographic approaches, which fully provide the basis for the formation of targeted, meaningful and operationally activity-related, control and regulation and an assessment and successful components of the pedagogical process.

#### Conclusions

Formation information competence of a high level for the physicians has become a necessity and is critical for the further technical progress, keeping up with the development of advanced computer and information

technologies, the development of medicine and pharmacy, manufacturing, distribution and servicing of medical devices and medical equipment, as well as other components of the health sector.

Teacher and health care professionals, students in the cycle of the postgraduate and the additional education of doctors, are the participants both in Public Health and the field of health care management.

The result of the introduction of the uniar approach in conducting classes in the postgraduate and additional education will integrate the experience, knowledge and skills of the teacher and students and make the learning experience the best for this contingent, and to lay the foundation for training in the next groups.

#### References

1. The order of the Health and Social Development Ministry of Russia from 28.04.2011 N 364 (as amended on 04.12.2012)
2. Grebenshikov, E.G The new interface of science and society: transdisciplinary strategies in biomedical research // Caspian Region: Politics, Economics and Culture. – 2011. – № 1 – (26). – P. 149–155.
3. Kobrinski B.A. Medical informatics: studies for stud. institutions of higher prof. education / B.A. Kobrinski, T.V. Zarubina. – 3rd ed., sr. – Moscow: Publishing Center «Academy», 2012. – 192 p.
4. Kolesnikova I.A. Fundamentals of andragogy: Textbook for stud. of high. ped. institutions / I.A. Kolesnikov, A.E. Maron, E.P. Tonkonogaya and others, ed. I.A. Kolesnikova – M.: Publishing Center «Academy», 2003.
5. Ovsyanitskaya L.Y. Features the IT education organization in the cycles of the postgraduate training // Proceedings of the «Urban health problems» Issue 14: Saint-Petersburg, «BBM», 2009.
6. Encyclopedia of professional education in the 3 v. / scientific. Ed. tip: S.Y. Batyshev, A.M. Novikov, V.A. Polyakov. – M.: RAE Association «Professional Education», 1998.
7. Judge A. (1994) Conference Paper. 1st World Congress of Transdisciplinarity, Union of International Associations.
8. Shorliffe E. Medical informatics meets medical education // JAMA. – 1995. – № 273. – P. 1061–65.



*Materials of Conferences***OVERCOMING COMMUNICATION FAILURES IN TEACHING CHEMISTRY IN BILINGUAL CONTEXTS**<sup>1</sup>Davydenko L., <sup>2</sup>Butenko L.<sup>1</sup>Linguistic University, Pyatigorsk,  
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Teaching is stimulating, satisfying, and real fun. Furthermore, it is educational. Chemistry teachers guide students in discovering the marvelous logic, efficient simplicity and design behind myriads of complex events in nature. Chemistry education today provides access to new knowledge, helping students understand how things happen in the real world.

The goal of our investigation is, first, the problem of correlation between conception systems of linguistic categories in chemistry and modern Russian and, second, the problem of overcoming communication failures in the process of chemistry acquisition by foreign students in bilingual contexts. A lot of failures occur because Russian and the language of chemistry are different in systems, to say nothing of the foreign students' proficiency which is rather restricted.

Education is to acquire knowledge, skill and values, both personal and social. Nowadays, education components are conventionally expressed as Cognitive, Personal and Social domains, the cognitive domain being stressed (Holbrook, 2005). To optimize successful communication in the process of teaching basic chemistry concepts to foreign students, it is quite necessary to teach them decode the most important notional systems encoded in the chemistry picture of the real world. That is why we will focus our attention on the communication failures which inevitably appear at the meeting-points of the two linguistic systems – the language of chemistry and the Russian language. In the process of teaching the felicity conditions are actually not always kept to.

The approach called *chemistry through education* means learning fundamental chemistry knowledge, concepts, theories and laws, and hereby the acquisition of communicative skills is related to oral, written and symbolic/tabular/graphic formats (Sanderson, 1962). No doubt, teaching and learning chemistry as a body of knowledge is on the whole rather a difficult occupation.

Our investigation of communication failures is carried out, first, from the point of view of pragmatics, second, from the point of view of cognitive linguistics, and third, interculturally, i.e. studying chemistry in intercultural communication in profes-

sional contexts. Sorry to say, it is unavoidable to fail in cross-cultural communication because our foreign students are not likely to understand all that they hear in Russian.

Cultural difference may lead to socio-pragmatic failures and then to communication ones. Grice (1975) advanced the Cooperative Principles, Leech (1983) put forward the Politeness Principle. To succeed in such a kind of communication as teaching and learning chemistry, neither the teacher nor the students should ever break the Cooperative Principles or violate the Politeness Principle. In cross-cultural communication foreign students have to overcome the pragmatic failures by improving their linguistic competence, communication competence and their cultural quality (Xiaorong). We consider these principles their «*felicity conditions*».

According to J. Habermas's theories of communication failures, there are three types of them explicated. *The first type* consists of errors, confusions and misunderstandings that occur within everyday «lifeworld» communication aimed at agreement and understanding (*communicative action*). *The second type* consists of failures to attain strategic goals within broader macrosocial communication processes aimed at technical or social success (*strategic action*). *The third type* occurs when the social system's mechanisms of strategic action interfere with *everyday processes of linguistic agreement* (Hove 2007).

To sum up, the fundamental feature of communication on the whole and the teaching process in particular is not domination but cooperation. «Reaching understanding is the inherent telos of human speech» (Habermas).

**References**

1. Sanderson R.T. Teaching Chemistry with Models. – Princeton, NJ.: D. Van Nostrand, 1962.
2. Grice H.P. Logic and Conversation // in P. Cole@J. Morgan (eds.). – 1975. – № 13. – P. 45–46.
3. Leech G. Principles of Pragmatics. London: Longman, 1983.
4. Hove T., 2007-05-23 Habermas on Communication Failure and Repair. Paper presented at the annual meeting of the International Communication Association, TBA, San Francisco, CA Online < PDF > . 2011-03-13 from [http://www.allacademic.com/meta/p170951\\_index.html](http://www.allacademic.com/meta/p170951_index.html).
5. Holbrook J. Making Chemistry Teaching Relevant // Chemical Education International. – 2005. – Vol. 6. – № 1.
6. Xiaorong L., Jian Gao. On Pragmatic Failures in Second Language Learning // Theory and Practice in Language Studies. – 2011. – Vol 1, № 3. – P. 283–286, Mar 2011.

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## THE METALLURGICAL PROCESSES EFFICIENCY EVALUATION: THE PROCESS ROBUSTNESS MEASUREMENT OF THE SHAFT RETRACTIVE MELTING

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The efficiency evaluation technique of the metallurgical processes, on the mine retractive melting of the lead production example has been developed in this work. The basic principles of the theory G. Taguti have been laid into the methodology basis. Also, it has been shown, that the copper content of the lead bullion and the lead and the arsenic content in the matte are the main factors (e.g. «the noise»), having affected the process efficiency (e.g. the signal») at the mine retractive melting. It, moreover, has been found, that the process maximum efficiency can be achieved, by measuring and maintaining at the optimum level, the selected values, as the independent parameters «the noise».

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**Keywords:** process efficiency, copper instruction into matte, independent parameters

The detailed analysis procedure of the economic – technologically indicators and corresponding them data on the process conditions technological regime and the parameters, that are determined the process final indicators is used in place to be created the mathematical model of the every metallurgical technology [1–3]. However, the direct data transfer of the existing technology to the new process is quite flawed, and it can be led to the significant errors, with the considerable change in the raw materials composition. This approach is particular relevant and is acquired the specific urgency for the processes, where two or more metals are extracted, in result of the raw materials complex composition processing to the desired products. So, to one of these processes, can be attributed the shaft retractive melting of the middlings and the industrial products separate processing, circulating and the other copper–, the lead – containing materials of the lead production with the following copper and the lead extraction to the desired products – the matte and the lead bullion, respectively. By the technology, the two desired products – the copper – lead matte and the lead bullion are obtained in the process, which are directed further, respectively, for the conversion and the refinement. This process is characterized by the low technological parameters: the copper extraction in the matte is at the level only ~85 %, and the lead in the lead bullion is hardly reached up to 45 %. However, in view of the alternative processing technologies absence of the middlings and the industrial products, circulating and the other copper–, the lead – containing materials of the lead production, the existing process is being still applied today. From the perspective of the above – mentioned, the challenge study of the shaft retractive melting process efficiency is certainly presented the fundamental and the significant one.

Thus, the present work purpose – is the metallurgical processes efficiency evaluation with the common positions, by the robustness

measurement, on the mine retractive melting process example.

### Materials and methods of research

The daily pair data on the products compositions of the heats – the mattes, the slags, and the lead bullion, having obtained at the shaft retractive melting, in the period from January to June, 2011, have been used by us in the work. The homogeneous data sets, which were indicated the average operating conditions of the process, had been selected. So, the non – typical results of the mattes and the slags compositions, evidently having distinguished from the total sample, have already been discarded, and they were not subjected to the necessary processing. Thus, the input data number, having accepted to the analysis, had been made up 185 paired samples of the mattes and the slags, and the lead bullion compositions, which was quite sufficient for the significant dependences between the single function and the independent parameters identification.

The approach, having developed in the paper [4], which was given the every process efficiency evaluation methodology, having consisted in the «signal-to-noise» ratio measurement (e.g. the theory of G. Taguti), had been used in the work. So, the theory essence is, that often, when, in practice, it is quite impossible to be known all the factors and the conditions of the process working, it is necessary to strive to be ensured, that the process would be maximum stable and the most robust to the uncontrollable factors variations, that have the greatest impact on the quality index variations (e.g. the process efficiency). This understanding the authors are called the robustness, and are, moreover, their approaches for its measurement. So, in their opinion, it is quite necessary to be measured only one value – the «signal-to-noise» ratio for the robustness measurement of the every process. The process quality can be improved only by the functional relationship study between the process input and output parameters, what, in fact, the «signal-to-noise» ratio study approach is.

### Results of research and their discussion

The copper extraction in the matte has already been selected for the shaft retractive melting process, as the ideal single function  $Y$ , having reacted to changes in the «single – to – noise» ratio.

As a result of the preliminary mathematical processing of the statistically industrial data, it

had been found, that, as the «the noise » (e.g. the vibrations) independent parameters, having affected the copper extraction, the most significant and important ones were the following parameters: the temperature (T), the partial pressure of the oxygen ( $P_{O_2}$ ), the slag composition (the CaO, SiO<sub>2</sub>, Fe<sub>com</sub>. Compositions), the Pb, As compositions in the matte, and the Cu in the lead bullion. Having taken into account, that in the melting processes such independent parameters, as the slag composition, and the closely related with it T и  $P_{O_2}$  [5], for the total duration of the process they are maintained at the constant level (e.g. the minor fluctuations of the slag composition can be ignored), the further consideration on the final function impact was considered from the Cu composition in the lead bullion ( $x_3$ ) and also from the Pb ( $x_4$ ), As ( $x_7$ ) compositions in the matte. Thus, the process efficiency evaluation has been to be measured the variations in the selected parameters (e.g. «the noise») and also to be determined the effect of each from them on the final function Y – the copper extraction in the matte (e.g. «the signal»).

Thus, the parameters sample data  $x_3, x_4$  и  $x_7$ , have been taken from the average monthly total set products' compositions of the heats, are given in the Table.

For the values calculating of the copper extraction in the matte, it has been used the procedure for the copper amount calculation in the starting material and in the matte, with the copper composition using of such products and their obtained volumes, having produced by the factory data. The variations evaluation procedure of the  $x_i$  independent parameters and their impact determination on the process efficiency has been resulted in for the  $Y-f(Y/x_i)$  type graphical dependencies building for all the common data set. Then, the obtained results have been shown in the Figure.

So, it is clearly seen in the Figure, a, b, c, that the variations limits  $x_3, x_4$  и  $x_7$  and their impact on the y value are expressed quite distinctly and clearly (including the  $Y/x_i$  high ratios areas) with the further increase in the  $Y/x_3, Y/x_4$  и  $Y/x_7$  ratio. For all this, the underlying trend, which must be observed by the theory G. Taguti, – the «signal – to – noise» ratio increase is practically reduced the process actual variation around the planned function features – it is not done so explicitly. Therefore, the measurement and the maintenance at the optimum level of the copper composition in the lead bullion and the lead and the arsenic compositions in the matte is the necessary and the sufficient condition for the process high efficiency provision.

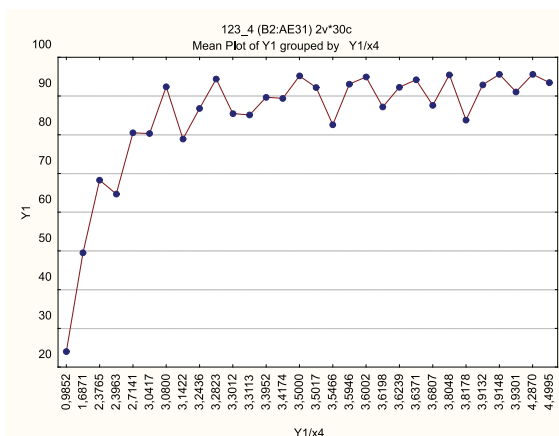
The  $x_i$  optimum values have already been determined, according to the built dependencies, by means of the calculation, which are

ensured the maximum copper extraction in the matte, and, consequently, the process maximum efficiency of the shaft retractive melting. The optimum values of the copper composition in the lead bullion and the lead, the arsenic compositions in the matte, having provided the maximum copper extraction in the matte, is equal to 95,6%, are made up 2,15; 21,2 and 3,28%, respectively. In practice, at the average copper extraction in the matte, which is equal to 83,7%, the similar parameters values are corresponded to 3,07; 27,8 and 4,25%, respectively.

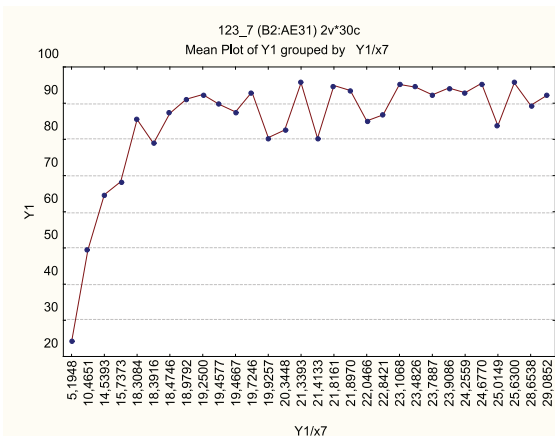
Thus, the data obtained are agreed rather well with the work's results [6], where the similar challenge has been solved, by means of the process mathematical modeling classical method using of the shaft retractive melting, with the same sample of the set using, as in the present work. This is practically demonstrated the theory of G. Taguti applicability to be evaluated the metallurgical processes efficiency.

The Metals Compositions in the Melting Products (e.g. Sample) and the Copper Extraction Calculated Values in the Matte

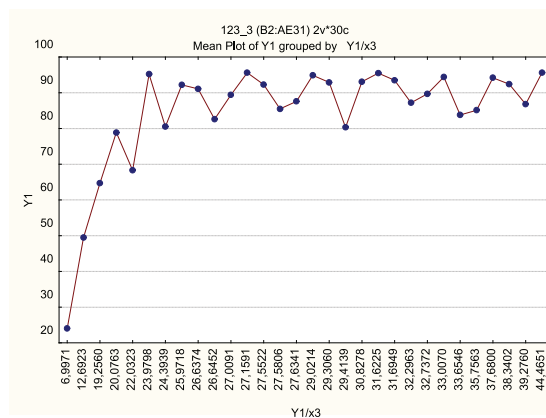
Number	Cu in lead bullion, % $x_3$	The content in the matte, %		Removing Cu in matte, % Y
		Pb $x_4$	As $x_7$	
1	3,55	26,33	3,17	92,2
2	3,90	29,34	4,73	49,5
3	3,43	24,36	4,62	24,0
4	3,31	26,16	3,12	89,4
5	3,10	28,74	4,34	68,3
6	3,30	29,66	4,04	80,5
17	3,42	23,18	4,80	91,1
18	3,17	23,74	3,83	92,9
19	2,73	26,40	3,75	80,3
20	3,02	25,90	4,72	93,1
21	3,10	24,86	4,67	85,5
22	3,97	27,20	4,12	95,2
23	3,02	25,10	3,87	95,5
24	2,41	30,00	4,80	92,4
25	3,36	27,00	4,45	64,7
26	2,38	25,70	3,86	85,1
27	3,17	23,80	4,50	87,6
28	3,52	22,30	4,48	95,6
29	2,49	21,95	3,35	83,8
30	2,95	20,78	4,27	93,5



a



b



c

The Variation Effect of the  $x_i$  Independent Parameters on the Copper Extraction in the Matte ( $Y$ )

### Conclusions

The method to be evaluated the metallurgical processes efficiency for the shaft retractive melting example of the lead production has been developed. The theory of G. Taguti applicability to be assessed the technological processes efficiency of the non – ferrous metallurgy has been shown. It has been found, that the copper composition measurement in the lead bullion and the lead, the arsenic compositions in the matte (e.g. «the noise») is the necessary and the sufficient condition, in order to be achieved the process maximum efficiency. It is necessary the measured independent parameters maintenance at the level of their optimum values for the process maximum efficiency provision. Their values increase above the optimum level will be led to the dramatic

reduction of the copper extraction in the matte (e.g. «the signal»).

### References

1. Kellog H.H. A Computer Model of the Slag – Fuming Process for Recovery of Zinc Oxide // *Trans.AIME.* – 1967. – Vol. 239. – P. 1439–49.
2. Goto S. Equilibrium Calculations between Matte Slag and Gaseous Phases in Copper Smelting. – London: IMM, 1975. – P. 23–34.
3. Vaskevich A.D., Sorokin M.L. The Model of Copper Oxide Solubility in the Slags // *The Non – Ferrous Metals.* – 1982. – № 7. – P. 25–28.
4. Leon R., Taguti G.E., et. al. The Quality Management. Robust Designing. Taguti Method. – M.: «SEIFI», 2002, P. 228.
5. Vanyukov A.V., Zaitzev V.Ya. The Slags and Mattes of the Non – Ferrous Metallurgy. – M.: The Metallurgy, 1969. – P. 389.
6. Dosmukhamedov N.K., Kalmukambetov A.O., Aitenov K.D. The Mathematical Model Development of the Shaft Retractive Melting Process // *The Bulletin of the KazSTU after K.E. Satpaev.* – 2011. – № 3(85). – P. 69–73.



## USEGE OF MILK PRODUCTION WASTE FOR OBTAINING FUNCTIONAL FOOD PRODUCTS FOR BABY AND DIETETIC NUTRITION

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An integrated dairy production waste management technology for obtaining functional food products for baby and dietetic foods was developed. This technology has been obtained through the use of physicochemical methods, organoleptic estimation and microbiological parameters. As a result, experimental samples of functional food products, standard process flow diagram for production of functional foods from the dairy industry waste have been developed.

**Keywords:** the Lowry method, enzymatic hydrolyzate, physical and chemical criteria, biological criteria, microbiological criteria, organoleptic criteria

When using a traditional technology for milk separation, smetana, butter, cheese, quark and milk protein production there are some by-products (skim milk, buttermilk, whey) obtained. Presently according to the GOST R 51917–2002 «Dairy and Milk Containing Products. Terms and Definitions» these by-products have an umbrella term – «secondary raw dairy material».

Skim milk, buttermilk and whey, or in other words secondary raw dairy material of AIC sudcomplex, should be used fully and effectively. When combined with whole milk and cream secondary raw dairy materials form a complex that can be called by the term «raw dairy material». In the production of 1 ton of

butter up to 20 tonnes of skimmed milk and 1,5 tons buttermilk are produced, in the production of 1 ton of cheese or quark – up to 9 tons of whey are produced. Skim milk is also obtained while milk standardizing [3, 4, 5].

The composition of skim milk, whey and buttermilk indicates that it is a high-grade raw material, and according to its biological value it is practically not inferior to whole milk. However, the energy value of skim milk and buttermilk almost 2 times and whey almost 3,5 times less than the energy value of whole milk (Table 1). This determines the applicability of using skim milk, buttermilk and whey in the production of dietary food products [1].

**Table 1**

The extent of major milk nutrients transition into secondary raw materials

Milk components (100%)	Extant of transition, %		
	Skim milk	Buttermilk	Whey
Milk fat	1,4	14,0	5,5
Protein, total, including:	99,6	99,4	24,3
Casein	99,5	99,5	22,5
Whey proteins	99,8	99,6	95,0
Lactose	99,5	99,4	99,5
Mineral salts	99,8	99,6	98,0
Solids	70,4	72,8	52,0

The use of whey, skim milk and buttermilk as a basis for the creation of functional food products is contingent the fact that at the minimum energy value and low content of substances (like fat, etc.) they contain very important complexes of biologically active substances (Table 2). The widespread use of secondary raw dairy material in the diet can have therapeutic-preventive effect in the prevention of obesity and cardiovascular pathology.

The research objective is to develop a comprehensive technology of waste processing for obtaining functional dairy products for baby and dietetic nutrition.

As the part of the research physicochemical, biological, organoleptic and microbiological criteria of quality and safety of functional foods derived from dairy waste products were studied.

### Materials and methods of research

Common, standard and original methods were used while performing this research work.

Theoretical and experimental studies were carried out using the current methodology of the study of complex phenomena using conventional, standard and original methods of biochemical, physicochemical, structural and mechanical analysis using the latest advances in science and technology.

Table 2

Physicochemical parameters of the secondary dairy raw materials

Dairy raw materials	Physicochemical parameters					
	Weight fraction, %			Acidity		Density, g/cm <sup>3</sup>
	Protein	Fat	Lactose	Titrated, °T	Active, pH	
Skim milk	3,00 ± 0,18	0,05 ± 0,01	4,25 ± 0,25	15–18	6,70	1,0325
Buttermilk	0,60 ± 0,05	0,20 ± 0,01	4,80 ± 0,29	13–75	6,5–4,5	1,0270
Whey	3,20 ± 0,19	0,50 ± 0,03	4,70 ± 0,28	15–50	6,6–4,9	1,0300

Sampling and preparation for analysis was performed in accordance with GOST 26809 «Dairy and Milk Containing Products. Acceptance Procedures, Methods of Selection and Preparation of Samples for Analysis», GOST 9225 «Dairy and Milk Containing Products. Methods of Microbiological Analysis», GOST 26929 «Raw Materials and Food Products. Preparation of Samples. Mineralization for Toxic Elements Determination».

Physicochemical parameters were determined by standard methods: mass fraction of moisture in accordance with GOST 30305.1 «Canned Condensed Milk. Methods for Moisture Mass Fraction Measuring».

Enzymatic hydrolysis was carried out using the static method in a thermostat with stirring at a temperature and pH, optimum for the enzyme used, and according to the recommendations the manufacturer. Hydrolysis was carried out for 4–24 hours, the ratio of the enzyme protein concentration to the substrate protein concentration was 1:25, 1:50, 1:100.

Determination of total nitrogen was performed using a protein analyzer RAPID N ELEMENTAR in accordance with European standards. The principle of the method consists in determining nitrogen by burning a known mass of analyte at high temperature (about 900 °C) in the chamber in the presence of oxygen, which leads to the release of carbon dioxide, water and nitrogen mass fraction detected by the device.

The total protein content was calculated by multiplying the total nitrogen conversion factor for milk proteins, constituting 6,38.

Determination of amino nitrogen was performed using a spectrophotometric method with 2,4,6-trinitrobenzenesulphonic acid (TNBS). The method is based on the spectrophotometric determination of chromophores that are formed by the reaction of primary amines with TNBS. Amount of amino nitrogen in the test hydrolysates were determined from the calibration graph, constructed for the standard dilutions of a known substance.

The degree of hydrolysis was determined as the ratio of amino nitrogen to total nitrogen.

Titrate acidity was determined in accordance with GOST 3624 «Milk. Titrimetric Methods for the Acidity Determination», active acidity was measured by potentiometric analyzer in accordance with GOST 26781 «Milk. Method of the pH Measuring».

Determination of amino acids was carried out with an automatic amino acid analyzer Aracus PMA GmbH, approved by guidelines 98/64/EU and 2000/45/EU. The principle of the method is a cation exchange separation of amino acids with a step gradient of pH and post-column ninhydrin derivatization. This sample was pre-subjected to an acid (6n. hydrochloric acid, 110 °C for 24–72 h) or enzymatic hydrolysis.

The molecular weight distribution of proteins and peptides in derived hydrolysates was assessed using the

Laemmli method of protein electrophoresis. Denaturing polyacrylamide gel (12% – separating and 4% – focusing) with 0,1% SDS-Na was used for protein separation. Electrophoresis was performed on a single electrode buffer supplemented with 0,1% SDS-Na at 15 mA. The gel was stained with 0,2% Coomassie R250 (prepared with glacial acetic acid) at elevated temperature for 7–10 min, then it was washed three times with distilled water.

Viewing and photographing of the gels was carried out on UV transilluminator TCP-20M («Vilber Lourmat», USA) at the wavelength of 312 nm. Preservation and processing of data was performed using gel-documenting system Vitran-Photo.

The amino acid sequence of the formed peptides was determined by gas chromatography-mass-spectrometer system Agilent 5975 C by MALDI-TOF method, which consists in the separation of ions by the ratio of the mass/charge.

The rheological characteristics of the samples were determined on a rotational viscometer VT550. Embedded microprocessor based on a rotating speed value  $n$  (c<sup>-1</sup>), torque  $M_{torque}$  (N×m) and the geometry of the measuring system, counted towards a shape coefficient  $f$ , calculates major structural and mechanical characteristics:

$$\eta = \frac{f M_{torque}}{Mn}; \gamma = M \cdot n; \tau = f M_{torque}$$

where  $\eta$  – effective viscosity, Pa·c;  $\gamma$  – sliding velocity, c<sup>-1</sup>;  $\tau$  – shearing strength, Pa.

The device allows you to set the change test conditions program: constant rotor speed, gradually increasing speed, step increasing speed, combine different speed conditions. With help of the systems like SV-DIN ( $f=369,4$ ,  $M=1,29$ ) and SV-DIN ( $f=61,4$ ,  $M=1,29$ ) it is possible to determine the viscosity in the range of 10 mPa × c at maximum speeds, with the MV-DIN up to 100 mPa·c and with the SV-DIN at minimum speed. Reliable results are obtained with the values of torque more than 0,15 N·cm

Microbiological parameters were determined in accordance with the current regulatory framework: SanRaN 2.3.4.551 «Milk and Dairy Products Production»; SanRaN 2.3.2.1078 «Hygienic Safety and Nutritional Value of Food Products».

Determination of the toxic elements, pesticides, antibiotics, and radionuclides content:

– lead – GOST R 51301 «Food Products and Raw Materials. Inversioned-voltammetric methods for the determination of toxic elements (cadmium, lead, copper and zinc)», GOST 26932 «Raw Materials and Food Products. The lead determination methods», GOST 30178 «Raw Materials and Food Products. Atomic absorption method for the determination of toxic elements», GOST 30538 «Food Products. Analysis of toxic elements by atomic-

emission method» and MG 4.1.986 «Method for measuring the mass fraction of lead and cadmium in the food products and food raw materials by electrothermal atomic absorption spectrometry. Methodical instructions»;

– arsenic – GOST R 51766 «Raw Materials and Food Products. Atomic absorption method for the arsenic determination», GOST 26930 «Raw Materials and Food Products. Method for the arsenic determination» and GOST 30538 «Food Products. Analysis of toxic elements by atomic-emission method»;

– cadmium – GOST R 51301 «Food Products and Raw Materials. Inversioned-voltammetric methods for the determination of toxic elements (cadmium, lead, copper and zinc)», GOST 26933 «Raw Materials and Food Products. Methods for cadmium determination», GOST 30178 «Raw Materials and Food Products. Atomic absorption method for the determination of toxic elements», GOST 30538 «Food Products. Analysis of toxic elements by atomic-emission method», MG 4.1.986 «Method for measuring the mass fraction of lead and cadmium in the food products and food raw materials by electrothermal atomic absorption spectrometry. Methodical instructions»;

– mercury – GOST 26927 «Raw Materials and Food Products. Methods for mercury determination» and MG 5178 «Methodical guidelines for mercury determination in food products»;

– strontium-90 and cesium-137 radionucleotides – MG 2.6.1.1194 «Radiation Monitoring. Strontium-90 and Cesium-137. Food Products. Sampling, analysis and hygienic assessment».

The experimental data was processed by the method of mathematical statistics on the computer. For further processing computer software WinStat or Statistica 5.0 was used.

### Results of research and their discussion

**Biological indicator.** This indicator is presented in determination of the residual antigenicity of enzymatic protein hydrolysates.

**Residual antigenicity** is a characteristic that is crucial for the possibilities of their usage in hypoallergenic milk-based products. Especially stringent requirements are shown to the reduction of antigenicity of the protein component of therapeutic use hypoallergenic products.

Until now, such a reduction of AG ( $10^{-6}$  and less of the original protein AG) could be achieved only for mixtures based on casein, put into deep proteolysis (eg, a mixture of «Nutramigen», «Pregestimil» and «Peptamen»).

Requirements for residual AG hydrolysates used in functional foods, are less stringent, but it is preferable to reduce AG at least to the level  $10^{-5}$  of the original protein in this case also. At higher antigenic structures you can not exclude the presence of the immunogenic and sensitizing properties in the product, which can cause allergic reactions in genetically susceptible individuals [6, 7, 8].

The residual antigenicity (AG) of cow's full cream milk and its hydrolyzate peptide was determined by the Lowry method. This method shows that the trypsin hydrolyzate filtrate is set to AG  $7,5 \cdot 10^{-6}$  10 kDa through the membrane.;

the chymotryptic hydrolyzate filtrate is set to AG  $3,7 \cdot 10^{-6}$  10 kDa through the membrane; the thermolysis hydrolyzate filtrate is set to AG  $5,8 \cdot 10^{-6}$  10 kDa through the membrane [2].

From the above it can be seen that the use of the enzyme chymotrypsin is significantly more effective in reducing the antigenic properties of the hydrolyzate. Even without using nanofiltration, AG in this case makes up  $4 \cdot 10^{-6}$ , which can be sufficient for the use of the hydrolyzate in the functional food products.

Thus, during the research of different processing options of hydrolyzed milk we concluded that, first of all, critical characteristic of the enzymatic hydrolyzate for use in enteral feeding is the kind of the molecular weight distribution which is corresponding to the predominance of medium peptides in the specimen. Such an enzymatic hydrolyzate has a combination of good digestibility properties with partially disturbed digestive function; low osmolarity and satisfying flavor properties. Secondly, these are hydrolysates, used in medical and health-care food, for which the critical feature is the residual antigenicity of cow's milk protein in the protein component of the product (guaranteed no more than  $1,10^{-5}$  and  $1,10^{-4}$  respectively).

**Organoleptic and physicochemical indicators.** In order to further research the properties of enzymatic hydrolyzate of milk proteins, organoleptic and physicochemical indicators were considered. Consistence of enzymatic hydrolyzate of milk proteins has the form of fine, dry powder with the presence of easy break up lumps. It has white with cream shade color. Smell and taste are clean and inherent for fresh milk mixture, with a specific taste. Mass fraction of dry solids has a value not less than 94–96%. Mass fraction of the peptide has a value not less than 50 g per 100 g of protein.

**Microbiological indicators.** In terms of safety the most important thing is the control of microbiological indicators of hydrolysates. Standardized microbiological indicators (with the requirements set out in the «Hygienic requirements for safety and nutritional value of food products» SanPiN 2.3.2.1078-01) are presented in Table 3.

By the results of enzymatic hydrolyzate of milk proteins microbiological characteristics researches for specialized food products during storage at  $4 \pm 2^\circ\text{C}$ , the analysis of the results showed that by the content of sanitary-indicative and pathogenic microorganisms tested samples of hydrolysates have high reliability, because such microorganisms (as *Escherichia coli*, *Staphylococcus aureus*, *Salmonella*) in standardized mass product were not found.

Table 3

Standardized microbiological indicators of enzymatic hydrolyzate

Indicator	Permissible levels, mg/kg, not more
QMAFAnM, CFU/g, not more	$2 \cdot 10^3$
Escherichia coli in 0,01 g	not allowed
Pathogenic microorganisms, including Salmonella spp in 25 g	not allowed
S. aureus in 1,0 g	not allowed
Yeast, CFU/g, not more	10
Mould, CFU/g, not more	50

A different picture is set in the determination of molds and yeasts that were found in hydrolyzate, besides, on the two hundred and seventieth day content of the latter exceeded the upper limit (at 20%, accordingly). From this we can conclude that guaranteed storage life including two-term (regimented by the Federal Service) is 180 days .

By the end of storage we examined the safety record of the enzymatic protein hydrolyzate for functional food products that were packaged under nitrogen in bags made of the combined material

We found that there is no migration of toxic elements in the product, controlled potentially hazardous chemical substances are contained in the product in concentrations that do not exceed established specifications. Apart from the listed substances the content of cesium radionuclides-137 (standard is no more than 50 Bq/kg) and strontium-90 (standard is no more than 25 Bq/kg) is not found in the product.

We controlled the organoleptic characteristics of enzymatic hydrolyzate of milk proteins additionally at the end of the shelf life.

The research has shown that the enzymatic hydrolyzate has the form of fine, dry powder with the presence of easy break up lumps. In the reduced state it has a form of homogeneous liquid without sediment At the end of the shelf life enzymatic hydrolyzate has white color with cream shade. Smell and taste are clean that is inherent for fresh milk mixture, with a specific taste.

During the research, organoleptic indicators did not change that indicates the correctness of the chosen period and temperature storage regime

At the same stage of research osmolarity of the samples was determined by a standard cryoscopic method of the reduction the freezing temperature of the solution using the osmometer.

Mixtures based on unhydrolyzed protein have the lowest osmolarity and good organoleptic properties, however, it can be difficult for patients with deep dysfunction of digestive sys-

tem, and, furthermore, with the injection of such mixtures to intracolonic probe, the absorption of the uncleaved protein significantly increases that can lead to food-allergic sensitization.

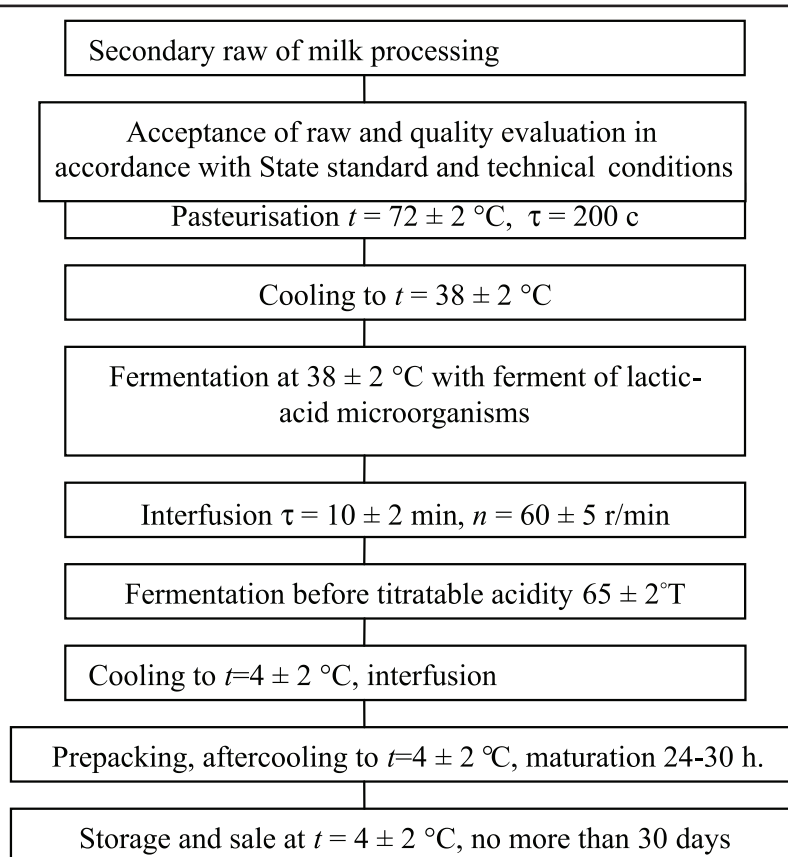
Based on the results of the research developed standard scheme of technological process of production of functional dairy products (Figure).

The process of reaching the functional product begins with the acceptance of raw materials and verifying its quality indicators in accordance with applicable requirements of technical documentation. Technological process of production functional dairy products consists of the following operations: reception and evaluation of the raw materials quality; cleaning; pasteurization, cooling, fermentation, fermentation of dairy raw materials; addition of flavoring and aromatic components (under recipe); packaging in market containers, maturation for several hours, storage and sale.

### Conclusions

The research resulted in the examination of physicochemical and biological criteria of quality and safety of functional foods, produced from waste of dairy industry. We found that hydrolysates of milk can be used for children and dietary, as well as medical and preventive nutrition, for which the critical feature is the residual antigenicity of cow's milk protein in the protein component of the product (guaranteed no more than  $1,10^{-5}$  and  $1,10^{-4}$  respectively). It is shown that in the content of sanitary-indicative and pathogenic microorganisms, test samples of hydrolysates are highly reliable, because such microorganisms (as Escherichia coli, Staphylococcus aureus, Salmonella) in standardized mass product were not found. We found that there is no migration of toxic elements in the product, controlled potentially hazardous chemical substances are contained in the product in concentrations that do not exceed established specifications. Typical technological process of functional foods production based on secondary raw of milk processing was developed.





Typical technological process of functional foods production based on secondary raw of milk processing

*Test samples of functional foods were developed.*

*The work was performed as part of the analytical departmental purpose-oriented program «Development of Scientific Potential of Higher Education».*

#### References

1. Antipova, L.V. The use of unconventional raw materials in the development of health care products / L.V. Antipova, A.S. Peshkov, A.E. Kutsova // Storage and processing of agricultural products. – 2009. – № 3. – P. 67–69.
2. Borisova, K.A. Secondary raw resources of food processing industry AIC of Russia and the environment: Reference book (edited. Sizenko E.I.) / K.A. Borisova, V.I. Komarov, E.I. Sizenko. – M.: Pishchepromizdat 1999. – 468 p.
3. Evdokimov, I.A. Current state and perspectives of processing milk whey // dairy industry. – 2006. – № 2. – P. 34–36.
4. Kravchenko, E.F. The use of milk whey in Russia and abroad / E.F. Kravchenko, T.A. Volkova // dairy industry. – 2005. – № 4. – P. 34–36.
5. Baranov, A.A. Clinical manifestations children's cross-allergic reactions to foods / A.A. Baranov, O.A. Subbotina, I.V. Borisova // Nutrition. – 2005. – № 4. – P. 36–40.
6. Gavrilov, G.B. Membrane technology treatment processes of whey and creation of products with functional properties: Monograph. – M.: Agricultural Publishing, 2006. – 134 p.
7. Inihov, G.S. Methods of analysis of milk and milk products / G.S. Inihov, N.P. Brio. – M.: Food Industry, 1971. – 424 p.
8. Kruglik V.I. Scientific and practical aspects of creation products for baby food / V.I. Kruglik, G.Y. Sazhinov. – Kemerovo: Kuzbassvuzizdat, 2005. – 195 p.

*Materials of Conferences***THE SUDDEN CHANGE IN THE MODELS  
OBJECT FORM ON THE COMPUTER**

Beysembayev K.M., Shmanov M.N.,  
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The modern technologies of the computer simulation are become the independent of the theoretical methods, having justified the decision. The main reasons for this are the numerical methods development with the high speed computing. Moreover, the users are often used by the ready – made special programs and by their application instructions, which is kept the solution away from the deep theoretical justification. All these reasons have already been led to the main errors in the final results. Particularly, it has been taken its place in the applied researches [1, 2], which are often used the calculators from the special applications, for example, such as the finite elements method (FEM). The free mesh construction is used in some areas, without the proper control calculations precision at the FEM meshes constructing for the complex structural constructions for the easy solutions, along with the manager mode. The grids may be varied slightly, but even for the symmetrical models on the symmetry axis's both sides, which is caused the quite significant deviations of the fractures' calculated directions. The challenges with the calculations accuracy are usually possible in the stress concentrations areas, not only in the complex circuits, but in the special zones, having had the profound impact on the constructions state. So, the emergence causes of these zones have not been precisely defined yet, and it is hard to be measured the errors in the calculations. But they can be the causes of the structures' catastrophic destruction, (remember the Transvaal Park disaster in Russia, a number of the accidents in Germany and Poland in the early 2000-es) [3]. Thus, their causes have not been identified, or they have been defined presumably. So, there is the interesting case in Volgograd (Russia): the deformation waves formation of the bridge across the Volga River. So, the main reasons for the construction's incorrect calculation, due to the resolvent, have had occurred just in many complex constructions, but, here, we have the factors, which are fundamentally not entered into the existing regulations and the calculating methods, the existing rules and the formulas. In our opinion, they are taken their place, due to the sudden change in the whole system form.

Usually, the calculation methods are provided for the deformation consideration of the structure's

separate section. But, here, it is talked on the entire construction's deformation, when it is changed its whole surface, and throughout the entire its volume. For example, in the theory – it is quite known for the bars stability, according to Euler, when the rod bending, in the form of the sine, is suddenly changed the form, and the convexities are also changed into the cavities. From the practice and the experience – it is quite known, and for the thin – walled structures, when they are changed their form, under the temperature influence, that it is accompanied by the sound effects. So, the phenomena are always accompanied by the system's oscillations. But, this has more to be done with the thin structures or the fine ones of its separate and the individual nodes (e.g. the bridge in Volgograd). So, it visually is seen the deformations with great difficulty for the thick structures, because of their values are made up the hundredth fractions of its size. The form change, in accordance with the physical presentation, is explained by the system's energy state transition to another, when the former one is already «not beneficial». So, at this moment of tension, in some elements structural elements are increased non – linearly, and, moreover, their growth is caused the form change, and, if the design is the thin – walled one, then the system's clear auto-oscillations are emerged.

For this phenomenon fixation, we always have the acoustic radiation, which is quickly decayed for the thick – walled structure. If there is the calculating design methodology for the stresses and the deformations, than the first requirement to it – it will have, from step to step, to be fixed the system's ongoing destructions (e.g. they can be of the different types). Then, they are taken into account under the challenge's boundary conditions, and they are expected the next step. Usually, at the stage's beginning, the stresses are changed not much, and their sharp growth (e.g. here, the improved the calculation's accuracy is also required) is indicated the bifurcation's beginning, or more precisely, rather the system's state multiple meanings [2, 3, 4]. So, the statistic solutions are not allowed efficiently to be fixed and to be captured the system's vibrations, but, at the defined improvement, they are fixed the cyclic changes in the system, when it is repeated its state, having caused the software program's looping.

It should be extremely simplified and used its complex solutions, in order to be created such a special program, where the model's many new elements are introduced. For example, at the system's considering of the underground long wall coal mining development, at first, the layer with the overhanging over it, first, by two, and, then, by three consoles of the rocks has been considered. So, the simplified finite elements have already been intro-

duced between the consoles and the layer formation. The layer formation integration had been introduced, having researched the layer's and the consoles' formation and behavior specific features and their peculiarities, that was allowed us to be estimated the main reservoir's characteristics of the layers' formation loading zones. The consoles had not been had the corresponding grid to speed up the necessary calculation, and they were described by the equations of the elasticity theory. As a result, the deformation form changing, the wave nature of the load distribution, especially, the specific features and the peculiarities of the layers' delaminated sections areas, their order in the layers formation, the deformation and the precipitation formation at the sections layers during the disintegration have easily been tracked and monitored.

It should be considered not only some elements' destruction of the system (e.g. the cross fracture, the delamination), in order to be, more precisely and accurately, described the constantly changing system, but also their mobility increase, due to the varying loads. Therefore, the «elements' change forming» term is used, sometimes instead of the «destruction» term, which should not be confused with the system's change forming. It was not quite enough the computer model for the precise and accurate assessment of the system's state change, and we have already used the very simple scale – tested model from the photo-elastic material, that made it possible the experiment's quality to be tracked and monitored.

Then, the tightening weight in the computer model, having simulated the overlying rocks, has been replaced by the half plane (e.g. the rocks imitation up to the ground surface) with the corresponding half plane and the overhead console interaction equations. Thus, having had the relatively small program code and, therefore, correspondingly, the good possibilities of the programming errors and the challenge's logic solving well – placed control, we have got the chance to be concentrated on the form changes fixation program (e.g. the destructions) of the various types, when we had to be compared the damages' types and, moreover, to be found the universal estimate for the high – priority selection of one of them for each calculating cycle [5], and also the special automatic correct program for the form change and the calculation continuation just in the new state, having dropped the given report into the data files.

So, the stress non – linear increase fixation is taken its place only, when the system is collected the elements' form changes of the minimum level and is became relatively free (e.g. it is quite impossible to be prevented such violations, due to the need of the management enormous efforts), and the prevention attempts are trying to be avoided the fact, that if they are occurred in the other areas. Then, the stresses are reduced, and the system, as it is sought to be repeated the previous state, although

at the new level. So, the areas, where there have been the discontinuities, are closed up again, which is repeated several times. Since, the statistic solution is practically allowed to be simulated the system tendency to the oscillations. We will note, that the logic challenges loss should not be occurred in the computer applied researches, and, moreover, the form changes in some areas of the destruction will have to be securely fixed, recorded and explained. So, the phenomenon process model should be constructed, having reflected «the common sense» [5], and the mixed and the ambiguous results to be explained by the known physical principles and the analogies, so the fixed some delaminations could be explained by the stresses wave spreading, having obtained firstly in the simplified, and then, in the solid – state model, and, finally, in the fixed state under the mining conditions.

Thus, the mechanic principles are practically allowed us to be extended the geo-mechanical system behavior and for the other ones, for example, the construction systems, which still is not taken into account at the designing.

#### References

1. Beysembayev K.M. The Complex Systems Non-Stationarity and Their Programming Peculiarities // The Chaos and Structures in the Non-Linear Systems. The Theory and Experiment: The Report's Theses of the 3-rd International Scientific Conference, which is devoted to the 30-th Anniversary of The Karaganda State Technical University after E.A. Buketov. (Karaganda, June, 27 – 28, 2002). – Karaganda, 2002. – P. 39–42.
2. Beysembayev K.M., Zhekenov S.A., Zhetesov S.S., Demechshuk E.N., Shmanov M.N., Tir E.D., Malybayev N.C. To the New Machine – Technological Systems and Their Models Development. – M.: The Coal, 2011. – № 4. – P. 69–71.
3. Beysembayev K.M., Veksler Yu.A., Icabekov M.U., Satarov S. The Bulletin of the KarStU after E.A. Buketov: the Physics Series. – Karaganda, 2006. – № 2 (42). – P. 53–62.
4. Melnikov N.N., Kalashnik A.E., Kalashnik N.A. The Technogenic Geo-Dynamic Processes at the Oil and Gas Fields Development in the Barents Sea Offshore // The Bulletin of MSTU. – 2009. – Vol. 12. – № 4. – P. 601–608;
5. Beysembayev K.M., Kogai G.D., Shashchanova M.B., Rahimova A. The Modern Challenges of Science and Education. – 2012. – № 6. – URL: [www.science-education.ru](http://www.science-education.ru). – P. 106–7471 (the date accessed 29.01.2013).

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#### MODELLING PROCESSES WASHING, WEIGHING, AND DEPOSITION OF SOLID FRACTIONS IN SLITS

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Behavior of solid fraction in water environment depends on their form (pebble, sand, silt) and dynamics of natural processes of sanding in slits. Washing, weighing, and deposition often takes

place with usage of facilities that are designed for water-selection with a large hydrodynamic strike.

Studying these processes can be realized via carrying out several stages of theoretic analysis.

We examine dynamics of washing, weighing, or depositions fractions without considering their interactions. We select the following basic parameters:

- inner parameters (size of fractions);
- outer parameters (pressure, temperature, and density of an environment);
- initial parameters (initial concentration of fractions according to their types in areas of slit);
- output parameters (final concentration of fractions according to their types in areas of slit).

Using three linear parameters (length  $a$ , width  $b$ , and thickness  $c$ ,  $a b c$ ) of fractions (specifically, their average values according to the three outlined types of fractions) as inner parameters proves to be irrational as, first of all, it complicates the model, increasing its dimension (three parameters instead of one), and, secondary, it doesn't define a form of fractions.

Therefore, in order to simplify the structure of formulas, we introduce a generalized parameter that links all three parts it. Using an arithmetical mean diameter does not prove effective as it doesn't reflect forms of fractions:

$$\bar{d}_{ar} = \frac{a + b + c}{3}. \quad (1)$$

Using average geometric diameter is more informative than (1) from this point of view:

$$\bar{d}_g = \sqrt[3]{abc}. \quad (2)$$

A method to decrease sanding in slits.

In order to decrease sending of silts, we select a facility of water raise with a less dynamic characteristic, since a sharp change in speed of water flow to a slit causes washing and weighing of solid fractions.

Obviously, sizes of (1) and (2) equal only in case when fractions have a form of a ball or a cube that can't be found in natural conditions. For the given values of  $a, b, c$  diameter  $\bar{d}_g$  will be less in comparison to  $\bar{d}_{ar}$ , as a fraction form alter from the ball.

Below we provide even more informative parameter, compared to (2), that is equal to ball volume in diameter:

$$\bar{d}_{eb} = \sqrt[3]{6V/\pi} = 1,24\sqrt[3]{V} \quad (3)$$

where  $V$  is a fraction volume.

We study an index that is equal to the area of round that if formed of a diametrical section that are formed of the average (width  $b$ ) and the smallest (thickness  $c$ ) size:

$$\bar{d}_{eq} = \sqrt{4S_{ds}/\pi} = 1,12\sqrt{Sds}, \quad (4)$$

where  $S_{ds}$  is the area of a fraction's diametrical sector that is normal to its biggest size (length  $a$ ).

Formula (4) is introduced in order to describe an equal size (diameter) of pebble and gravel. To use it, we carried out measurement of  $a, b, c$ , calculation of  $S_{ds}$ , and calculation according to (4) that gave us the following results: gravel –  $d_{eq} = 0,5-1,5$ , pebble –  $d_{eq} = 1,6-2,5$  mm. Pebble and gravel can move within the flow in a suspended condition, and description of this motion requires studying flow around a fraction. Therefore, geometry of sand fractions of this type should be described as equal to round (or a ball, according to (30)) in size that considers not only parameters, but also a form of fractions.

When studying sand fractions, we can consider so called sieve size that is the smallest size of a sieve cells, though which fractions have been sifted. Geometric characteristics of sand, slit, and clay fraction groups were defined via sieve analysis and definition of sieve size (for large-grain sands  $\bar{d}_c = 0,5-2,5$ , average-grain –  $\bar{d}_c = 2,5-0,5$ , small-grain –  $\bar{d}_c = 0,12-2,5$  mm). Starting with thin-grain sand fractions, it is necessary to use washing of fractions

Apart from reserves, fractions of pebble and sand must be also characterized by a coefficient of form. There are many suggestions and recommendations on defining this coefficient in bibliographic sources on studying various fractions (soil, seeds, grain, etc). Works of J. McKnown and J. Malaiky [1] suggest imaging all three sizes of a fraction as half-axis of ellipses:  $a_1 = a/2$ ;  $b_1 = b/2$ ;  $c_1 = c/2$ , in which the corresponding projection is fit. Then, the coefficient of form will look as:

$$C_{f1} = \frac{a_1}{\sqrt{b_1 c_1}}. \quad (5)$$

Its further development is expressed for coefficients [2] as:

$$C_{f2} = \frac{c}{\sqrt{ab}}; \quad C_{f2} = \frac{b}{c_1}; \quad C_{f1} = \frac{a+b}{2c}. \quad (6)$$

The simplest formula of  $C_{f1}$  (6) contains parameter  $a$ ; actually, a length (the biggest size or an elongation) only directs a fraction in case it tears off, weighs, descends, deposits, while geometric sector of the smallest and an average parameters plays the key part in these processes.

Obviously, coefficient of form should be located in the interval (0, 1), in a limit, in case of a sphere, it should equal 1 (if  $a = b = c$ ), and reach for zero in case of a stretched parallelepiped ( $a \geq bc$ ). Then formulas формулы  $C_{f1}$ ,  $C_{f2}$  and  $C_{f3}$  are excluded from the study, as for them  $Cf > 1$ , and  $Cf \rightarrow 0$  when  $a \gg bc$ .

When all the mentioned requirements of asymptotic behavior are secured, coefficient of form will correlate hydraulic fineness with size of fraction of different form. Our analysis has shown that



this characteristic is secured by a coefficient, calculated with formula:

$$C_f = \left( \frac{\bar{d}_e^2}{bc} \right)^\alpha; \alpha = 0,8, \bar{d}_e \text{ according to (4), (7)}$$

Indexes  $C_{f_1}$  and  $C_{f_2}$  provide an obviously increased coefficient of form. It is linked to the fact that for  $K_{f_1}$  dependence between fractions is considered linear, and for  $K_{f_2}$  – according to a square parabola. Their further study shows us that the degree of nonlinearity of hydraulic processes lies between (1) and (2). In (7) it equals  $2\alpha = 1,6$ , in other words, this dependence is described as parabola less than a square one that, obviously, corresponds to the physics of this phenomenon. Really, square parabola naturally considers only the area of diametric direction of a fraction sector flow, and parabola of a less degree considers a fraction's volume as well. Studying these indexes, we can form equations of deposition and washing a separate part of spheric ( $C_f = 1$ ) and non-spheric ( $C_f < 1$ ) form.

Calculating heterogeneity of fractions composition in motion, still and suspended conditions.

We study the very totality of a fraction, when conditions for their motion are placed, flow structure and vertical transition of a fraction (lifting and descending) are formed, fractions are placed in a suspended condition, fraction flow is in turbulence.

Descriptions of fractions are usually based on an assumption that they are formed occasionally, and each size of fraction can be given a provision (weight coefficient). While breaking fractions into definite intervals, for example, via sieving analysis, one can come up with a curve of granulometric composition. This curve is constructed on discreet value of sieving sizes. Besides, there is always a certain function in its form, as we are studying an interval of fraction size. After that we calculate a density and connectivity of fraction flow, speed of free even drop of fractions in a still liquid (water).

Considering these indexes, we have formed equations of deposition and washing of a flow of non-linked fractions of spheric ( $C_f = 1$ ) and non-spheric ( $C_f < 1$ ) form.

Description of fractions' motion in a flow with a suspended condition and constructing diffusion models of dynamics of fraction mixtures with an account of boundary conditions (concentration of suspension at a lower border).

For a stationary case (when concentration of fractions  $C$  and coefficient of diffusion  $Cd$  do not alter) we have an equation of Frankle type:

$$\omega \frac{\partial C(z)}{\partial z} = \frac{\partial}{\partial z} C_d \frac{\partial C}{\partial z}, \quad (8)$$

where  $\omega$  is hydraulic size;  $z$  is vertical coordinate.

Equation (8) should be supplemented with border conditions at the border  $z = 0$ ,  $C(0) = C_0$ . In this case its particular solution in terms of constant

equality of a substance quality that moves up and down looks as:

$$C = C_0 \exp \left( -\omega \int_{z_0}^z \frac{dz}{K_d} \right). \quad (9)$$

Defining functions  $C_0$  and  $C_d$  according to (9), we calculate profile of a substance concentration.

Description of a silt's condition from the point of sanding according to rheological model is represented by integral differential equations of Fredholm and Volter type of the second order and development of model of identifying cores of creeping and relaxation for a specific silt.

#### References

1. Turkin A.A. Physical-mechanic characteristics of fractions of sand that soils slits / A.A. Turkin, S.K. Manasyan – Attachment of the bulletin of Krasnoyarsk state agrarian university. – 2004. – P. 72–74.
2. Sibirina T.F. Hydraulics and hydrology. Laboratory practice. Krasnoyarsk state agrarian university // Methodical textbook / T.F. Sibirina, A.A. Turkin – Achinsky branch of Krasnoyarsk state agrarian university. – Achinsk, 2005. – 42 p.
3. Turkin A.A. Artificial gravel filter. – Attachment of the bulletin of Krasnoyarsk state agrarian university. – 2004. – P. 138–140.
4. Turkin A.A. A facility for constructing gravel filter in a silt / A.A. Turkin, T.F. Sibirina, S.K. Manasyan. – Bulletin of Krasnoyarsk state agrarian university, 2008. – P. 138–140.
5. Turkin A.A. A method to clean given up silts / A.A. Turkin, S.K. Manasyan. – Attachment of the bulletin of Krasnoyarsk state agrarian university. – 2006. – Vol. 1. – P. 348–349.
6. Turkin A.A. Problems of economic-water provision of Achinsky districts. – Attachment of the bulletin of Krasnoyarsk state agrarian university, 2007. – P. 74–75.
7. Turkin A.A. A method to construct a gravel filter in a slit / A.A. Turkin, T.F. Sibirina, S.K. Manasyan. – Attachment of the bulletin of Krasnoyarsk state agrarian university, 2008. – P. 74–76.

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#### PROTECTING SLITS FROM DANDING WITH AN ARTIFICIAL FILTER

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Low efficiency of exploitation water-intake slits is linked to deficiencies of their construction and building technology (filers of small diameter, drilling with clay mixture and claying of by-filter area, presence of small-grain sands, insufficient pumping).

In order to establish a required water intake, measures of restoring slits' efficiency are necessary. Decrease in the output of underground water intake can be defined by evacuation of its resources, alteration in parameters of a layer (drying off the most permeable area, an impact of low-permeable rock

areas), deterioration of water intake equipment, calmotage, and boil of filter facilities.

All factors, linked to regional impact over the efficiency of water intake slits, are usually established at the stage of hydro-geological research. Changes in efficiency of water intake slits that is linked to their construction features and processes of chemical and biological calmotage are most definitely established during a slit's exploitation. Process of calmotage, boil of by-filter areas is described by a decrease in a filter permeability and porosity of rock in by-filter area, and also by corresponding alteration in coefficient of filtration. A character of change in hydraulic resistance can be revealed according to an analysis of an impact of filter permeability and porosity of rock over a water tributary in a slit. It has been experimentally established that when filter permeability is higher than 20%, increase in total area of holes impacts a slit consumption insignificantly, and dependence of alteration in filter resistance with an increase in filtration is described by an exponential or display function with a negative exponent. Change in porosity of rock in by-filter area of a slit and in radius of decreased filtration has a similar effect over a slit output [3, 4].

According to the provided information, a prediction of decrease in a slit consumption can be given according to an analysis of legislations of decrease in specific output or increase in generalized slit resistance in time. In all cases a complex analysis of the whole water intake is required in order to reveal a reasonability of reconstructive works on water intake facilities (slits). Most frequently, work of a slit itself is analyzed, and during the first approach on water intake, it is necessary to carry out operation of probating slits in order to evaluate losses in pressure (resistance) of a slit and compare it to the initial data.

Evaluation of a generalized resistance of a slit can be given most reliably with a data on decrease in levels of the very water intake slit, annular piezometer, and pumping output.

In case a water intake slit does not have annular (by-filter) piezometers, short-term stop of water intake slit can be used in order to observe restoration of level in it.

Comparison of resistance values of filter and by-filter areas of slit, received by any of the described methods, with initial ones under equal terms allows us to judge on reasonability of works to regenerate slits.

During exploitation of a slit, works that are linked to restoration or increasing consumption (output) of slit, occupy a special place.

In order to stimulate water intake, mechanic or hydraulic cleaning is carried out for filters that have been exposed to boil and calmotation as well

explosions of intake/output, electric hydric pump, acoustic, and other methods of increasing water intake insignificantly. For a more efficient stimulation of water intake from slits with sand water bearing horizon we suggest a facility for constructing gravel filter in a slit that allows one to place an artificial filter during a slit operation. This filter is not worse than its natural analogues, it cuts off small-grain sand from water bearing horizons, located in sand layers.

The facility operates as follows: Water lifting and pneumatic piping are placed simultaneously. At their end hydro-pneumatic pump of ejector type is placed with a distributive-filter mechanism, performed as a membrane with petals. Due to mobile stock, as well as a spring that rests against the flange, the membrane helps to put calibrated pebble so it creates an artificial filter. While pumping off natural sand, petals of the membrane descend, and when the facility goes deep, they lift. Pumping off small-grain sand takes place constantly with a simultaneous loading and consolidation of calibrated pebble. Along the pneumatic pipe air is delivered to hydro-pneumatic pump that creates vacuum when is discharged from the tip. Thus starts absorption of water with sand (dirt) and its delivery to the surface. When the tip and the membrane leave casing tube, pumping water to the surface, the membrane starts to open, filling intertube area with pebble. At the same time, selection of small-grain crystals takes place, and artificial filter replaces them by the work of the membrane petals. An efficiency of the filter is defined by an operator according to a situation, until small-grain sand is removed completely.

#### References

1. Turkin A.A. Physical-mechanic characteristics of fractions of sand that pollutes slits / A.A. Turkin, S.K. Manasyan. – Attachment to the Bulletin. Krasnoyarsk state agrarian university. 2006. – P. 72–74.
2. Turkin A.A. Artificial gravel filter. – Attachment to the Bulletin. Krasnoyarsk state agrarian university, 2008. – P. 138–140.
3. Patent 4359 of Russian Federation, MPK7 E03B3/15, E21B 43/04 Facility for constructing gravel filter in a slit / A.A. Turkin; applicant and patent holder – 2004131774/22; published 27/01/2005, Bulletin № 3.
4. Turkin A.A. Motion of water in sand-gravel water bearing horizons // Modern trends in development of Agrarian-Industrial complex in Russia; materials of the V international scientific conference of Northern Federal Region. – Krasnoyarsk, 2009. – P. 13–15.
5. Turkin A.A. Reconstruction and reproduction of water intake slits with protection from sanding Textbook / A.A. Turkin, N.V. Tsuglenok. – Krasnoyarsk: Krasnoyarsk state agrarian university, 2012. – 136 p.

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*Materials of Conferences***THE THEATRICAL EXCURSION  
SPECIFICITY (BASED  
ON THE THEATRICAL MUSEUMS  
EXPOSITIONS)**

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The theater, like no other art form, is reflected the reality around the apparent perception of the available forms of the life itself. In this, the accessibility feature of its ideological and aesthetic impact is laid, the dialectic relationship of the theatrical works with the audience, the secret of the most active sensory perception, which is based on the empathetic hero and the author.

However, the theatrical image perception – is the sufficiently complex process, that is required the enhanced sensory activity, the active work of the imagination, the associative thinking, the certain culture of senses, and the corresponding intellectual training. These are the tasks that are directed at the theatrical tours and the excursions, which have their own features. «The specific theater art is confronted its own demands before the theatrical tour, it has become, like the connective link between the man and the theater» [1].

Really, there is the limitless range of the vital material (e.g. the objects), which can be drawn their themes by the authors for the theater excursion programs. So, the theatre excursions can be overviews, and the specific thematic, the city, the country, and the museum ones. The latter have the special significance, since they are most clearly revealed the essence of the theater art, its masters, the preparation process of the performances and the others. The museums funds are contained the most rich documentary data and the materials on the theaters history.

It is quite possible for us to be distinguished the three types of the theater museums: the museums generalists in all its entirety; the museums in the theaters, more narrow focus, with the permanent exhibitions, collecting materials, related to the development history of the given theater and its companies; the type of the memorial museums, dedicated to the life and the works of the outstanding figures and the personalities of the theater art (e.g. the actors, the stage directors). The expositions of the most known and the famous theater museums are the following: the Theater Museum after A. Bakhrushin (e.g. Moscow), the Museum of Theatrical and Musical culture (e.g. St. Petersburg), the Paris Theater «Grand-Opera», the Milan Theater «La Scala», the London Theater «Covent Garden», the New-York «Metropolitan-Opera», the Museum of the State Academic Bolshoi Theater in Moscow

and the Mariinsky Theater in St.Petersburg have been based on the spectacular nature of the theater art, with its specificity. So, there are quite large archives files in these museums, having preserved the manuscripts, the plans, the directing developments of the performances, having shown on the preparation process.

The Memorial Museums (e.g. the K.S. Stanislavsky House – Museum, the M. Ermolova House – Museum, the Ulanova House – Office and etc.) are borne more intimate chamber character. The Memorial Museum, as a rule, is presented the theatrical figure and the personality in the various manifestations of his character, it is conveyed that atmosphere, where the celebrities have lived, worked, and created. So, the exhibits of such museums, on the expiry of time, have been become invaluable, as the rare sign of their talent and the gift, especially, when many pages of the theater history are quite forgotten, the sightseers (e.g. the theater lovers) willingly will meet with that phenomena, which these artists were for our culture. This significant and the noble task of the theatrical museum collection is served by all its image informational material, by all its quite clear structure. So, the museum profile knowledge is taken into account by the guide at the preparation of the tour material.

There are three different versions of the museum's theater tour carrying out: the chronological one, when the items are displayed in that consequence order, in which the related with them events are being developed; the theme one, at which, in accordance with the requirements of the theme opening; and the complex one, i.e. the subject and chronologically. At the same time, the material selection principle (especially, it is related to the large excursions) and its semantic organization will become the significant challenge in the work on the tour, having chosen one or another particular variant for themselves, and having formulated the coming goal for themselves. Usually, the tour guide is going to have two possible material's interpretations: the documentary one and the imaginative and creative one.

Having given to the fact, that the theater collections' structure is included in itself such components, as: the exhibits, having related to the theater's species (e.g. the drama, the ballet, the opera), and also the stage directions, the acting art, the theater stage design, the stage equipment, the audio- and the video – recordings, the archival (e.g. the source materials) and the bibliographic departments.

Thus, every tour guide, who is taken for the development of the theatrical museum excursion, will have to possess the publicist's temperament, in order actively to influence upon the necessary perception

of the documentary materials (e.g. the photographs, the drawings, the manuscripts) by the sightseers. This is practically contributed the sense of the truth, the sincerity, the clarity of the truth to the presented materials, but very often, too much documentalism and the facts noting is accompanied by the imagery and the entertainment loss. The tour, which is the fine arts- and the arts review related topics, should not be confused and identified with the journalist's treatise, it must be necessarily presented the artistic facts' generalization and the reality phenomena in it. Exactly, the vital content, having associated with the personalities and the roles, must be brought to the audience in the various combinations with the figurative and the metaphorical their reflection and the comprehension, because there are quite different here, than in the excursions to the historical theme, like the acting, the inner feeling, as well as the necessary image concentration. So, this specific feature and the peculiarity are indicated by A. Zis: «The actor – is the chief exponent of the specific performing arts, the support bearer of his unique, ... peculiar to him alone the specific features» [2]. Indeed, the theatrical image – is the harmonic system. It is the reconciled and balanced ratios of the external and the internal features of the embodied role of the private and the public ones in it. It is the living self – propelled model of the reality. So, «the theater cannot be existed outside the time, outside of the space, and outside of the presence effect on the scene of the living person, for exactly, and the time, and the space, and the movement it is by him, the actor, is formed in the theatre» [3].

So, everything is mentioned in the theater tour, as if, it is constantly being projected on the historical background, that it is informed them the large scale, the credibility, and also the high reliability. The actor's or the stage director's art is evaluated, in the context of the historical time, against the background of the general public and the artistic panorama, in the unity of the performances, in the consonance of his school, the fate of the team. The challenge of the historicism of the guide's artistic thinking and the creative comprehension at the present stage of our society's movement is the one from the key ones for the tours' development of the given subject. The significant aspect of this challenge – is how the modern expert's opinion is manifested on the events of the theoretical past. And it is especially valuable, when in the subjects, having suggested by the history and selected favorites for their tour of the story; we meet with the distinct expressed creative position, with the distinct presence in the presentation of the author himself.

Thus, it is quite necessary the guide's sufficient erudition, and his deep knowledge of the historical details, having combined with the acting specific features and the peculiarities, with the ability to the dry facts of the ancient chronicles to be melted into the living flesh of the unique story.

So, the great possibilities for the principle implementing of the connection between the theory and the life is given the tour guide the comparison admission, at which the sightseers fuller and more aware of the existing changes. It is meant on two different historical periods of time, in which the outstanding actors and the prominent stage directors have been living. That distance, which is determined their creative lives, is practically defined the stylistic boundary between them.

In addition to the story, the show and the demonstration are the significant constituent part of any one, including the theater trip and the excursion. The show – is the access presentation to the items' inspection. The demonstration – is to be shown the things in their action or movement. In this case, the show is served, as the common «information method», and the demonstration, – as the additional method of the proof and the persuasion. If the direct static show is served to be informed the visitors about the objects' and the works' presence in the exhibition, the main purpose of the demonstration – the best way to be revealed their characteristics and their peculiar features.

As it has already been noted, the Theater Museum, as a rule, has the handwriting exhibits and the documentary nature ones (e.g. the books, the libretto shows' writings, the scenes' photos from the places and the performances, the actors and etc.) and the visual sources (e.g. the sceneries' and the decorations' sketches, and the costumes, the videos). Hence, the notion on the actor's identity, the character of his acting way is suggested the possible methods for the tour guide, at least, two basic interpretations. In one case, we can talk the way of the actor, the stage director, first of all, as his positions, his credo, the elected moral and the ideological and aesthetic principles by him, in the other one – both of his development (e.g. the evolution) of the creativity. So, the theatrical exhibition of the Museum is very diverse, and each of its faces could be the subject for the separate discussion. Let us dwell briefly upon each of them. The overwhelming majority of the theatrical exhibitions can be taken by the documents and by the artistic photos, having provided the frames, imprinted the way theater world, as it is seen by the camera lens. So, the photos have the large documentary and the artistic significance, because they are given the visual presentation on the theater's figures and its personalities, the heritage of which has been played the large role in the culture of that or another country. So, the Museum workers and the theater critics are widely referred to the genre of the graphic, the pictorial or the sculptural theatrical portrait, which, as the permanent testimony on the artists' life and their creative work, as if overlapping the space and the time, having remained forever the constituent part of the fine legacy. The images of the artists in the works of art have already become something inseparable from the spiritual interpretation of the authors – the artists.



Here, you often have to be dealt with the deeply natural paradox of the verbal transmission of their personal artistic perception and the comprehension. Since, that the perception is more individual, the higher it is at the spiritual level, the brighter and more fully in the story on the actor is played the personality of the narrator himself, and here, it is significant not to be obscured his main hero by the narrator, and not to be replaced it by the bright creation of his rich imagination and professionally well – grounded savvy.

So, the high level of the visual culture is explained much of the success and the dignity of the theatrical performance, in particular the artistic solution of the most significant components and no small important indicators of the costume, the scenery, and the decoration. The set designer and the decorative artist – is the man of the theater, the representative of the ancient theatrical occupation, the significance of which has been steadily increased with the evolution of the art scene. The basic conception of the decorative art – is the emotional relationship of the design and the theatrical performances' activity. The costumes sketches and the scenery sets, the exhibitions are carried in themselves the energy plans, the ideas, and the artistic fantasies. «The theater is relied entirely, and it is based on the conventional forms of the expression, so, they have the genetic predisposition to the conventional methods of the stage directing» [4]. The scenery sketches for the plays and the decorations for the performances are contained that transition, when the individual is joined, the invented conditional peace with the actual reality. The large scale and the most prominent set designers, having presented the significant artists in the museums' exhibitions, open to the audience the quite wide panorama of the shows images, the structure of their poetics, the color – light stage directing. So, the approval of three – dimensional stage has been entailed for itself the return of the theater models, which are often on display at the exhibitions. The stage design and the sceneries are conceived in them bigger and more bulk, the theater, as if strives to be comprehended its own structure. The lines, the color, the texture, the form, the perspective, the space and the movement of the actor has been become the basis of the meaningful comprehension in such exhibitions.

The search for the necessary costume is the quite serious step in the work of the theater artist and the actor on the way. The costume in the theater is also as well as the work of the art, having entered the constituent and the integral part of the performance set design. The stage product is the complex one by its nature (although sometimes it is quite simple by its form) is based on its own composition principles, the plastic organization laws, with its rich expressive language. The characters' clothing on the stage is interacted, as with the cast as the pattern of the roles, well as more – with the author's thought. By focusing on the actor, his psychological

state, the artist in his sketches, as if it opens up the aesthetic value of the composition, having allowed you to be felt the plastics' spatiality, the diversity of the shapes and the suit silhouette. The attention is drawn to this feature of the costume in the theater, as it is the subject – material closeness just to the scenery. So, it is quite often made of the same materials, as the spatial scenic environment. Their artistic stylistic interaction is practically achieved by the technical pictorial means. The art of the artistic costumes, having formed in the process of the theater's development, were given the boost and the strong impulse from the first major works of the old generation masters, is formed in the original art – school skill meaningful comprehension of the plastic values scenic image on the stage. Having overlooked the part of the exhibitions, which is associated with the scenery and the costumes, the associative range of the ideas is appeared at the sightseers, when they see the tangible expression of the artistic ideas. At the same time, the decorative feature means are restored the historical character of the performances. Having taken into account the fixed nature of the sketches during the display, the tour guide has the possibility to be elaborated on the key themes of the stage directors, on the tempo and rhythmic patterns of the images, in order to be accented and highlighted the significance of the fine figure in the given passage, or in the performance, as a whole.

So, there is also another kind of the exhibition material – the video films (e.g. the historical, the newsreels and the documentary, the excerpts), having exhibited in the halls of the theater museums. Often, this is the interview with the actors, the film-makers, the artists, the fragments of the staging, the rehearsals. Such films have been become the powerful artistic component of the excursions, as their strength is in the reliability. They are greatly increased the material perception effect, and they, moreover, can be served, as the introduction, and be demonstrated up to its direct presentation. The film immediately helps to be created the positive psychological spirit, the positive mental attitude, to be enabled its listeners to enter into the subject of the conversation, having prepared the ground and setting the necessary stage for the future excursions. In the images of the film more directly and immediately the life stuff material has been reflected. Here, some connections have clearly been discovered the image with the prototype.

At last, the playbills and the posters are not less interesting exhibit at the Theater Museum's exhibitions. Along with the history of the theater's development, the whole area of the scenic advertising has been grown, having expanded its reach and involved and engaged more and more viewers in the process of the mutual communication. In the XIX-th century, the lithograph painted posters, having made by the first class masters, are practically invaded the streets, having painted in the bright colors, and having illuminated the urban environment in Germany,

England, France, Holland, Belgium, and the USA. The decorative system of the art nouveau is particularly noticeably has been manifested in the posters to the «Russian Seasons» ballets by S. Dyagilev at the end of XIX – early XX centuries.

The theatrical poster – is the document of its time, which is visible and tangible, which has its own psychological and aesthetic qualities of the reliability. The poster's genre, having provided by the information text part – sometimes it is more persuade document, than the photo, which until recently was considered the most compelling and the irrefutable support authentication.

Thus, the Theater Museums exhibition, having built by the chronological principle, from the birth of the theater's origin up to the present day, is practically demonstrated the variety of the forms, styles, genres, methods, and techniques, so characteristic for the ever – changing trends in the art are involved the findings by each artist's his individual handwriting, position, manners. To evaluate such diversity is quite impossible without the true internal culture, the unity of mind and the emotions. So, having seen in the theatrical exhibition, the material, as a whole, is constituted the very «divertissement», which is deserved the special attention, it exactly is remained

in the memory of the sightseers. After the exhibition halls viewing, the participants find themselves extremely in the indirect connections with the exhibits, and in the very direct ones with the tour guide. Thus, the museum exhibition – is the starting point of the excursion, and the impression of it – is the final.

As we tried to show the tour guide's position, as a result, it has become the important, essential, synthesizing, significant, constructive factor, which has the impact on the final result of the viewer's perception of such specific sphere, as the theater tour.

#### References

1. Sichinaeva V.A. The Excursion Work. – M., 1981. – P. 71.
2. Zis A. The Types of Art. – M., 1979. – P. 74.
3. Ibid. – p.74.
4. Kharitonov V.V. The Arts Interaction. – Yekaterinburg, 1992. – P. 124.

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*Materials of Conferences*

**THE SEMITHIN SECTIONS USE  
OF VARIOUS HUMAN AND ANIMALS  
ORGANS IN THE PARTICULAR  
HYSTOLOGY BASES STUDIES FOR MBF  
STUDENTS OF THE RNRMU – RUSSIAN  
NATIONAL RESEARCH MEDICAL  
UNIVERSITY NAMED  
AFTER N.I. PIROGOV**

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Available to the Morphology Chair MBF, the standard light–optical products for the histology, having characterized the various human and animals organs and tissues, not always of their good quality, because of their good thickness (e.g. Pavlovich, 2005–2008; Fedoseev, et. al., 2005, Pitzova, et. al, Pavlovich, et. al., 2008; 2009), which is not helped to be understood the peculiarities and their specific features structures by the students. So, the histological technologies and techniques use, combined with the new computer teaching methods use (e.g. Gurina et. al., 2009; Pavlovich, Prosvirnin, 2011) is offered hope to be improved the education, under the students' employment time reducing conditions in the seminars and their lectures. The semithin sections production in the Chair has been carried out by the traditional methods (e.g. Pavlovich, et al., 2011; 2012) with the organs, having contained in the epoxy resins, having stained them by the toluidine blue or the pyronin G. Then, the products digitization, and the panorama shots preparation has been followed. For all this, the obtained illustrations could have the quite different increase. So, the qualitative light optical illustrations producing and the wish to be shared with the world, have been inspired us to be created «The World–Histology» internet–resource [theYa.ru portal page in the Yandex system], on the basis of the semithin sections, which is improved the illustration material help by the students' mastering to the quite various topics on the general and the particular histology of the human and the animals in the normal situation, in the pathology, and in the experiment. So, all the material from the various animal species and the humans has been split by us on the number of the albums: the epithelial, the connective, the muscle and the nerve tissues one; the cardiovascular, the urogenital, the respiratory, the endocrine, the immune, and the hematopoietic systems, the gastrointestinal tract, the skin and its derivatives, and also «The Organ Systems Pathology», «The Cells and Tissues in the Experimental Exposures». In what follows, it

is supposed to be created the albums: «The Organs and Tissues Age–Related Changes», «The Organs and Tissues Morphological–Comparatively Study at the Different Species of Mammals», «The Organs and Tissues Histochemistry», and also «The Cells' Ultrastructure and the Organs and Tissues Extracellular Matrix». So, the students would be able to be self–studied the products, to be reported the challenges, to be posted the comments, and to be participated in the recitations on the topics. And it is quite possible, that especially this site will be of the interest not only to students, but to the specialists and the experts, who is able to be sent their photos, and the discussion, incomprehensible to the researches themselves to be described the products, which will be enhanced our understanding on the morphological diversity of the living systems.

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**BUILDING THE MODELS  
INCORPORATING POPULATION  
DYNAMICS OF FISH-EATING BIRDS  
AND DEPLETION OF FISH RESOURCES**

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Global climate change and population explosions of certain fish-eating bird species are accompanied by expansion of their breeding ranges northwards along major rivers able to provide them with sufficient food resources. One of these species, the Great Cormorant (*Phalacrocorax carbo* L.) started breeding within Saratov oblast fairly recently. Since then, this species' numbers increased exponentially. New breeding colonies of cormorants appear annually. Being fish-eating birds, cormorants hunt for fish in areas traditionally used by local population for fishing and recreation. Pungent and malodorous, cormorants' feces destroy arboreal vegetation on islands where they breed. Consequently, recreational value of such islands diminishes. Additionally, fishermen and fish resource rangers think that cormorants endanger fish resources of the Volga River. In this context, research of the Great Cormorant impact on commercial and recreational fisheries is truly relevant to avoid both unjustified public protests and fish resource depletion.

Our goal was to build the imitation model incorporating population dynamics of a fish-eating bird species (using Great Cormorant as an example) with depletion of fish resources. The model could

be used for various fish-eating bird species with a similar breeding biology:

- Birds start reproducing at the age of two years
- Annual adult female survival has a probability of  $P_A$
- Annual juvenile female survival ( $P_J$ ) can be approximated at  $0,5 P_A$
- Monogamous reproduction
- Monocyclic reproduction, i.e. one successful brood with a size  $B$  and probability of successful fledging  $p_s$ , and probability of reneating after unsuccessful breeding  $p_r$ .

According to the model, the total population size at year  $t$  can be determined as:

$$N_t = N_0 \lambda^t.$$

Population growth rate  $\lambda$  can be computed using the modified equation of the earlier model (Podolsky, 2012 *a*, 2012*b*):

$$\begin{aligned} \lambda &= P_A + P_J \cdot 1/2 \cdot [p_s B + p_s \cdot (1 - p_s) p_r B] = \\ &= P_A + P_J \cdot 1/2 \cdot B p_s \cdot [1 + p_r - p_r p_s]. \end{aligned}$$

The model input includes processes determining changes in bird population structure and size and daily intake of fish by the birds of different age categories. The model outputs are both the estimate of the total fish intake by the birds and the ratio of annual fish resource depletion to the total fish resource amount in the region. Since the modeled system incorporates various processes, we used the object-oriented imitation modeling approach. First, we created the information system as the basis for our model. The information system is essentially the information model of the actual system describing the relationships between the cormorants and fish resources.

At the second stage, we created the hierarchical list of information objects included in the model. The objects were grouped in classes and subclasses of different orders as a dendrogram. Each subclass inherits all the attributes of the class and adds some specific attributes, which are inherited by inferior subclasses of the lower order of hierarchy. It is worth noting that each information object has associations with certain traits reflecting its specificity, indicators determining its condition, factors affecting the object itself, and processes connecting the indicators of its condition with those factors. In our model, the objects were: adult – i.e. reproducing third-year bird, subadult (non-reproducing second year bird), juvenile (first-year) bird, egg (clutch) and a nest.

At the third modeling stage, we compiled the list of information processes relating factors to the indicators of object conditions. Each process is assigned a conditional start. Some of the processes we considered in our system were: «Bird arrival to the breeding sites», «Nest-building», «Egg-laying» (for third-year birds), «Incubation», «Egg loss», «Nest loss», «Reneating», «Nestling-hatching»,

«Nestling-feeding», «Nestling loss», «Adult bird feeding», «Fledged juvenile feeding», and «Fall departure from the breeding sites». Block-structured nature of the model makes it possible to change numbers and parameters of its objects and processes. To ensure the possibility of modeling taking into account statistical nature of the processes, the model can use generators of random numbers for various data distribution types. The process duration and its termination time is set up in the model as well.

Currently, the model is developed in MATLAB. We anticipate its future development using the C# language. If parameterized on the basis of empirical demographic field studies, the model can be potentially used for management decisions on cormorant population regulation in the region.

#### References

1. Podolsky A.L. Evaluating the ecological quality of natural landscapes by computer modeling of songbird population dynamics // *European Journal of Natural History*. – 2012 *a*. – № 1. – P. 34–35.
2. Podolsky A.L. Use of information technologies in the modeling of songbird population dynamics for assessing the ecological quality of natural landscapes // *International Congress on Information Technologies-2012 (ICIT-2012): Information and Communication Technologies in Education, Manufacturing and Research. Proceedings of Abstracts*. – Saratov: Saratov State Technical University Publishing House, 2012 *b*. – P. 82.

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#### IDENTIFYING PRIORITIES IN STUDYING SOIL CONTAMINATION OF THE NATURAL AREAS ADJACENT TO BIG CITIES

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Protected natural areas near big cities act as popular recreational sites and source of fresh air for the city residents, and host substantial biodiversity. Contaminated soils may result in plants and fungi rich in pollutants causing health hazards to the city residents involved in picking up berries and mushrooms for consumption. Therefore, it is crucial to determine the environmental condition of soils in natural areas adjacent to the big cities. We identified the priorities to include studying heavy metal, nitrite, microbial and radioactive pollution of soils.

In 2012, we conducted a pilot study of soil pollution within the protected natural forested area «Kumysnaya Polyana» (KP), which covers 4417 ha of the Bald Mountain plateau adjacent to the city of Saratov. The goal of our research was to identify how the proximity to the city limits affected levels of forest soil contamination within KP. With this goal in mind, we grouped 134 forest-management sections of the KP area into three zones: adjacent (close proximity to the city), medium, and remote



(farthest from the city boundaries). To ensure random sampling procedure in our study, all section numbers of each zone have been entered in the computer, and the computer program generating a series of random numbers selected eight sections in each of the three zones to be studied for soil contamination.

In the pilot study, we identified soil acidity and concentrations of the following pollutants: nitrates and nitrites of presumably anthropogenic origin along with the cations of ammonium and heavy metals (cadmium, lead and copper). For each sampled forest section, we collected five 200 cm<sup>3</sup> soil samples at random locations, carefully mixed them, and then conducted quantitative chemical analyses based on standard techniques [1, 2, 3]. This procedure gave us the concentrations of each pollutant

at each selected forest-management section. Then the results of analyses were averaged for each proximity zone. Statistical processing of the data included calculation of the standard error of the mean and one-way ANOVA analysis using the software package MINITAB [4]. The results are presented in the table.

While soil-pH did not vary significantly among the proximity zones, our study confirmed with high statistical confidence that the largest concentrations of all contaminants in the soil were found in the zone adjacent to the city while the lowest concentrations were detected in the remote zone. This finding supported our hypothesis that the pollutants came from anthropogenic sources, and the city of Saratov was the main source of pollution of adjacent territories including the protected natural forested area KP.

Differences in soil acidity and pollutant concentrations within protected natural area «Kumysnaya Polyana» depending on proximity to the city limits

Zones/Concentrations, mg in a kg of soil	pH	NO <sub>3</sub> <sup>-</sup>	NO <sub>2</sub> <sup>-</sup>	NH <sub>4</sub> <sup>+</sup>	Cd <sup>2+</sup>	Pb <sup>2+</sup>	Cu <sup>2+</sup>
Adjacent	7,11 ± 0,11	10,64 ± 2,58	0,16 ± 0,011	13,81 ± 0,45	0,0216 ± 0,0088	3,55 ± 0,41	0,0491 ± 0,0138
Medium	7,18 ± 0,07	1,91 ± 0,32	0,07 ± 0,011	11,85 ± 0,50	0,0008 ± 0,0001	1,43 ± 0,09	0,0026 ± 0,0003
Remote	7,27 ± 0,13	0,49 ± 0,06	0,03 ± 0,004	10,97 ± 0,36	0,0006 ± 0,0002	0,52 ± 0,07	0,0008 ± 0,0001
Statistical significance: P (one-way ANOVA)	0,599	< 0,001	< 0,001	0,001	0,011	< 0,001	< 0,001

Unfortunately, proximity to the big city, besides bringing recreational benefits to the residents of the state capital, is a significant threat to the ecosystems of KP. The negative factors are both direct human influence (illegal logging, residential construction, forest fires, collecting rare plants, etc.) and indirect impact such as contamination of KP ecosystems by various man-made pollutants emitted into the environment by the city industry and transport.

While maximum allowable concentrations of analyzed pollutants in soils were not reached [5, 6], and some of the exact sources of established soil pollution would have been difficult to determine, the results of our pilot study suggested that, in spite of the long-term protected status of KP, environmental pollution of this natural area cannot be neglected. Since contaminants have ability for a long-term accumulation in an ecosystem, especially in soils, the latter can remain contaminated for decades even after the pollution sources stopped existing (for example, lead-containing gasoline was banned in Russia in 1998). Consequently, plants and edible mushrooms could become contaminated

as well within natural areas adjacent to big cities. That is why our pilot study will be followed by a comprehensive research of soil pollution within the KP area.

#### References

- Zolotov Yu.A. Basics of Analytical Chemistry. Vol. 2. Methods of chemical analyses / Yu.A. Zolotov, E.N. Dorohova, V.I. Fadeyeva et al. – M.: Vysshaya Shkola., 1999. – 494 p.
- Otto M. Contemporary Methods of Analytical Chemistry. Vol.1&2.– M.: Technosphaera, 2003. – 407 p. + 277 p.
- Scholz F. Electrical Analytical methods. – M.: Binom, 2006. – 326 p.
- MINITAB® Software for Windows. – 2010. – Version 16.2.2. – Minitab Inc., State College, PA.
- Heavy metals in soils // [http://www.gidrogel.ru/ecol/hv\\_met.htm](http://www.gidrogel.ru/ecol/hv_met.htm).
- 1995 Federal Law of the Russian Federation «Sanitary and epidemiological well-being of residential population» № // <http://www.dioxin.ru/doc/gn2.1.7.2041-06.htm>.

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*Materials of Conferences***SYSTEM OF VALUES, AS CONDITION OF INNOVATIVE MODERNIZATION PROCESSES DEVELOPMENT**

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The sustainable development of the Russian society in strategic prospect in the conditions of globalization of the commodity and financial markets, the global innovative development, being accompanied redistribution of major factors of production on a global scale and weakening of the traditional relations, communications and society institutes at regional level, is possible only on condition of the balanced development of economy and the socio-cultural system, leaning on fundamental preconditions of activation of investment and innovative processes and their direction on complex modernization of productive forces on the basis of the advanced technological ways, and also preparation of the welfare environment for perception and use of again arising organizational and technological capabilities.

In a complex it is possible to solve these problems only on condition of the creation the special mechanism of innovative modernization including system of adoption of administrative decisions, leaning on naturally arising driving forces of social and economic transformations

The analysis of experience carrying out successful modernizations in post-war Germany, Japan, Turkey, China and a number of the countries of South East Asia [1–5] and as well the analysis of experience of pre-war modernization in the USSR allowed to draw a conclusion that for successful carrying out modernization reforms it is necessary that administrative decisions leaned and appealed to values and internal and external subjects of economy needs, created on their basis and sociocultural system. Therefore the problem of a complex of values formation becomes the most important task of modern innovative modernization management at the level of the state and its regions.

Basic values which are formed in the course of society activity, are synthesized and accumulated by its main institutes and they can be shown as public requirements to the development of these institutes. Institutes during functioning unite into alliances, seeking to strengthen positions and to provide performance of the requirements. Fight for limited resources leads to formation of 2 groups of values of two resisting systems – innovatively developing economy and sociocultural system. Values of innovatively developing economy are focused

on increase of efficiency of the production sphere on the basis of innovative development of technical and economic system, and value of sociocultural system – on achievement of social justice and social development for the concrete region. It is obviously that these specified groups of values can conflict. When forming strategic administrative decisions in the field of innovative modernization of the region this problem has to find the solution.

The complex of values development of socio-cultural system of the Russian society consists of a group of traditional sociocultural values (historically developed traditional values forming a social and moral basis of the Russian society), and also values of society development (public progress) which are formed in the conditions of globalization and innovative development.

To number of historically developed traditional sociocultural values created under the influence of history, traditions, expectations, and also strategic aspirations of considerable part of modern Russian society, belong, the following: kindness, humane outlook, self-sacrifice, social responsibility, need for historical participation, traditional character, openness, patriotism, the strong majestic power (it is made with use of proposals of A.M. Novikova [6, 7]).

Values of society development are: active personal and collective creativity (intellectual and spiritual and moral); aspiration to innovation, as to a way of the solution of problems, the answer to modern global challenges of development; aspiration to a new, modern way of life, a thoughtway; need for the «honest» and lawful state; need for «the moral right» and need for the effective mechanism of institutional development and self-regulation.

The approximate package of values innovative economy development, taking into account globalization, includes the following main values groups of subjects of economy:

- needs for creation of innovative, improved production and services;
- aspiration to the technological development aimed at creation and application of essentially new or improved technologies;
- needs for improvement of the organization of production of its structure, for expansion and/or diversification;
- improvement of working conditions, change of its character;
- the administrative development aimed at improvement of management style, methods of decision-making, motivation, information processing.

Values of innovatively developing economy and the sociocultural system, leaning on objective needs of operating subjects, form the mutual demand for the appropriate strategic innovative resources.

As strategic innovative resources we will understand the resources formed within these systems and societies critically necessary for innovative development in the conditions of globalization and transition to the new technological way. So, within a complex of values of sociocultural system the demand for innovative technologies and production, acting as a strategic innovative resource of development of sociocultural system is formed. And within this complex of values of innovative economy the demand for the intellectual and spiritual and moral development of workers providing their high creative potential and acting as a strategic innovative resource for innovative economy is formed.

The mechanism of interaction of supply and demand for strategic innovative resources acts as a driving force to innovative modernization. Therefore, effective interaction sociocultural and innovative economic systems at the level of mutual satisfaction of values through granting strategic resources to opposite system put a basis of effective innovative modernization of social and economic system as a whole.

1. At the stage of values identification and analysis, their extensive discussion can be organized that will allow to consider requirements of public institutes most fully. The idea of development created thus and the relevant system of values is automatically legitimized. If it is also is fixed legislatively, it creates new logic of decision-making concerning large national projects.

2. Developed on the basis of the accepted system of values the portfolio of the strategic directions of development will provide continuity the course in the conditions of selectivity of the power, will allow society to exercise more effectively control of integrity of actions of the authorities, and also will serve as protection to the state from extremist reactions to lawful actions in the field of management of development.

3. Involvement of citizens to the system of innovative modernization values formation will mobilize public energy for realization the corresponding projects and allows to explain to the society the needs many unpopular measures.

Offered approach is flexible and adequately technological as allows to create mechanisms of monitoring the change of the valuable system of society condition and is timely, reasonable, according to the established changes, correct the portfolio of the strategic directions development, projects and programs.

#### References

1. Anisimov N.V., Bunin V.N., Denisov Y.D. etc. Japan in the modern world: Factors of stabilization of development and safety. – M.: MAX press, 2000. – 254 p.
2. Buzov V.I. The contemporary history of Asia and Africa (1945-2004): studies. grant / Century. I. Buzov, under the editorship of A.A. Egorov. – Rostov n/D.: Phoenix, 2005 – 574 p. – <http://www.istmira.com/istoriya-azii-i-afriki>.
3. Danilov V.I. Turkey of the 20-30th years: way to democracy // the East. – 1997. – №. 2. – P. 63.

4. Kireev N.G. Etatism history in Turkey. – M.: Science, 1991. – 341 p.

5. Batukova L.R. Modernization: general regularities, main aspects of management // National interests: priorities and safety. – M., 2012. – № 3(144). – P. 9–18.

6. Novikov A.M. Novikov D.A. Methodology. – M.: SINTEG. – 668 p. – URL: <http://www.methodolog.ru/method.htm>.

7. Novikov A.M. To Russia the national idea // the Spetsialist Magazine, 2008 is necessary, for № 11, the Site of the academician of Russian joint stock company. – URL: <http://www.anovikov.ru/artikle.htm>.

8. Batukova L.R. Concept approaches to formation of a control system by modernization: interconditionality of economic and institutional aspects, bases of management of carrying out modernization reforms, page 49–58 // Materials of the international scientific and practical conference (on October 7, 2011) – In 3 h. – P. 1 / Main editor V.I. Dolgy. – «Post-crisis development of modern society: prospection (economic, social, philosophical, legal aspects)». – Saratov: ITs «Science», 2011. – 224 p.

9. Belyakova G.Y., Batukova L.R. Modernization reforms: questions of a goal-setting and main aspects of a control system. – SPb.: Problems of modern economy, Euroasian international scientific and analytical magazine, 2011. – № 4(40).

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#### THE ACTIVITY OF CONSTRUCTION ORGANIZATIONS. PRIVATE ISSUES OF COST ACCOUNTING

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The economic and financial stability of the construction, and the effectiveness of the functioning of the system of internal control is directly dependent on the legally correct fastening of contractual relations with the other participants of the process of building relations on the market.

The conditions of the modern economy of the contract must be regarded as one of the specific types of civil-legal relations. It is connected primarily with the fact that in the area of normative-legal regulation are the participants of the process of construction of various forms of ownership. If you refer to the statistical data provided in the report of the Federal service of state statistics of the Russian Federation, the volume of the produced construction works in Russia between January-November 2012 compared with the same period in 2011 increased by 2,1% and amounted to 4 trillion 796,3 billion rubles.

In viewing the increasing volume of construction works it is necessary to search for ways to optimize economic relations, arising out of the contract for construction work that may be achieved through:

1) studying the specific features of the legal basis of the contract for construction work;

2) analyzing the functional orientation of such an agreement.

The relationship between the parties of the construction process is governed by the relevant legal regulations. In particular, the scope of activities of the Federal policy in respect to the subjects of natural monopolies determined by the Federal law «On natural monopolies». In this case, the definition of the subject of the natural monopoly includes not only large construction companies such as «Gazprom», «Transneft», but also construction companies that carry out their activity on the commodity market, classified as a natural monopoly.

Still not completely eliminated gaps in existing legislation, including the ambiguity of the interpretation of existing standards and regulations, which form the basis of the practical difficulties in the application of legal norms aimed at settlement of mutual relations of economic entities-participants of the construction contracts, as well as indirectly complicates the organization of the system of accounting in construction.

Today, the current legal framework of the industry is changing with the same rapidity as the economic situation creates a number of difficulties for accounting services of building organizations number of difficulties.

Construction organization may carry out its activities as a General Contracting organization, which may not perform construction works, and only performs the functions of the coordination of the activities of subcontractors, the collection and analysis of economic information, directly related to the construction, for the conduction of the construction management, but it may also carry out activities as a subcontracting organization. The Prime contractor may also carry out construction work, as well as act as the employer for subcontractors. The subcontract organizations, as a rule, act in the General scheme of realization of the construction contract as direct executors of works, having narrow specialization by types of construction works.

If the ratio between the parties construction contract: the contractor, the contractor and the subcontractor identified only formally, for example, as a brokerage transaction, the great risks that such a transaction will be renamed in a deal that satisfies the actual legal relations, i.e. in the transaction of subcontracting. In other words, the construction work contract may have different legal conditions depending on specific conditions, goals and objectives of the participants of the construction process.

Determination of the composition of the expenditure is an independent decision of each individual organization, the direct and indirect costs are fixed in the accounting policies of the construction organization. If the company is a General contractor, in the composition of its direct costs may be included expenses on the works of the sub-contractor on the construction of specific objects in the analysis of the cost of works, executed by its own forces.

In that case, if the Prime contractor is not conducting the construction of its own, he does not have its own direct expenses, and the expenses for the management of subcontractors should be included in the indirect costs, which on the basis of cost-based distribution shall be distributed proportionally for the construction of facilities. But then the question arises: if the organization is the General contractor in the reporting period takes work on all objects of construction, whether you can use it as a base for the distribution of the volume of work performed by subcontractors? Such a decision seems to be not quite correct. After all, if the main contractor does not have the expenses of one of the construction objects, it does not mean, that the costs of the management of the other objects were not carried out. As a base for cost-sharing you can use the estimated cost of the construction of each object of construction, based on the General contractor agreements, which were concluded with customers.

For commercial organizations, methods of determination of cost of construction products on the territory of the Russian Federation has recommendatory character. Therefore, in the process of its activity the building organization often faces difficulties in cost accounting, which were not settled before the date of commencement of the work.

Firstly, in the course of construction, the contractor may find that the need arose for additional works which were not taken into account in the documentation, and such work is directly lead to an increase in the estimated object cost. Before the contractor is obliged to notify the customer about this, the customer must provide a reply to the message within the terms specified in the contract. If the contract does not contain the norm, then the answer is provided in ten days, unless otherwise stipulated by law. Article 73 of the Civil Code of the Russian Federation frees the customer from the reimbursement of additional expenses incurred by the contractor, if it is a proven fact that there is no need for such works, including their focus on prevention of destruction or damage of the object of construction. In this case the contractor will be deprived of the right of claim payment for additional work performed and will incur a loss in the form of downtime, if the response from the customer is received with infringement of terms of delivery.

Secondly, it may be an uncertainty when making decisions on the procedure of accounting costs: in General for construction or for complex objects. Initially mistakes in the methodology applied directly lead to the significant difficulties connected with the reliability of the distribution of expenditure between objects construction. The proportional distribution of expenses by a mathematical method of distribution of the less reliable than more objects of construction are different from each other, since there is a difficulty in determining the overall framework for all objects of construction for an apportionment of the total costs.



Oftentimes, a company after the completion of construction may identify additional expenses. Decision of the question with «too late» expenditure was resolved only in November 2012, when the Ministry of Finance, in a letter dated 12 November 2011 № 03-03-10/126 recognized the legitimate nature of the inclusion of certain types of expenses in the structure of expenses after the Deposit of the fixed asset object into operation.

An important event of the year 2013 is the fact that the building holdings in this year for the first time published statements for the year 2012 in the form of the consolidated financial statements according to IFRS. This requirement enshrined article 8 of the Federal law on July 27, 2010. № 208-FZ «On consolidated financial reporting». At the same time the rest of the building organizations are not deprived of the right of application of international financial reporting standards.

The norms of international standards with every year, become more and more full-fledged elements of the accounting policies of the companies, not only construction, but also of other branches.

Already today, the accounting regulations contain direct links to the provisions of International Accounting Standard (IAS). For example, Accounting Regulation 2/2008, «Accounting for construction contracts» is developed on the basis of IAS 11 «Accounting for Construction Contracts».

However, while there are some differences the norms of Accounting Regulation 2/2008 construction organization will be useable only on the condition that the contract for construction work falls on different calendar years, or has long-term character. There is no doubt the fact that the building organization in a time period can carry out work under several contracts, which have different temporal nature. IAS 11, in turn, allows you to use a unified approach to accounting for agreements with different duration. The problem of the account of expenses of future periods, are included in the General expenditures of the organization (for example, insurance of construction equipment, which in the construction organizations occupy a significant share in the structure of fixed assets) can be solved through the application of the Accounting Regulation /2008, which allows you to use the most suitable variant of accounting, and Accounting Regulation 9/99 does not set restrictions on the terms of beginning and end of work with the recognition of revenue from the performance of work, calculated on a long term, with the use of the method in the process of readiness.

In respect of construction contracts, which have short-term characters, the amount of flow, according to the current Russian legislation, the need to write off a lump sum, not to apply this provision, many construction companies prolong the contract for construction work, which were originally designed for a short term, for a period of more than a year to the possibility of application of the provisions of Accounting Regulation 2/2008. The current

legislation does not contain a direct prohibition on the expansion of the scope of this standard, however, if such an opportunity would be provided initially, the organizations would not have to resort to the use of such schemes.

The desired change that can be made in Russian accounting is a change in the approach to the write-off of excessive costs, which the Russian accounting are recognized immediately in the composition of other expenses. International rules on the basis of the provisions of IAS 2 «Inventories» allow the organization costs of construction products attributed to the regulatory costs and include them in the cost, and the excess of the cost of materials and labour recognised as an expense in the period in which they occur. However, one cannot lose sight of the reservation in paragraph 2 in IAS 2, which says that the standard does not apply if the work in progress occurs under the construction contract. The cost of work in progress on construction contracts is regulated by the provisions of IAS 11, according to which expenses are written off in a special procedure, linked to the willingness of the object as a whole.

From the moment of entry of the new Federal law «On accounting» Accounting Regulations will be gradually withdrawn from use and in their place will be taken by the Federal accounting standards, which may be a Russian international standard.

The implementation of the recommendations of international standards allows to solve complex private matters relating to the Russian accounting. IFRS is not so rigidly regulating the actions of the accounting service, based on professional judgment. While their more stringent requirements are not directed at the process of documenting the economic activity, as to the scope and nature of the information provided in the financial statements today, we continue to go sure step to the construction of the accounting statements in accordance with international standards.

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#### **THE SCIENCE AND TECHNOLOGY PARKS, AS THE REGION'S INVESTMENT POTENTIAL IMPROVING TOOLS**

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The investment potential concept by the authors' opinion on the Russia's accession to WTO has been described in the paper. The countries' and

the regions' competitive recovery, on the basis of the innovations, and the technology parks creation has also been described in the paper. The factors' impact assessing on the region's investment potential, by means of the correlation calculation has been revealed.

The innovations introduction in the Russian economy, as a whole, and in the country's regions, in particular, will be facilitated the competitive recovery in the global arena, one way or another, having increased the investment attractiveness level, and the listed – above private investment potentials, which, in their turn, are quite able to be attracted so much – needed modern economy the means of the financing.

So, the investments attracting into the economy – this is the question of its survival, thus the investment attractiveness increasing – it is the additional funding, which will be allowed to be made the necessary step in the region's further economic development. The investment attractiveness improvement will be allowed to be increased the rates of the economic growth, to be strengthened the region's positions in the international arena, as well as to be improved the population's welfare.

The economic, legal, political, social, and the other conditions, having created by the state to the all business entities and the management subjects, and also to the foreign investors for the profitable capital investments, for the purpose of the national economy further development are understood under the investment attractiveness [1].

So, the technology parks establishment is the significant tool to be improved the investment potential. The technology park, according to the opinion of Skopina E.V., – is the cooperation structure, having created on the basis of the Higher Educational Institution, for the purpose of its research and scientific capacity using, and the developed technologies commercialization, through the quite small innovative companies and enterprises creation and their development, having existed on the technology park territory [5].

Ivanitsky V.P. and Zubkov L.D. in «The Innovation Activity Infrastructural Support in the Strategic Importance Areas» paper have been called the innovation infrastructure, which the industry parks are included, the key and the significant factor of the Russian innovation system formation. Especially, such a system should be facilitated the country's transition just from the export – resources to the innovative model of its further development [6].

So, the technology parks can be the effective form and the efficient way of the innovation processes organizing. This is completely confirmed by the long – term international experience. The technology parks have already been existed not only one decade years in India and China, Europe and the USA. So, it is simplified the innovation companies creation and its further growth, through the incubation processes and the new processes devel-

opment companies from the already existing ones. So, the technology park, besides the highly – quality grounds and the space, is provided also the other services. Moreover, the Russian technology parks, in addition, the incubator functions carrying out, are also served, as a sort of the «security grounds», which are protected the enterprises and the companies from the aggressive environment [7].

The important component of the investment attractiveness is the region's investment potential. Some authors consider the region's investment potential, as the region's ability to be met its needs in the investment resources without the debt capital use and the other sources of the attracted funds, that is the region's production factors collection and the capital investment spheres, which are available there.

T.S. Zhutovskaya considers the investment potential size of the investment resources, and the national economy state. On the one hand, this is the free capital investment into the economic entities and the management objects, as well as into the securities, for the purpose of either to be gained the income, or to be controlled the investee entity. On the other hand, – this is the promotion and the effective participation in the social and economic activities of the facilities and the national economy spheres [3].

According to the «Expert RA» rating agency opinion, having based the investment rating of the Russian regions, at the region's investment potential assessment, it should be considered the main macroeconomic performance, the area saturation by the production factors, the consumer's demand volume, and etc. So, this potential capability is the set of the eight private capacities:

- the raw materials – resource one (e.g. the average supply of the balance reserves of the main types of the natural resources);
- the labor one (e.g. the labor resources and their educational level);
- the production one (e.g. the combined effect of the population economic activity in the region);
- the innovative one (e.g. the scientific development level and the scientific and technological progress implementations in the region);
- the institutional one (e.g. the development degree of the leading Institutions of the ME – market economy);
- the infrastructural one (e.g. the region's economic and geographical situation, and its infrastructural provision);
- the financial one (e.g. the amount of the tax base and the region's enterprises and companies profitability);
- the consumer one (e.g. the region's combined purchasing power of the population) [2].

At the first stage of the factors influence analysis, we will make the individual potentials assessment in the several regions, according to the «Expert RA» rating agency method. Next, it is quite

necessary to be determined the amounts of the investments in the fixed assets, in the context of the considered regions.

The statistical method for the linear correlation coefficient (e.g. or the Pearson's correlation coefficient) is being used for the factors influence determination on the amounts of the investments.

The correlation is called the relationship between the two variables. So, this index may be accepted the number range from  $-1$  to  $+1$ . Then, the negative correlation – is the correlation, in which the further increase in one variable is associated with the further decrease in the other one. The positive correlation – is the relationship, in which the further increase in one variable is quite associated with the further increase in the other variable. If the correlation coefficient is equal to  $0$ , the two variables are completely independent of each other. So, the correlation is being considered the strong one, if its ratio is above  $0,60$ ; if it is exceeded  $0,90$ , than the correlation is being considered the very strong one. So, the private potentials research of the several separately taken individual regions and the relationship definition between them and the volumes of the investments, by means of correlation coefficient calculation will be helped to be drawn the certain conclusions. If there is the positive correlation between a high enough level, then it will be quite possible to be spoken on the fact, that such factors, as the volume of the mineral mining operations, the number of the economically active population, or the amount of the R & D expenditures are affected upon the region's investment potential, and, therefore, upon the amount of the investments involvement, which is the significant tool in the accelerating rates of the economic growth of the regions and the country, as a whole.

In the course of the carried out research, we have already revealed the various authors' views on the investment potential concept, the impact of the Russia's accession to the World Trade Organization (WTO) on the country's investment potential, and the factors, having affected it. Also, we have already proposed our approach for the potential determination, by means of the impact calculation through the correlation coefficient.

So, the importance and the significance of the investment potential definition of the region and the country, as a whole, are explained to the fact, that the investors, immediately before their money investing, carefully evaluate the potential investment objects.

The approach, having proposed by us, to the factors impact assessing on the investment potential will be enable to be made more versatile analysis of each individually separately taken region, and also to be identified the macroeconomic and the regional risks.

So, the examples of the existing technology parks in Russia (e.g. for example, «Skolkovo», or «The Titanium Valley») are clearly shown the volumes increase of the investments in the innovation.

In their turn, the innovation introduction into the regions' and the country's economy, as a whole, will be permitted to be reached quite the new level of the further social and economic development.

#### References

1. The Business Organizations (Enterprises): the Textbook / under the editorship E.V. Sergeev. – The 3 – rd edition, revised and enlarged – M.: Prospect, 2010. – P. 208–209.
2. Shabaeva V.E. The Investment Potential of the Russian Regions // The Economic and Social Challenges of Russia. – M., 2001. – № 3 – P. 60–84.
3. Zhutovskaya T.S. The Investment Potential of the National Economy // The Bulletin of the Tyumen State University. – 2008. – № 4 – P. 180–185.
4. The Federal State Statistics Service. – The Russtat / www.gks.ru.
5. Skopina E.V. The Integrated Development of the Regional Industrial Cooperation and the Cluster Projects // The Regional Economy and Management: the Electric Scientific Journal. – Kirov: LLC «The International Center for Scientific and Research Projects», 2007. – № 1 (09).
6. Ivanitzky V.P., Zubkova L.D. The Innovation Activity Infrastructural Support in the Strategic Importance Areas // The Innovations and Investments. – 2010. – № 6.
7. Mukhametov A.G. The Technology Parks in the Modern Russian Economy // The Economic – Socially and Technical Systems. – 2010. – № 3.

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#### INDICATORS OF DEVELOPMENT INNOVATIVE REGIONAL CLUSTERS IN MODERN ECONOMY

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The clusters approach has emerged as an important analytical tool for governments and economic development agencies seeking policy prescriptions to make their economies and firms more competitive. While the cluster approach has traditionally been used for examining national economies it can also be a useful tool in analyzing the dynamics of sub-national or regional economies. However, it is absolutely vital that cluster programs and actions are properly tailored to the individual needs and requirements of any given cluster and the specific characteristics of any given region.

Previously the Russian Federation showed little interest in cluster-based policies at the national level. However, considerable interest is now being shown in the cluster approach at the regional level of the country. There are cluster strategies, conceptions of cluster policies accepted by some regional government in Russia. The main accents in these documents are made on regional innovations. The factors encouraging cluster development and innovations diffusion are presented in Table 1.

Table 1

## Factors Encouraging Cluster Development

Groups of factors	Factors encouraging cluster development
Strong science base	Leading research organizations: University departments, hospitals/medical schools and charities, critical mass of researchers, world leading scientist(s)
Entrepreneurial culture	Commercial awareness and entrepreneurship in universities and research institutes, role models and recognition of entrepreneurs, second generation entrepreneurs
Growing company base	Thriving spin-out and start up companies, more mature 'role model' companies
Ability to attract key staff	Critical mass of employment opportunities, image/reputation as biotechnology cluster, attractive place to live
Premises and infrastructure	Incubators available close to research organizations, premises with wet labs and flexible leasing arrangements, space to expand, good transport links: motorways, rail, international airport
Availability of finance	Venture Capitalists, business angels

Table 1

## Factors Encouraging Cluster Development

Groups of factors	Factors encouraging cluster development
Business support services and large companies	Specialist business, legal, patent, recruitment, property advisors, large companies in related sectors (healthcare, chemical, agro food)
Skilled workforce	Skilled workforce, training courses at all levels
Effective networking	Shared aspiration to be a cluster. Regional trade associations. shared equipment and infrastructure, frequent collaborations
Supportive policy environment	National and sector innovation support policies, proportionate fiscal and regulatory framework, support from RDAs and other economic development

Recognizing different cluster governance structures and coordinating mechanisms can help to guide cluster policy towards the most efficient use of factors encouraging the cluster initiatives. Application of the cluster approach is the most actual at a regional level due to the necessity of close contact between participants of the cluster, that high the regional competitiveness.

Although numerous methods are used to analyze and measure the size and importance of regional clusters, there is no universally accepted method of cluster assessment and measurement.

The purpose of Table 2 to consider the indicators of innovation clusters in regions and in the country.

Practitioners generally favor the use of both quantitative and qualitative analysis towards cluster identification and analysis. This is the approach is

taking to its current research which is attempting to map industrial clusters across the Russian regions. This approach will make use of various official data sources such as the Inter-Departmental Business register (IDBR) as well as close liaison and interviews with local business leaders, RDAs etc. Clearly some clusters are more difficult to define than others.

Knowledge of governance structures and coordinating mechanisms can also guide policy towards the most efficient use of scarce resources, especially as clusters, even in the same location, might have very different characteristics. Finally, the participants of the cluster should try and help localize, deepen, broaden, activity enrich and/or improve the innovative capacity of clusters.

Under this approach clusters are primarily viewed as an analytical device to improve the effectiveness of narrower types of policy tools.



Table 2

## Main types of innovation indicators

Main types	Innovation indicator
Human re-courses	<ul style="list-style-type: none"> <li>– new doctorate graduates per 1000 population aged 25–24;</li> <li>– percentage population aged 30–34 completed tertiary education;</li> <li>– percentage youth aged 20–24 having attained at least upper secondary education</li> </ul>
Open, excellent and attractive research system	<ul style="list-style-type: none"> <li>– international scientific co-publication per million population;</li> <li>– scientific publication among top 10% most cited publications worldwide as % of total scientific publication of the country</li> </ul>
Finance and support	<ul style="list-style-type: none"> <li>– public R&amp;D expenditures as % of GDP;</li> <li>– venture capital (early stage expansion and replacement) as % of GDP</li> </ul>
Firms investment activities	<ul style="list-style-type: none"> <li>– business R&amp;D expenditures as % of GDP;</li> <li>– non-R&amp;D innovation expenditures as % of turnover</li> </ul>
Innovative entrepreneurship	<ul style="list-style-type: none"> <li>– SMEs innovating in-house as % of SMEs;</li> <li>– innovative SMEs collaborating with others as % of SMEs;</li> <li>– public-private co-publications per million population</li> </ul>
Intellectual assets	<ul style="list-style-type: none"> <li>– PCT patents application per billion GDP;</li> <li>– PCT patent applications in social challenges per billion of GDP (climate changes, health)</li> </ul>
Innovators	<ul style="list-style-type: none"> <li>– SMEs introducing product or process innovations as % of SMEs;</li> <li>– SMEs introducing marketing or organizational innovations as % of SMEs;</li> <li>– high-growth innovative firms</li> </ul>

## References

1. Ross Brown Cluster Dynamics in Theory and Practice with Application to Scotland, Regional and Industrial Policy Research Paper Number 38 March 2000, Published by: European Policies Research Centre University of Strathclyde 40 George St. Glasgow G1 1QE United Kingdom, ISBN: 1-871130-16-6.

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*Materials of Conferences***MAJOR GEOECOLOGICAL PROBLEMS OF PERM REGION**

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Perm region (Perm Krai) – one of the largest regions in Russia (the second largest square in the European part of Russia) and the largest in the Volga economic district, belongs to one of the most adverse ecological regions of the country. Environmental problem in the Perm region in recent years, become extremely important due to global environmental change, the development of an emergency. Environmental problems of the Perm region, and for the entire territory of Russia, related to anthropogenic impacts on the environment, as well as natural – geological factors that have a profound effect on natural ecosystems and public health. Key environmental (geoecological) problems are:

- Chemical pollution in varying degrees of environmental media (air, soil, surface and ground water) due to high development pressure, especially in urban and industrial agglomerations (complex of oil, metallurgical, machine-building, chemical, pulp and paper industry);

- The accumulation of vast amounts of industrial and domestic waste, which is a constant source of many types of environmental pollution. The main problem – the use (utilization) of accumulated waste and reducing the amount of surface storage of newly generated waste;

- Contamination of soil and water with pesticides activities of agriculture;

- Radioactive contamination of the environment due to natural and man-made sources of radiation (including – underground nuclear explosions);

- Violation of natural environments and landscapes of intense economic activity mining (especially halmeic, oil and coal areas);

- Violation of forest and land resources (forest degradation activities of logging and wood industry);

- Change of the hydrogeological conditions: conversion of natural hydrochemical and hydrodynamic conditions, depletion and contamination of fresh groundwater;

- Changing geological conditions: education on undermined spaces fracture zones, subsidence troughs, funnels collapse, the intensification of geodynamic processes. Serious impact on the environment, in certain circumstances can have dangerous Induced Processes;

- The development of exogenous (gully erosion, landslides, flooding, waterlogging, suffusion, the complex processes associated with the processing of the coast, and especially karst reservoirs) and

endogenous (geodynamic, structural-tectonic, neotectonic) geological processes;

- The development of natural and man-made natural and environmental impacts.

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**WIND ENERGY IN TURKEY**<sup>1</sup>Okuyan Cemal, <sup>2</sup>Zholdasbekov A., <sup>2</sup>Sihinbaeva Z.<sup>1</sup>*Balikesir University, Balikesir;*<sup>2</sup>*South Kazakhstan M. Auesov University, Shymkent, e-mail: cemalokuyan@hotmail.com*

Increase in production, increasing expectations on the development of technology and comfort of mankind, has led to a rapid increase in energy consumption. The most useful type of energy «electrical energy» is. Therefore, the main goal is the production of electrical energy.

Has gained importance in recent years due to environmental awareness around the world, the energy generated seamless, reliable and cost-effective addition to being environmentally friendly becomes more important. This is revealed in many countries energy awareness. Thermal power plants pollute the environment, so renewable energy sources is very important. Wind, solar and biogas energy sources accordance with this definition.

Energy demand f all the countries in the world is increasing day by day. The criteria of the developed countries, energy has become synonymous with ownership. Heritage of millions of years of fossil fuels has decreased drastically. New oil, coal and natural gas resources are not available, the available resources are known to be depleted as soon as possible.

RES (renewable energy sources) are wind, solar and biogas energy, eco-friendly nature and quite due to the decrease in production costs per unit of energy has become widely used. Serious technological research is being done in many countries on the development of these technologies. With advances in composite materials and on the aerodynamics of the wing shows significant developments in wind energy. Low wind speed wind turbines have been developed that can produce more energy. Wind turbine for the selection of the initial investment costs are high, and the right place to invest one year after the measurement is required. Made on each side of the world, wind maps, geographic areas suitable for wind turbine are determined.

In this study, wind energy in the world and in Turkey were investigated.

### World wind energy use

Small wind turbines are the two countries with the highest in China (number: 450 000/166 MW) and the U.S. (number: 144 000 /179 MW), respectively. In 2020 the total capacity of small wind turbines is expected to reach 3800 MW. Medium-sized turbines are more common among countries, the United Kingdom, Canada, Germany, Spain, Poland, Japan and Italy. [1]

Despite the revival of this sector in many countries, only a few countries producing small turbine offers special support policies. A few countries purchase guarantee. Especially in regions where access to electricity is very little support in developed countries. Only in China, the energy generated by a small wind turbine in rural areas, policies, supported by reasonable price a little bit. Small wind turbines, the energy market are a very low level. However, the market potential is very high. [1]

Offshore wind capacity continued to increase in 2010. Like previous years, the sea was built on wind farms in 12 countries. 10 of them in Europe, while the other 2 percent in Asia. Total capacity is 3117 MW. In 2010, 59% of the new capacity is added.

### Wind energy using in turkey

As can be seen in the table below, Turkey is a country dependent on foreign energy. Provides nearly half of the energy from abroad, therefore, attaches importance to the local energy production. In 2001, the «Energy Market Regulatory Authority» established in the electricity, natural gas, oil and LPG market held by this committee.

According to projections made by the International Energy Agency, the world's primary energy demand will increase by 40% between 2007–2030. This, of 12 billion tons of oil equivalent (toe) by 2030, 16,8 billion TOE refers to the level exit. Important for Turkey's energy security. Therefore, to evaluate the potential of new and renewable sources of energy, nuclear power plant investments made significant investments in energy efficiency and new energy technologies. That these laws have been enacted in order to plan. Electricity Market Law (2001), the Natural Gas Market Law (2001), the Petroleum Market Law (2003), LPG Market Law (2005), Renewable Energy Sources Act (2005), Geothermal Resources Act (2007).

Wind potential of Turkey is 48 000 MW. 8000 MW of this is very efficient (> 8,5 m/s), 40000 MW in the medium-efficiency (> 7 m/s), respectively. In 2004, with 18 MW of installed wind power, 800 MW in 2010 has been exceeded. After the entry into force of the Law on Renewable Energy 3363 with a total capacity of 93 MW, is granted a license. Part of the construction of 1200 MW of these projects are ongoing.

Wind Atlas of Turkey is seen in the western regions is very advantageous for the wind. Therefore, the major part of the investment realized in this region. With the guarantee of the government purchase

the energy produced by the wind turbine businesses selling. This warranty cents 5,5 for the first 10 years. Turkey, adequate incentives for entrepreneurs who want to invest in wind energy state [3].

### Conclusion

Wind energy can be said in summary about the location of the present and future.

- According to 2009 in 2010 and reached 197 GW 37 GW increase.

- The growth rate in 2010 was 23,6%.

- Wind sector, turnover of 40 billion euros in 2010 and 670 000 employees.

- Total installed capacity in China, became number one. (19 GW capacity expansion in a year with 50% of the world market of new investments)

- In Europe, Germany 27 215 MW and 20 676 MW, followed by Spain, and it maintains the first place.

- In Europe, the share of wind energy in the total energy production in Denmark 21%, Portugal 18%, Spain is 16%.

- New capacity growth of 54,6% with Asia first, with 27% from Europe, North America, 16,7% in the third.

- Nuclear accident in Japan, and due to the oil spill in the Gulf of Mexico, has increased the importance of wind energy. Countries have been forced to evaluate wind energy policies accordingly.

- Global capacity, 1,5 million MW in 2015 and in 2020 is estimated at 600 000 MW [2].

### References

1. WWEA releases Small Wind World Report 2012, 15–18 Mart 2012, Husum, Bonn.
2. World Wind Energy Report 2010, WWEA, Nisan 2011, Bonn.
3. www.enerji.gov.tr.
4. Renewables 2011, Global Status report, www.ren21.net.
5. Yenilenebilir Enerji Projesi / Cemal Okuyan, GMKA, 2012, Balıkesir, Turkey.

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### THEORETIC EXPLANATION OF INCREASING OUTPUT AND BIOLOGICAL QUALITY OF CONSUMABLE WATER FROM SLITS

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In order to explain stimulation of water selection, in other words, prove a provision of continuous technological process under different terms of operation of water inlet slits, it is necessary to study processes that take place in the mouth of a water inlet slit under different schemes of water flow, define

the worst one of them; develop a mathematic model and provide an analysis of the process of protecting slits from sanding, show that the suggested scheme meets the listed requirements.

While analyzing schemes of water flow towards a slit under same initial data of water-bearing horizon (coefficient of filtering ( $C_f$ ) and filtration of rock ( $\mu^c$ ), power of water-bearing layer ( $m^l$ ), etc.) it is necessary to underline that the most unfavourable scheme of water flow is that of water inlet to a slit in a pressure water-bearing horizon. It proves the fact that while comparing all variants of water flow towards to a slit, under a same output, the greatest decrease in dynamic level is observed on the scheme of water flow towards slit in a pressure water-bearing horizon [3].

To prove a continuous operation of slits under any scheme of water inlet, we will study the worst of them – the scheme of water inlet in pressure water-bearing horizon.

While analyzing dynamics of soil water motion to a slit, we need to make a number of assumptions, introduced by Dupuit, that can simplify all reasonings:

- mirror of soil waters is horizontal and parallel to the surface of underlying waterproof layer;
- the soil is homogenous, and, therefore, coefficient of filtration is the same, and motion of the inflowing underground waters has a laminar nature.

According to these assumptions, mirror of soil waters was horizontal before pumping out water-bearing layer, in other words, the slit was placed down into a soil pool, not gravel flow. A funnel of depression is formed around the slit when the water is pumped out. Sections of this funnel by vertical flatnesses that cross the slit's axis, give us symmetrical curves of dispersion in all cases [7].

Under the given assumptions geometric place of the points of the dispersion curves touching the lowered surface of soil waters present a round that is described from the slit center by radius  $R$  (in other words, radius of Dupuit).

In order to define the amount of water that inflows to a slit, it is necessary to define an area of some surface  $S_s$  that is equal to pressure and speed of filtration.

When coefficient of filtration  $C_f$  is known, amount of water that goes through this slit will equal:

$$q = S_s C_f \frac{dy}{dS}, \quad (1)$$

where  $dy$  is a difference between curves of dispersion on equipotential surface  $ac$  and the nearest equipotential surface  $a_1 c_1$  that is locator on distance  $dS$  from the first line of flow.

A decrease in water level in a slit under pumping out of duration  $t_{\text{day}}$  in no-pressure water-bearing layer is defined with formula:

$$\Delta h(t) = Hw - \sqrt{H_w^2 - \frac{Q}{\pi K w} \ln \frac{1,5\sqrt{a_y t}}{r}}. \quad (2)$$

In formula (2) value  $\ln \frac{1,5\sqrt{a_y t}}{r} = \ln \frac{R_p}{r}$  characterizes hydraulic resistance from hydrogeological conditions that can be generally expressed as:

$$R = R_o + \beta \xi, \quad (3)$$

where  $R_o = \ln \frac{R_p}{r}$ ;  $\beta = \frac{Q_o}{Q}$  is a deviation of output of one slit to an output of another slit (dimensionless coefficient);

$\xi$  is an additional resistance (defined according to tables) [3], dimensionless coefficient.

A slit's efficiency for pressure water-bearing layers:

$$Q_w = \pi C_f \Delta h_{add} (2H - \Delta h_{add}) / (R_o + \beta \xi), \quad (4)$$

where  $\Delta h_{add}$  is an optimal decrease of water level in a slit, m;  $H_w$  is a domestic power of water-bearing layer, m.

An impact of water level over the slit's output  $h_o = H - \Delta h$  has a great practical significance. Pumping off water can alter a position of water level in a slit, and, therefore, regulate the slit's efficiency.

A mark water level outside a slit is always higher than that inside it. This difference of marks increases as a deepness of water drop increases. An emergence of water level leap by the slit walls is explained by the fact that the surface of equal pressure near the slit, where curve of dispersion comes with greater angles to the slit wall, obtains a curved form and, if we draw a surface of equal pressure from the point of crossing slit walls by the curve of dispersion, its probable form in a cut will be presented as a curved line  $AB$  that deviates from the higher limit of the slit with an angle that equals an angle of fall of dispersion curve, and from the lower limit it comes to a vertical line. On this line piezometric pressure will be same in all cases and equal to the height of soil waters at a final point  $A$  of dispersion curve. If water level in a slit was also at the same height, then water, placed in the area between surface  $A - B$  and slit surface, would not be able to move, as this motions requires a certain decrease in pressure  $h_o$ , that can develop only via water levels in a slit and across walls in its water-bearing soil.

S.K. Abramov has suggested the following empiric formula that considers an impact of basic factors over  $h_o$  [5]

$$h = a \sqrt{\frac{Q \cdot \Delta h}{C_f S_p}}, \quad (5)$$

where  $a$  is a coefficient that depends on a construction of filter,  $m^2$ ;  $h_o$  is a leap in levels, m;  $Q$  is an output of slits,  $m^3/\text{day}$ ;  $\Delta h$  is a decrease in



water level inside the slit while pumping off, m;  $C_f$  is coefficient of water layer filtration, m/day;  $S_o$  is an operative area of the filter, m<sup>2</sup>,  $S_o = \pi dl$ ,  $d$  is an outer diameter of the filter, m;  $l$  is the filter length, m.

Analysis of processes that take place in slit mouth under the starting regime of submersible pump shows us that operative pressure increases 1,5 times at this moment, and, therefore, consumption increases as well. An increase in consumption leads to a sharp alteration in difference of water level marks in a silt and at the filter border. The less permeability of the soil, the higher a value of level leap  $\Delta h$ .

A sharp change in level leap value  $\Delta h$ , and, therefore, alteration in water flow to silt causes destruction of natural filter and carrying out soil.

While using the suggested construction of reverse valve, an even change in consumption under any pressure takes place. Therefore, we can conclude that under transitive processes in submersible pumps the reverse valve with an adjustable period of opening excludes the possibility of a sharp change in water level difference in a slit and at the border of the filter with a sufficient level of reliability (process of diffusion is not present).

Our theoretic premises will be confirmed by test results.

#### References

1. Turkin A.A., Physical-mechanic characteristics of fractions of sand that soils slits / A.A. Turkin, S.K. Manasyan. – Attachment of the bulletin of Krasnoyarsk state agrarian university, 2004. – P. 72–74.
2. Sibirina T.F. Hydraulics and hydrology. Laboratory practice. Krasnoyarsk state agrarian university / Methodical textbook / T.F. Sibirina, A.A. Turkin. – Achinskiy branch of Krasnoyarsk state agrarian university. – Achinsk, 2005. – 42 p.
3. Turkin A.A. Artificial gravel filter. – Attachment of the bulletin of Krasnoyarsk state agrarian university, 2004. – P. 138–140.
4. Turkin A.A. A facility for constructing gravel filter in a silt / A.A. Turkin, T.F. Sibirina, S.K. Manasyan. – Bulletin of Krasnoyarsk state agrarian university, 2008. – P. 138–140.
5. Turkin A.A. A method to clean given up silts / A.A. Turkin, S.K. Manasyan. – Attachment of the bulletin of Krasnoyarsk state agrarian university, 2006. – Vol. 1. – P. 348–349.
6. Turkin A.A. Problems of economic-water provision of Achinskiy districts. – Attachment of the bulletin of Krasnoyarsk state agrarian university, 2007. – P. 74–75.
7. Turkin A.A. A method to construct a gravel filter in a slit / A.A. Turkin, T.F. Sibirina, S.K. Manasyan – Attachment of the bulletin of Krasnoyarsk state agrarian university, 2008. – P. 74–76.

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*Short Reports*

**LANDSCAPE APPROACH TOWARDS  
DEVELOPING NATURE-PRESERVING  
MEASURES IN THE POOL  
OF THE RIVER KOLYMA OF SAKHA  
REPUBLIC (YAKUTIYA)**

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Arctic territory of the Sakha Republic (Yakutiya) can be described by extremely severe natural-climate and complex economic conditions, remoteness from industrial centers, and low population density. Besides, a presence of rich natural resources defines the development of various branches of mining industry, energetics, transport, social infrastructure. However, low stability of arctic landscapes to anthropogenic strain even under an extensive type of economy can lead to ecologic problems.

In order to decrease negative impact of economic activity, it is reasonable to use landscape approach that provides for a solution of ecologic problems according to legislations of landscape alteration under an impact of anthropogenic factors. In this case a research, aimed to evaluate the degree of anthropogenic disturbance of landscape and their natural stability has been carried out at the territory of the pool of the river Kolyma. According to the results of this study, different levels of landscape-differentiated measures of preserving nature have been developed.

Evaluation of the degree of anthropogenic disturbance of landscapes of the river Kolyma pool was carried out via calculating territorial distribution of the structure of economic use of territory with altered parameters of different natural environment components. To do it, we have outlined the different types of territory usage in areas of Verkhnekolymskiy, Srednekolymskiy, Nizhnekolymskiy administrative districts. Those include: territories of industrial facilitation, transport, energetics, places of population, agricultural areas (deer and horse pastures); fells; areas of hunting and fur trade; unused territories. These areas have been combined into four types according to a degree of anthropogenic disturbance:

- 1) heavy disturbances (areas of industrial production, construction sites, energetics, places of population, etc.);
- 2) moderate disturbance (hunting and fishing areas, fells);
- 3) low disturbance (deer and horse pastures);
- 4) undisturbed – areas that are not impacted by economic activity, territories of open woods, swamps, tundras, etc.

Also, we have defined areas, occupied by them and their areal distribution. A degree of anthropogenic disturbance has been defined according to a volume of taking substances of basic components and expressed in percent share of the area of each type of economic usage to the whole area of the studied region [1].

Thus, in relative values territories of type 1 (industrial areas, places of population) are spread all over the pool of the river Kolyma, but occupy an insignificant territory – 0,01% of the whole area in average. Territories of type 2 (areas of hunting and fishing, fells) occupy greater territory – from 1,7% in Srednekolymskiy region to 3,2% in Nizhnekolymskiy region. On average throughout the pool their part forms 2,45%. Areas of lowly disturbed areas (type 3) that are mostly occupied by deer pastures, form approximately 23% of the pool territories, in Verkhnekolymskiy region their part equals 8%, in Srednekolymskiy region – 18%, and in Nizhnekolymskiy region – 41%. Undisturbed territories (type 4) occupy an average over 65%; their part in Verkhnekolymskiy and Srednekolymskiy regions equal 74–84%, and over 37% – in Nizhnekolymskiy region.

Thus, defining a degree of disturbance of natural landscapes by anthropogenic activity has shown that a degree of economic acquisition of territory in the pool of the river Kolyma is generally low. This fact is explained by natural-economic conditions. Besides, local development of areas of industrial acquisition proves typical.

In order to estimate stability of landscapes in the pool of the river Kolyma against anthropogenic impact we used two complementary methods: component impact of prior natural elements over the decrease in landscape stability [2], and evaluation of stability of landscape-ecological complexes against anthropogenic impacts [3].

Estimation of stability has been carried out for nine landscape provinces of the pool of the river Kolyma that are outlined in our works [4, 5]. As natural complexes of the Far North are located in cryolythic zone and are occupied by tundra, mountain tundra, and North-taiga flora, cryosolic and bioclimatic indexes serve as the basics of evaluating stability of these landscapes.

Indexes of cryosolic conditions are: character of distribution of many-years frozen ground, average annual temperature of rock and volumetric iciness of rock. Indexes of bioclimatic conditions are: biological efficiency, warmth provision (sum of temperatures during a period with average stable temperatures higher than 10 °C), and index of dryness (degree of hydration). In order to describe the used landscapes in the pool of the river Kolyma we used indexes of cryosolic and bioclimatic conditions that are provided in works [5, 6, 7].

Estimation of stability has been carried out with the method of ranging in combination with the method of direct evaluation. For this, we have facilitated a scale, every interval of which was given a value (a point). 4 grades have been outlined according to a degree of a factor impact over a decrease in landscape stability: does not impact – 1 point; impacts weekly – 2 points; impacts significantly – 3 points; disturbs – 4 points. Integral effect of all components is estimated by a sum of points. The higher the total point is, the less stable we consider a natural complex.

Analysis of the received data allowed us to estimate a stability of natural complexes in the pool of the river Kolyma. Provinces that refer to subarctic and arctic tundras, mountain tundras, and forest tundras proved to be the most stable according to the sum of points: Alazee-Kolymskaya lake-thermocarst, Nizhnekolyskaya tundra, Kolymskaya lake-thermocarst, Northern-Anyuiskaya low-mountain, and Kondakovsko-Ulakhansiyskaya low mountain area. Mountain open woods and sub-bear mountain open woods provinces as Alazeysko-Ozhoginskaya highland, Yukagirskaya low-mountain, and Momsкая mid-mountain areas are weakly-stable, and Northern-taiga Ozhoginskaya low-mountain province that occupies the Southern territory of the river Kolyma pool, has a moderate level of stability against anthropogenic disturbances.

Solving a problem to decrease unfavourable consequences of anthropogenic strain, we need to ground on a system of nature-preserving measures. Various levels of nature-preserving measures have been suggested at the territory of the river Kolyma. These measures are specified in a set of direction and types, differentiated according to types of landscapes, degree of their anthropogenic disturbance and stability.

Thus, the basic type of using unstable tundra, mountain tundra, and forest-tundra landscapes is reindeer breeding and horse breeding, fishing and hunting-fur trade with a low level of anthropogenic disturbance. Nature-preserving measures should have the highest level, carry preventive character, and be directed to prevent degradation of soil-floral cover and preserve rock and soil in solid condition: these are norms of keeping strain over lichen pastures; limitation of free pasture; limitation and ordering movement of heavy track transport, maintaining rules of hunting and fishing; provision for migration of wild animals.

For low-stable mountain open woods and sub-bear mountain open woods with a primary development of hunting-fishing trades, presence of fells,

burnt areas, and also using them as pastures weak and moderate levels of anthropogenic disturbance is typical. It defines a recommendation of **high-level** measures of nature preservation that include fire prevention, regulation of deer pasturing, maintaining optimal strain over pastures, norms and rules of hunting and fishing. A high significance belongs to measures of preserving vulnerable plants and undeveloped soil in relation to water protection, slope protection, and cryogenic protection functions of mountain territories.

Ozhoginskaya province that suffers from the greatest anthropogenic strain, refers to Northern-taiga landscapes. Here we can observe measures of prospecting coal with a pit method, a significant impact of Kolymskaya and Ust-Srednekanskaya hydro power station (Magadan region). Due to fragmental location of middle-taiga flora with fir-trees and pines, natural stability increases up to a moderate level. In this case **an increased** level of preserving nature that includes taking territories off from use and recultivation of areas that are involved in coal prospecting is required. Measures of protecting forests, water provision of flood plains, prohibiting woodcutting are also necessary.

Thus, landscape approach provides for a development of spatial-differentiative system of nature-preserving measures that are formed according to types of landscapes and level of anthropogenic disturbance. It corresponds to ecological requirements of optimizing use of nature in the Far North

#### References

1. Qualitative evaluation of anthropogenic alterations in physical-geographic structure of the pool of Higher Kolyma / N.N. Grigoriyeva, G.A. Kruchkova, S.A. Rakita, L.M. Ryabova // Bulletin of Moscow state university, series 5, Geography. – 1986. – № 4. – P. 9–13.
2. Bucks I.I. Some methodological problems of defining potential stability of natural complexes in order to predict their condition // Methodology and methods of geographic prediction. – M., 1983. – P. 104–113.
3. Shpolyanskaya N.A., Zotova L.I. The map of landscapes' stability of cryolite area of Western Siberia // Bulletin of Moscow state university, Series 5, Geography. – 1994. – № 1. – P. 56–65.
4. Cryosolic-landscape map of Yakutskaya ASSR, Scale 1:2 500 000 / Ed. P.I. Melnikov. – M., 1991. – P. 2.
5. Fedorov A.N., Botulu T.A., Varlamov S.P., and others Cryosolic landscapes of YakutiyaL explanation note to «Cryosolic-landscape map of Yakutskaya ASSR». – M., 1989. – 70 p.
6. Bucks I.I., Buyborodin V.N., Timitbayeva L.S. Correlation ecological-phytocoenotic map. Scale 1:7 500 000 // Series «Maps of nature, population, and economy of Asian Russia». – M., 1977. – P. 1.
7. Pozdnyakov L.K., Protopopov V.V., Gorbatenko V.M. Biological efficiency of woods of Middle Siberia in Yakutiya. – Krasnoyarsk, 1969. – 155 p.

*Materials of Conferences***LABOUR EDUCATION IN RUSSIA  
OF THE END OF XIX MIDDLE  
OF THE XX-TH CENTURY**

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Development of a society demands development of ideas, methods and education means. The idea of labour education has appeared in the Ancient Greece, but the first pedagogical operating time on this theme have appeared only in Renaissance. Each historical period put the problems before education in general and labour education in particular.

In Russia development of idea of labour education is connected with N.I. Novikov's name (1744–1818). It published the magazine first in Russia «Children's reading for heart and reason», propagandising necessity of education of love to work, goodwill and compassions to people since small years.

Most full and fundamentally idea of labour education in domestic pedagogics of second half XIX century has been considered by K.D. Ushinsky. In article «Work in its mental and educational value» K.D. Ushinsky considered work from philosophical, social, pedagogical, psychological positions, it put work on the first place, thus especially stipulating that the capital «is no more, as work creation» [8].

It defined work as «activity of the person free and concordant with Christian morals at which he dares by its unconditional necessity for achievement of this or that truly human purpose in life» [4].

The Ushinsky considered that the person is formed and develops in labour activity. Work, first, is a basis and means of human existence, and, secondly, it represents a source of physical, intellectual and moral perfection of the person. From here, work a major factor and means of education of the person in intellectual, physical, social (civil) and moral aspects.

Specifying in value of work for preparation of pupils for practical activities. Ushinsky has put forward absolutely correct position that education not only should inspire to the pupil respect and love to work: it should give still to it and a habit to work [5].

The given position was under construction on the basis of following elements:

1. Education should be national. It first of all means that it through widely developed school network should cover all rising generation of the people as compulsory education and form these generations in the spirit of economic, political and cultural

and educational interests of the people; over education business the people should know, supervise.

2. Education should give to children real formation and at the same time develop their mental faculties so that this knowledge has been connected with life and directed for the public blessing. From here the major value and work as factor and as one of main principles of education.

3. The central place in formation of the person the native language as should occupy language of training and as a source of knowledge, as people treasury, as «the best never withering and eternally dismissed colour of all spiritual life».

4. Education should be got by the formation purpose *высокоморального* the person, the person for whom work is a point of honour and happiness, the person-patriot, with firm will and character, the fighter for good reason the native land, the people, for its happiness, for its progress.

5. The Woman education and formation on a level with the man as «the man and the woman – persons equal in rights, equally independent and equally responsible», – wrote Ushinsky should be provided.

6. Any loan and introduction in practice of education of overseas systems alien for the people and experience without critical processing according to spirit of idea of a nationality – is inadmissible [6].

Development of idea of labour education in pre-revolutionary Russia is connected with S.A. Levitin's name.

Criticising traditional school for it «isolation from life, extrenity to children's interests and children's pleasures», S.A. Levitin gives of a word of one of founders of German labour school of G.Kershenshtejnera: «Our school is the island isolated from the whole world and from in full swing direct life on which our children are forwarded every day vigorous and cheerful, and whence come back tired and languid» [1]. In idea of creation of labour school as «future schools», S.A. Levitin allocates two aspects:

– The labour school as a general principle of the organisation of the national education, which essence consists in orientation of formation to inquiries of life, work, on requirement of workers (in other words, preparation for work is the leading purpose of formation);

– Labour school as a training and education method: construction of all teaching material on work and active amateur performance of school-boys (in this aspect work acts as a tutorial and education).

Thus, the idea of labour education has received the greatest development during the Soviet period. The logic in definition of labour school as optimum



form of education of youth is simple and convincing: at the heart of society life labour activity lies; hence, the school should be labour on the educational essence and social mission.

According to article the fourth point nine «the Law on the statement of the legislation of USSR and union republics on national education» one of main principles of national education in the USSR it – «communication of training and education of rising generation with life, with practice of communistic building, with socially useful, productive work; polytechnical, labour education and training» [3]. With a view of creation of effective realisation of problems on labour education of pupils the enterprises of the industry, building, transport, communication, service sphere were fixed to comprehensive schools, collective farms (with the consent of general meeting of collective farmers), state farms, timber enterprises, scientifically – research, project institutes, other enterprises and the organisations which along with comprehensive schools it is made responsible for the organisation of labour preparation of pupils as base. The huge contribution to development of the concept of labour education has brought Ampere-second. Макаренко. It had been described pedagogical working conditions as basic means of education: productive, collective and competitive character of work, a variety and complication of labour operations, an aesthetics and the scientific organisation of work, a rational mode of work and rest, a positive emotional background [2].

According to the concept offered by Makarenko, the Soviet school included not only general educational, and as labour and polytechnical. In it lessons of labour training and kinds of work of schoolboys were obligatory. Formation at school has polytechnical character: the knowledge of bases of modern manufacture, technics, economy is given.

Problems of labour education in the USSR dared in the course of general educational preparation, at manual training, in various kinds of work of schoolboys, including in summer works, in after-hour activity [7].

Indicators of labour good breeding were the requirement of the schoolboy for work, interest to work, labour activity, presence of knowledge of manufacture, labour abilities, readiness for a trade choice.

Representation about work as about the important factor of education remains and at modern Russian school though work of schoolboys and initial vocational training are unessential, and are recommended, if there are possibilities and demand. The domestic concept of labour education approaches with the western approach according to which initial labour preparation and vocational training are available for all. At city schools labour education

has passed in vocational counselling. A vocational counselling result is the professional self-determination of pupils understood as a ready state of the graduate to a choice of a trade. Its indicators: presence of a professional choice, knowledge of the future trade and the requirements shown to the person, knowledge of the specific features, educational and practical work on a chosen speciality, presence of the general labour skills. The labour education which has undergone changes, remains today only on the basis of student's production teams.

In the USSR educational process indissolubly contacted labour education which should prepare people for their future labour activity in its general sense, instead of to a concrete trade. Modern educational process is directed on reception of certain highly specialised skills which allow the graduate of school to continue training on in advance chosen speciality, at the same time, practically depriving of their possibility to change the choice.

Now in the country sharply there is a shortage question not lawyers and economists, namely experts in agriculture: tractor operators, machine operators, agriculturists. In this connection student's production teams become on one step with professional orientation at city schools in which as labour student's brigades and the labour associations of schoolboys directed for various economic works in nearby villages and on skilled platforms of institutes of agriculture began to be created.

#### References

1. Levitin S.A. labour school – future school. – Т. 1. – М.: Practical knowledge, 1916. – 170 p., P. 2.
2. Makarenko A.C. About education/Sost.i the author vstup.st. V.S. Helemendik. – М.: Политиздат, 1990.
3. Edition of the Law of the USSR from 11/27/1985 – Sheets BC the USSR. – 1985. – № 48, item 918.
4. Saltanov E.N. labour and moral education in K.D. Ushinsky's pedagogics // Pedagogics. – 2004. – № 4. – P. 58.
5. Saltanov E.N. labour and moral education in K.D. Ushinsky's pedagogics // Pedagogics. – 2004. – № 4. – P. 60.
6. Usova A.V. K.D. Ushinsky about education: value of its ideas in our days / of K.D. Ushinsky and problems of modern formation: materials of scientifically-practical conference. 26 окт. 1999 г. – Chelyabinsk, 2000. – P. 11
7. Ushinsky K.D. The Избранные pedagogical compositions: In 2 т. Т. 1 / Under the editorship of A.I. Piskunova. – М., 1974.
8. Ushinsky K.D. Trud in its mental and educational value // Magazine of the Ministry of national education. – 1860. – № 7.

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*Materials of Conferences***LOVEOLOGY (STUDY OF LOVE):  
THEORETIC-METHODOLOGIC  
FOUNDATION**

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The article provides a theoretic-methodologic foundation of the necessity to create a study of love (loveology) in terms of classic philosophic traditions; the history of matter is studied; love is defined as a social-philosophic category; methodologic construct of study is provided. Particularly, the article points out the fact that a significant number of works have been devoted to the problem of love since antique to the modern times. The matter was studied in its different aspects: display of love as a social-cultural phenomenon; creation of classification of types of love; revelation its psychological basics. Therefore, we can conclude that the collected scientific material is a necessary and sufficient condition to outline loveology into a separate branch of science, as psychology, sociology, political study.

**Urgency.** A significance of philosophic comprehension of the category «love» in understanding the nature of human existence in its true spiritual sense during the process of conscious life does not cause any doubt, since trends of replacing the content of this idea with elements of pragmatism and utility become more widespread, and this fact provides for a moral degradation of society. From our point of view, it is no less important to outline the knowledge of love that has been collected during ages since the formation of the first philosophic ideas that have not yet been systematized and explained, into a separate branch of science.

**Main Body.** The thesis on creation of science as a consequent collection of scientific knowledge into the process of apprehension in a specific problem and separating it when critical mass is reached. Thus psychology was formed, as well as sociology, study of politics, etc. We think that the time for loveology has come.

**Methodological construct of the research.** Each true essence, according to G.V.F. Hegel, is the Real, das Wahre (real essence), in other words, the very existence, and love is not an exclusion in this case, it can be explained through a discussion (Logos). Besides, the category «love», as a logically-real idea that is explained through a social-philosophic discussion, has a triple, or, dialectic structure:

- «a) an abstract or rational aspect (verständige);
- b) dialectic or negative-rational (vernünftige);
- c) speculative or positive-rational aspect [1, 382].

These aspects can be presented in two dimensions, or as an independent system. Besides, the category «love» as a system includes such elements as subject, object, context field that has its social-cultural and subjective saturation, and in which the subject-object interaction takes place. As an element of social-cultural system it bears the axiological and regulative functions. However, it is not a process, but a condition that has its spiritual and psychophysical characteristics. However, reaching a state of love is a process that includes a number of stages that replace each other consequently during time. We thought that «types of love» that are outlined traditionally, are, in their essence, stages of reaching love, name and contents of which depend on the selected classification. The most general variant of stages includes: passion/interest, falling in love, devotion, sharing existence.

As a condition, the category of love represents a subjective personal-selective attitude towards an object of love that functions at three interactive and interrelated levels: transcendent, social, biological. Transcendent level implies a unity with the world though perceiving love as an answer of the meaning of existence/purpose that lifts a man above ordinary reality and arise natural human feelings in him, thus outlining him not only from natural world, but social as well. Social level that consists of stereotypes, dictated norms, rules, and directions that are destructed by love. It creates a new, outer-social, spiritual level of interaction that exists beyond limits of material world. Biological level of interaction also exceed the limits of satisfying physiologic need for sex, so it starts to function at a new qualitative level, when unity of bodies becomes a prolongation, one of forms of interaction between souls. Besides, it is important to point out the fact that consideration of gender differences while selecting a partner is defined socially and culturally.

Love, as an attitude, as an expression of truly human feeling is, first of all, a spiritual unity, therefore, it is defined by a gender. And here lies a paradox: in order to mature spiritually for these relations, a person should absorb all wealth of social-cultural heritage, but, when he enters the next level that allows him to experience love, he must overcome social frames and reach metaphysical level of consciousness. Thus, we come to another side of the category of love – an action that is no less important, as love is an act. It is a spiritual action, aimed to overcome inner obstacles that we have already described, studying social level, and outer, social-physical action, aimed to protect an object of love as prioritizing it over one's own egoism.

**Resume.** Love, as a social philosophic category, is a timeless metaphysical formation that

has spiritual and psycho-physic characteristics and includes such elements as subject, object, context field, in which subject-objective interaction takes place. As a logically-real concept that is explained via social-philosophic discussion, it has two aspects: as an independent system that functions on three interactive and interrelated levels: transcendent, social, and biological, and also as an element of social-cultural system that bears axiological and regulative function. Being a timeless category, it includes subjective intimate-selective attitude towards an object of love and is expressed in two types of actions: outer (social-physical) and spiritual. Besides, in our opinion, the category of love cannot be a subject of *classification, as it is a single timeless formation*. However, the very formation/maturing of this feeling goes through a number of stages. The created classifications of types of love, in fact, represent their description. Love in its true meaning corresponds to a perfect (according to Stenberg), or divine (according to Platonov) type of love. In case formation of love stops at a certain stage, it is transformed into a different feeling within a maximum range, depending on a person's inclinations: from positive (friendship, sympathy) to negative (hatred, rejection). The love itself that is represented as a qualitative formation, includes all components of its devel-

opment stages, but is not a totality of them. We should also outline that stages of forming love, passion/interest, falling in love, devotion, are united by the fact that «the other one» is a **mean** of reaching one's own satisfaction on the stage «sharing existence» – «me» and «the other one» act as equal, and only in case of love «the other one» is the **priority** in meaning «the one, for whom I do it».

Thus, as this article presents theoretic explanation of the importance of creating loveology as an independent scientific branch, we have carried out categorization of love, suggested a methodological construct, outlined stages of love formation. The article can be considered as a starting point of the study of love. In other words, we have sufficient foundation to state: the science loveology has started its existence.

#### References

1. Gegel G.V.F. Phenomenology of a spirit. – M.: Academic Project, 2008. – 767 p.

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*Short Reports***THE WOMEN'S INTERESTS PROTECTION  
LEGAL ASPECTS**

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The human rights' respect and protection – this is the foundation, upon which the civil liberties and the state democracy are laid on. The human freedom, having guaranteed by the State, is the prerequisite for the society's economic and the social progress. Their rights and responsibilities knowledge, the ability to be used them, actively to be defended and to be protected them, the clear presentation on the human's place in the state structure, the reciprocal rights and the responsibilities understanding of the State and the citizen, the ability to be used the existing state and the social mechanisms for their legitimate rights' and the interests' protection – that is currently included in the legal description of the human's culture.

The human legal awareness is designed to be improved the human citizens' and the officials' competence, to be formed the new type of the human legal thinking, as the necessary condition of the human life and the vital activities under the modern reality conditions. So, there is such a principle – the rights, the liberties, and the obligations equality of the men and the women. However, quite often, especially in the marriage and in the family, and in the labor law, the woman is distinguished and separated into the special category by her position, which is and created her the possibility to be carried out that significant social function, to be realized that purpose, which is usually called by us the child's birth, the feeding, the raising. Exactly, the quite understandable retreats are occurred, due to the human natural and the native inequality by sex.

The violence challenge against the women, there is a long way and in all the countries, having reflected the disharmony and the imbalances, that are existed in the relationships in the community. This challenge severity is quite indicated the unhealthy social and the moral atmosphere in the society. The discrimination against the women is not a thing of the past in the most of the equal countries in the world. So, the new social realities, having faced and survived by us, today, will be inevitably led to the changes in the society's traditional structure, that is inevitably led to the changes in the society's traditional structure, in the traditional thought's, perception's and behavior's canon. Unfortunately, just as in our recent tolerant past, in the updated society, the deep relationship between the man and the woman is, in fact, the same, which is not equal, having taken the course on the democracy. So, the attitude is not gender equality in the society is secured

with the sexual roles stereotypes, and it is rooted itself in the social structures.

Thus, now, the women are made up more than half of the world's population, and they always have played the significant role in the human society's development. So, the world is constantly changing, and, today, it is quite difficult to be indentified the country in the former Soviet space, which is not involved in the changes' dynamics in the world.

So, the women's battering challenge – is the social one: it is rooted in the gender stereotypes. The view has been instilled, since the childhood, that the woman – is the weaker sex, and she should be occupied the subordinate position, in relation to the man, who, as the punishment, has his right to beat her. The women, having subjected to the violence, and are abused, can always be got away from the abuser and the offender. In the modern society, it is believed, that the woman has her right to leave the house freely, when the violence has been become very serious. In fact, and, in reality, there are many obstacles, especially for the women in this way – it is the fears, the common properties and the others. So, once, having subjected the woman violence, and the abused woman – they are all and always victims [1]. But it is not so, having passed the advice and the consultation at the experts and the specialists, the woman can be returned to her normal life, if the violence cycle has been broken.

So, the men – are the offenders and the abusers, and they behave themselves aggressively and rudely in relations with all. In fact, the overwhelming majority of them are able to be controlled their behavior and they are understood, where and to whom, it is quite possible to be expressed the aggressive emotions.

So, the offenders and the abusers, having used the violence, all think, – that they are not mentally healthy. No, all these men are usually mentally healthy. These men's social status can be at the high level, they can take up the leadership positions, to be active, to lead the social life, and to be successful in their business.

So, the men, having battered their wives, and also they beat their children. This is happened about in 1/3 families. Because, having got their own way, it should be settled down and be believed, that she and his children love him. However, there is not power much, and the violation cycle is being continued. The children are needed their father, even if he is aggressive. The woman is left because of the children, to whom she considers, are needed their father. The domestic quarrels, the manhandling, the assault and the battery, and also the physical abuse are not characteristic for the educated, and the poor people. So, in the families, with a higher level of their income and the education, such accidents are



becoming less frequent. So, the woman violence is not practically restricted to the certain strata, the layers and the groups of the population. This is happened in all the social groups, regardless of the education and the income levels.

The violence against the women is distinguished by the different cyclicity and also by the gradual increase in the acts of the violence. This can be started simply from the criticism, having gone to the humiliation and the abasement, to the complete isolation, – and then by the slap in the face, by the kick, by the regular beatings, and sometimes – the outcome confusion.

Thus, the alcohol is the violence cause. Then, the alcohol drinking is reduced the ability to be controlled the behavior, but there are many men among the offenders and the abusers, who do not use the tobacco or the alcohol. Some of them, having passed the medical treatment for the alcoholism, having continued to be the aggressive and the violent ones towards the loved ones. Thus, the alcoholism, or the alcoholic beverages taking cannot be served the violence justification.

So, the wife beating custom is as the old one, well as the marriage. In the most ancient times, the evidences of which had already been come down to us, the law was openly encouraged and also sanctioned the wife beating practices and the customs. But we always think and consider, that it had already been left in the past, when the morals and the manners were more violent and rude, and, moreover, the women were considered the men's property. The woman violence and their abuse – is the very common and the widely – spread phenomenon in our time.

So, in many countries, the legal experts and the specialists, and also the lawyers, who have specialized in the women's rights protection, consider that the domestic violence is occupied one of the first places among those types of the criminal nature, the necessary details of which are rarely reached the police and the law – reinforcement bodies and the authorities [2].

So, the domestic violence against the women – it is the quite old phenomenon. In some countries, the law is practically provided for the husband's right to be use the force against his wife, if she acted contrary to his will, but, under the condition, that it will be not damaged to her health and not be killed her. Thus, there is such the law and in the religion.

So, the current society's development stage is characterized by the severe crime situation, by the violence outbreak against the women. The violence study in the family has been shown, that there is the same situation in our families, which is quite typical for the families of all the other states. And the violence is practically arose from the wishing to be dominated others, in order to be achieved the dominant position, in explaining the domestic violence, and this negative phenomenon is associated with

the man's and the woman's power and the status in their marriage, with the wishing to be preserved the patriarchal family life and the family structure.

So, the other factors are the poverty and the unemployment, the stress or the depression, due to the job loss. The violence impact against the women are expressed in the hematomas, the bruises, the wounds, and the fractures, moreover, some of the women had been suffered from the blows in the area of the head, with the half of the injuries was of the serious nature. The men crimes apex against the women, the murder is still remained. Meanwhile, the violence consequences are reflected, and they are affected upon the victim's physical and the psychological health. Then, the women, having subjected the severe abuse and the ill – treatment, are frequently felt the fear sense, the depression, the physical illness and discomfort, which the alcohol and the drugs abuse risk is being increased, as well as the suicide committing risk.

Thus, the women, having subjected to the violence, – do not deserve it, at all. The women – this is, primarily, the mother, the selfless creature, that rocks the cradle of us all. She protects us from the ills of the life, the wear and tear of the life, the mother's milk herself is given the nobility and the generosity into our soul, the striving to a better, and she is the loved one. We usually are taken all that is beautiful from the mother. «The Mother» – is practically one of the child's first words. He is still the baby, the small one, and he is already in need of the mother's constant proximity. He is not remained indifferent, when he sees especially her face, her smile, and hears her voice. It is bound at him all the best pleasant, with her looks. The close contact with the mother at the infancy time – is vital to the baby's needs.

The men are taken everything the perfect from the mother, and what is given her in return?! The men must be taught to be respected to the women from the childhood, especially to his wife (e.g. she is the mother of your children), to be laid the great sense of the humanity in him, the ability to be lived among the people, but not only in his imagination. After all, the son, having become the adult man, must be the sensitive father, the good family man, and the respected, the beloved husband. So, it is necessary to be prepared the constantly growing man for the growing human life future, to be grown up in him the citizen with the inherent true character's qualities, who could respond with the warmth and the attention.

Thus, the woman – is, the first and foremost, the mother, and, – then, it is her wisdom, her tenderness, and her love.

#### References

1. The Methodical Manual for the Professionals Trust Hotline Service Work Creation and Organization for Victims of the Domestic Violence. – Almaty, 2011.
2. Shamuratova A. The Domestic Violence: Causes and Consequences. – Karakalpakstan, the Nukus town, 2011.