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**SCIENTIFIC RESEARCH  
OF THE SCO COUNTRIES:  
SYNERGY AND INTEGRATION**

上合组织国家的科学研究：协同和一体化

International Conference



Beijing, China 2018



上合组织国家的科学研究：协同和一体化  
国际会议

参与者的英文报告

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“Scientific research of the SCO  
countries: synergy and integration”**

**Part 2: Participants' reports in English**

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这些会议文集结合了会议的材料 – 学术论文和科学工作者的论文报告。它考察了职业化人格的技术和社会学问题。一些文章涉及人格职业化研究问题的理论和方法论方法和原则。

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## Foreword

*We thank all participants of our conference "Scientific research of the SCO countries: synergy and integration" for the interest shown, for your speeches and reports. Such a wide range of participants, representing all the countries that are members of the Shanghai Cooperation Organization, speaks about the necessity and importance of this event. The reports of the participants cover a wide range of topical scientific problems and our joint interaction will contribute to the further development of both theoretical and applied modern scientific research by scientists from different countries. The result of the conference was the participation of 83 authors from 7 countries (China, Russia, Uzbekistan, Kazakhstan, Azerbaijan, Tajikistan, Kyrgyzstan).*

*The holding of this conference was a result of the serious interest of the academic world community, the state authorities of China and the Chinese Communist Party to preserve and strengthen international cooperation in the scientific field. We also thank our Russian partner Infinity Publishing House for assistance in organizing the conference, preparing and publishing the conference proceedings in Chinese Part and English Part.*

*I hope that the collection of the conference will be useful to a wide range of readers, will help to look at interesting questions for the reader under a new point of view, and also will allow to find contacts among scientists on common interests.*

**Fan Fukuan,**

*Chairman of the organizing committee of the conference*

*"Scientific research of the SCO countries: synergy and integration"*

*Professor, Doctor of Economic Sciences,*

*member of the Chinese Academy of Sciences*

## 前言

我们感谢所有参加本次会议的“上海合作组织国家的科学研究：协同作用和整合”，感谢您的演讲和报告。代表所有上海合作组织成员国的广泛参与者都谈到此次活动的必要性和重要性。参与者的报告涵盖了广泛的主题性科学问题，我们的联合互动将有助于不同国家的科学家进一步发展理论和应用的现代科学研究。会议结果是来自7个国家（中国，俄罗斯，乌兹别克斯坦，哈萨克斯坦，阿塞拜疆，塔吉克斯坦，吉尔吉斯斯坦）的83位作者的参与。这次会议的召开，是学术界，中国国家权力机关和中国共产党对维护和加强科学领域国际合作的高度重视的结果。我们还要感谢我们的俄罗斯合作伙伴无限出版社协助组织会议，准备和发布中英文会议文集。

我希望会议的收集对广大读者有用，将有助于在新的观点下为读者提供有趣的问题，并且还将允许在共同利益的科学家中寻找联系。

范福宽，  
教授，经济科学博士，中国科学院院士，会议组委会主席“上合组织国家科学研究：协同与融合”

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乌兹别克语语言文化中非正式语言类型“誓言”的语言特征  
**The linguistic features of the informal types of speech  
genre “oath” in Uzbek lingo culture**

**Hasanova Fatima Mamanovna,**  
*a teacher of the department of foreign  
languages, Andijan State University*

本文讨论了乌兹别克语言文化的一些言语体裁“誓言”。值得注意的是，乌兹别克人在语言学上的誓言的特点是由诸如“神圣的面包”，“神圣的汽车”，“神圣的桌布”或“每个穆斯林的神圣职责”等誓言指标表示。

关键词：圣面包，誓言，神圣仪式，传统，习俗，神圣职责和责任等。

**Annotation.** *This article discusses some types of the the speech genre “oath” of Uzbek lingo culture. It is worth noting that the peculiarity of the Uzbek oath in linguistics is represented by oath indicators such as “holy bread”, “sacred car”, “sacred tablecloth” or “sacred duties of every Muslim”.*

**Keywords:** *holy bread, oaths, holy rituals, traditions, customs, sacred duties and responsibilities and etc.*

Each type of the speech genre “oath” is distinguished by its specific semantics, style and special compositional structure in linguistics. In particular, the study of the diversity of oaths causes the enlargement of the speech genre “oath” semantics. For example, there are an official promise, a covenant, a commitment in the semantics of the oaths of the Uzbek linguistics. There are many formal and informal oath types as a promise, trusting, an agreement, commitment in Uzbek lingo culture. For example, marriage vow has also official and informal forms in Uzbek tradition. Official marriage means that the registration of a marriage in government offices, informal marriage means religion (the Sharia) marriage agreement. The bride and groom are required to go through both types of marriages, the official marriage and the Sharia marriages. Just like that there are many unwritten forms of speech genre “oath” in Uzbek lingo culture.

In fact, the speech genre “oath” is based on solemn promise, testament, trusting, affirmation, declaration and etc. invoking a divine witness<sup>1</sup>. We observed that

<sup>1</sup> [https://www.google.com/search?ei=0vb\\_Wu\\_jG8fWsAHA1oiIDQ&q=oath+definition&oq=oath&gs\\_l=psy-ab..1.7.35i39k1l2j0i0i67k1j0l2j0i67k1l2j0l2.13093.16142.0.18316.2.2.0.0.0.124.238.0j2](https://www.google.com/search?ei=0vb_Wu_jG8fWsAHA1oiIDQ&q=oath+definition&oq=oath&gs_l=psy-ab..1.7.35i39k1l2j0i0i67k1j0l2j0i67k1l2j0l2.13093.16142.0.18316.2.2.0.0.0.124.238.0j2)

there are many elements of the speech genre “oath” such as sacred rituals, sacred things (bread, praying), a sacred duty (deceased person’s words etc.) in these informal customs. They are the custom of breaking bread, a kinship’s promise, the custom of payment of deceased person’s debts, the last wishes of the deceased person and etc.

The custom of “breaking the flat bread” during "Fatikha Tuy" in Uzbek lingo cultures means semantically informal agreement of father of the bride<sup>2</sup>. According to Uzbek tradition, breaking bread is the first step in the marriage ceremony. The fact that the father agrees to marry his daughter to this family through this custom and it appears as a sacred promise of father of the bride and father’s desire for the bride and groom to live together. Usually when the father agrees, the special party is organized, the door of bride’s house is open for the groom’s relatives, the “sacred” bread in the table is broken and the food is eaten and the problems of the wedding party are solved. In the history of English lingo culture the girl accepted the invitation of the young man, and the girl's father was first to hear it. But nowadays the girl and the young man make the announcement. It is usual that the girl's mother invites the young man to a tea or dinner. So the young man could visit the girl's house to get acquainted with the girl's family before the wedding.

As a result of comparing English and Uzbek engagement we can say that there are a lot of specific differences between the two languages' lingo cultures. The breaking of flat bread is expressed in the English lingo culture by the agreement of the girl, but in Uzbek lingo cultures by the father's agreement. It is usual that only female, the mother or aunts, the grandmother of the bride say to the representatives of groom’s family about dating engagement and usually the father of bride appoints the date. In this day the members of the groom’s family (not groom) come to the bride’s home as a guest and brought food such as patir (Uzbek bread) in a large basket, sweets, pistachio, almond and others in a another basket. Patir (Uzbek bread) and sweets is a symbol of sacredness that let God give the new family sustenance (food), children like sweets in the future, pistachio, almond is a symbol of respect in Uzbek lingo culture. Saying welcoming and kind words in plural in a cheerfully tone such as “*welcome to our home (hush kelibsizlar, kelinglar)*” by parents or old and close relatives of bride’s family is very polite during engagement party. After guesing, main part of the party begins with a lot of prayings by an old man of the family and in the end of the praying a lot of best wishes for a bride and groom are said by old male. The bread which brought by groom’s family is broken by old male and in Uzbek lingo culture means that breaking bread never become the whole that’s why this engagement cannot be broken. Shortly, we can say that the bread and praying in celebrating the date of engagement of Uzbek lingo culture

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2.0...0...1c.1.64.psy-ab..0.2.237...0i203k1.0.j1vJ3ANjtIE

<sup>2</sup> <http://asia-travel.uz/en/uzbekistan/customs-and-traditions/>

are the nonlinguistic devices of the speech genre “oath”.

In history of Uzbek lingo culture had a close friendship tradition. This tradition semantically meant a declaration of two men’s promise in their society. It can be translated into English as “sworn brothers”. But in English lingo culture it is understood that this word means to be a brother from the point of view of the church.

This tradition, known as an ancient ritual, has always been unique in its appearance. In Sh. Nizomiddin's book, the friendship of Temur and Ulugbek was as follows: they made a promise at the saint place such as of Amir Musa, Zindachashm’s graves<sup>3</sup>. Nowadays saint graves or temples do not have a vision of a close friendship covenant. During centuries this custom has more changed. Nowadays it is famous as a kinship’s promise. In modern tradition of Uzbek lingo culture two men or women, no matter one of them is man or women may declare themselves as a kinbrothers, kinsisters or a close friend. As an unwritten rule, one of them invite to be a kinship or a close friend, if the listener accepts this, they declare each other under oath among relatives, friends and etc of their society. In this tradition we can see verbal devices such sayings like “*From now you are my sworn sister (brother, friend). God is witness to our decision that we are kinbrother (kinsister, kinbrother and sister, kinsister and brother etc.)* and nonverbal devices (*in the meaning of wishing unhappiness: touching the bread, sitting around the tablecloth, sitting in the the car*<sup>4</sup>), of the speech genre oath may be used. The people who accepted this invitation are named that “*qiyomatli opa singil (sworn sisters), qiyomatli aka-uka (sworn brothers)*”. Shortly, the semantic meaning of this tradition is an agreement or promise of the speakers who aren’t kin. There are many unwritten rules of a close kinship in Uzbek lingo culture. Sworn brother or sister, friend must help each other in bad times, support them and often meet.

According to the Uzbek burial tradition, one of the close relatives (only male such as son, brother and etc.) of the deceased person must answer “I will”, when the Islam priest asks as follows “who will pay the deceased person’s debts if he has a debt”. This means that the person who answers to this question is obliged to pay them and he agrees with paying. This symbolizes as one of the sacred duties of every Muslim.

If one of his children close relatives fails to do so, it is a great disgrace and an insult to the deceased's relatives.

It should be noted that the last wish of the deceased person is also accepted as a serious request of the speaker and listener’s commitment in Uzbek lingo culture. The last wish of the deceased person expresses the confidence of the deceased to the listener. If the deceased person's last wish fails, the deceased's soul will be disturbed and will not be satisfied with his relatives. The disturbance of the deceased

<sup>3</sup> Низомиддин Ш. Темурийлар тарихи, Т., 1996, 84 р.

<sup>4</sup> The car which the speaker has is sacred thing for uzbek culture. The speaker means that let him be unhappy things

person's soul is wrong according to religious rules. That's why children and their relatives must fulfill last wish of deceased person in order to keep the soul spirit free and in peace. We can say that the audience receives a specific commitment to fulfill it. According to this, the last wish of the deceased person is regarded as obligatory, if it is not harmful. In Uzbek lingo culture the father and mother of the family left her or his children to the his or her most trusted person such as the oldest child of the family, sisters, brothers, parents when they are dead. They say as follows: *If I die, save my children (your brothers and sisters), I left you my children because you trust in God! May God bless you! If you do not do what I say, I'm not pleased with you and my soul will never rest in peace.*

As a conclusion, we can say that we can see a lot of elements of the speech genre "oath" in Uzbek unwritten customs. The guarantors of the speech genre are "sacred bread", "sacred car", "sacred tablecloth" or "speaker's wishes about unhappiness to himself", and "sacred duty of the speaker" in these customs.

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2. <http://asia-travel.uz/en/uzbekistan/customs-and-traditions/>
3. Низомиддин. Ш. Темурийлар тарихи, Т., 1996.

基督教出现的民族语言学先决条件  
在西北高加索地区

**Ethnolinguistic preconditions for the emergence of Christianity  
in the North-Western Caucasus**

**Pkhitikov Khauti Mukharbievich**

*Kabardino-Balkarian State University named after Kh. M. Berbekov*

在这篇文章中，第一次尝试找出“圣诞节 - 圣诞节”一词的起源对卡巴尔人来说具有神圣的意义。基于对语言单位的分析，词典材料的研究具有比较性。通过文本分析还涉及语义相对与历史的映射，建模，描述和定量方法检测语音相似性卡巴尔迪 - 切尔克斯 (Adyghe) 语言与古代埃及象形文字的解密文本“死亡之书”古代 埃及，在那里“圣诞节 - 圣诞节”。

这项研究揭示了卡巴尔语言中“圣诞节 - 圣诞节”这个词的类型和语义上的相似之处，它具有共同的根系和语义意义。

关键词：卡巴尔语，“圣诞节 - 圣诞节”，象形文字，古埃及语言，原语，母语，中高加索人群。

*In this article, the first time an attempt is made to find out the origin of the word "Хъурома - Christmas" it sacred significance to the Kabardian people. The study of lexicographic material is of a comparative nature, based on the analysis of linguistic units. By the analysis of texts also involved semantic comparative-historical mapping, modeling, descriptive and quantitative methods for the detection of phonetic similarities Kabardino-Circassian (Adyghe) language with the decrypted text of ancient Egyptian hieroglyphic signs of the "Book of the Dead" Ancient Egypt, where the word "Хъурома - Christmas".*

*The study reveals the typological and semantic similarity of the word "Хъурома - Christmas" with a common root system and semantic meaning in Kabardian language.*

**Keywords:** *Kabardian Language, "Хъурома - Christmas", hieroglyphic texts, the ancient Egyptian language, proto-language, mother tongue, Sino-Caucasian group.*

In this decrypted hieroglyphic text from the Book of the Dead with the help of A.Kh. Guardian on line 29, the lines go from left to right, top to bottom is a direct proof of the existence of the holiday of Khurom.



[1, <http://rustoria.ru/images/content/w1000/d8/d811d0a726daf4971596e689ce470851?r=1450151486526906923>].

Transliteration (HP) of zone 1, from right to left, from top to bottom:

1. Uit Mu Ur-ra-ma nit-ra-schi thu-ma iht Em dga-mi-da-ti schit mi Am-kha hadg ni-ha-ha iu-kha Mu-ha...dga-mi-da-ma par iu-kha zi ha-ra-ti zi-ma iu-kha An

2. Ra Um hu schit zi ba Uit ihu-kha ia-tu iu-ma Kha-mat ha-ni Dga-mi-da Nu-ri Kha-ma i-tu kha-hi-par er a hast Ka-a-ba-ha-ri i-urt E-mis ni-tir-ti schi E-mis-ma dga-mi-da

3. Psa Ub ma-hua na-hin zi sa-bi schi<sup>h</sup> Ua-ua-ma ha-a dga-mi-da ti Mu An-kha dgai dga-mi-da-har it-kha i-at hu Nur-kha zi har dgai En dga-mi-da-ha-ri Ue ni-ut is-hat En Ui-ti

4. Mi-ha Akh dga-mi-da-ma Ta-sa ha-di ti schi-si Ra-kha Ha-ta-pa-ma na-hin er hai ni-hin hu khat Mut schi-kha mi schi-ma-ma Uš zih bar Ha-ra-ma-mi Nur-kha Hatm Ra niht zi ui-mu

5. An-ma ni-hint Dada Tra-ma i-at Tho-tha-ri Mai-a Mat it hu zi-khua Ra i-bin zi Ui har zi e-u-da dga-mi-da hast Ka-a-bat Nur it-schi kha-hir i-rat Am-kha i-sa Tar Hat-ma thu-ri

6. Kha-ra-ma na-hur ui-mu ha-a dga-mi-da hu ui-khua

7. Hu a dga-mi-da Ur i-khua-a zi int...na-sir-ti Hatm

8. Dga-mi-disch Kha-ma Hatm is Ta I dga-mi-diach hu gha-ru zit

9. Mu schi<sup>h</sup>t schi khat schi i-at-ma Scham Ra ha-da dga-mi-da Ra er

10. Pa i-bi-nu mir Ua-ua-si zi Za-ra-schi

11. Mu uit An-schi khas-ti Tut niht Mi-hari

12. Tu-ma khi<sup>h</sup>-kha ši-nu khua-ha-ri Ra-ma in-kha iu-ha bin Dga-ba-ha ma psa bi-nu schi-sir Un-ma ii Uš

13. Dga pa Ha-ta-pa Ha-ta-pa zi Ha-ra-ma in-ma zi-ma schis Mai-a nah-hau Um schi-ma-ma Mu nitr dga-mi-da pat Ta-schi iu schit-ma Di bin dga-mi-da thu

zi Ha-ra-ma in-kha dgat Ta-ma ei in

14. Tha-ma i-bin Ra hu Sim ischt schitt Ra di-schar Mu dga-mi-da pat schi ba-kha naht zi-ma schi-ma ha-bint dga-kha i-pa schit i-usch pa Em ti ma-dgit Ra Hatm ti-pa zi-ma schit ni-ut zi si-psti schit

15. Ta it in-mi e A-nu dga-mi-da-ma schir ar iit pahu Ur dga-mi-da-ma hu Ha-ba Mu ha-ra-schi Ha-ta-pa-ma-schi I-nart e-ša Bagh Nom hi ia dgar-hat Ha-ba Mu ii-ah Ha-ta-pa dgar-hat Dga-ba-kha Ha-ba nitr schiu

16. Ra schit i-bin Ha-ta-pa par Ant Nom hi ia schit par Ant Mai-schi par Ant Nom hi Pha-tha hu i-na-ma Tut-schi Nom hi Mi Nom hi Pha-tha e Dga-ba-ha Ha-ta-pa-si zi Ra-kha Mu-ui nitr ha-ra-schi nitr

17. Zi-ma Tha Ha-ba iat-hat Ta-mir si-ni na-hi-ba-schi Ui-ma Nom hi Hat-ma ti pa-rat Urr ga-ra-ma hu zi...hu Nom hi it-si har in-ma Ui-ua zi ha-a i-bin-schi dga-si Mir naht Ui-ua pa-šir Ue

18. Ba in-kha Ta iat..Ma-ša-ma i-bin-ha Ha-ta-pa Mat si-na Mu Ua-ui man-ma-ti Mu se-ša Ha-ta-pa schi-mu Abt Mu i-ra-dga i-par i-bint Yy-kha naht ih sa-bi Ba-ta pa-si pa-si Ba-ti Ta is-ha Bagh pa Hatm i-tu

19. A Nom Hat nit-ri schit si-na Mu-ma-ti bi-du Ra Um hu Mu Ta ti-pa Ra I-nar hue-I ist Ha-ta-pa ma-hua ghi Ta-pa-si

20. Dga-mi-da ist Ta-schi i-bin Ra Ha-ba schit Ra niht hu ma Ha-ba-schi Ta ist I-na-nar dgar-hat zi-schi-si Ma-ša schi-ma schi-ma nah-ha zi Ra Kha-mu Um-ma a No-mu in-ma Mu dgat Ha-ta-pa

21. I-bin di-scha schiht zi Ta-pa Ra-I hu dga-mi-da et pa-hu-ma Ha-ba Mu-ma schiu schit Ra niht ma-hua-ma Ha-ba-ma schi-mi niht ha-na si-na-nu ni-hasch e-ma An Mu ma-hua-ma Ha-ba Ra-I Ha-tu-sa schi-tu ha-du Ur-rasch Mu

22. Ra niht hu ma Ha-ba ma thu ša Ur is Ru-a pa nih-ha Ha-ba Mu

23. Ba-ta Aš-ma Ha-ba ha-da i-bin hu ma Ha-ba ut Ta Nom-si Ha-ba hi Ta schit

24. Ta it da-sir Húast ni-hu hu i-bin Ub-ma schi-hu Šu Nom hi ši-na Mat

25. Ra Tan-ma Mut si-na Mu Ua-ua-rasch Ra To-ba Kha-ma

26. Ma-hua-ma schit ui-khua An Di-mi-ma Nom hi K ahu Nurr math hi Tau-schi par

27. Mu i-na Ta-ma hu Ha-ba i-ni ma-hua-ma khua Tau-schi Nuħ hu Mu dga-mi-da

28. In dga-mi-da hahu-ti Ta e-ui a-ha edgi Ka Ui

29. Nom zi int Hú-ro-ma i-na Hat-ma Ui dgat hadg-ma iu ha-ma-si Im

30. Hu Nur hu aha Mai Mai dga schit hu Yy y in ha-ma-si i-bi-ni-ra-kha

31. Tar sa-bi Ha-ta-pa i-na Hat-ma Ui-rat ma-hua-schi Tar zi-ma dgir-dga Ta it-ma Un-ma Nur Ui schit hu Ma-ni Ta it-ma khat da-sir Húast edgi Ha-ta-pa ih Hu-ra-schi ša Aš hu in i-na Hat-ma Ui dgat i-nar Si-ma-ma

Transliteration of the text of zone 2 - the sacred symbol in the palm of God Am:

Dga-ma An dga-ma

Transliteration of the text in the second frame with the girl and the guy on the right, from top to bottom:

1. Hat-ma Ui ma-hua-schi Ka-ma schit ni-ha-ħa-ma Mi-ma (schif Ma-an-ma) se-ša dga-mi-da nitr ti ist ma-hua i-par hu Nur hu Ra i-sir int pa-da Nom hi Un-mi uist Tan

2. Aha i-nat Ha-bat pai Scham-ma I-man-ma

3. Hu Nur Hu-ra Ui

We read in Kabardino-Circassian (Adyghe):

Right - left, top - down:

1. Тут Му Урраме нитраши тУме ихыт Ем джамыдэти шыт мы Амкэ хьэдж ныхахэ иукэ Мухэ...джамыдэмэ пэр иукэ зы хьэрати зымэ иукэ Ан

2. Ра Ум ху шыт зы бэ Уит ихукэ иЭту иумэ Кьамэт хьэни Джамыдэ Нури Кьамэ иту кьахьыпэр ер а хэст Каабэхэри иурт Емыс нитрти шы Емысмэ джэмыдэ

3. Псэ Уб махуэ нахьын зы сабий щихь Уауэмэ хьэа джамыдэ ты Му Анкэ джаи джамыдэхэр иткэ иат ху Нуркэ зы хьэр джэи Ен джамыдэхэри Уе ниут исхэт Ен Уити

4. Мыхэ Акь джамыдэмэ Ташэ хэди ты шыси Ракэ Хьэтапэмэ нахьын ер хьэи ныхьын ху кьат Мут шыкэ мы щимэмэ Уш зыхь бэр Хьэрамэми Нуркэ Хьэтм Ра ныхт зы уиму

5. Анмэ ныхьынт Дадэ Траме иат ТпотЭри Майа Мэт ит ху зыкьуэ Ра ибын зы Уи хьэр зы еудэ джамыдэа хэст Каабэт Нур итши кьахьыр ират Амкэ ишэ Тар Хьэтмэ тУри

6. Кьарэмэ нэхур уиму хьэа джэмыдэ ху уикьуэ

7. Ху а джэмыдэ Ур икьуэа зы инт...нэсырти Хьэтм

8. Джэмыдиш Кьамэ Хьэтм ис Та и джэмыдиш ху гьэру зыт

9. Му щихьт шы кьат шы йЭтмэ Щам Ра хэдэ джэмыдэ Ра ер

10. Пэ ибыну мыр Уауэси зы Зарэщи

11. Му Тут Анщи кьэсти Тут ныхт Михэри

12. Тумэ кьихькэ шыну кьуэхэри Рамэ инкэ иухэ бын Джабэхэ мэ псэ быну шысыр Унмэ ии Уш

13. Джэр пэ Хьэтапэ Хьэтапэ зы Хьэрамэ инмэ зымэ шыс Майа нахьхэу Ум щимэмэ Му нитр джэмыдэ пэт Таши иу шытмэ Ди бын джэмыдэ тУу зы Хьэрамэ инкэ джэт Тамэ еи ин

14. Тхьэмэ ибын Ра ху Сим ищт шытт Ра дыщэр Му джамыдэ пэт шы

бэкъэ нахът зымэ шимэ хьэбынт джэкъэ ипэ щыт иуц пэ Ем ты маджыт Ра Хьэtm тыпэ зымэ щыт ниут зы сипэти щыт

15. Та ит инми е Ану джамыдэмэ щыр ар ийт пэху Ур джамыдэмэ ху Хьэбэ Му хьэраши Хьэтапэмэщи Инарт ешэ Багът Ном хьы иа джэрхэт Хьэбэ Му ийахь Хьэтапэ джэрхэт Джабэкъэ Хьэбэ нитр щииу

16. Ра щыт ибын Хьэтапэ пэр Ант Ном хьы иа щыт пэр Ант Майщи пэр Ант Ном хьы ШатIэ ху инэмэ Тутши Ном хьы Ми Ном хьы ШатIэ е Джабэхэ Хьэтапэси зы Ракъэ Мууи нитр хьэраши нитр

17. Зымэ тхьэ Хьэбэ иатхэт Тамыр сини нэхьыбэщи Уимэ Ном хьы Хьэtm ты пэрат Урр пэрамэ ху зы...ху Ном хьы итси хьэр инмэ Уиуэ зы хьэа ибынщи джаси Мир нахът Уиуэ пэщыр Уе

18. Бэ инкъэ Та иат...Машэмэ ибынхэ Хьэтапэмэт синэ Му Уауи мэнмати Му сешэ Хьэтапэ щиму Абт Му ираджэ ипэр ибынт Яякъэ нахът ихь саби Батэ пэси Бати Та исхэ Багъ пэ Хьэtm иту

19. А Ном Хьэт нитри щыт синэ Мумэти быду Ра Ум ху щыт Яящи Ном хьы Та тыпэ Хьэххэ Та нэсырт ху Му Та тыпэ Ра Инар хуеи ист Хьэтапэ мэхуэ гыы Тапэси

20. Джэмыдэ ист Тащи ибын Ра Хьэбэ щыт Ра нихът ху мэ Хьэбэщи Та ист Инанэр джэрхэт зыщыси Машэ щимэ щимэ нахьахэ зы Ра Къаму Умма а Ному инмэ Му джэт Хьэтапэ

21. Ибын дыщэ щихът зы Тапэ Раи ху джэмыдэ ет пэхумэ Хьэбэ Мумэ щииу щыт Ра нихът махуэмэ Хьэбэмэ щими нихът хьэнэ синану нихьащ емэ Ан Му махуэмэ Хьэбэ Раи Хьэгусэ щыту хэду Уррац Му

22. Ра нихът ху мэ Хьэбэ мэ tIу шэ Ур ис Руа пэ нихьхэ Хьэбэ Му

23. Батэ Ашмэ Хьэбэ е хэдэ ибын ху мэ Хьэбэ Iут Та Номси Хьэбэ хьы Та щыт

24. Та ит дэсыр Хьуэст нихьу ху ибын Убмэ щихьуу Шу Ном хьы шыно Мэт

25. Ра Танмэ Мут синэ Му Уауэрац Ра Тобэ Къамэ

26. Махуэмэ щыт уикъуэ Ан Дымымэ Ном хьы Ка ху Нурр мэхт хьы Тауши пэр

27. Му инэ Тамэ ху Хьэбэ ини махуэмэ къуэ Тауши Нухь ху Му джэмыдэ

28. Ин джамыдэ хахути Та еуи ахэ еджи Ка Уи

29. Ном зы инт Хьуромэ инэ Хьэtm Уи джэт хьэджмэ иу хамэси Им

30. Ху Нур ху ахэ Май Май джэ щыт ху Яя ин хамэси ибыныракъэ

31. Тар сабий Хьэтапэ инэ Хьэtm Уират махуэщи Тар зымэ джырджэ Та итмэ Унмэ Нур Уи щыт ху Мэни Та итмэ къат дэсыр Хьуэст еджи Хьэтапэ ихь Хурэщи шэ Аш ху ин инэ Хьэtm Уи джэт инэр Симэмэ

We read in Kabardino-Circassian (Adyghe) text in zone 2, where God Am is depicted:

Джэмэ Ан джэмэ

We read in the Kabardino-Circassian (Adyghe) text in zone 3, where the girl and the boy are depicted in the frame, the right-to the left, the top-down:

1. Хьэтмэ Уи мэхуэщи Камэ щыт ныхахьэмэ Мимэ (Шихь Маанмэ) сешэ джэмыдэ нитр ты ист махуэ ипэр ху Нур ху Ра исыр инт падэ Ном хьы Унми уист Тан

2. Ахэ инэ Хьэбэт пэи Щаммэ Иманмэ

3. Ху Нур Хурэ Уи

Translating to Russian language:

1. It stands in Mu city Ur standing two carries away Um the calf leads Am hajj committing the captivating Muys ... the bull of the first catches one man first catches An

2. Ra in Ume bright standing one son of Wei white catches up Kama haneitsa body Nur Kame gives it back to him he lives in Kaaba catches Yemys worth three Imys calf

3. The soul of the Ub clear bear the first child of St. Waua man of the calf in the gift lead in Mu Anu pray the body of the standing is leading Noor the first person praying for the Yen bodies of the Weiks lead, lives En in Ui

4. Here are the Akih calves Tasha chooses as a gift brings the god Khatapa brings his man brings, drives to the top in Mu, the three to the pyramid Usha, the sons are born on the holy mountain Haramu Nur in Hattia, God bears one relative

5. Anu is borne by Dada. The Tram presents Thoth, in Maya Met stands, the first white son of Ra, one of the Wu throws a bullock, lives in Kaaba Nur, the person who is standing is given to Amu, taken to Tar Khatia of two

6. The black man drives the black man's calf to drive your son

7. Drive the bull in Ur son of the first big ... got to Hatty

8. Three Kama calves are standing in Hattya. That three of his calves drives connected together

9. Mu shrine on the third floor on the third raise Sham God choose the calf god himself

10. The firstborn he Waua first Zara

11. In Mu stands An arrived in time Here carries Miytsev

12. Illegal son of the Tsar is afraid of God Almighty catches the children of Jaba Save the souls of children sitting in Una of eight Ushytsy

13. Praying to the first Khatapa, Khatapa the first Kharam almighty first sitting in May blows to the Mind a pyramid, in Mu stands the Taurus first Ta catches standing Di children of calves the first Haram Almighty prays That he is almighty

14. God's son Ra light Sim on the ground stands Ra golden in the male body

of the first three sons carry in the first pyramid people pray the first ones catch the first I'm giving as a gift brings the madzhitza Ra Hattam gives the first standing captive the first ahead of me standing

15. That is the Almighty belongs to Anu three bodies of them one with a white nose in Ur goni calf goni haba in Mu people Hatapa Inar luck Baga in Nom saves they pray Hube in Mu carry away Hatap pray Jaba Hab standing captivating

16. Ra is a child Hatapa firstborn An Nom save they stand first An Maya first Yen Nom save Pata light beloved Tuta Nom save from the Mijs Nom rescue Pata from the evil Jaba Hatapi first-born Ra in Mu stands people stand there

17. One god of the Hub stands in Ta favorite of them much in Ui Nome save the Hutts take to the first Ur of the firstborns drive first ... drive in Nome save the standing people almighty The Iyens of the first human children praying from the Miyans carry in Wu a room Ve

18. The people of the omnipotent Ta praises ... Masha the child Khatapa beloved Muet Waua the man in Mu takes me away Khatapa pyramid in Aba in Mu summons the first-born of children Yai carry the baby Batu baby Bati in Ta live Baga of the firstborn in Hattya living

19. In Nome Hattia stand the beloved Mooma in the fortress of Ra Um chase the standing Yayu Nom save T give the Khakhovs Those who came to drive to Mu Ta forever give up Inar he wants him to live Khatapa clear crying Tapa

20. Taurus lives in Ta baby Ra Haba stands Ra takes away drives on Khaba in Ta live Inana prays sitting Masha in pyramid in pyramid enter first Ra Kama Um it's Nom big Muks pray to Hatapa

21. Child golden sacred first-born Tapa Ra gon taurus give white-whisked Khaba Muma captivates standing Ra blows clear Khaba in the pyramid introduces the khanite of my child belonging to Anu Muisky clear Khaba Ra stands near Khatusa chooses he Ur in Mu located

22. Ra brings light Khaba gives two takes away to Ur standing Ruitsy first takes Khaba to Mu

23. Bata Ash Khaba choose the children of white Khaba stands in Ta Nome Khaba save Those standing

24. In Ta standing living Host rescues bright children Ub of Saint Shu Nom save is afraid of Mat

25. Ra in Tanya Muisky loved Muytsev Uaua Ra Toba Kama

26. Clear is your son An Dym Nom save Ka light Nur weak save Tau first-born

27. Muytsev beloved Ta light Haba's favorite clear son Tau Nuhi drive in the Mu bull

28. The big calf is kicked out That belongs to him call Ka to Ui

29. Nom one big, Huromu (Christmas) like Hutty The Wuitsa pray, Hajj commit, captivate strangers Him

30. Bright Nur bright they Maya Maya pray to the standing light Yay he for them is omnipotent with other people's children

31. Children Tara Khatapa favorite Huttov Uiytsev clear Tar first cross in Ta stands, he stands in Una, in Nura, in Ui stands bright Man in Ta stands at the height of living there Host calls Hatapu save Hera Vezi Ash of the light almighty beloved Huttov The Wijits pray beloved Sima

Translation into Russian of the text in the first frame of God Am, holding on his palms a sacred symbol:

Praying Anu pray

Translation into Russian of the text in the second frame with the girl and the guy, we go from right to left, from top to bottom:

1. In Hatty, Ui the clear Kama is brought to Mimu (Saint Maan) takes me away the body of the person standing in the gift of the clear first light Nur the bright Ra the living all-powerful break the Nom save in the Una of the living and in Tanya

2. They are the favorite Hubs first Sham Iman

3. Bright Nur Hera Ui

In the 29th line of the hieroglyphic text: "**Nom one big Khuromu (Christmas) like the Hutts. The Wijits pray Hajj commit captivating strangers by Him.**"

The semantic meaning of this phrase is that the Proto-Haggists loved to celebrate Christmas, to Khurom.

According to ancient Adigah sources, the New Year - Khuromu was celebrated on March 21-22 with a ritual song, young boys went through the village these days, went to every yard with wishes for well-being, health, success in life for family members and collected food, various sweets.

Mozdok Kabardians and now celebrate Christmas - Khuromu here is their ritual lyrics:

Хъуромэ:

Уо хъуромэ!	Oh, Christmas!
Уо-уо!	Wo-wo!
Уо хъуромашэ!	Oh, Christmas is upon us!
Уо-уо!	Wo-wo!
Уо, мышэрыгщIэ...	Oh, plentiful millet for us...
Уо-уо!	Wo-wo!
Уо, напщIэ махуэ...	Oh, what good fortune...
Уо-уо!	Wo-wo!
Уо, натIэ исэ!	Oh, what merriment!
Уо-уо!...	Wo-wo!...

[2, [http://www.facebook.com/permalink.php?id=192171867493752&story\\_fbid=507316782645924](http://www.facebook.com/permalink.php?id=192171867493752&story_fbid=507316782645924)].

To date, the Christianity of the peoples of the North-Western Caucasus has not been studied sufficiently, and it is impossible to say exactly from what time in the

North Caucasus Christianity appeared among Adygs.

According to some sources, Christianity was spread by the Greeks in the 7th century BC, and according to other sources Christianity came in the 1st century AD. With Andrew the First-Called and his Companion Simon. Among the Circassians there is an opinion that Christianity was spread by Jews even before the Greeks appeared in the North-Western Caucasus. For a long time Adygs of Jews are called "jurt", the etymology of which is that "Zhor" is a "cross distributing", that is, one who spreads Christianity.

It turns out that in very ancient times, the Proto-Haggies did not just celebrate Christmas, Hurom, but also had a rich supply of songs and rituals related to this holiday of Khurom - Christmas.

The 31st line of hieroglyphic text tells us about the most ancient existence of Christianity and its cross: **"Children of Tara Hatapa's beloved Huttov Uiytsev clear Tar the first cross in Ta stands, he stands in Una, in Nura, in Ui stands a bright Man in Ta lives on high he lives there The host calls Khatapu save Hera Vezi Ash of the light almighty beloved Huttov The Wiiitsa pray the beloved Sima."**

Obviously, we are talking about the spread of Christianity, that the crosses were in the cities of Tar (Terek), Ta (Taman), Un and Nur are Egyptian cities, and Ui is Nubia. Further studies of hieroglyphic texts shed light on the secrets of the Christianity of the North Caucasus.

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2. Khuroma. [http://www.facebook.com/permalink.php?id=192171867493752&story\\_fbid=507316782645924](http://www.facebook.com/permalink.php?id=192171867493752&story_fbid=507316782645924) (reference date: September 15, 2017).

在现代罗马语言的介词表达（基于俄语，法语和意大利语言）中使用语法工具案例的特殊性，

**Peculiarities of using grammar instrumental cases in the prepositional expressions of modern romance languages (on the basis of the Russian, French and Italian languages)**

**Alekberova Inessa El'darovna**

*Candidate of Philological Sciences, Associate Professor*

**Udalova Evgeniya Aleksandrovna**

*Associate Professor*

*Russian International Academy for Tourism*

*Moscow, Russia*

如今罗曼语言的比较类型学表现了我们某些语法链接的结构语义顺应性的分析。大多数语法类型的问题决定了每种语言的独创性。分析性语言的介词式表达在屈折语言的个案形式中没有准确的等价物。仅在代理的主要功能中使用浪漫群组合规性的语言，并且可以找到该工具。手段的积极作用由IC形式的无生命名词也作为行动主体和手段或工具出现时的情况而定。在案例类别研究中的类型学方法允许在语义齐次函数的语法设计中看到并行性。

关键词：比较类型学，工具性案例，复杂交互作用，词汇语义，顺应性，行为形象，预测功能，语言分析。

**Annotation.** *Nowadays the comparative typology of Romance languages represents us the analysis structural-semantic compliances to some grammar links. Mostly the problem of substantial categories of syntax determines the originality of each language. Prepositional expressions of analytical languages have no accurate equivalents among case forms of inflected languages. In the languages of Romance group compliance only in primary function of an agent and the tool can be found. The active role of means is specified by the situation when the inanimate noun in the form of IC appears also as an action agent and as means or tools. Typological approach in a study of category of cases allows to see parallelism in syntax design of semantic homogeneous functions.*

**Keywords:** *comparative typology, instrumental case, complex interaction, lexical semantics, compliance, image of action, predicative function, linguistic analyses.*

As we know, nowadays the comparative typology of Romance languages, in particular the Italian and French languages, represents us the analysis of Romance structural-semantic compliances to some grammar links of Russian one. In the course of the analysis structural-semantic similarities and divergences between the grammar organisation of Russian and Romance languages are pointed out on the first place. Mostly the problem of substantial categories of syntax determines the originality of each language, therefore, during the realisation of this category complex interaction process of functional, syntactic and lexical semantics are found in the language. [Budagov: 23-25].

As the practical grammar of Romance languages includes a number of the phenomena difficult to explain, that often escape from our attention, learning language has to take place with a support into native Russian.

Researchers always focused the attention to category of a case that is caused by “its tangled interaction with the semantic correlates”, as prepositional expressions of analytical languages have no accurate equivalents among case forms of inflected languages. [Sabaneeva: 87].

As V.G. Gak notes, an instrumental case (further IC) in Russian language has wider volume of values and definitions than other ones with pretexts like “par, avec, de” in French and pretexts “da, in, con, di, a” in Italian language. First of all the category of case is connected with those semantic roles that are executed by substantives in the semantic-syntactical organisation of any statement. There are following functions of IC in general:

1) semantic:

- instrumental function: *to plot with the pencil*
- image of action: *to write with the shivering hand*
- function of reasons: *he is recovered by miracle*

2) syntax:

- subject function: *the bus is splashed with dirt*
- object function: *to throw questions*
- predicative function: *it works as a teacher*

As for famous scientist Y.A.Pupynin, he selects three basic functions:

- 1) exponential function: *to wave a hand, to draw with gouache*
- 2) instrumental function: *to cut with knife*
- 3) classifying function

In the languages of Romance group compliance only in primary function of an agent and the tool can be found:

Ex. French: *Cette fille est aimée de tous.*

*Cet arbre est planté par mon père.*

*Tu écris avec un stylo.*

Italian: *Questa canzone è cantata dalla mia sorella.*

*Pietro scrive a penna.*

*Andare in treno.*

In figurative senses of IC there will be correspondence between non-prepositional nouns or pretexts of French - en, and of Italian – in.

Ex. French: Joindre les mains – to throw up the hands [Mozhe: 58].

Italian: Agitare la mano (le mani) - to throw up the hands [Petrova: 34].

However French language provides constructions with a pretext “par”, that can be identical to the Russian genitive case, and construction with a pretext “en” - to a prepositional case.

Ex. *Le professeur commence par l'interrogation* (by inquiry), *en classe* (in a class).

Whereas in Italian language construction with a pretext of “in”, “di”, “per” corresponds to a prepositional and genitive cases there.

Ex. *Per rabbia* – for rage

*La casa di Sandro* – Sandro's house

*Il calore dell'estate* – heat of summer

Thus, on the bases of all these examples, it is possible to underline or aware two basic functions of IC:

#### 1. Actantial function (instrumental value)

When the substantive in Russian language in the form of IC designates a part of a body which is used for achievement of the goal, in Romance languages there is correspondence of constructions with the French pretext “de” and the Italian pretext “con”.

Ex. Russian: *Он ей указывает головой на дверь.*

French: *Il lui désigne de la tête une porte.*

Italian: *Indica con la = colla testa alla porta.*

If the Russian substantive designates the tool by which action is made, then in Romance languages constructions with the French pretext “avec” and Italian “con” or “a” are used. [Kalmykov: 46].

Ex. Russian: *Девочка пишет ручкой.*

French: *La fille écrit avec un stylo.*

Italian: *La figlia scrive a una penna.*

The active role of means is specified by the situation when the inanimate noun in the form of IC appears also as an action agent, and as means or tools, i.e. means and the vendor are connected. In this case, for example, in French it is instrumental - agent function is transferred by construction with a pretext “par”, and in Italian – “di”.

Ex. Russian: *Он сидел в кресле, измученный волнением.*

French: *Il est assis dans un fauteuil tourmenté par l'inquiétude.*

Italian: *Era seduto su una sedia sfinito per l'emozione.*

Thought, the Russian object of IC cannot have the general model for its transmission to any Romance constructions.

## 2. Adverbial function

Linguists realized that the most widespread function is an adverbial function of an action image, function of an action making method.

Ex. Russian: *смотреть глазами*

French: *fixer des yeux (pretext "de")*

Italian: *fissare lo sguardo (non-prepositional construction)*

There is, as we call, closeness of a sort IC to comparing that is emphasized with the translation of comparative constructions with pretexts in French: - "comme", in Italian: - "come".

Ex. Russian: *Пуговицы его пальто отливали золотом.*

French: *Les boutons de son manteau brillaient comme l'or.*

Italian: *Bottoni del suo cappotto brillavano come l'oro.*

In Romance languages The IC temporal value is transferred most often by non-prepositional construction.

Ex. French: – *un soir* – *one night*

Italian: – *un giorno* – *once (afternoon)*

Thus, typological approach in a study of category of cases allows to see parallelism in syntax design of semantic homogeneous functions. The IC heterogeneous functions integrated by the unique or the same form in Russian are transferred in Romance languages by different syntax means. In some cases syncretism of IC values which is shown in case of connection of canon and object IC values takes place. So, languages of Romance group reveal differentiated approach in transmission media of semantic varieties in each IC function. IC can act also in a semantic role, unusual for it, at the same time the semantic structure of an expression gives way to syntax structure.

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虚拟话语：交际的性别特征

**Virtual discourse: gender features of communication**

**Vasilishina Elena Nikolaevna**

*Karaganda Academy of the Ministry of Internal Affairs of the Republic of Kazakhstan named after Barimbek Beisenov*

Virtual reality more and more covers the minds of mankind, taking roots in the unknown spheres of human activity: online purchase, online credit, Internet banking, etc. Relatively for today, a new era of the digital revolution (digital) should be concretized, which will allow, in the final analysis, to trace the relationship with virtual discourse.

The dynamism of today's world predetermines the rapidity of human reactions. Mobile and Internet technologies transform consciousness and force to find new ways and principles of life. We can state with certainty that today we have overcome the traditional principle of living communication and moved on to a new one surrounded by digital devices and the Internet. Another thing is that not everyone realizes the scale of a new type of communication. A "digital gap" [1] arises between those who have knowledge in information technology, and who do not have such, while remaining superficially aware. However, this does not prevent both of them from coexisting in everyday virtual reality.

Based on the definition of the theorist and methodologist of the discursive analysis of T. Van Dijk, we will understand the discourse as a "communicative event ... a complex communicative phenomenon that includes a social context that gives an idea of how participants in communication (and their characteristics - public values, knowledge of the language, knowledge of the world), and about the processes of production and perception of the message "[2]. The indicated characteristics of the discourse (social context, characteristics of communication participants, production processes and message perception) are significant for the virtual component of communication, which allows us to define it as a discourse.

The gender component seems to be an actual area of research in relation to virtual discourse and will allow to determine the features of virtual communication between male and female. However, gender sensitivity in the language is not supported by all researchers. Thus, V.P. Belyanin considers it appropriate to talk about the specifics of speech production by men and women. The researcher emphasizes that a man strives for sharpness and is inclined to show initiative in dialogue, their

speech is laconic, rather than speech of women. Speaking about the specific character of speech, the saturation of men's speech with nouns and numerals is noted, and women's speeches are verbs [3]. Also, men in speech tend to use stylistically reduced vocabulary, while women are stylistically colored, and they often use the method of hyperbolization, which finds expression in the use of such interjections as "wow!", " Oh my God!", etc.

For the analysis, we took the page of Ksenia Sobchak in the social network Instagram. Ksenia Sobchak is a fairly well-known person both in Russia and abroad: the host of the scandalous show Dom-2; presidential candidate; journalist. We studied the comments on two photos on her page, where K. Sobchak is depicted next to the famous singer Sergei Shnurov.

Women's comments are more voluminous than male ones (masculine laconic), as well as they carry information of an explanatory nature, demonstrate cause-and-effect relations. At the same time, the sentences that women use in speech are exclamatory: they as though ask questions and immediately give an answer to them.

Female texts represent mini-reasoning on a given topic with a compulsory comparison with one's own self and the way I have everything in this situation:

*zhurva @ goga5070 that blah. To whom does this divorce act? Once upon a time, they lived, they did not grieve, but then they decided to shake the instagram with news - a divorce! And then public suffering and other garbage (of course, people are molded differently, but when I suffer, I myself can not bear the idea of making it public).*

Women are inclined to make a whole text, a mini-story from one heard or seen phrase, as demonstrated in the following commentary:

*annashilman Shnur once showed his male authoritarianism and his human trash, and very much offended the sweetest, gentle girl - Alice Vox. He got cold with her, licking her with lies and mud. Now he was sentenced to punishment and another girl, whom apparently also periodically did badly - Matilda, punished him with a painful divorce. All the evil caused by man to other people, necessarily returns to him back. What Shnur sowed, then shook.*

In the above commentary, the nominative vocabulary "trash" and "Male authoritarianism" are used, which demonstrates the desire of the female half to define everything, thereby expressing one's own position with respect to the object of discussion.

At the syntactic level, the sentences of female speech are mostly complex.

*zhurva @ neanor\_ I agree, for this I have a reservation - all people are different. For me personally, the story of a serious divorce seems unconvincing, but this does not mean that I completely reject the sincerity of this story, express my opinion is simple. Actually, since people themselves carry their history in instagram, it means more haypas on it are expected to catch.*

It is noted that the speech of women expresses the manifestation of location, participation; full of understanding of another's feelings [4]:

*vita\_vogue @ xenia\_sobchak I have no doubt that everything will be fine, because they have true love. When you love, you forgive. If there is nothing to forgive, then you rethink, weigh and understand that this is the one whom you do not want to lose.*

Or:

*tanya\_kossoft Maybe it's all right*

Male speech is replete with stylistically reduced vocabulary:

*Tokinkonstantin Tipple, as usual! Not everyone was ready for the morning! Photos were done for sobriety!*

*andrey\_rodichev1991 Shnur handsome*

*andres\_sever Ksyu, where did you find this drunk?*

*Petrovich\_region46 Sobchak the finished scum.*

*an\_drei5998 Fu, horse! What does it do in my tape?*

Suggestions, as seen from the examples above, are simple, not complicated. Contain, in the main, the nomination of a person: *drunk, handsome, scum.*

The only phrase in the male speech-commentary, which breaks out of the general context of male communicative behavior, is the last example where, in addition to the nomination - *the horse* - there is also a questioning sentence in the form of a rhetorical question addressed to itself.

Often laconism in phrases comes to using smiles instead of text.

Thus, it is obvious that men's speech and women's speech in virtual discourse has a number of differences that affect the communication itself: differences in morphology, semantics, syntax:

1. The frequency of comments allows us to conclude that women write more often.
2. The text of the woman is longer.
3. For the purpose of escorting your own text with an additional emotional component, smileys have met us in equal numbers, the only difference is that the male audience has a smiley function as a full text, that is, it replaces it.
4. Stylistically reduced vocabulary is used more often by men than by female audience, which means that men's speech is rougher, more expressive.
5. Women are inclined to analyze the situation stated in the social situation, men - to a clear and concise nomination of persons - the discussed objects.

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互联网的语言文化环境中的先例现象

## Precedent phenomena in lingvocultural environment of Internet

**Konovalova Diana Gennadievna**

*Postgraduate*

*Peoples' Friendship University of Russia (RUDN University)*

关键词：先例现象，分类，认知语言学。

**Keywords:** *precedent phenomena, categorization, cognitive linguistics.*

Researcher Boyarskikh O.S. notes that the specificity of cognitive linguistics is related to the study of language as a general cognitive mechanism, as a cognitive tool - a system of signs that play a role in the representation (coding) and in the transformation of information [Kubryakova 1996: 53; Boyarsky 2008: 33]. The task of the researchers of this direction is to describe and explain the language ability or knowledge of the language as an internal cognitive structure and dynamics of the speaker-listener, viewed as a system for processing information consisting of a finite number of modules and correlating linguistic information at various levels.

The body of cognitive sciences is quite diverse, but the basic operations, for example, categorization and conceptualization of the world, are reflected in various cognitive disciplines. For example, in cognitive semantics, concepts play a central role in determining the realities of everyday life: they structure feelings, behavior, attitude to something. A common way of studying how this process happens is to observe the peculiarities of the functioning of the language, and in particular, the use of certain cognitive and phenomenological structures.

Communication is based on the same conceptual system that is used both in thinking and in activity "[Lakoff, Johnson 2004: 23]. That is, communication in the Internet environment has the same system. Precedent phenomena are of interest to researchers in the cognitive field because these linguistic units "belong to the verbal level, and the underlying invariants of representations are to the conceptual level of consciousness" [Krasnyh 2003].

One of the fundamental concepts of all cognitive linguistics is the concept of **categorization** - it is a process of classifying objects of cognition and combining these concepts into classes, sets, groups, categories. According to Boyarskaya E.L., the knowledge of the surrounding world, its comprehension occurs by

establishing common features when comparing the past and the new experience. The new experience is classified by consciousness and correlated with one or more conceptual formations that were formed earlier. The result of the action of deep cognitive processes is the formation of a system of categories that are groups of concepts stored in memory [Boyarskaya 2011: 18].

***Categorization and precedent phenomena.***

The precedent phenomena are the nuclear components of the cognitive space of linguocultural communities that transmit cultural information and predetermine the attitude of the carriers of different cultures to reality. Knowledge and ideas about the world are structured in the form of mental spaces. Among the latter, cultural space (real and mental), individual and collective cognitive spaces, and also the cognitive space of the linguocultural community are distinguished. The Internet environment acts as an open linguistic culture environment, a platform for self-expression, in which the linguistic personality operates with a cognitive style. The cognitive style of native speakers reflects a cognitive space that implements a totality of features and is transmitted through the invariate part of the constituents. This refers to the totality of cognitive structures that make up precedent phenomena. By such structures we mean the concepts of precedent texts, the frame of the structure of consciousness and the gestalt structure. Cognitive style is understood by us in a narrow sense, on the basis of definitions: "the style of presentation and presentation of information, peculiarities of its location and structure in discourse, associated with a specific selection of cognitive operations or their preferred use in the processes of constructing and interpreting texts of different types" [Kubryakova 1996: 80]; 3) "the way or style of thinking or evaluation, that is, the strategy for processing social information" [Van Dijk 1989: 295]. In the existing domestic and foreign linguistic literature, the cognitive style is associated with human behavior in relation to the structural connections of thought and sensation, with character traits, as well as the person's fundamental ability to carry out the most important cognitive processes that determine the structure of human linguistic activity (narration, description, argumentation, instruction, etc.) [Kubryakova 1996: 80].

Invariants of representations are also correlated with the cognitive aspect of the consideration of the theory of prototypes, in which, under the given phenomenon, we mean "a certain mental representation of an object or phenomenon, which, nevertheless, leaves the question of the essence of the prototype open. The terms denoting the prototype vary from more or less specific, such as "image", "schema", to more abstract ones, such as "representation of the concept" or "ideal representative of the category" [Rakhilina 2000].

But the prototypes are still conditionally open in accordance with the development of the contexts of the use of precedent phenomena and when

considering static data slices. Dynamic indicators (consideration of the use of any nuclear-peripheral changes in contexts over certain time intervals), as well as static ones, are openly allowed under the condition of functioning of the FS in different linguocultural communities, which is conditioned in "cultures and ethnic consciousnesses" [Bannikova 2004: 6].

Cognitive categories are contained in the human mind as some mental concepts and expressed through lexical units of language with the help of certain precedent phenomena. When choosing lexical means of expression in a message, the addressee uses certain structures, according to which the choice falls on the category most often encountered to describe similar situations, for example, of any categories reflecting the precedent situation.

«Understood the mystery Bitcoin - the same Pinocchio, who grew up in the Field of Miracles»

The example shows how, using the precedent phenomenon, the attitude of the user of the Internet network to the appreciation of the value of a new valuable unit is expressed, the economy is compared with the cultural sign - "The Field of Miracles" in the work of A.K. Tolstoy.

The Internet space today contains a large number of informative resources that are interesting for philological analysis. Philologists pay attention to expressions of the Latin language, which often lost their original values on the Internet, were taken out of context and not always correctly used. These precedent texts are the memorable dictum. It is obvious that in our time they are perceived and used as quotations, quoted by a certain precedent text, which is established if such a quotation is authorized or attributed to a particular situation [Krasina 2017: 182]. In particular, the researcher Vladimir Fayer writes about the problem of transformation and gives several examples of inaccurate understanding of the meaning of the phrase [<https://postnauka.ru/longreads/86423>].

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在西伯利亚鞑靼人的辩证成语中反映美食代码  
**Reflection of the gastronomic code in the dialectic idioms  
of the Siberian Tatars**

**Ermakova Elena Nikolaevna, Faizullina Guzel Chakhvarovna**

*Tyumen State University,*

*Tobolsk, Russia*

文章分析了食物的组成部分的方言成语，它在生活在西西伯利亚领土上的西伯利亚鞑靼语的方言中发挥着积极的作用。西伯利亚鞑靼语 - 鲜为人知的现象；被分析的单位是隐喻的产物，实际上并没有在辞典实践中进行描述。另一方面，这些主格单位一方面表达了国家的美食代码，另一方面以食物成分名称的方言成语具有表现力，反映了人民精神生活和物质生活的特点，功能对他们来说是评估。

关键词：美食代码，文化代码，西伯利亚鞑靼语，方言习语

**Annotation.** *The article analyzes dialectal idioms with the component-name of food, which actively functions in the dialects of Siberian Tatars living on the territory of Western Siberia. Dialects of Siberian Tatars - little-known phenomenon; The units analyzed, which are the product of metaphorization, are not actually described in lexicographical practice. These nominative units, on the one hand, express the gastronomic code of the nation, on the other hand, the dialectal idioms with the component-name of food are expressive, reflect the features of the spiritual and material life of the people, a characteristic feature for them is evaluation.*

**Keywords:** *gastronomic code, culture code, Siberian Tatars, dialectal idioms*

The worldview system of any national language is encrypted in a cultural code, the nomination of which takes place primarily with the help of linguistic signs, since it is the language of the people that preserves its cultural heritage, in turn the cultural code conveys the material and spiritual experience of generations.

The significance of the cultural codes of any language depends on the characteristics of the national culture. Idioms are those units in which the code of the nation is most notably reflected. Cultural information is stored in the internal form of idioms, not knowing which it is impossible to imagine and comprehend the cultural-national color. Phraseological units (idioms) are of the greatest interest in terms of identifying the national and cultural specifics, since they reflect the culture, traditions and mentality of the people to a greater extent [Dorodneva, Ermakova 2013: 237].

For many centuries, idioms developed certain codes: a numerical (*в четырех соснах заблудиться, седьмая вода на киселе, для бешеной собаки семь верст не крюк*), somatic (*положить зубы на полку, кишка тонка, повесить нос*), gastronomic (*гадать на кофейной гуще, березовая каша, лаптем щи хлебать*), zoomorphic (*проливать крокодиловы слезы, вертеться как белка в колесе, врать как сивый мерин*), clothing code (*не у шубы рукав, трещать по швам, по Сеньке и шапка*), spatial (*за тридцать земель, куда Макар телят не гонял*), temporal (*денно и ночью, при царе Горохе, когда рак на горе свистнет*).

An understanding of the ethno-cultural code of a certain people is largely promoted by the dialectal picture of the world. Our scientific interests are connected with the study of the dialect that has developed in the territory of one of the largest regions of Russia - Western Siberia. In the Omsk region and southern areas of the Tyumen region, historically lived the Turkic tribes, which later formed the Siberian Tatar nation. It was here that the Tobol-Irtysh dialect was formed, which got its name due to the fact that a significant part of the Tatars lived on the banks of the rivers Tobol and Irtysh. Long distances between settlements led to language disunity, which led to the formation of not only different dialects, but also different dialects among Siberian Tatars.

In the idiom of any dialect, it is possible to distinguish three layers: 1) idioms that function in the literary language; 2) idioms related to literary, but undergoing changes in dialects (differing in formal expression, component composition, compatibility, etc.); 3) idioms that do not function in the literary language.

Idioms that do not function in the literary language are speech units used by the speakers, usually in spontaneous speech. In modern linguistics, such units qualify as dialectal. By dialect idioms (phraseological units) we mean stable, separately formed units that perform a nominative function and correspond to parts of speech that differ from the literary component composition, grammatical form, functioning in the oral speech of residents of a territorially limited area [Ermakova, Faizullina 2016: 55].

Let us analyze the gastronomic *code* of culture, reflected in linguistic signs - dialect idioms with a component-name of food.

The speaker of the dialect, studying the surrounding world and reflecting it in his speech, relates this world primarily with its needs. Food for man is a basic need, without which its existence is impossible. It is no accident that in the idioms of Siberian Tatars, as well as in the language of any nation, the different names of dishes and food are very frequent as components. So, Siberian Tatars use gastronomic products, hot dishes, dairy products as a gastronomic component.

A special place in the Tatar national cuisine is occupied by baked and fried flour products, their names are actively used to characterize both external and internal properties of man. As a rule, the basis of the name transfer by similarity

is the shape of the culinary product: round and pointed. At the same idioms are designed by type of *name of flour products + somatic*: *балеш авыз* «incapacitated person» – balish + mouth. When the name of a round-faced person is used idioms *лунушгә нум* (face [as] flat cake), *нәлец нум* (face [as] balish), *шәңкә нум* (face [as] shanga). By the same principle idioms are formed *он нум* «white face» – flour + face и *күптермә авыс* «fluffy» – lush bun + mouth. A sharp-headed person is called *эртник паш* – fish + head.

The idioms of the Siberian Tatars have an internal form not only by the similarity of the shape of the product, but also by quality. Lexical unit with a secondary nominative meaning *павырсақ* «compassionate person» is used in the speech of the inhabitants of the Vagay raion. Boursaks are obtained in the form of an unusually fragile cap. This quality of the national flour product was the basis of the semantic transfer: a fragile flour product - "a man with a gentle temperament."

Lexeme *шәңкә* in a figurative meaning is used as part of idioms *шәңкә нум* (шәңкә + face) and independently. Unlike other traditional pies, shangs are baked as open potato pies. Ready cake due to the peculiarity of the filling in the hands falls apart. Probably, this feature formed the basis of the portable meaning of "stupid person", we note, by the way, that on the basis of this transpositive meaning, a verb *шәңкәләну*.

In the speech of the Tobol-Irtysh Tatars, a lexeme *шырцай* with the meaning of "talker". *Шырцай* – this liquid dish, prepared it as follows: in the hot tea added flour, stirred it. It was tea-soup, which was "independent." This dish, by virtue of its availability, was the main in the hungry military and post-war years. But still it is not an independent, not significant for eating a dish, and by virtue of this, the lexeme *шырцай* the meaning of "a frivolous person" develops, the lexeme of the hem is a synonym: 1) liquid; 2) a frivolous person. At the heart of the semantic transfer is a comparison of the liquid principle with an unreliable person, on whom one can not rely and rely. Lexeme *шурбә* «bouillon» participates in the formation of idioms *шурбә алы күс* (bouillon-eye) «sick eyes, from which oozes mucus».

Active in the dialects of Siberian Tatars, the nomination of a person with a component-name of a dish from cereals. A person with a full loose face is called *нутқа* «porridge» or *нутқа нум* – porridge + face with an association for the similarity of appearance. The forgotten dish today is *курмац* - «corn fried in a frying pan» [Tumasheva 1992]. Verb *кыр* is noted as a Kirghiz dialect in the dictionary of V.V. Radlov in the meaning of "fry": *пудай кырды онь* – fry wheat [Radlov 1899]; D.G. Tumasheva identifies three values of lexeme *куру* – 1. fry, 2. rake, 3. do burs, finish knitting [Tumasheva 1992]. "Dictionary of Russian folk dialects" fixes a lexeme *затуран*, which the Russians call the Tatar food «*курмачь*» (*kurmac*). The food is cooked like this: barley is fried, it is pounded, boiled with milk, butter is added and eaten "[Dictionary of Russian folk dialects (1976)]. In the speech of

Tobol-Irtysh Tatars, an idiom is actively used *курмац тел* - «talkative», the internal form of which is formed by the addition of a word combination of *фру grains* and lexeme *tongue*. This idiom has a positive connotation: an eloquent person, resourceful in conversation, wit is always an object of universal respect.

Frequency in the language and speech of the Siberian Tatra nomination of a person with a component-former name of a baked dish: *пичүнкә нит* «black skin» – baked potatoes + face. This idiom, as a rule, is used with a negative characterization of a person: *Шал пичүнкә нит пүтән игәнте*. Lexeme *пичүнкә* – borrowing from the Russian language - *печенка*: *Пес кәртүп қасғантә, пичүнкәне кәстёртә нешереп ашайтын* (When digging potatoes, always cook baked potatoes at the stake).

Milk is one of the central gastronomic concepts of the Tatar people. Through the lexeme, through the notion of this product, the people's value attitudes toward the world are reflected. Lexeme *сөт* (milk) is actively involved in the formation of idioms: *сөт анасы* «milk mother», *сөте кипмәгән* «about who is too young and inexperienced», *сөт тә юк, йон да юк* «there is no use», *сөтлә сыйыр* – 1. A woman who has a lot of milk; 2. Generous. Milk is considered to be the staple food that is used both fresh and recycled. Nomination of a person with a component-name *күтцек* (curdled milk) applies to a person who imagines himself, conceited: *Қараң, қараң күтцекне!* The meaning of lexeme *күтцек* in lexicographic sources recorded as "cottage cheese" [Tumasheva 1992], [BDSTYA 2009], However, during the field work this unit was fixed in the sense of "yogurt". The technologies for the preparation of dairy products of yogurt and katyk are excellent: yogurt is formed by souring raw milk, and the katik is prepared from boiled milk. Thus, the studied lexemes can not be considered synonymous.

Nominations of a person with a name component *май* are represented as national idioms *майлы күз* «shameless person» (butter + eye), and dialectal *майлы паш* "A man shirking from work" (butter + head). At the heart of the unit transfer *майлы* is a comparison 1) with the turbidity of the substance, 2) with the inconsistency of the substance (*йылып йөрөйте май шигелле* – unstable as butter). Both units have a negative connotation.

The idioms fund of any language is unique and valuable when studying the attitude of its bearers. The emotionally expressive component of human nominations with idioms with a gastronomic component reflects both a positive and a negative connotation. In the dialectal gastronomic code of culture, as, indeed, in the gastronomic code of culture as a whole, idioms characterizing the negative properties of man (stupidity, laziness, unreliability, pomposity, clumsiness) prevail. The identification of the semantic and grammatical specificity of dialect idioms, the study of the interrelations between dialect and literary idioms are necessary both for the study and description of diachronic and comparative idioms,

and for understanding the development of synchronic idiomatics.

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对精神分裂症患者的时间感知

## Time perception in patients with schizophrenia

**Denisova Tatyana Nicolaevna**

*Candidate of Psychological Sciences, Associate Professor  
Vologda State University,  
Vologda, Russia*

本文致力于精神分裂症患者世界形象心理（主观）时间的实验研究。样本由50位精神分裂症患者和50位健康个体组成。

暴露精神分裂症患者的时间能力下降。确定并描述患者的时间及其组成部分（过去，现在和未来）的特点。提出作者的三层次时间概念以估计主题时间概念的水平。

临床心理学家可以使用心理诊断复杂的时间能力估计来诊断和纠正问题的解决方案。

关键词：世界形象，心理（主观）时间，精神分裂症，时间观念，时间能力。

**Annotation.** *The article is devoted to the experimental study of psychological (subjective) time in the image of world of patients with schizophrenia. The sample consisted of 50 patients with schizophrenia and 50 healthy individuals.*

*A reduction of time competence in patients with schizophrenia are exposed. Peculiarities of the image of time and its components (past, present and future) of patients are identified and described. The author's concept of three-level time to estimate the level of the concept of the time of the subject is presented.*

*The psychodiagnostic complex for estimation of the time competence can be used by clinical psychologists for diagnostic and corrective solution of the problems.*

**Keywords:** *image of the world, psychological (subjective) time, schizophrenia, the concept of time, time competence.*

**Formulation of the problem.** Time is one of the most important components of our life, it permeates all the mental processes and spheres of human life. Time is the connecting link in the image of the subject's world and, at the same time, it enters as a component in this image. The concept of "The image of the world" was introduced by A.N. Leontiev, to describe the integral system of human values. The image of the world is built on the basis of highlighting significant experience for the system of activities carried out by the subject [4]. The image of the world

is based on the temporal outline of the world [4,9]. A person can not act without orientation in time, without synchronizing his behavior with changes in the world around him. The distortion of the temporal component of the image of the world inevitably leads to inadequate changes in the image of the world of the subject as a whole.

*The situation of mental disorder creates special conditions for the development and functioning of the image of the world and its temporal component. The study of the time of the image of the world of a psychic sick person is necessary for more effective implementation of diagnostic and therapeutic purposes. One of the most common mental illnesses, often affecting people of working age, is schizophrenia.*

*K. Jaspers also described the peculiarities of the experience of time in patients with schizophrenia: the experience of the stopped time; awareness of the just-completed period of time; discontinuity of time; "Compression" of the past; the experience of the stopped time, the time "flowing in" at another time, and the time that has fallen down [10]].*

Most modern domestic and foreign studies are devoted to the study of impairments in the perception of objective time in schizophrenia, i.e. violations of the adequacy of estimating time intervals that are associated with cognitive deficits, with impaired functioning of certain cerebral structures, and the like.

S.V. Gribanova, V.B. Pavlenko and S.A. Mahina found that patients with schizophrenia of a paranoid form with an apatobular defect lagged when measuring the time intervals of various activities. The authors attribute this to the reduced plasticity of mental processes, which is revealed in patients with schizophrenia [2].

A.I. Melekhin investigated the features of orientation in time and the perception of short and long time intervals. The author distinguishes his view of analysis - the problem of time perception in these patients in the context of cognitive deficits. Identified distortions of orientation in time, underestimation of time intervals in patients with schizophrenia, he associates with violations of the processes of attention and memory [5]. Similar patterns were revealed in a number of foreign studies. Ch.A. Carroll and colleagues note significant differences in the evaluation of time intervals in patients with schizophrenia, compared with the norm [12]. S. Tordjman believes that autistic patients with schizophrenia are overly focused on the present moment due to fear of death [14].

O. Bonnot and colleagues point out that psychiatrists often report a shortage of time estimates for patients with schizophrenia, but it is still unclear whether temporal disorders in schizophrenia are associated with certain cognitive problems or with biological abnormalities [11]. D.B. Davalos and his colleagues discovered neuroanatomical grounds for the deficiency of temporal judgments in patients with schizophrenia associated, in particular, with disturbances in the temporal regions

of the brain [13].

Psychological (subjective) time was studied much less often. For example, V.A.Rakova and O.Yu. Shchelkova identified the perception of temporal perspective in individuals with long-term paranoid schizophrenia: idealization and undifferentiated sense of well-being in the assessments of the past; in the assessments of the future - unrealistic; a negative attitude towards the present, which increases with the duration of the painful process [7].

**The purpose of our research** is to identify the features of the temporal component of the image of the world in patients with schizophrenia.

**Sampling and methods.** Two groups of subjects participated in the study:

1) 50 patients with schizophrenia undergoing treatment in the Vologda Regional Psychiatric Hospital with the diagnosis: schizophrenia, hallucinatory-paranoid syndrome (men, outside psychosis, median prescription: 8 years, average number of hospitalizations: 5);

2) 50 mentally healthy persons, men.

Methods of research: conversation; observation; analysis of documents (case histories); method of expert evaluation; analysis of graphic production; the standard 25-scale semantic differential of C. Osgood (it was suggested to estimate time and its components: past, present and future); projective technique "Draw time" (it was suggested to depict time in the form of any image and divide the drawing into three parts: past, present and future); color-associative test (it was suggested to choose colors from the standard color set of M. Lusher that associate the subjects with time and its components). Statistical processing was performed using correlation analysis, Pearson's  $\chi^2$  criterion, Fisher's angular transformation.

As a result of the processing of the semantic differential, the semantic codes of time and its components, the hierarchy of characteristics, were distinguished, beginning with the quality that received the greatest number of votes. Further, semantic universals were distinguished-lists of characteristics of the concepts under study, equally estimated by a significant number of subjects (no less than 75%) [1].

**The results of the research and their discussion.** Differences in the semantic estimation of time were revealed. For healthy subjects, time is fast, active, precious (at a significant level), for patients - complex and expensive (at the trend level). Essential is the lack of characteristics reflecting the dynamics of time in patient estimates.

When color associating time, the most preferred color is revealed in patients - gray (30%), which can mean indifference, detachment, estrangement, and in healthy - green. Patients are significantly less likely to opt for an optimistic yellow color, above the rank of brown and black colors.

The analysis of the results of using the projective method "Draw time" also

*revealed the features of the presentation of time by patients.*

*Figures were analyzed depending on the level of time concept of their authors. In previous studies, we proposed the concept of a three-level time, according to which a subject can represent time as point, cyclic or global [3]. Point-time is situational, limited by the events of one's own life; missed through the prism of their problems, tied to specific subjects, situations, relationships; characterized by a weak relationship between the past, the present and the future. The cyclic time is a closed cycle, which is repeated unchanged. Within the cycle there is development from the past through the present to the future; there is one direction; there is an initial point of reference and an end point of development that pass one into another; but there is no development from cycle to cycle. The subject with the concept of cyclic time is able to rely on past experience and plan the future, but in a limited range. Global time does not depend on the time of life of a specific subject (a concrete historical epoch), transpersonally, infinitely, has a direction (or many directions), develops, moves, expands. The subject with this concept is capable of analyzing past experience, and planning with regard to the surrounding rhythms and processes.*

*An expert assessment of the level of the concept of time, reflected in the drawings, was made. Experts were 10 specialists in psychology. Significant differences in the level of the concept of time between healthy individuals and patients with schizophrenia were revealed ( $\chi^2 \text{ emp} = 64.61, p \leq 0.001$ ). The level of point time was observed in 12% of healthy subjects and 58% of patients with schizophrenia. The level of cyclic time was noted in 46% of healthy and 40% of patients with schizophrenia. The level of global time - in 42% of healthy and only 4% of patients with schizophrenia.*

The drawings were analyzed by the size of the time image and the number of colors used for drawing. The time picture took half the leaf and more in 76% of healthy subjects and 40% of patients with schizophrenia. Time images of schizophrenic patients are mostly small. These data are consistent with the level of the concept of time in these patients and with the evaluation of time on the scale "Large - small" of the semantic differential. Of the healthy, 68% rated the time as large, among patients 30% ( $p \leq 0.001$ ).

There is a clear tendency to use fewer colors for drawing in patients, compared with the norm. More than three colors were used by 46% of healthy subjects and only 12% of patients.

Differences are revealed by the factor of abstractness-specificity of the image of time. Among healthy, 56% used abstract symbols, among patients - only 18%. The presence of such features of the drawings in patients with schizophrenia is predictable enough due to the well-known decrease in their level of metaphoricity and high field dependence.

Presentations by patients of the past, present, future and the relationship between these time components also differ from those of healthy people.

Patients with schizophrenia demonstrate an emotionally-evaluative, positive attitude to the past, while the number of significant characteristics of the past is higher in them than in healthy ones. The past for them - *fast, precious, favorite, clean*. As before, there is no "active" characteristic in the patient's assessments. If the data of the semantic estimation are consistent with the results obtained in the study mentioned above, V.A. Rakova and O.Yu. Shchelkov, which marked the idealization of the past by schizophrenic patients, color association shows a contradiction in the representation of the past. It is noted, in contrast to the healthy, the dissociation of a conscious and unconscious attitude towards the past. Color association, which allows us to identify some unconscious components of the relationship, has shown that the past is assessed by patients much more pessimistically than with semantic evaluation. The patients preferred colors are gray and black (30% each), followed by green (20%). Healthy subjects prefer chromatic colors - green, red, yellow.

Significant differences are manifested in the assessment of the present. The most important characteristics of the present time in healthy subjects are active and expensive, in patients - tense, precious, complex, difficult. The characteristic "active" is also absent when evaluating the present. At the same time, in assessments of schizophrenic patients there is a significant decrease in activity of the present in comparison with the past, and in healthy, on the contrary, a significant increase in activity of the present, compared with the past. In addition, for all mentally ill subjects, the present is significantly more difficult and sad than the past. The color characteristics of the present in patients are significantly more likely to have dark tones. Preferred colors present - Black (30%), purple and gray (20%), which could mean negativism, uncertainty, detachment, hopelessness or indifference. The preferred colors of the present in healthy - green, red, yellow (confidence, energy, strength, optimism) [8].

The future is presented to patients with semantic evaluation in even more "iridescent" tones than the past - as intelligent, orderly, favorite, good, active, etc. The preferred colors of the future are green, red, yellow, as in healthy, although brown and gray colors occur in 20% of cases.

A correlation analysis was made between the averages of the estimates of the time components taken in pairs. In the group of healthy subjects, the correlation between the semantic codes of time components is high ( $r = 0.9$  and above). In the group of patients: a close correlation was revealed only between the past and the future ( $r = 0.9$ ), and the "past failures" of the bonds are revealed between the past and the present and the future (in both cases  $r = 0.4$ ).

As a result of the analysis of the pictures according to the following criterion

- the mutual position of the past-present-future - it was revealed that 64% of the healthy subjects placed the past-present-future in a linear sequence, and among patients - only 18%. Time for patients is not always directed towards the future through the past and present, while the linearity and direction of time from past to present, from present to future is its important characteristic, which reflects the subject's understanding of cause-effect relationships.

### **Conclusions**

1. The study confirmed features of psychiatric patients with schizophrenia, marked by many researchers - reduction of metaphor, motivational depletion, the uniqueness of personality, perception, thinking, social passivity, etc., - and revealed substantial features of the temporal component of the image of patients around the world.

2. Psychological time seems simplistic, not significant, small, monotonous. Most patients have a level of point time (58%). The psychological present is assessed negatively; the psychological past - positively - at an appreciable level, but negatively at a deep level. The future is overly optimistic, while there is no movement from the future to the present, the ability to plan is broken.

3. Time and its components are not represented as processes, do not differ in activity, are "frozen", do not have dynamics. Perhaps this is due to the difficulties in perceiving the objective time, which we noted in the theoretical analysis.

4. The patient's psychological time is not continuous. In the temporal image of the world there are voids, gaps, shifting of times, a violation of their sequence. In the image of the world time function does not perform communication, thereby may be in violation of connections between the past and value assessments of events, distorted view of the future. Reduced temporal competence, i.e. degree of integration of the past, present and future, reflecting "temporal continuity and integration of events" (according to J. Nutten) [6].

5. The discrepancy between the significant characteristics of the time and its components in patients with schizophrenia and healthy people and reflects their diverging internal psychological rhythms, difficulty synchronizing with the surrounding processes and rhythms that may underlie the social adaptation of patients with disorders.

6. Methodical diagnostic system allows to evaluate the degree of temporal competence of the subject and may be included in conventional diagnostic system patopsihologicheskikh techniques used in experimental psychological research in a psychiatric hospital - to solve problems of differential diagnosis, clarify the severity of mental activity disorders, evaluating the dynamics of mental disorders and accounting the effectiveness of the therapy. The revealed features of the presentation of time can be used to conduct psychocorrection measures and maintenance therapy.

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确定青年环境中的自杀行为

## Identification of suicidal behavior in the youth environment

**Kovshova Olga Stepanovna**

*Doctor of Medical Sciences, Associate Professor, Head of the  
Department of Medical Psychology and Psychotherapy*

**Novikova Nadezhda Vladimirovna**

*clinical psychologist of the Department of Clinical Psychology and  
Psychotherapy  
Samara State Medical University of the Ministry of Health of Russia,  
Samara, Russia*

文章探讨了青少年环境中自杀行为的危险因素，通过系统研究人格来监测年轻人的心理情绪状态，以确定“自杀脆弱性”。青少年环境中自杀风险的主要因素是：示范性，情感性，独特性，破产性，社会悲观性，违反时间观点。低血压，焦虑，异常行为和药物滥用。对世界和其他人的看法是对未来失败和失败的敌意和全球性的恐惧。

关键词。 预防自杀行为，自杀风险因素，自杀易感性，社会心理适应，自杀行为预测因子的数学模型。

**Annotation.** *The article discusses the risk factors of suicidal behavior in the youth environment monitoring the psycho-emotional state of young people to identify "suicidal vulnerability" based on a systematic approach to the research of personality. The main factors of suicidal risk in the youth environment are: demonstrativeness, affectivity, uniqueness, insolvency, social pessimism, violation of the time perspective. hypotimia, anxiety, deviant behavior, and substance abuse. perception of the world and others as hostile, global fear of failures and defeats in the future.*

**Keyword.** *Prevention of suicidal behavior, factors of suicidal risk, suicidal vulnerability, socio-psychological adaptation, mathematical model of predictors of suicidal behavior.*

The Russian Federation, according to WHO, is a country with a high suicide rate (39 people per 100,000 population). Especially relevant in Russia is the problem of suicidal risk in the youth environment. The frequency of suicides among adolescents has increased almost 3-fold over the past 10 years. Russia ranks second in the world in the number of puberty suicides (14,000 minors committed

suicide in our country in the last 5 years). The second most frequent cause of death at a young age is suicide. According to researchers, at the age of 16-24 there is the largest number of suicides, with suicidal activity rising sharply from 14-15 years and reaching a maximum of 16-19 years [10]. However, only 10% of cases have a true desire to commit suicide, in 90% of cases, suicidal behavior is a "cry for help", a young man's desire to prove his worth by destroying himself [5]. No one can prevent a catastrophe of voluntary death, but there is an opportunity to prevent a person's catastrophe. Thus, it can be concluded that the problems associated with the identification of young people with high suicide risk and prevention of suicidal behavior.

**Purpose:** to identify the factors of psychological disadaptation of the individual and the risk of suicidal behavior in the youth environment.

The basis of this research is the assumption that in order to build effective prevention of suicidal behavior in a youth environment, a comprehensive approach is needed to identify and correct factors of suicidal risk and individual psychological disadaptation. The research was carried out on the basis of the Department of Clinical Psychology and Psychotherapy of SamSMU Clinics.

**Methods of investigation:** Patocharacterological diagnostic questionnaire of personality A.E. Licko (1983); The method of diagnosing social and psychological adaptation of K. Rogers and R. Diamond (2004); Methods for diagnosing the degree of satisfaction of basic needs Skvortsova (1986); The questionnaire of suicidal risk A.G. Shmeleva (1993); Questionnaire of suicidal risk (A. Perales, St. Marcos University, Peru, 1999); Methods of mathematical statistics.

**Sample research.** A total of 128 students enrolled in the 1st and 2nd courses of the city of Samara were enrolled, the average age of which was 18 (18.24 + -0.76) years, of which 25 (20%) were boys and 103 girls (80%). The sample consisted of 47% of students enrolled in the first year, and 53% of the students in the second year. According to the marital status, 98% of the surveyed are not married, 1% are married and 1% are in an unregistered marriage. 25% of the respondents live with their parents, 7% with their relatives, 31% in solitude, 37% chose the option "other", most of whom specify that they live with roommates in a dormitory or in an apartment. At the moment 95% of the subjects do not have a job, 5% of the respondents work accordingly.

Based on the analysis of the suicide risk profile, an experimental subgroup was selected in the sample, consisting of 41 (32%) people with suicidal risk, and a control subgroup of 87 (68%) who did not have suicidal risk.

An analysis of the results of a structured interview showed that 28% of the subjects at least once in their lives had a desire to die. (Of these, 50% of the surveyed had such a desire in the last year). At least once in life 18% thought about suicide, (of which 39% thought about it during the last year). Suicide was planned at 4%,

of which 20% was in the last year. Attempted self-harm or suicide 11%, (of which 36% - during the last year).

Attempts to commit suicide or self-harm are most often explained by the following reasons: conflicts with parents (43%), problems or conflicts with the lover (29%), learning problems (29%), dissatisfaction with appearance (14%), conflicts with relatives (14%). Many noted that there were no clear reasons for this (36%). According to the results of analysis of the structured interview, antivital experiences were revealed in 28% of the subjects surveyed, suicidal thoughts in 18%, suicidal plans in 4%, self-injurious behavior in 11%, of which 64% did not appeal to anyone for help and 29% indicate the likelihood of a second attempt at self-harm.

The research of individual personality traits revealed significant differences in the relationship between schizoid and astheno-neurotic types of character accentuation. This indicates that the experimental group notes isolation, difficulties in establishing emotional contacts, lack of intuition and empathy in communication, a tendency to unconventional, unaccepted decisions and behaviors, as well as a tendency to increased fatigue, irritability, hypochondria in the character structure.

Hypertensive and unstable types are detected reliably less often in young people in the experimental group, therefore, they are not characterized by heightened mood, activity, striving for leadership, sociability, craving for entertainment, pleasure, superficiality of contacts. Significant differences have also been identified with respect to the response of emancipation, propensity to depression and suicidal tendencies. In the experimental group, the desire for independence prevails, the desire to get rid of tutelage, the propensity to respond to the hypothymic type, in the experimental group there is a real desire to die, and not attract attention to itself.

The research of socio-psychological adaptation revealed significant differences in all scales, except for the scale "Striving for domination". Young people in the experimental group have a decrease in social and psychological adaptation, acceptance of themselves, a tendency to conflicts with surrounding people, anxiety and apathy, as well as passivity in solving life problems. The rates of escapism are significantly higher in the experimental group, which indicates a tendency to "withdraw" from the problems.

Research of the motivational and need sphere did not reveal the presence of specific features in the degree of satisfaction of basic needs in young people with suicidal risk. Regardless of the presence of suicidal risk, the need for self-expression is important for young people, which can be considered as an age-specific feature.

The integral index of suicidal risk according to the questionnaire of A.G. Shmeleva in the modification of T.N. Razuvayeva also has a positive significant correlation with the indices of hypothyroidism ( $r_s = 0.601$ , with  $p < 0.01$ ) and anx-

ity ( $r_s = 0.637$ , with  $p < 0.01$ ). Negative correlation relationships were revealed with adaptation parameters ( $r_s = -0.572$ , at  $p < 0.01$ ), self-perception ( $r_s = -0.366$ , at  $p < 0.01$ ), acceptance of others ( $r_s = -0.471$ ,  $p < 0.01$ ), emotional comfort ( $r_s = -0.586$ , at  $p < 0.01$ ), internality ( $r_s = -0.561$ , with  $p < 0.01$ ). A positive correlation of suicidal risk with an indicator of escapism (avoidance of problems) was also found ( $r_s = 0.510$ , with  $p < 0.01$ ). The integral index of suicidal risk has an inverse relationship with the unstable type of character accentuation ( $r_s = -0.411$ , with  $p < 0.01$ ) and positive - with a propensity to depression ( $r_s = 0.400$ , with  $p < 0.01$ ).

Significant differences ( $p < 0.01$ ). were obtained by the following suicidal factors: - demonstrativeness (as a desire to attract the attention of others to their misfortunes, to gain their sympathy); affectivity (as the dominance of emotions over intellectual control, the willingness to respond directly emotionally); uniqueness (as the perception of yourself and your life as a whole as an exceptional phenomenon, not like the others); insolvency (as an idea of its own failure, uselessness, "disconnection" from the world); social pessimism (perception of the world and surrounding people as something hostile); violation of the temporary perspective (as the impossibility of constructive planning for the future, the global fear of failures and losses in the future).

In the experimental group, a tendency to hypothyroidism, anxiety, unacceptable behavior in society and abuse of psychologically active substances prevails.

We present an approximate mathematical regression model for identifying predisposition to suicidal risk, the predictors of which are a low level of socio-psychological adaptation, high rates of escapism and hypothyria.

The results of regression analysis allow us to reliably consider three factors in the mathematical model of predictors of suicidality risk (PSR):

$$PSR = -0.294 A + 0.084 E + 0.552 D + 30.666, \text{ where}$$

A - a decrease in the level of socio-psychological adaptation,

E - high rates of escapism,

D - high rates of hypothyroidism.

Thus, the main factors of suicidal risk in the youth environment are demonstrativeness, affectivity, uniqueness, insolvency, social pessimism, violation of the time perspective. Additional factors of suicidal risk are hypothyroidism, anxiety, deviant behavior, as well as propensity to abuse of psychoactive substances.

**CONCLUSIONS:** The research of individual psychological characteristics showed that young people with suicidal risk are characterized by schizoid traits, a tendency towards astheno-neurotic character traits, as well as an increased response towards emancipation, a propensity for depression, a true suicidal tendencies.

In young people with suicidal risk, there is a decrease in the level of socio-psychological adaptation, self-acceptance, acceptance of others, emotional comfort,

internality and high rates of escapism.

Regression analysis of psychological factors predisposing to suicidal behavior revealed three significantly significant factors: a decrease in the level of socio-psychological adaptation, an increase in escapism, an increase in the indices of hypothyroidism.

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俄罗斯年轻企业家胜任特征实证研究  
**Experimental study of competency characteristics of young Russian entrepreneurs**

**Noakk Nataliya Vadimovna**

*Candidate of Psychological Sciences, Senior Research Officer*

**Znamenskaya Alexandra Nikolaevna**

*Research Assistant*

*Central Economics and Mathematics Institute, Russian Academy of Sciences, Moscow, Russia*

本文致力于现代市场条件下的国内年轻企业家的竞争力特征。对于目前的研究阶段，任务是分析灵活性这样一个重要能力的表现。该研究基于企业家能力模型。灵活性与模型中表示的其他能力以及使用卡特尔问卷测量的个人心理特征一起定义。为了解释结果，我们使用了自我调节的概念，特别是后者的补偿功能，这使我们能够解释一些现象学的案例。

关键词：国内年轻企业家，能力模型，灵活性，自我调节，补偿机制

**Annotation.** *The article is devoted to the characteristics of competence of young domestic entrepreneurs in modern market conditions. For the current stage of the study, the task was to analyze the manifestation of such an important competence as flexibility. The research is based on model of entrepreneurial competence. Flexibility is defined both with other competences represented in the model, and with individual psychological characteristics measured using the Cattell questionnaire. To interpret the results, we used the concept of self-regulation, in particular, the compensatory function of the latter, which allowed us to explain some phenomenological cases.*

**Keywords:** *young domestic entrepreneurs, competence model, flexibility, self-regulation, compensatory mechanisms.*

### **Introduction**

This article is one of a series of publications by the team of authors on the identification of the characteristics of a domestic entrepreneur in the current market conditions. The toolkit was described in detail in [2]. Recall that the sample included 116 people - young people (average age 25 - 30 years), 70 men and 46 women who are already engaged in business (have their own business), or are at its

beginning. The author's model of entrepreneurial competencies formed the basis for the research. The model of competences used was proposed by the authors as experimental and requiring calibration during the research [3]. In the course of research and comparison of data collected using the competency model, on the one hand, and the Cattell questionnaire, on the other, a number of contradictory phenomena were identified, related to the discrepancy between the results obtained, which required further research [1]. It was suggested that the possible reasons for the discrepancy between the data, one of which is the phenomenon of uniform development of mutually exclusive personal abilities and qualities, indicated by researchers of the individual psychological characteristics of representatives of the business environment, for example, the ability to analyze and act simultaneously [11]. Similar results were also obtained on a sample of modern entrepreneurs [10]. The author explores the manifestation of various individual and psychological qualities of entrepreneurs in the decision-making process at different stages of business development. It turned out that there is a combination, at first glance, of mutually exclusive qualities (for example, aggressiveness and friendliness) - depending on the stage of business development and the requirements of the external situation.

In interpreting the results obtained, it was suggested that the behavior of respondents, in particular their competences (identified by the Evaluation Center's procedures) and their personal characteristics (the Cattell questionnaire) are mediated by certain regulatory properties. In any case, the data we obtained required the expansion of the field of comparison of the characteristics of the methods used, as well as new experimental studies.

For the current stage of the research, the task was to analyze the manifestation of such an important competence as *flexibility* in the experimental study of young domestic entrepreneurs. The choice of this particular competence is due to several reasons. First, in the above-mentioned research of the team, a crucial role was identified - at the stage of the crisis - "the ability to adapt to changes in the external environment" [10]. In the situation of import substitution, this implies, above all, the entrepreneur's ability to "tune" to the tastes and preferences of consumers, to take their interests into account. In the author's model of competences, *flexibility* is "responsible" for the indicated skills. In addition, as it turned out from the preliminary analysis, respondents with high values for *flexibility* have high values in other competencies. It is possible that *flexibility* is one of the centers of the profile of respondents around which other competences are grouped.

Finally, the analysis of research literature on the research of the characteristics of domestic entrepreneurs indicates a function of *flexibility as a regulatory property of individuality*, which determines its importance in the profile of respondents [5; 6]. Thus, the study of the flexibility, the connection of this competence with

other competences of the model of domestic entrepreneurs, the search for possible determinants of an individual and personal character, was significant for us.

### **Main part**

#### ***1. On the definition of flexibility***

According to literary sources [4; 5; 6; 9; 12] it is established that *flexibility* is a quality, the presence of which is of great importance for the effectiveness of the entrepreneur's activity. However, the interpretation of *flexibility* by different researchers varies. Flexibility is often understood as the ability to look critically at the work done and to demonstrate pragmatism, the lack of a rigid peg to the initial plan, not in accordance with the current situation. It often manifests itself in communicating with customers, contractors, potential partners and can be contrasted with stubbornness and the desire to prove one's rightness.

In [4] the relates to the versatility and the ability to follow the rapid progress and adjust their activities, it emphasizes its role in the long-term success of the business. A similar notion of flexibility as mobility is in [9]. Flexibility as the ability to adapt is considered in [12]. Over time, the product or service, most likely, the authors write, will differ from what was originally intended. Flexibility, a very important quality that a successful entrepreneur must possess is the ability to react in a timely manner to changes in the market and consumer tastes.

These studies, however, are of an applied nature. An example of a fundamental study is the work of E.I. Kulagina, T.B. Kornilova [5; 6], V.I. Morosanova [7; 8]. In [6] The research was conducted on three groups of entrepreneurs-realtors, analyzed the risk-readiness relationship with the motivational prerequisites and characteristics of conscious self-regulation. A distinctive characteristic of this activity is that, if it is aimed at strict adherence to legislation, it is absolutely not standardized by the methods of its implementation, i.e. proceeds as a conscious resolution of situations of uncertainty, with high demands on the self-regulation of the subject. Thus, regulatory properties are placed at the center of the structure of individual and personal characteristics of domestic entrepreneurs. In [6], we also substantiate a close idea of the *flexibility* of entrepreneurs. An important thesis for us was the affirmation of the *basic role of flexibility* in the block of qualities that characterize the level and degree of development of the regulatory properties of individuality, the importance of this characteristic precisely for young entrepreneurs-people of a new generation who have recently come into business. In the study [6], it was revealed that for a group with less professional experience, orientation toward a processally expressed self-regulation when achieving a result is more characteristic. For them, maximum *flexibility* and *rationality* are characteristic. *Rationality* is understood by the authors as a need for information gathering and effective work with it (similar in terms of competence, *effective work with information* in our research). It is the maximum conditions of uncertainty characterizing the work of

trainees who have not yet developed the necessary skills of work, require them to be more *risk-averse*, and more *rational* [6, стр. 116].

In understanding and determining self-regulation, the authors rely on the approach proposed in [7; 8]. The authors of recent works detail their understanding of self-regulation, its structure, and the history of research development. The problem of psychic self-regulation is associated with the name O.A. Konopkina, who in 1970 founded the Laboratory of Psychology of Self-Regulation and developing the ideas of Anokhin, Bernshtein, Oshanin and Nebylitsyna, laid the foundations of the psychology of self-regulation as a field of knowledge in our country. In the first researches, the subject was sensorimotor activity. In 1980 O.A. Konopkin proposed a conceptual model that reproduces the most common structural and functional aspects of the structure of conscious self-regulation of activity, singling out in its process the main functional links; the basic general patterns of self-regulation are revealed and it is proved that the success of each of the investigated types of activity is ensured by the formation of a complete system of self-regulation. At the present time, self-regulation is understood as an open information system in which systemic interactions structure regulatory functions "regardless of the specific mental means and methods of their implementation" [8; page 36]. Different levels of self-regulation are singled out, the concept of a style of self-regulation, as well as its compensatory mechanisms, is introduced. One of the functions of self-regulation is to mediate the influence of personal prerequisites on behavior, compensating for the extreme manifestations of the corresponding features. Thus, when researching the properties of temperament in [8], it was found that when the level of conscious self-control increases, the openness to the new experience, typical of extroverts, decreases, and in introverts, closed from external stimulation, when the level of conscious self-regulation increases, the openness to new experience increases. In this, the author sees the fact of including compensatory mechanisms of conscious self-regulation.

In [8], substantiation of individual styles of self-regulation as a system of conscious self-regulation, including "functional links of the goal of activity, models of significant conditions, programs of performing actions, success criteria, evaluation of results and correction of actions" [8, p. 37]. The conclusions of the described works on the important role of self-regulation in the activity of young entrepreneurs, as well as related qualities - *flexibility*, *rationality* as a need for information gathering, *risk propensity* - were used by us in interpreting the results of the conducted research. In addition, it was also significant for us to justify the compensatory mechanisms of conscious regulation, which, as will be seen below, clearly manifest themselves in the activities of our respondents.

### ***Research toolkit. Results.***

At the heart of our research of entrepreneurial activity, as mentioned above,

is the competence approach, according to which the diagnosis is based on the author's model of competencies of the domestic entrepreneur. *Flexibility* is considered as one of the competences included in the author's model of competencies of the domestic entrepreneur, and is defined as the *ability to react quickly and adequately to changes; preservation of working capacity in conditions of changes; positive attitude to the new*. It is assumed that this competence is one of the most important in the implementation of such a task as the adjustment of the entrepreneurial activity process to the consumer's demand, his tastes and preferences [10]. At the first stage of the research, a group of respondents with high values for *flexibility* received by them during the Evaluation Center was identified. The task was to identify how many people (in % of the ratio) of those who joined this group have high values also in other competences included in the author's model of entrepreneurial competencies. In other words, it was necessary to determine with what competence the *flexibility* forms relationships of one level (in this case, high values) and what is the intensity (frequency) of these links. In the course of the analysis, it was found that most of the intersections in the group of high values for *flexibility* are observed in terms of competence *effective communication* - 16 out of 22 (73% of the total number of respondents with high values for *flexibility* and of 36 people in the group of respondents with high values for this competence). Then follow (in descending order): *effective work with information* - 12 people - 55% (out of 27 people total); *decision-making* - 11 people - 50% (out of 16 respondents with high values in the specified competence); *focus on the result* - 10 people - 46% (out of 24 total); *readiness for development* - 10 people - 46% (out of 24); *personal responsibility* - 8 people (36%); *creativity, innovation* - 6 people - 27% (out of 18 total); *leadership* - 4 people (18%); *organization* - 4 people (18%) - (out of 5 people with high organizational values); *orientation on efficiency* - 3 people (14%).

The next task was to determine which characteristics of the respondents, identified through the Cattell questionnaire, are most related to the manifestation of *flexibility*. As it turned out, the main "method" for providing *flexibility* in our group of respondents is the manifestation of such characteristics as *boldness* (high values by factor H "Robustness-boldness": [13] - 16 out of 22 in all - 73%. %) of respondents from the group with high values for *flexibility* show high values for a combination of factors H + E (*courage* combined with *dominance*): the factor E "Conformity-dominance": [13] The two remaining in the group of 16 people with high values for H (№14M and №15B) - show high values on the factor A. Two other of the remaining four - 17M and 22M - both show high values of the factor F [13] 31% of people 16, characterized *boldness* have high values of Factor L. [13].

Thus, we examined the characteristics of a group of respondents demonstrating their behavior high values in the competence of *flexibility*, which are, most likely, due to the "inclusion" of individual and personal characteristics associated

with *courage*.

Now we will characterize another group of respondents from the selected list (demonstrating high *flexibility* in terms of competence), but did not show the same high H. factor according to the Cattell questionnaire. According to the hypothesis of the psychic self-regulation of the individual characteristics of young entrepreneurs [6], these respondents had to show other qualities to achieve in behavior as high a level of *flexibility*. You can refer to the study [8], call them different styles of self-regulation, and the underlying mechanisms - the compensatory mechanisms of self-regulation. For example, No. 18K shows low values for both of these factors (4 - "E", 2 - "H"), however, the highest values for "L", (trust-suspicion), O (calmness-anxiety), Q1 (conservatism -radicalism), high - according to Q2 (non-conformism), Q4 (emotional tension). №16G its low values for both factors (H and E) compensates for high intelligence, criticality (reflection of their mistakes) (factors A, MD, respectively). No. 9L shows high values for the factors G, M, Q2. At extremely low values of intelligence (in contrast to No. 16G), it shows high values for Factor G, as well as high values for factor M: [13], simultaneously with high values for Q2 [13]. Respondent # 1/3 has average values for factor H compensated by very high values for factors Q1, Q3, as well as a high value for factor L. According to our assumptions, it is self-regulation that mediates the influence of personal characteristics on the behavior of respondents in the experimental situation - due to the inclusion of compensatory mechanisms. A low level of *courage* (with a high level of *flexibility* of behavior) can be compensated for by the high *creative potential* and *independence of decisions* (No. 9L), or by *high self-control* (No. 1Z), or by *caution in behavior* (No. 18K), or by *high intelligence* (No. 16G).

### Conclusions.

1. Analysis of research literature on the study of the characteristics of domestic entrepreneurs indicates a function of *flexibility as a regulatory property of individuality*, which determines its importance in the profile of respondents.
2. When studying the qualities of an entrepreneur for interpreting the results of a research, it is expedient to rely on the concept of self-regulation, substantiated in the laboratory by OA Konopkin.
3. In our research of young domestic entrepreneurs found a significant role of flexibility as a competence, as well as related individual and personal characteristics. The most frequent links of *flexibility* with *courage* and *dominance* (characteristics of the factors of Kattel).
4. A group of respondents was identified, which, despite the absence of these characteristics, nevertheless demonstrate high values for *flexibility*. To interpret the results, the concept of self-regulation was used, in particular, the compensatory function of the latter, which made it possible to explain the phenomenological cases studied in the first approximation. A more detailed analysis requires a separate

work.

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研究学生青少年在职业训练过程中的健康生活方式  
**Study healthy lifestyle of student youth in the process of professional training**

**Kora Natalia Alexeyevna**

*Candidate of Philological Sciences, Associate Professor*

**Eremeeva Tatiana Sergeevna**

*Candidate of Pedagogic Sciences, Associate Professor*

*Amur State University*

健康在现代社会中被视为一个人的社会属性，其定性和定量水平为一个人展现个人潜能，实现他的能力，提高竞争力和发展事业提供了机会。通过对科学文献的分析，可以确定对大多数人来说，他们自己的健康和子女的健康本身并不是有价值的，而是作为实现人生目标的一种手段。分别看来，学生青年的身心健康本身并不重要，而是作为在掌握一般文化和专业能力过程中取得成功的手段，从而可以形成更高的教育机构评级。学生之间的研究结果表明，健康（作为价值取向之一）被包含在受访者的首选价值块中。

关键词：健康，健康威胁，健康形成能力，健康生活方式，健康工作。

***Annotation.** Health is seen in modern society as a social property of a person whose qualitative and quantitative level provides an opportunity for a person to show personal potential, realize his abilities, be competitive, and make a career. Analysis of the scientific literature made it possible to establish that for most people their own health and the health of their children is valuable not in itself, but as a means of achieving life goals. It seems, respectively, that the physical and psychological health of student youth is important not as such, but as a means to achieve success in the process of mastering general cultural and professional competencies, thereby allowing to form a higher rating of the educational institution. The results of the study among students show that health (as one of the value orientations) is included in the preferred block of values of respondents.*

***Keywords:** health, health threats, health forming competencies, healthy lifestyle, health work.*

The majority of modern researchers (Bezrukikh M.M., Ponomarenko V.A., Vartanyants O.R., Wasserman L.I., etc.), discussing the usefulness of personality development, connect it with the category of "health" as a goal and a criterion of

success personal development of a person. The highest value and national priority of any society is a healthy person (both physically and spiritually), so the education of a healthy lifestyle, the prevention of the formation of harmful habits and addictions, the creation in the younger generation of value orientations focused on responsibility for the preservation of personal health, a purposeful and systematic training their elementary ways of checking their status - are one of the basic directions of state policy in the field of health injuries and education.

It is known that physical and spiritual health are two inseparable components that mutually influence each other. Physical health implies the renunciation of a person from bad habits (overeating / starvation, smoking, use of psychoactive substances, etc.). Accordingly, in order to achieve a high level of such health, a person must rationally eat, follow the rules of personal hygiene and safe behavior, optimally combine work and rest, physical labor and mental activity, to carry out the necessary amount of motor activity. Spiritual health of a person depends on the inner comfort (mental well-being) of the individual, its adequate relation to the surrounding world, its position in society. To be spiritually healthy, it is necessary to learn to live, first of all, with yourself and with surrounding people, be able to analyze various life situations and predict their development, and also be able to behave adequately in a variety of conditions, taking into account the need, opportunity and desire.

In accordance with the biopsychosocial model (Engel G.), which is based on a systematic approach to the functioning of the individual not only on the biological but also on the personal and psychological level, the state of human health is determined by the interaction of a number of factors: biological (heredity, structural defects, stress) , social (family, reference groups, norms of behavior, belonging to the social class) and psychological factors (representations, emotions, behavior) [5]. Proceeding from this, it can be said that one should not regard a person as a passive victim of the disease, or a product of a certain environment. The person must be held responsible for his health and illness. In the course of conscious and purposeful efforts to maintain a healthy lifestyle, the individual is likely to gain good health, both spiritual and physical.

We agree with the statement of G.V. Zalevsky that health is the peak that a person must climb himself [3]. Since human life is the highest value of society, the totality of qualities, qualities, and states of man is the value not only of man himself, but of society as a whole. This is what makes the health of every individual into social wealth. Even in ancient yoga, we proceeded from the proposition that man must strive for health, for health is not an egoistic goal, but a duty to others [6].

The results of specialist research (Vasilieva OS, Pakhalyan V., Kozina G.Yu., Pravdina L.R., etc.) prove that healthy people have a sense of dignity and self-esteem, as well as adequate self-esteem; Satisfy their material and spiritual needs;

achieve their goals and objectives; seek to realize their personal potential. From all this there is a positive motivation for a healthy style and lifestyle of the individual, an internal locus of control. Spiritual health determines the harmonic process of development of the inner world of a person (agreement with myself - "I understand", "I accept", "I analyze," "I control," "I love") and relationships with people around him, socio-psychological adaptation in society, life. It is the spiritual component that determines the individual health of a person as a person and as a free and responsible subject of society, as well as the lifestyle that the individual chooses.

At present, the conduct of psychological health research focuses on four core areas: improving and maintaining health; prevention and treatment of diseases (including bad habits, addictions); early diagnosis and identification of causes and correlates of health / illness and other dysfunctions; improvement of the health system and the formation of a policy for the protection of the health of each member of society [1]. So, for example, in the studies of M.F. Sekach [4], L.P. Shipovskaya et al. [6] and others found that the reasons for the excessive loss of health are the factors of an unhealthy lifestyle: bad habits formed (smoking, drunkenness, exposure to psychoactive substances, inactivity, violation of the daily routine), inadequate health education in saving technologies, dissatisfaction and loss of the meaning of life, avoidance of spiritual norms and criteria of universal morality, physical and mental overload, and weak social support.

The health of students at the moment is a socially significant indicator of the medical and demographic characteristics of the population of Russia, since the frequent morbidity of participants in the educational process undoubtedly affects the level of mastering competences and, subsequently, professional activity. As the researchers note (Derkach AA), against the background of increasing demands on the level of professional training of specialists, intensification of the educational process in the conditions of innovative transformations in higher education, the quality of life of young people and the deterioration of the state of health decrease [2].

In 2017, on the basis of the Amur State University, a presentation of students about health and healthy lifestyles was revealed and a diagnosis of the value-semantic sphere of first-year students was carried out using the questionnaire of M. Rokich. The total sample was 132 people aged 19 to 22 years. This study was attended by Chinese students studying at the Amur State University, and students of Russia.

Analysis of the results of the survey showed that "health" (as a terminal value) was included in the group of preferences (ranks 1 to 6) of respondents' values (Table 1).

**Table 1**

*Hierarchy of terminal values (in percent)*

<b>Terminal values</b>	<b>Students of Russia</b>	<b>Students of China</b>
Active life	62	66
Health	59	68
Love	64	54
Financially secured life	66	62
Having good and faithful friends	63	56
Development	68	74

The table shows that for students of Russia (68%) and China (74%), the most significant value is "development". The respondents said that the process of professional training in the university provides favorable conditions for working on themselves and constant physical and spiritual improvement. "Health" (physical and mental) for 68% of respondents from China was in second place in importance, while for Russian students (59%) this value was only in sixth place. "Active active life" in 66% of Chinese students is the third position, while in Russian students this value takes only the fifth position. Based on the data obtained, it can be assumed that for Chinese students these three values are interrelated, inseparable from each other, and for Russian students are preferred, but not related to each other.

Further, a survey of respondents was carried out, which allowed to supplement the results obtained. All participants in the study were asked to give a definition of a healthy lifestyle. Unfortunately, only 40% of Russian students and 42% of Chinese students were able to give a full and informative answer. General in the answers of respondents it was said that this is "conscious and responsible behavior of a person", this is a "choice of the way of life" of a person. Components of a healthy lifestyle could be listed even fewer respondents: 39% of Russian students and 40% of Chinese students. It was also found that only 56% of the Russian students surveyed did not use tobacco products (do not smoke), while 78% of Chinese students answered negatively about the question of smoking. Do not drink alcohol at all - 48% of Russian students and 64% of Chinese students. Drug users have not been found in any of the groups of respondents. Keep track of their food intake (regular and full) - 42% of Russian students and 48% of Chinese students.

These data suggest that most students understand and recognize the importance of maintaining health for themselves, try to lead a healthy lifestyle. It should be noted that a very small number of students (besides physical training classes) regularly participate in sports (32% of Russian and 40% of Chinese students). Very sketchy and disjointed knowledge showed the students questioned by self-regulation of their state (emotional and physical).

The results of the research showed that the formation of health forming competencies in our university students requires more attention, so this was the basis for reviewing the content of the programs (preventive) and other recreational activities. During the period of study at the university, where the personality of the future professional is becoming, student youth should be convinced of the need for purposeful and systematic work on themselves, studying the characteristics of the organism, rational and balanced nutrition, optimal use of their physical and psychological potential, having a healthy lifestyle.

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企业家行为的术语表示：生产力/反生产力的指标

**Terminological representation of entrepreneurs' behavior: indicators of productivity / counterproductivity**

**Znamenskaya Alexandra Nikolaevna**

*Research Assistant*

**Noakk Nataliya Vadimovna**

*Candidate of Psychological Sciences, Senior Research Officer  
Central Economics and Mathematics Institute, Russian Academy of  
Sciences, Moscow, Russia*

本文简要概述了可用来源，提出了市场代理人特别是企业家的生产性和反生产行为的问题，在这些问题中，术语与国内外各种研究人员对这些行为的理解相关。

关键词：生产和反生产行为，企业家，行为指标

**Annotation.** *The article provides a brief overview of available sources that raise the issues of productive and counterproductive behavior of market agents, in particular entrepreneurs, during which terms are correlated with the understanding of these behaviors by various researchers, both domestic and foreign.*

**Keywords:** *productive and counterproductive behavior, entrepreneurs, behavior indicators*

**Introduction**

Entrepreneurship is the basis for successful economic development of the country. The unique situation of the economic crisis in the life of Russia inevitably leads to significant changes in the personality of the entrepreneur and his behavior. Accordingly, there is a growing need to identify the characteristics that are necessary for a successful entrepreneur, as well as to identify indicators of productive and counterproductive behavior of this group of agents in the new economic situation.

The task of the presented work is to make a brief overview of available sources raising the issues of productive and counterproductive behavior of market agents, in particular entrepreneurs, in the course of which to correlate terms that reflect the understanding of these behaviors by various researchers, both domestic and foreign.

## Main part

### *1. Productive and counterproductive behavior of market agents*

These terms are found in the research literature in several basic contexts. In the most general sense - as a productive and counterproductive behavior of man in general - regardless of the specific situation. For example, in [3] the author compares several concepts - activity, effectiveness, counterproductivity and productivity, considering them in terms of the ratio of the person's intentions, his goals, on the one hand - and the results obtained, on the other. In productive behavior they are approximated, in the counterproductive way, they are distant from each other.

Conclusion: effectiveness is not equal to productivity, as well as activity. Not every result of a perfect act corresponds to the purposes of the acting and is in its interests; You can do a lot, but do not approach the desired (or intended).

The author points out the following signs of counterproductive behavior:

- a combination of high activity with a lack of ranking of actions by significance;
- the lack of clear criteria for achieving the goal as it approaches it;
- Inadequate use of feedback - only information that corresponds to the expectation of the acting entity is taken into account.

In the article by Temnitskiy AL [4] the author contrasts entrepreneurs and hired workers, highlighting the predictors of successful behavior of the latter. Entrepreneurs are only told that their activities are more connected with success [4, p. 29].

The most significant part of the found work on productive and counterproductive behavior is devoted to the analysis of the person's behavior in the organization. So, in a deep review article Gulevich OA. [1] counterproductive behavior is understood as such behavior of employees, which adversely affects the work of the whole team. The author points out that the following terms are used to denote this kind of negative activity in the scientific literature: counterproductive work behavior, deviant behavior at the workplace, and destructive behavior. The author dwells on the first term in detail. There is a broad and narrow understanding of it. According to the first - *kontroktivnoe* behavior is any intentional activity of employees, which harms the legitimate interests of the organization [7]. According to a narrower definition, counterproductive behavior is understood as any intentional action by employees who violate the norms and values prevalent in the organization and cause damage to both the organization as a whole and its individual employees [1].

There are several classifications of counterproductive activity based on various characteristics - the object of the action (individuals or the organization as a whole), the nature of the deeds (whether related to work or not - (Levine, 2010), severity of the damage (Dunlop & Lee, 2004; Kelloway et al. Kwok, Au & Ho, 2005; Lee & Allen, 2002; Shao, Resick & Hargis, 2011. - Taken by: [1].) In the

latter case, the authors identify 4 types of counterproductive behavior, of which the following are of interest to us :

- low productivity - is caused, as a rule, by irrational use of working time (absenteeism and tardiness, reading of literature not related to work, solving personal problems during working hours, etc.) [1];

- disrespect for employees - can be expressed, for example, in supporting rumors discrediting individual employees and creating their own.

As points out. OA Gulevich, the main drawback of the classifications analyzed is the dependence on the specifics of the activity of an organization. Nevertheless, the generality that most of the authors of the analyzed work singles out in one way or another is that counterproductive activity has a negative significance for labor productivity and thus affects the financial and psychological well-being of the organization. OA Gulevich in his review also stops at the factors of counterproductive behavior. In this issue, as the author of the article points out, there are two mutually exclusive explanations on literature. Adherents of the so-called instrumental motivation argue that people (carriers of counterproductive behavior) tend to achieve personal goals, improve their position. At the same time, their opponents, who proclaim the thesis of expressive motivation as a determinant of counterproductive behavior, focus their attention on the emotional sphere of the individual, arguing that behavior of this kind is a way of expressing negative emotions, primarily anger. In particular, counterproductive behavior is more common in people with weak positive and strong negative emotions.

The author of the article, relying on foreign research, identifies 3 groups of personal factors, of which the most interesting for us is that related to personal traits and values of employees. In particular, people with a low level of willingness to accord, conscientiousness and emotional stability (the "Big Five"), a high level of aggressiveness and a strongly pronounced orientation toward social dominance (support of the existing social hierarchy in society) often show counterproductive behavior.

As the most important problem in the field of studying counterproductive activity, the author sees the problem of its measurement, in particular, the correctness of the use in this field of traditional psychological methods such as questionnaires based on self-reports. Orientation to the social desirability of the responses accompanying these psychological tools certainly forces researchers to refer to other tools.

### ***1. Rent-oriented behavior***

This term is most often found in the general context with the term "entrepreneurs". In the domestic literature, rent-seeking behavior is defined as a situation where the income of a business entrepreneur depends not on the availability of abilities, but on proximity to the state apparatus, that is, when entrepreneurs aim to

receive income (rent) from personal ties [2]. L.N. Danilenko in his review article analyzes the phenomenon of rent-oriented behavior on the material of domestic and foreign researchers. This term is most often found in the general context with the term "entrepreneurs". In the domestic literature, *rent-oriented behavior* is defined as a situation where the income of a business entrepreneur depends not on the availability of abilities, but on proximity to the state apparatus, that is, when entrepreneurs aim to receive income (rent) from personal ties [2]. L.N. Danilenko in his review article analyzes the phenomenon of rent-oriented behavior on the material of domestic and foreign researchers.

Out of foreign researches, when characterizing this kind of activity, A.Oslund's works are distinguished, which understood by rental behavior "activities aimed at either using a monopoly position or access to government subsidies, in contrast to the desire for a market economy to profit in the process of competition ". At the same time, "obtaining a rent implies either privileged access to sources of income or open crime" [2]. In our country, according to the findings of researchers of this issue, a special type of business has developed-an administrative business, the essence of which is cooperation with the authorities, where the object of competition is not consumers in the market of goods and services, but access to state structures [2].

## **2. Cross-cultural research of entrepreneurship**

Interesting for our problems is the study of L. Spencer and S. Spencer [6], where the authors describe the results of cross-cultural research on the definition of "*personal entrepreneurial characteristics*", that is, competencies that predict the creation of a business and its success within and between cultures. One of the tasks set was to allocate competencies that distinguish more and less successful entrepreneurs. A sample criterion for successful and less successful entrepreneurs was identified in three developing countries: Ecuador in Latin America, Malawi in Africa and India in Asia. As we see, the tasks of the authors only partially meet the tasks of our research, nevertheless the results obtained by foreign colleagues can not but interest. In particular, the analysis of the obtained results showed that the most successful entrepreneurs from the less successful ones are distinguished by personal entrepreneurial competencies (in contrast, for example, from experience, education). In most of the statistical researches, the following seven competences proved to be important in the four clusters of the competency model for entrepreneurs.

### *Achievements.*

1. Initiative.
2. Sees and uses opportunities.
3. Perseverance.
4. Care for high quality of work.

*Personal maturity.*

Self-confidence.

*Control*

a. Develops or uses procedures to ensure that the work is completed or that it meets the quality standards;

b. personally controls all aspects of the project.

*Orientation to others.*

Recognizing the importance of business relationships

Of interest to us is not only the authors of the diagnostic method - the Evaluation Center (or the Assessment Center). In our experimental research, we rely mainly on this tool

### ***3. Competence of the entrepreneur and behavior indicators***

In connection with what was said above, the work of S. Widett and S. Holliford "What we understand by competence" is very interesting [5]. Here, researchers do not stop at the level of competence, but "descend" to a more specific level - indicators of behavior. Each competence is a set of related behavioral indicators. The main conclusion is that competence can be defined in different ways, but most modern models are now based on behavior indicators (Fig. 1).

For example, following the logic of the authors and in accordance with Fig. 1, that competence, which was considered above among the most developed among entrepreneurs - *Orientation to others. Recognition of the importance of business relationships* - can be included in the competence cluster *Work with people*, which includes the following indicators of behavior: *establishes and maintains external contacts that are useful for business; maintains regular bilateral communications; realizes its own role in establishing external relations.*

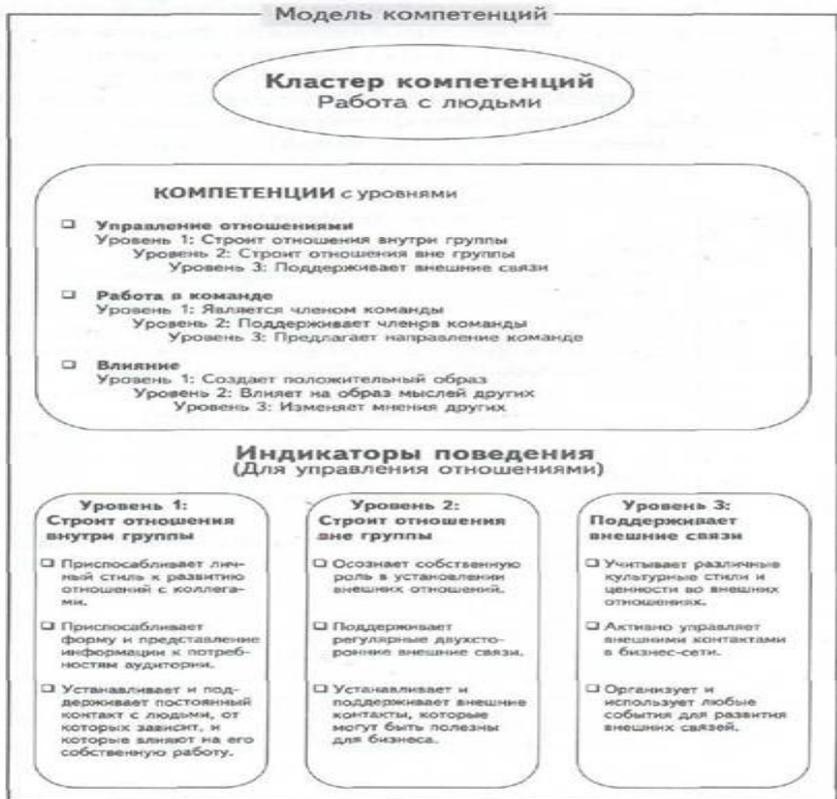


Fig. 1. Competency model. Source: [5]

### Conclusions

The conclusions are preliminary and relate to those sources that were found at the current stage of the study.

1. The terms "productive / counterproductive behavior in the research literature are most often used to characterize the activities of a person in an organization, but not of an entrepreneurial nature.

2. Investigations of entrepreneurs in Russian conditions are often conducted in the context of studying so-called rent-oriented behavior.

3. The research closest to our problems was a cross-cultural of the competencies of entrepreneurs using the tools of the Evaluation Center. It is shown that it is important to distinguish more and less successful entrepreneurs by their competencies, in contrast to experience and education. Among the competences, a special role is played by: targeting other people; control and self-control skills;

self-esteem; motivation of achievement.

4. Identification of indicators of behavior in the competence of entrepreneurs allows talking about more and less successful agents. Diagnostics of indicators of productive / counterproductive behavior can become the basis of empirical research of domestic entrepreneurs.

### Thanks

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青少年智力低下与智力低下的健康形象心理研究  
**Psychological research of the image of health in adolescents with  
oligophrenia and mental retardation**

**Sinitskaya Yuliya Evgenievna**  
*V.I. Vernadsky Crimean Federal University  
Simferopol, Russia*

本文证实了研究智力发育迟缓和精神发育障碍的青少年健康形象的迫切性。健康青少年精神发育迟滞与智力发育障碍形成心理特征的比较分析。根据心理诊断情结分析所得结果的原创性。在主要的支持下，它表明了意识的形成，形成了青少年健康的形象。

关键词：健康形象，健康，精神发育积压，智力低下，青少年，形成意识，感官组织，意义，意义，健康神话。

**Annotation.** *The article substantiates the urgency of researching the image of health in adolescents with mental retardation and backlog of mental development. A comparative analysis of psychological features in the formation of the image of health in healthy, adolescents with mentally retardation and backlog of mental development. The originality of the obtained results is analyzed on the basis of the psychodiagnostic complex. It is shown, with the primary support, on what formative of consciousness the image of health in adolescents is formed.*

**Keywords:** *image of health, health, backlog of mental development, mental retardation, adolescents, forming consciousness, sensual tissue, signification, meaning, myth of health.*

**Introduction.** The psychology of health is an actively developing direction of modern science. The main protection against diseases is the prevention of health and the promotion of a healthy lifestyle, which promotes maintenance and improvement of health [9]. Insufficient research of teenagers' views about health and healthy lifestyles deprives us of feedback in this problem, which determines the relevance of this research work.

Any activity is mediated by a way of consciousness [5]. Activities aimed at preserving and promoting health are mediated by health. The development of the image of health is carried out in stages, has its age characteristics. It can be argued that the image of health in adolescents with mental retardation and with backlog of mental development is full of contradictions, many of its components need

correction and development, so it is difficult for them to lead a healthy lifestyle. Adequate, conscious image of health will inevitably change the behavior of a teenager, will direct his actions to actively-positive improvement of his state of health [8]. However, the adolescent's ideas about his health, attitude towards health, as a rule, are poorly formed. This is especially evident in adolescents with mental retardation and with backlog of mental development

The work is based on the cultural and activity paradigm. In the course of our research, we relied on the basic postulates of the cultural and historical theory of the development of higher mental functions. Vygotsky [4], some provisions of the theory of activity of A.N. Leontiev [5, 6], as well as work on child pathopsychology, which formed in the mainstream of this direction (VV Lebedinsky, S.Ya. Rubinshtein, etc.) [7, 8].

**Statement of the main material.** The goal of this work is an empirical study and identification of the features of the image of health in adolescents with mental retardation and with backlog of mental development. *The subject of research* is the image of health in adolescents with mental retardation and with backlog of mental development

In the course of our research, *two hypotheses* were put forward:

1. In adolescents with backlog of mental development, the image of health is less formed than that of their healthy peers: the formation of the myth of health and the meaning of health lags behind.

2. In adolescents with mental retardation, the image of health is at an embryonic stage of formation; in the image of health only sensual tissue is represented.

An empirical study involved only 68 adolescents. Experimental group № 1 consisted of 21 adolescents with backlog of mental development (F80 - F89), experimental group № 2 comprised 21 adolescents diagnosed with mild degree of mental retardation (F70). Subjects - students of a special (correctional) general education school for children with disabilities "Zlagoda" in Simferopol. The group of norms included 26 teenagers, students in the secondary school № 21 in Simferopol. Age of the researched - 12-15.

In the experimental research we used the following *psychological techniques*: a projective drawing technique on "My health", "Self-esteem" Dembo-Rubinshtein, De Greifee's test, "Color test of relations" A.M. Etkind, as well as the studied, an open question was asked, "What is health?" [1, 7]. To assess the reliability of the differences in results, the following mathematical criteria were used: the Mann-Whitney U test, the Pearson consensus test.

**Analysis of research results.** A qualitative analysis of the projective method "My Health" showed that the pictures of healthy adolescents differ from those of adolescents with mental retardation and with backlog of mental development in content and form. From the data obtained, it follows that both healthy adolescents

(30.8%) and adolescents with backlog of mental development (42.8%) in the drawing technique "My Health" most often portray not the health itself, but nature, explaining this by the fact that walks on fresh air are good for health, and that they are very fond of walking outside. The most common topic in the illustrations for adolescents with mental retardation was the image of themselves (33.3%), which indicates the specific situational nature of the types of drawings. The mentally retarded adolescent says: "I am beautiful and healthy," but I can not explain what his health is. These estimates are undifferentiated, directed not outward, but fixed around the most mentally retarded adolescent. So, it is shown that adolescents in their drawings, resort to various categories and plots, often depicting not health itself, but concepts that have an indirect connection with it.

In addition to qualitative analysis, we used the theoretical model of the image of consciousness described by F.E. Vasilyuk, based on the psychological concept of consciousness, AN. Leontiev [2]. The essence of the analysis of the obtained drawings was reduced to the isolation of the consciousness generator, on which the subject relied mainly, with the help of an expert evaluation (the data are presented in *Table 1*).

**Table1. The degree of expression in adolescents reliance on the generators of consciousness, based on the received drawings in the "My Health" method, in percent**

Group	SC	ST	V	STM	M	PM
N	3,9	19,2	30,8	11,5	11,5	23,0
BMD	23,8	33,3	14,3	9,5	9,5	9,5
MR	28,6	4,8	19,0	4,8	33,3	9,5

*Note: N-group norm adolescents; BMD - adolescents diagnosed with backlog of mental development ; MR - adolescents with a diagnosis of mental retardation; SC - the subject content; ST - the sensory tissue of the subject matter; V - the value; STM - the sensory tissue of meaning; M - the meaning; PM - sensual tissue of personal meaning (emotion).*

By depicting the picture "My health", healthy adolescents rely much less on the subjective content forming consciousness than the adolescents with backlog of mental development ( $p \leq 0,01$ ) and mentally retarded adolescents ( $p \leq 0,01$ ). Carrying out a drawing based on this formative of consciousness, a teenager represents an objective situation. To a large extent, reliance on subject content is characteristic of mentally retarded adolescents (28.6%). For example, a mentally retarded teenager of 14 years old, depicting himself in the picture, explains: "It's me. I am beautiful and healthy. " Mentally retarded adolescents also authentically perform drawings based on sensory tissue of objective content than their healthy peers ( $p \leq 0.01$ ) and adolescents with backlog of mental development ( $p \leq 0.01$ ).

There were no statistically significant differences between healthy adolescents and adolescents with backlog of mental development in the given category of drawings. Interestingly, the reliance on sensory tissue of the subject matter is most often represented in the figures of adolescents with backlog of mental development (33.3%), this explains the plot depicted by the child in the figure as an opportunity to do something to be healthy. Healthy adolescents often rely on the consciousness-forming value (30.8%) when performing drawings, this is confirmed by the revealed statistically significant differences between healthy adolescents and adolescents with backlog of mental development ( $p \leq 0,05$ ). The importance of mentally retarded adolescents is primitive, as a rule, these are borrowed concepts and representations from the nearest social environment, aimed at the ability to maintain health: "play sports", "temper", "eat right", "walk". Figures with the support on the sensory fabric of consciousness forming the meaning are performed by mentally retarded adolescents to the least extent (4.8%). There were no statistically significant differences in this category of figures in three groups of subjects. It is shown that the pictures of mentally retarded adolescents are most often performed with the support of personal meaning. The studied results of differences with healthy adolescents and adolescents with backlog of mental development are statistically significant ( $p \leq 0,01$ ). However, we believe that this personal sense of mentally retarded adolescents is specific. He is of a primitive nature, connected with the events of his personal life and is identical with the peculiarities of the personal meaning of the younger schoolboy. The system of training in a special school, regular corrective work makes a significant contribution to the development of mentally retarded adolescents and adolescents with backlog of mental development, which is reflected in their drawings and answers, but the images of consciousness are still abstract, unformed. These features confirm that the health image of a mentally retarded adolescent is at an embryonic stage of formation.

Further, we carried out an analysis of the Dembo-Rubinstein methodology "Self-Assessment". It should be noted that the scales "growth" and "marks" are objective. A adolescent can rely on external assessments, evaluating himself.

**Table 2. Average indicators of self-esteem of adolescents by the method of Dembo-Rubinstein, in points**

Scale	Growth	Health	Intellect	Happiness	Character	Notes
N	4,4	2,0	2,4	2,1	3,3	3,1
BMD	4,2	1,0	1,1	2,4	2,3	2,3
MR	2,6	2,3	1,7	1,5	2,3	1,5

*Note: N-group norm adolescents; BMD - adolescents diagnosed with backlog of mental development; MR - adolescents with a diagnosis of mental retardation.*

Based on the results shown in Table 2, it can be stated that statistically significant differences in intergroup health indicators between healthy adolescents and adolescents with backlog of mental development ( $p \leq 0.01$ ), healthy and mentally retarded ( $p \leq 0.05$ ), mentally retarded and with backlog of mental development ( $p \leq 0.01$ ), respectively. Estimates of adolescents with with backlog of mental development on this scale indicate that they evaluate themselves as the most healthy (1.0 points). Adolescents with mental retardation also assess their health with a high score (2.3 points). This assessment is inadequate, which reflects the uncriticality of the judgments of adolescents with mental retardation and indicates that they are not aware of their defect. Healthy adolescents also assess their health at a high level (2.0 points), noting that, if they are ill, it is shortly associated with seasonal peculiarities, for example, the subject D. says: "Sometimes in the autumn I get sick. Dampness, rain, wind. In the autumn everyone gets sick, nothing strange. I lay a week at home and again - in school. " On the "happiness" scale, adolescents with backlog of mental development assess themselves statistically reliably as more fortunate compared to their healthy peers ( $p \leq 0.05$ ). However, as the happiest in comparison with other groups of subjects, mentally retarded adolescents evaluate themselves (1.5 points,  $p \leq 0.01$ ). Answering the question of the psychologist "Why do you consider yourself so happy?", Oligophrenic in most cases associate their answer with love to their mother, fortunately is with her side. This indicates that adolescents with these abnormalities of mental development still remain dependent on the nearest social environment, their happiness and social well-being depends on the significant adult (mother) [32]. Drawing attention to the indicator on the scale of "character" in the groups of adolescents with backlog of mental development and oligophrenic (2.3 points, respectively), the tendency to overestimate, undifferentiated assessment is again observed, which is interpreted as inadequate self-evaluation. So, the evaluation of their health by the test subjects, both experimental and control groups, is overestimated. From a similar situation, we encounter when analyzing the results of the "test Debe Greife".

The obtained indicators of self-evaluation of adolescent health using the "Debe Greife" method are shown in table 3 in scores. The higher the score is on a certain scale, the higher the teenager estimates health. Mentally retarded adolescents reliably estimate their health significantly than adolescents with backlog of mental development ( $p \leq 0.05$ ). However, there were no statistically significant differences in the evaluation of their health between healthy and mentally retarded adolescents. This indicates that mentally retarded adolescents do not realize their defect, appreciating their health (14.0 points) and considering themselves healthy. Adolescents with backlog of mental development assess their health reliably lower than their healthy peers ( $p \leq 0.05$ ), but explain their assessments, linking them not with the presence of serious diseases, but with well-being at a particular moment.

**Table 3. Average indicators of self-evaluation of adolescent health by the method "De Graeuse test", in points**

Scale	I	Mother	Friend
N	14,3	14,2	12,9
BMD	12,8	18,6	12,6
MR	14,0	15,2	12,7

*Note: N-group norm adolescents; BMD - adolescents diagnosed with backlog of mental development ; MR - adolescents with a diagnosis of mental retardation.*

Mother's health the adolescents of all researching groups are rated as the best. Mentally retarded adolescents assess the health of their mothers significantly higher than their healthy peers ( $p \leq 0,05$ ), while adolescents with backlog of mental development, compared with the health of their mothers highest score, significantly higher than in mentally retarded adolescents ( $p \leq 0,01$  ). These estimates indicate that adolescents with backlog of mental development, like oligophrenic, are dependent on the parent, who is their authority in everything.

This situation, which attests to the inadequacy of assessing the health of mentally retarded adolescents and adolescents with backlog of mental development, is confirmed by the results obtained by the projective method "Color test of relationships", when the adolescent is in a situation of non-verbal, subconscious, emotional assessment of his health. Adolescents with backlog of mental development and mentally retarded adolescents reliably lower the disease rate than their healthy peers ( $p \leq 0,05$ ). Consequently, healthy adolescents counterpose the notion of "health" to the concept of "illness" ( $p \leq 0,01$ ), and oligophrenics and adolescents with backlog of mental development do not, statistical differences are not revealed. There is a significant difference between the concepts of "health" and "good health" ( $p \leq 0,01$ ). We believe that this is connected with the fact that health for teenagers is a constant characteristic, but, well-being, in turn, is temporary. This is due to the fact that adolescents associate the concept of "good health" with a good mood, cheerfulness. The highest rank corresponds to the least pleasant color: this is a "disease" - a black color. However, at the subconscious level, the adolescents with backlog of mental development and a mentally retarded adolescents equally assesses the illness and well-being, and the significant differences between these estimates. Thus, adolescents of experimental groups on a non-verbal, unconscious level can not differentiate the proposed concepts, this indicates that their health image is at the initial stage of formation.

The final stage of the data analysis is the interpretation of the responses received to the open question, asked the adolescents "What is health?". We have identified the following categories of answers: "health is good health"; "do not be sick"; "do sport"; "Lead a healthy lifestyle" (includes the categories of answers: tempering, doing exercises, not drinking, smoking, not having bad habits, etc.);

"Healthy food"; "happiness and joy". The category of answers "health is happiness and joy" did not occur in the group of mentally retarded adolescents, which indicates that when answering this question and ideas about one's health, a mentally retarded adolescent does not experience any emotions (sensory tissue of personal meaning is not represented), in contrast to a healthy teenager. Adolescent with backlog of mental development and mentally retarded adolescents are significantly more likely to respond "health is not to hurt" ( $p \leq 0.01$ ) in comparison with healthy peers. This points to the fact that adolescents of experimental groups do not have any idea of health, in their answers they only oppose the antonymous concepts. In healthy adolescents, the dominant response was found: "Health is sports" (23.1%), which reflects the sensations caused by activity with the objective reality. Such responses of adolescents with backlog of mental development and mental retardation as "leading a healthy lifestyle" are borrowed definitions and representations from the immediate environment.

**Conclusions.** Thus, in accordance with the complex of the results of the experimental psychological research, we confirmed the hypotheses put forward by us that there is still no clear idea and understanding of health in adolescents. The results obtained for all the methods are correlated. Proceeding from this, we see that healthy adolescents perform their drawings more reliant on meaning. Consequently, ideas about health (myths of health) begin to be formed. Adolescents with backlog of mental development perform drawings, as a rule, with support on the sensory fabric of substantive content, which confirms the fact that the myth of health and sense of health is lagging behind. Mentally retarded adolescents depict their health in most cases based on subject content (a specific subject situation: drawing yourself). In his answers, a mentally retarded adolescent describes not health, but himself. Speech is a short phrase. Health is opposed to illness. All this indicates that the image of the health of a mentally retarded adolescent is at an embryonic stage of formation, only sensory tissue is present in the image of health.

The results obtained in the course of the research provide an opportunity to use them in correctional and rehabilitation work with children with disabilities. At the next stage of the research, it is planned to develop a correctional (training) program aimed at forming an image of adolescent health. Adequate formation of an image of health will allow to include in their way of life the actions concerning strengthening and preservation of health.

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宗教对人生焦虑水平影响的心理学研究  
**Psychological research of the influence of religiosity on the level of  
existential anxiety of person**

**Chmelev Vladislav Viktorovich**

*V.I. Vernadsky Crimean Federal University  
Simferopol, Russia*

作者研究了宗教性和求神倾向对哲学院学生和神学院学生存在和存在焦虑水平的影响。给出了存在焦虑水平的发生和减少过程的特点。分析了从存在心理学和心理治疗角度理解焦虑的方法。主要关注于实验性心理学研究，以便研究宗教和寻求神灵的人之间存在的焦虑的出现和严重程度的原因。

关键词：存在主义，存在主义，存在主义动机，存在主义动机，存在主义存在主义存在主义动机，存在主义存在主义存在主义数据，

***Annotation.** The author studies the influence of religiosity and propensity to God-seeking on the existence and level of existential anxiety among students of the Faculty of Philosophy and students of theological seminary. The characteristic of the process of occurrence and decrease of the level of existential anxiety is given. Approaches to understanding anxiety from the point of view of existential psychology and psychotherapy are analyzed. The main attention is paid to experimental psychological research, which allowed to study the causes of the emergence and severity of existential anxiety among religious and God-seeking people.*

***Keywords:** existential, being, will, choice, responsibility, existential data of being, existential fundamental motivation, existential fulfillment of life.*

**Introduction.** Several decades ago, one of the founders of the existential trend in psychotherapy, Irwin Yalom, noted that "Existential psychology, like a homeless tramp, does not belong to anything. She has no legal residence, no formal education, or her own organization ... "[9, p. 20]. Of course, much has changed since then: many textbooks, tutorials and monographs on existential psychology have appeared. However, there are still very few possibilities for studying individual phenomena related to the psychology of existence. Existential anxiety belongs to the number of such phenomena, and it is no coincidence that exactly a century and a half ago Søren Kierkegaard's classical works began his forward development with an existential view of man in the world [3]. In what way is the religiousness

and existential anxiety of man interconnected? Perhaps, wanting to have a firm foundation of his being, does a person try to find it in religion and God-seeking? Perhaps the existential anxiety that grows when a person collides with the ultimate datum of being pushes him to seek himself in religion [1, 2]? The answers to these questions, which are set forth in this work, are of practical importance for understanding important vital choices of a person.

**Statement of the main material.** The basis of this work is the concept of existential anxiety as an indicator of a person's internal conflict with ultimate data of being. The research was based on the theory of existential philosophy of S. Kierkegaard, as well as on certain positions of the theory of existential analysis of L. Binswanger and R. Kuhn. The structure of existential data is considered on the basis of the works of M. Heidegger and I. Yalom. The concept of the relationship between religiosity and the existential anxiety of P. Tillich [1, 2, 9].

Proceeding from this, the *purpose* of this work is to research the relationship of religiosity and propensity to God-seeking with the presence and level of existential anxiety. In accordance with the goal, the *research tasks* were determined: to conduct an empirical study that would reveal a probable relationship between the presence and level of existential anxiety among people who are religious and prone to God-seeking.

*The object* of this *research* is the emotional sphere of the personality of religious people and people prone to God-seeking, *the subject* - the peculiarities of experiencing anxiety by religious and God-seeking people.

We put forward the following *hypothesis*: religiosity and propensity to God-seeking, fulfilling the role of "existential foundation," reduce the level of existential anxiety of the.

The experimental and psychological research was carried out using the following *diagnostic tools*: the modified Dembo-Rubinshtein self-evaluation technique, the author's technique "Autotypeidentification of existential anxiety", the test of "Existential motivations" [8]. The diagnostic tool chosen by us fully corresponds to the theoretical and methodological basis of our research. The mathematical apparatus of the research is represented by the method of multiple regression.

The research involved two groups of subjects (samples), the control sample consisted of students of the Faculty of Philosophy, an experimental sample was presented by students of the theological seminary. This choice of the experimental group is due to the fact that students of the theological seminary have a higher level of religiosity, and a certain amount of them is in the process of God-seeking. A total of 65 people were involved in the study, aged from 20 to 22, 32 of them were students of the Faculty of Philosophy, 35 students were seminarians.

**Analysis of the results.** The results obtained during our research are of a practical nature. This psycho-diagnostic study made it possible to show the existing

interrelation between the presence and level of existential anxiety, and the person's inclination to religiosity and God-seeking. The presence of this relationship allows us to specify the direction of the therapeutic work with an orientation to the existential-analytical structure of the work. Also, the result of our work is the possibility of isolating, with a certain degree of accuracy, that ultimate givenness of being, a collision with which led to the emergence of existential anxiety. This, in turn, allows us to significantly specify the vector of therapeutic work.

The results of the research, obtained with the help of multiple regression, statistically confirm the reliability of the differences obtained between the control and experimental samples ( $p \leq 0,005$ ). Also, statistical data made it possible to single out a certain dependence of the level of existential anxiety on the indices of individual scales of all methods. This dependence is presented as follows: the adjusted coefficient of determination ( $R = 0.926$ ) of the general level of existential anxiety shows that its level increases with the combination of the following characteristics: increasing the experience of loneliness ( $\beta = 0.156$  at  $p = 0.004$ ), increasing the number of symptoms and states of existential anxiety ( $\beta = -0.533$  at  $p = 0.000$ ) and the presence of a positive choice on the scale "Religious self-determination" ( $\beta = -0.155$  with  $p = 0.001$ ). It should be noted that an increase in the level of existential anxiety is also affected by an increase in the score on the "Responsibility" scale of the modified Dembo-Rubinstein methodology and a decrease in the "FM 2" scale of the "TEM" methodology, which indicates satisfaction with life and leads to the experience of the fundamental value of one's own being.

All  $t(65)$  other than 0 and approaching by values of  $k \pm 1$  allow us to say that these variables reproduce Student's distribution, close to normal. That, in turn, confirms the reliability of the differences obtained.

The obtained statistical data contradict the working hypothesis of our research, which consisted in the following understanding of one of the causes of the emergence of existential anxiety: religiosity and propensity to God-seeking, fulfilling the role of "existential foundation", reduce the level of existential anxiety of the individual.

The methods chosen by us allowed us to realize the main goal of our research to the fullest extent possible - to study the relationship of religiosity and propensity to God-seeking with the presence and level of existential anxiety. At the same time, the techniques used made it possible to clarify the symptoms of situational anxiety.

Modified methodology "Self-evaluation" Dembo-Rubinstein displays a level of concern associated with the ultimate data of being, which indicates the corresponding level of existential anxiety.

The "Autistic identification of existential anxiety" technique also displays the symptoms and conditions characteristic of existential anxiety, a combination of

two or more symptoms indicates that the collision with the ultimate given being and the anxiety caused by it has not been accepted and integrated by the individual. Consequently, the impossibility of an internal solution of the problem arises leads to its emergence outward and the manifestation in the symptoms and states of existential anxiety.

The "Existential motivation test" method showed the existence of an inversely proportional relationship between the level of existential anxiety and the level of existential fulfillment of life. That is, an indicator that indicates a low degree of existential fulfillment of life, which is a consequence of the low fulfillment of all four fundamental existential motivations, also indicates the presence of a high level of existential anxiety, which is confirmed by the results obtained in the two previous methods.

**Conclusions.** After calculating the results for each of the methods and comparing them with the help of statistical tools, it was revealed that the working hypothesis of our research is not confirmed. At the same time, it is confirmed that there is a dependence of propensity to religiosity and God-seeking and existential anxiety. However, our assumption of building a solid foundation of our being in turning to religion, in order to minimize existential anxiety, faced a strong contradiction. The essence of this contradiction lies in the fact that religion serves not as the basis of human existence, which helps to meet with existential anxiety, to accept and integrate it into one's personality, but by the factor that continuously confronts a person with the ultimate datum of being, but does not form a solid foundation for becoming a mature and integral personality [4, 5].

The results obtained by our methods confirm the fact that people prone to God-seeking and religiosity are more susceptible to the emergence of existential anxiety, because of the lack of a range of possibilities that determine the freedom of choice, the fullness of life with meaning, responsibility for oneself and their existential situation. Restricting the variability of life leads to a significant decrease in the level of existential fulfillment of life, which is formed from the totality of fulfillment of each of the four fundamental motivations and, first of all, the first motivation that is responsible for creating a solid basis for human being. As a consequence, there is a significant increase in the level of existential anxiety, which in its essence is a necessary and indispensable condition of human existence [6, 7].

The need to acquire one's authenticity is the key to understanding the motives of people prone to religiosity and God-seeking, because the desire for themselves on the one hand, the existential anxiety generated by this desire on the other, are the opposite poles, avoiding confrontation with which, the person replaces the quest yourself searching for God.

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全球化是现代国际关系的一个因素：发展的挑战或向量

**Globalization as a factor of modern international relations: a challenge or vector of development**

**Saikhanova Khadizhat Ibragimovna**

*Pyatigorsk State University, Institute of International Relations*

The content of the category "globalization" is one of the most urgent topics of discussions among researchers. Discourse is conducted around such issues as time of origin, essence, trends, consequences of globalization and the like. Today, the globalization process, according to many scientists, is not only the main trend of world development, but also a new system of international relations that is forming in the modern world and I agree with this opinion, because it is impossible not to notice the manifestation of globalization and its consequences in various areas of human activities.

The very term "globalization" began to be developed in the late 1980s. In modern sense, it is associated with the name of the American researcher T. Levitt, who in the article "Globalization of Markets", published in the magazine "Harvard Business Review" in 1983, designated the phenomenon of merging the markets of individual products produced by large multinational corporations[1]. Currently, there is a sufficient number of generally accepted definitions. Thus, E. Giddens believes that "globalization is an expansion of world social ties that connect remote regions in such a way that local events develop under the influence of events that occur many miles away from them"[2]. Or, for example, according to D. Geld, "globalization," means at least two different phenomena. First, it assumes that political, economic and social activities are becoming global in their consequences. And secondly, it means that there has been an increase in interaction and interrelations within states and societies and between themselves "[3]. In turn, R. Robertson notes that globalization is "a historical process of strengthening contacts between different parts of the world, which leads to growing similarity and uniformity in the life of the peoples of the world" [4].

Interesting enough in the content and role of globalization, is the point of view of the French explorer J.-C. Le Goff, on the basis of which the author proposed to group the main approaches to the understanding of globalization in three separate directions:

1. The liberal direction, according to which globalization is viewed as an objective process and an important phenomenon, because it contributes to the in-

crease of economic and social activity in the world;

2. Marxist internationalism, which is based on the basic ideas of Marx on internationalism and the features of the formation of the world working class, which is called upon to ensure its fundamental goals. The author, in this approach, suggests that globalization be viewed as a process of peaceful negotiations between the national groups of the working class and the need to continue the class struggle at the supranational level;

3. Culturological direction, which characterizes globalization as a manifestation of the crisis of national cultures and the clash of historical communities of people.

Most Western scholars, such as R. Robertson or I. Wallerstein, say that globalization as a complex global process can not be unambiguously defined, which is why it is inappropriate to make any demands on it. In these views, I agree with the above scientists and I believe that globalization as a factor of modern international relations can not be characterized as a positive or only negative phenomenon, because it only ensures the systemic nature of the world, and, probably, this is its main value. So, for example, I. Wallerstein, argues that the subject of globalization should be the whole world, or the so-called "seamless integrity", as globalization as a complex process is indivisible in certain parts and spheres, as the corresponding types of social relations lose under the effect of globalization processes its subjective feature.

The European science of global researches considers globalization in close interrelation with modern integration processes, and according to some of them, globalization in general is the highest form of social integration. Interesting ideas about the content and essence of globalization, formed within the Russian school. For example, according to V. Egorov, "globalization is a process and phenomenon based on the theory of self-organization (synergetics) and includes such processes as openness and emergence (suddenness, unexpected appearance), the irreversibility of such a process lays the foundation for a new vision of the world". Therefore, given the many interpretations of the concept and essence of globalization, the author suggests the following definition: globalization is a process of intensifying the interrelationships between various forms of organizing social life, which leads to a state of interdependence between the components of the system of interrelations.

Thus, I would like to note that the existing polysemantic views arise from the understanding of globalization as a factor of modern international relations from the standpoint of socio-political, socio-economic, socio-cultural foreshortening.

The socio-political aspect is the constitutional changes that take place in many countries of the world. The power poles move from national states to transnational corporations (TNCs), transnational banks (TNBs), international intergovernmental organizations. Such shifts influence the change in the meaning and role of the

sovereignty of national governments, make them dependent on the external actors of a global society. Global politics changes the traditional notion of the differences between domestic and foreign, domestic and international policies. There is an increase in the number of factors that determine world politics. Reducing the possibilities of using traditional power potential leads to the development, in the words of J. Nye, of the "entropy of power" of the great states. The processes of globalization affect the active rethinking of the parameters of hegemony and geopolitical power. A fairly complete planetary cartography was formed, technical capabilities of global power were created (instant communication, regular planetary communications), with the access to the world arena of regions (USA, Russia, Japan) outside Western Europe, the "post-European era" of world politics began. The socio-economic aspect is expressed in the expansion of individual countries (the USA) or associations of countries (EU) or groups of countries (for example, the Group of Seven) into world and national markets with their goods, trade rules, standards, and the like.

The socio-cultural aspect is to promote Western standards of consumption and, accordingly, norms and values. New satellite communication technologies have become a powerful means of expanding global contacts and contributed to the creation of a global media network. Initially, globalization was seen as a blessing for humanity, but the realities turned out to be unexpected: on the planet, the lines of the civilizational fault formed, which became peculiar fronts of value conflicts. According to the author, this is primarily due to the fact that globalization has not ensured the harmonization of the interests of all social groups with a view to directing their activities in one vector. The policy of introducing universal standards for the development of mankind, in fact, failed, because, based on Western values, does not take into account the diversity of values professed in societies with excellent historical, cultural and religious backgrounds.

Thus, in the complex situation of constructive and destructive changes at the national, supra-national and world levels, when globalization in its current project has both many shortcomings and achievements, the international-political aspect of the global problems is of particular relevance. In the focus of attention of the world community there are constantly political problems associated with well-established ideas about national statehood, sovereignty, representation of interests, democratic procedures, etc. This is the essence of the path to a new multipolar world, which requires the constant upholding of national interests on the basis of compulsory consideration of the national interests of neighboring states. After all, globalization is a subjectively objective process. It is a natural component of the objective development of mankind, it is multifaceted, complex and ambiguous. And so, today globalization can be considered a key megatrend of modern international relations and world development.

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俄罗斯黄金开采业的劳动力形成来源（十八世纪初至二十世纪）

**Sources of labor formation in the Russian gold mining industry (XVIII-early XX centuries.)**

**Kochegarova Elena Danilovna**

*Candidate of Historical Sciences, Associate Professor  
Heihe University*

文章考虑了俄罗斯黄金矿业劳动力形成的来源；显示了乌拉尔，西伯利亚，远东地区劳动力市场形成的显著特征；探矿区劳动力资源使用的主要规律

关键词：黄金，俄罗斯黄金矿业，劳动力

**Annotation.** *The article considers the sources of labor force formation in the Russian gold mining industry; showing the distinctive features of the formation of the labor market in the Urals, Siberia, the Far East; the main regularities of the use of labor resources in the exploration areas*

**Keywords:** *gold, gold mining industry of Russia, labor*

The problem of providing the gold mining industry with qualified personnel has emerged directly together with the Russian gold industry and remains relevant throughout the entire period of its development, so it seems expedient to consider ways to solve it, focusing on the sources of labor force formation.

The acute need of the state for gold and the first discoveries of ore deposits in the Urals, Altai, Transbaikalia and Karelia determined the appearance and development of domestic gold mining, the level of which in the 18th century. was no more than 5 tons [4; p.139]. Large-scale mining in Russia began after the discovery in 1814 of gold-bearing placers (in the nineteenth century, 2003 tons were produced) and within a hundred years progressed to the east, covering the Urals, Western Siberia, the Yenisei region, Transbaikalia, the Lena region and the Amur region. The successful operation of gold mining enterprises was largely determined by the availability of skilled labor.

In the pre-reform period, the development of gold deposits in the Urals was carried out with the use of the labor of serfs and peasants who worked at state-owned enterprises. Another source of labor replenishment was civilian labor, which on average was from 30 to 50% in state-owned factories, from 70 to 90% in

the industries of the settlement plants and 100% in the private gold mining industry [3; p.225]. The gradual displacement of forced labor was typical both for the state, and the settlement and private mountain districts of the Urals, which had a significant need for labor.

By the end of the nineteenth century, a layer of skilled workers was formed, recognizing themselves as a special social group [2; p. 74], different from the immediate surroundings (peasantry, administration), who considered mining the main destination. Acquisition of labor in the gold mines was carried out mainly at the expense of impoverished peasants, Cossacks and mining workers: in 1880, in the gold mining industry of the Southern Urals, 57.6 percent of the workers were peasants; 25.9% - from retired lower military ranks, Cossacks and mining workers; 19.5% were Bashkirs, Tatars, Kazakhs [7; p.49]. The labor of exiles and convicts was practically not used, only in the Kytlymsky mine of the Perm province from 1907 to 1917 about 100 prisoners were employed [6; p.86].

In Siberia, the period of the formation of the gold industry occurred in the 30-50 years of the nineteenth century. Initially, gold mining arose and developed on the basis of private capital and hired labor. The rapid pace of the development of the industry was due, along with the high gold content in placers, the presence in the province of a significant reserve of labor, which was created at the expense of local residents and immigrants from European Russia. The bulk of the gold-mining workers were formed from the indigenous inhabitants of Siberia, who in the second half of the nineteenth century 87.9 - 96.5% of the total number of workers [9; p.178]. The number of immigrants from European Russia varied significantly, depending on the gold mining district or a separate mine. Thus, in 1895, in the gold mines of the Olekma system, the inhabitants of the central provinces were 38.4%, and in the gold mines of the Vitim system 46.6% [9; p.180].

It should be noted that the considerable distance and the absence of transport infrastructure made it difficult for the workers to enter the central densely populated provinces of European Russia and only in the 90s of the 19th century the appearance of the railway and the crop failure that ruined a significant part of the peasantry led to the influx of settlers.

The main source of the working composition of the gold industry of Siberia were landless and landless peasants, gradually displacing the exiled settlers constituting the main contingent in the initial period of the industry development. To a lesser extent, the urban population was involved (up to 10% by the end of the nineteenth century) and the indigenous peoples of Siberia, who carried out mostly auxiliary work.

Distinctive features was the process of folding the labor market at the mines in the Transbaikalia: in the pre-reform period, the bulk consisted of feudal-dependent workers (ministers, apprentices and exiles); after 1861, the labor of forced labor

was gradually replaced by free labor, while the exiled activists continued to work in the mines of the Cabinet until 1917 and accounted for 27% of all mining workers [8; p.104].

Industrial gold mining in the Far East began in the 60s of the nineteenth century and, as new fields were discovered, advanced to the Primorsky Region. One of the most acute problems of the initial stage of the industry development was the shortage of workers, since the recruitment of workers from the environment of immigrants in the Amur region was banned, while, for example, in Siberia, the gold mining industry distracted a considerable part of the peasants from agricultural production.

The hired labor market was extremely slow in the Far East, until the end of the nineteenth century, the demand for workers was always higher than supply. The main source of the labor market was the peasantry, but unlike other regions of Russia, the population formed here could not allocate even the minimum number of workers demanded by the emerging industry. The bulk of the labor supply was supplied by the Siberian provinces. At the initial stage, large companies through their agents hired workers, mainly in the Tomsk, Tobolsk, Yenisei provinces and Transbaikalia. In the future, the number of immigrants from the provinces of European Russia steadily increased: in 1893 they accounted for 13.4% of the total number of Amur-based seekers, and in 1911 - 42%. The main suppliers were Nizhny Novgorod, Simbirsk, Penza, Saratov, Perm provinces [1; p.92].

The population of the exploration areas was also formed at the expense of exiles and discharged from the army at that time. The share of spare lower ranks in the late 1880s and early 1890s. among the mining workers of the Amur and Primorye regions was from 3 to 11%. The exile settlers in 1871 made up 2% of the Amur-based seekers, in 1880 - from 3 to 7%; In the mines of the Bureya Mining System in 1888, there were 11.4% of them. In the 1890s. the specific weight of the exiled settlers in the composition of the gold industry workers of the Amur Region ranged from 2 to 3.8%, in the Primorsky region it ranged from 2.7 to 3.8% [1; p.97].

The transition to the prospecting work from the late 80's. XIX century. promoted the mass attraction of Chinese and Korean workers to the mines, the number of which has steadily increased, reaching 30429 people by 1909. However, this figure is far from the reality, since part of the workers escaped accounting. The involvement of the "yellow" workers was dictated by the objective conditions in which the gold industry appeared. Insecurity of permanent earnings, lack of means of communication, high cost of basic necessities, as well as excessive state taxes (up to 12% of the cost of gold mined) contributed to the withdrawal of Russian workers from the spoolwork. The minimum earnings of the Russian worker was 3 rubles, the Chinese was content with daily earnings of about 1 ruble; Russians

could not work on gold mines (less than 1.5 spoils in 100 poods of sands), the Chinese worked freely even with a gold content of 30 shares, making available 40% of working mines [10; p.75].

With an increase in the number of "eastern" workers, the proportion of Russians employed in the gold industry has changed. So, in 1900 in the mines of the Amur region Russian workers were 80%, the Chinese - 4%; in 1909 the share of Chinese increased to 87%, while the share of Russians decreased to 12% [5; p.61]. On the eve of the First World War, Chinese and Korean migrants accounted for almost 80% of the gold miners in Eastern Siberia, 85.3% in the mines of the Zeya mountain district, 90% in the mines of the Amur mountain district, 93% in the mines of the Bureinsky mountain district [10; p.74].

During the First World War, constant mobilization sharply reduced the proportion of skilled Russian workers in the gold mining industry. The handicapped workers (Hungarians, Austrians, Czechs, Germans in an insignificant number) who used mainly at the dredging enterprises and ore-extracting factories of the Urals and Western Siberia, at the same time, still prevailed in the mines of Transbaikalia and the Far East, Chinese and Korean otkhodniki.

A brief review of the main sources of the formation of labor resources in the gold mining industry in Russia makes it possible to single out the following patterns: 1) the use of forced and free-hired labor with a tendency to increase the level of the latter; 2) the main source of the labor market is the peasantry; 3) the migratory flows of the seasonal labor force had a directed movement vector from west to east; 4) domination of the "eastern workers" in the late nineteenth and early twentieth centuries. In the gold mines, the development of the gold industry was directly dependent on the influx of immigrants.

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建筑和景观空间的权力  
**Architectural and landscape spaces of power**

**Fedorov Viktor Vladimirovich**

*Doctor of Culturology, Professor*

**Fedorov Mikhail Viktorovich**

*Candidate of Philosophical Sciences, Associate Professor  
Tver State Technical University*

Social life always has an architecturally organized appearance. The central part of the large settlements (built up by palaces, castles and temples) is a place of concentration of power structures, an instrument of administrative and psychological influence on the society. In the process of their formation and development, the cities became "both a fortress, a warehouse, and a workshop, and a market, but first (and primarily) a place of power" [1, p. 18]. Power as an asymmetry of influence is always projected onto the territory of the city and forms in it special "spaces of power", differing in architectural and landscape features:

1) the orderly arrangement of buildings and structures, their "correct" orientation to the countries of the world and the use of dominant forms of relief (as a social hierarchy);

2) a claim to the exclusivity of power spaces (isolation, isolation, specially designed gates / entrances, demonstrative dualism of left / right, high / low, etc.).

This is a complex social and architectural phenomenon, generated and ordered by historically developing power technologies [2; 3; 4]. Studying it, we restrict the subject of research to the part of that part of urban space that represents the image of power in the mass consciousness, contributes to the formation of conditions for creating and changing ideologies and technologies of power. Analysis of social reality through the prism of spatial relations most clearly demonstrates the relationship of society and power as the existence of specially organized territorial and spatial structures, allows us to disclose their content, unobvious connections and the dynamics of interdependence.

The spatial embodiment of power is the result of the contation-tion of 1) the physical (architectural-landscape, subject) space and 2) the ordering social space, which defines the technological structure of power relations [5; 6]. The ideas about power that have developed in society fully become the object of reflection as an "image of power" when they acquire a sign expression (verbal or visual)

that carries a certain semantic load [7, p. 34]. In this sense, the image of power is inseparable from its material and content expression, it acts as a result of social communication [8].

The diachronic method (the method of periodization) - in contrast to the chronological discovery of the sequence of states of power spaces without accentuation of the logical relationship - involves a comparison of the architectural expression of power with the characteristic moments of the state of society. In a more concrete plan, the following is carried out: a) the definition of artistic composition and space-planning features of objects of localization of power structures; b) identification of sustainable and repeatedly reproduced architectural solutions; c) tracing certain patterns of development, etc. In the center of attention are features and trends, the nature and forms of their manifestation, the discovery of the moments of the emergence of new architectural and planning solutions, the presence of structural and typological relationships, etc.

At the same time, diachrony is considered as a phenomenon and a concept that, first, the appearance of any buildings, structures and their complexes in relation to space and time, and secondly, their stable existence / reproduction in significant historical intervals as a rule, measured by decades / centuries, which is typical for the duration of the life cycle of architectural creations). Change is an extremely abstract characteristic of their existence, a more specific one is a process as a sequence of states of a phenomenon in time (processes of functioning, moral and physical wear, revitalization, revalorization, etc.) that correspond to actual moments of social life. The nature of the development of power spaces (and the urban environment as a whole) can not be interpreted as an inertial vector of ever-increasing complexity. It is possible to give many examples of the development of the architectural situation, leading not to complication, but, on the contrary, to simplification, cheapening due to quality decrease, technological "kickbacks", even ruining, which are just as characteristic for the development of the urban environment as growth and flourishing.

One of the most important attributes of the phenomenon of architectural spaces of power is continuity, which consists in preserving certain elements of existing (existing or only projected) objects. Continuity is not limited to the reproduction of historically and territorially close architectural solutions. For example, after millennia, the experience of erecting ziggurats (multistage religious buildings of Ancient Mesopotamia) is quite consciously extracted from the cultural memory of mankind, and the Mausoleum of V.I. Lenin appears on Red Square in Moscow. The new construction in the historical center of the capital, which carries the powerful potential of an alien culture, denies everything. And the previous planning decision of the square (the monument to K. Minin and D. Pozharsky, which stood on the transverse axis of the square since 1818, was moved to its periphery in

1931), and the experience of erecting functionally, chronically and mentally close monumental funerary structures (the mausoleum of M.B. Barclay de Tolly, N.I. Pirogov, and others).

The isolation of the structural components of the image of power that corresponds to a specific society and a certain historical epoch shows that in all cases there is a common feature - the material-material embodiment of the phenomenon of power in architecture. Discovering the invariant predictors of the organization of power spaces (historical and cultural tradition), one can judge the actual state of society [8; 9]. The semantics of the architectural-landscape and planning embodiment of power spaces is determined by: 1) the spatial position of power structures; 2) architectural forms and planning solutions; 3) plastic, light-color and textural solutions of facades; 4) the expressed architectural symbolics.

Stably reproduced for millennia, the characteristics of urban spaces carry a certain content, conditioned by the code for solving practical problems. The architectural space of power should "not only make it possible to carry out the corresponding function, but it must mean so clearly that the implementation was not only executable, but desirable" [1, p. 65]. For example, among the invariant features of the planning organization of power spaces, one usually finds: a) the symmetry of architectural-compositional solutions, the presence of a pronounced axis, the dominance of the "classical" form (a rectangle in its pure form or enriched by the inclusion of circular arcs); b) ensemble building, synthesis of architecture with sculpture and monumental art; c) the availability of free space for demonstrations, processions, rallies.

The ability of the urban environment to act as a substratum (the basis and conditions of rational organization) of social life is most evidently manifested in exceptional objects and architectural complexes (the largest, the most beautiful, the most expensive, timed to important historical milestones, etc.). At the same time, the areas of dislocation of power were to be alienated (isolated, but not removed), and at the same time - periodically accessible, visible, sufficiently spacious to demonstrate military force, as well as magnificent processions to the glory of civil and religious power.

The centers of power are always "built from the same elements" [1, p. 28 - 29]: a) barriers, gates, spatial locks; b) open spaces that facilitate the control of the situation; c) axes of symmetry and prescribed trajectories of movement for entrances and parades; d) "special" dimensions of buildings and squares as an expression of the power of power; e) strict rules for the movement / finding of representatives of power in space, the existence of special places for the position of rulers. " A vivid example is the Forbidden City in Beijing (moats with water, inaccessible walls 10.4 meters high, watchtowers, etc.).

The interdependence of the dynamics of social life and the architectural envi-

ronment (including urban power spaces) is worthy of note [9]. The main purpose of the city - a complex socio-cultural, economic-geographical and architectural-urban education - the creation of conditions for the formation and development of society. At one time, the emergence of large settlements meant a transition from "environmental" existence to a permanent stay of the individual in society. Man-made artificial reality, alienating not only from nature, but also from society, has acquired the ability of autonomous functioning. Today, the urban space of power is not so much an object as a self-organizing process that takes place in a space-time continuum.

Social being is an exceptionally dynamic system, and the architectural and landscape environment, on the contrary, appears externally as a very inertial system. Its structural elements exist in the unchanged external form of the decade (buildings and structures) and even centuries (street-road network, functional zones, support fund, etc.). Therefore, the dynamics of communication between the society and the architecture of power is manifested mainly in the nature of their interdependence. Changing, society transforms the semantics of the environment of the object-spatial environment, gives architecture all the new value-semantic content. This is a complex nonlinear process, for which the moments of the emergence of new ones, the transformation of old values and their synergetic interaction are characteristic. Sometimes the hierarchy and dismemberment of traditional architectural and landscape spaces of power are accepted and supported by the new elite (the Kremlin in Moscow, the Reichstag in Berlin, the White House in Washington, etc.). But often the authorities do not see the opportunity to reorganize them so that they respond to the current system of social relations. Then it changes the place of its location (the city of Bonn, Brasilia, etc.).

The urban space of power "relies on the hidden power of the structural-spatial form", revealing in this its similarity with modern management theories. The ultra-modern spaces of power of the beginning of the 21st century "are distinguished by a reduction in hierarchies, increased communication, flexibility, creativity, and demonstration of personal responsibility" [10, p. 113-112]. Ideally, in the eyes of citizens, they should look like the personification of democratic values, prosperity, prosperity, "place of power" for the overwhelming majority of citizens. For example, a large number of glazed surfaces are already almost textually interpreted as "an image of a transparent policy, sustainable development, openness."

In modern Russia, the architectural spaces of power "with a biography" (and in the domestic tradition the authority of all levels prefers exclusively "namolennye", central places) are strikingly different from what is being created all over the world at the present time. Such a desire to preserve the spatial (visual, functional, etc.) barrier between society and government, justified by a primitively understood continuity, looks like an outright anachronism. In the world architectural

practice in the interiors of the new offices of power, we find:

- 1) the absence of visible protection (of course, it is necessary, but imperceptibly present and characterized by higher efficiency, because it functions on a different technological level, using contactless scanners, weapons detection systems, explosives, etc.);
- 2) multilevel atriums flooded with natural light pouring from above;
- 3) the possibility of visual contact with the city, the environment (so that the rooms in some parts of the building perform a rather public, rather than office function);
- 4) the mass of architectural forms and details, the symbolic content of which is read by the subject of perception intuitively, without hesitation.

In turn, the exteriors of new government buildings and other authorities are characterized by the fact that:

- 1) inside and around them, extensive public spaces are necessarily formed, on which people can freely gather;
- 2) contain architectural forms of intermediate scale (trees, benches, flagpoles, clocks, sculptures, etc.);
- 3) the area surrounding the residence of power flows smoothly into the space of the atrium, permeate the building.

The problem of transforming the urban spaces of power in modern Russia is quite obvious at the regional level. As a rule, the regional government occupies buildings inherited to it. The lack of office space, spaces for public events, an obvious shortage of parking spaces during regional meetings, etc., urgently calls attention to the situation. With the current state of the economy, no regional center (except for capitals, partly - the largest cities of the country) can afford to build a new administrative center. Most likely, the real way to solve the problem is "creeping" renovation (replacement of some existing objects with new objects) or reconstruction. But most often we are talking about a historical center, and the reaction of civil society is quite predictable ...

The task is very complex (professionally and psychologically), but, nevertheless, it has many options for an acceptable solution. In such situations, the interaction of social spaces and power spaces develops, mainly, in the plane of social psychology. Neglect or misunderstanding of the role of feedback generates a complex and hardly predictable result of the perception of power (the space of power as a form of its presentation) by the individual and the mass consciousness. Moreover, the result is purely subjective and depends on a large number of factors (starting from the socio-economic situation in the country, ending with the weather and the momentary mood of the subject of perception).

Self-assertion in the appropriated space, symbolic violence over topos and society is in the nature of power. Here, in the most obvious form, social being

materializes in the architectural and landscape environment, acts as the object of perception, understanding and appropriation of meanings. Therefore, one of the urgent tasks facing the society is to bring the city spaces of power in line with the requirements of the time.

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相框与艺术创作的文化历史极限

**Picture Frame and the Cultural-historical Limits of the Artistic Creation**

**Tkacheva Marina Lvovna**

*Candidate of Philosophical Sciences, Associate Professor  
Baikal State University*

注释。 框架分析的例子考察了不同时期和流派的美术特征。 框架的功能。 分析的主题是印象派艺术家埃尔格列柯的作品。 强调知觉过程的重要性，其解释性特征。 涂鸦的特点是一种图案活动的形式，它有自己的发展逻辑和特点。

关键词：美术；帧；埃尔格列柯；印象派；伊尔库茨克艺术家；业余艺术；艺术感知；涂鸦；架构。

***Annotation.** The example of the analysis of the frame examines the features of the fine arts of different historical periods and genres. The functions of the frame as an element of the artistic image are formulated. The subject of analysis is the work of El Greco, the Impressionists. The importance of the process of artistic perception, its interpretative character is underlined. Graffiti is characterized as a form of pictorial activity that has its own logic of development and features.*

***Keywords:** fine arts; frame; El Greco; impressionism; Irkutsk artists; amateur art; artistic perception; graffiti; architecture.*

More than a decade ago, G. Simmel's essay "Frame of the picture. Aesthetic experience" [1]. Despite the modest amount, it turned out to be extremely precise, not even for the situation at that time, but for the problems of today's pictorial activity.

Picture Frame as an object belonging to the picture, looks quite external and superficial against the background of traditional art history studies in the field of historical specificity of artistic creativity. Only Vipper gave the frame several pages [2], describing it as a way of linking the picture and architecture, style features of the design and function of the canvas. The situation is complicated by the fact that even serious publishing firms, as a rule, reproduce paintings without frames. Thus, an installation is created to consider the frame as more or less accidental for a pictorial canvas. Simmel also writes about the frame as a border marking the integrity of the canvas designed by the artist, its closure to the inner content and formal synthesis. From this point of view, the frame begins to look exactly like a

border space between the canvas and the rest of the world in situations of fracture of conditions or fundamental principles of pictorial creativity. Two examples.

The first is taken from the history of Spanish painting of the late Renaissance. This is the work of the giant of Spanish painting Domenico Theotokopuli (El Greco). One of his relatively early paintings “Espolio” has a wide and inconsistent fame. In this picture, much of what forms the originality of El Greco and, at the same time, provokes all kinds of protests, censures and negative assessments. Unusually chosen by the artist plot of the picture as an altar image: according to the testimony of art historians, he is extremely rare in painting at that time. It is untypical for the artist to interpret the characters of the canvas (primarily, Jesus Christ), having clearly read Italian roots, closely related to the Titanism, ideality and humanity of biblical characters. The liturgy started by the customer - the chapter of the Toledo cathedral at first about the theological inaccuracies of the picture (the image of the head of Jesus below the crowd, the presence of three Mari, allegedly not mentioned in the sacred texts), and then the trial, where the chapter directly expressed the demand to make a change in picture. Actually, the very fact of such demands is typical enough for the time and genre of the canvas, intended to become an altarpiece. It is unconventional that the artist remained in the position of the Italian idea of the high prestige of artistic work, the right of the painter to independence and innovation, obviously being for a generation ahead of those principles that the Spanish church authorities adhered to. It is also remarkable that in the end “something changed with regard to the churchmen and the altar image adorned the cathedral. The painting brought the master tremendous success in Toledo, and the story associated with the long litigation was soon forgotten “[3]. But in relation to this canvas, other streams of artistic consciousness collided, and it is the frame that helps to recognize the different quality of the artistic development of the sixteenth-century Spanish art. According to the tradition of the Spanish artistic life, the frame for the painting was created by the artist himself. The frame is carved in a traditional manner for medieval Spain, which subordinates sculpture to architecture and has absorbed centuries-old experience of carving in stone and wood. Such work was traditionally valued much higher than painting; The case with Espolio is no exception: the picture was appreciated much cheaper than the frame to it.

The second plot is taken from the textbook material, relating to the history of painting already XIX century.

France. The last quarter century. Scandals around the Impressionists are gradually replaced by understanding, interest and fame. One small touch, which, among others, distinguishes the artistic practice of the Impressionists: some of them (Pizarro, Seurah) put forward new requirements for the frame: it should not be so rich as the proper design; it must continue the space of the picture beyond the

canvas, it materializes the demand of artists to treat the picture not as a reality, designed to decorate the interiors and delight the eye, but as a new reality, having its own organization laws, its internal core structure. It may seem that the frame, created in accordance with the new requirements, contributes to an act, if I may say so, of some artistic aggression, an attempt to spread the idea of a new value of artistic creativity beyond himself, to force even the side elements of a pictorial canvas to work on a new idea of how, that there is a new painting and what it means in the artistic consciousness. Namely: painting, like any other work, is affirmed as a higher product in comparison with actuality itself, for in its definition and essential property is the fact of man-made reconstruction of the world. The closest consequence of the appearance of the new painting was a change in the perception of the impressionism of the public, which in 1874 screamed: “daub! This is unclear! And 25 years later, perhaps the same aged for 25 years, the audience admired the same pictures: “How realistic, beautiful, artistic!” The fact that the eyes of the viewer has changed, of course, the merit is not the framework, in which the canvas is inserted. But what would be the picture without ending it?

Thus, the frame is the object that is part of the pictorial and graphic work. In the work of an individual artist, attention to the frame refers to the design, accuracy, which indicates the gravitation towards completeness of work; frame reminds the last point, which puts the writer at the end of the novel. Attention to this external moment may indicate internal insistence, classically understood professionalism in work. On the contrary, the negligence of the design and indifference to it, as it were, signal that the artist does not value his work or viewers (such is in some works of I. Glazunov).

In many cases, the frame is a continuation of the experiment started in the picture, or its completion. In today's Irkutsk artistic practice, special attention to the frame can be noted in the Ust-Iliman A. Pogrebny. As a frame, he can use the most unexpected items: the backs of the chairs, the connected shafts, the rims from the barrels, everything that fantasy tells. It can be assumed that such a frame increases the number of meanings by which the artist loads his canvas. They create additional space for viewer associations. Picture frame acts as a signal, a symbol, a mark of those meanings that are contained in it as an independent subject. Then the collision of the semantic fields of the picture and frame excites the associative fantasy of the viewer, based on his, the viewer, personal experience. So we turn to the important for any kind of art theme - the specificity of artistic perception. It was in this respect that the frame was spoken by BR Vipper. The frame prepares the perception, separates the picture from the wall on which it is located, creates or, on the contrary, destroys the illusion of the space of the picture, emphasizes the color, size and format of the canvas. Returning to the very beginning of the text, we note one more value of the example of El Greco. Picture frame is the meeting

place for different types of art. She simultaneously and painting, and architecture, and a sculpture, and an interior. It is appropriate to consider it as a fragment of the history of arts and crafts, and as a necessary element of inter-artistic synthesis. The frame turns out to be loaded with artistic and philosophical meanings as a detail of that system of the universe into which the eye of the perceiver is immersed in the collision with the canvas. A necessary prerequisite for such an interpretation is the understanding of artistic activity not as a sum of ranged art forms, connected externally through some ideological or ideological constructs, but as an organism whose components acquire meaning only in their relation to the whole. Picture frame is a detail of the model of the universe, without which the model itself will not take place, for all the seeming smallness and insignificance of this detail. In it, as in the matrix, the concepts of art in general, its purpose are concentrated.

A vivid example of inter-artistic synthesis in this sense can be the work of Irkutsk artist and designer I. Shirshkov. His picturesque experiments, gravitating toward conceptualism, demanded a strict, restrained and comparatively “non-aggressive” frame. His “signs” and other fundamentally important canvases demonstrate the strict taste of the designer and, at the same time, denote the context of the existence of canvases: the tradition of graphic, even hieroglyphic painting, which has something in common with calligraphy of the East, organically linked to spatial experiments. The artwork is not only surrounded by other artistic values. It constantly experiences the pressure of life. This term is used by me not in the sense that life forces the artist to constantly update its content. It would be too simple and vulgar: sometimes a simple plot or poetic comparison produces a greater impression on the creative personality than a historical catastrophe. It is a question of more special things concerning the historical boundaries of the world of the arts, the genesis of the historical and cultural notions of what is and what is not art (in particular, painting). You can give an example with the expansion of the boundaries of painting in the era of Velasquez: for his contemporaries, painting was only paintings on mythological and religious themes. Still-lives, genre scenes, of course, they wrote. But they were considered low genres, unworthy of laudatory epithets and special attention. Caravaggio in Italy, and Velazquez in Spain introduced low-lying genres into the boundaries of high art, greatly expanding the very space of art. And here is a funny detail: the so-called “bodegons” are decorated in luxurious, fashion-time frames. To contemporaries this discrepancy hurt the eye. But time passed - and what was seen as a sign of plebeian taste acquired the features of noble antiquity. The historical perspective equated a trifle and luxury in one name - a monument of the era. From shocking, there is no trace, and only a special reflection helps to isolate the historical context and historical boundaries of the art world.

No less illustrative example is the iconography, in which there is also a kind

of frame - the ark, sometimes the stigma around the midshipman. In this case we are dealing with a purely hermeneutic phenomenon: the symbolic designation of a written context in which the prehistory of the image is revealed and which therefore acts as a boundary space between the condensed-sacral middling and the “less” sacral frame. In the extreme version, the frame of the icon extends to all the material objects depicted on it, and turns into a salary that conditionally duplicates the object world of the icon, revealing in it the “most-most”: faces, hands, feet of the saints, the Virgin and Christ. This establishes a hierarchy of types of artistic activity: what is done by the brush is less valuable than that made by the jeweler or carver. Decorative and applied art, relatively speaking, is a “greater” art than painting. It was the same in medieval Europe and in medieval Japan.

Picture frame stands on the border of different types of art. It is obvious that in the development of each of them, despite the intra-artistic synthesis, there are their own levers and reasons for development, their own pace of this development. The borderline position of the frame helps to trace those determinants that determine the specific historical, regional and cultural context of its existence and the rate of its historical change.

The artistic situation in the 21st century should be interesting as a model for investigating the above problem. It seems that contemporary visual creativity is unique in many respects.

The first thing that many researchers note is the blurring of the boundary between artistic and non-artistic activities. Actually, this process was already observed at the turn of the XIX-XX centuries: it was to this period that the recognition of non-professional, amateur visual activity as a full-fledged painting (Henri Rousseau, Niko Pirosmani) belongs. One important criteria of artistry is changing - the availability of vocational education and schools. Most valued is no longer masterly mastery of skill, but the invention of his own theme, artistic principles and individual program. This movement is natural for modern times, where the importance of individuality, dissimilarity is recognized by society and is lauded the most.

The second is the expansion of the possible boundaries of the individual's activity: his private, private space “splashes out” beyond his limits, conquering public space. I mean graffiti, in which both the already named and the only topics converge. Graffiti can be fine in terms of skill, but most of these amateur images are far from any even the most loyal criteria of artistry. professionals. The desire to declare one's position (often very critical in relation to certain social phenomena and even social life in general) is often almost the only impulse for the “creativity” of graffiti artists.

If the professional painting is a result of sometimes painful thinking for the artist, then the dignity and, at the same time, the lack of graffiti - spontaneity, the

speed of its creation and the ability to destroy what others created and seemed unsuitable for the next author. So the originality of the statement, the assertion of its individuality turns into a disregard and destruction of another personality, unlike itself.

Speaking of professional artists, competition, the market and money as objects of a special kind of attachment play a significant role among motives that motivate them to intensive work: a lot of creative people (not only artists - painters and graphic artists) measure their skills by selling their work. With respect to these attitudes, they do not differ from the very common prejudices of ordinary mass consciousness.

Graffitiists in the overwhelming majority of cases demonstrate “disinterestedness” of disinterest, in obtaining material benefits from their activities. Their statements on the walls, fences and even windows can be regarded as a paradoxical statement of other, not mercantile values and goals.

Thus, the “case of graffiti” is an example of the absence of a “frame”, the boundaries of art and non-art, correlated with the lack of distinction between internal and external space in the city. Graffiti specifically “sews up” public spaces and individual activity strategies, social meanings and their contradictions in the space of contemporary artistic culture.

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关于儿童综合医院护士工作时间的计时结果（以梁赞为例）  
**About the results of timekeeping of working hours of district nurses of  
children's polyclinics (on an example of Ryazan)**

**Chvyryova Natalia Vladimirovna**

*Candidate of Medical Sciences*

*Ryazan State Medical University named after academician I.P. Pavlov*

摘要。近几十年来，国家医疗保健体系正在发生变化。为了解决提高医疗服务质量的问题，有必要理顺医务人员的工作条件。

关键词：小儿科，初级卫生保健，计时，工作时间标准。

**Abstract.** *The changes taking place in the national healthcare system in recent decades are aimed at increasing the efficiency of the activities of medical organizations of primary level, including those providing medical care to children. To solve the problem of improving the quality of medical services, it is necessary to rationalize the working conditions of medical personnel.*

**Keywords:** *pediatric district nurse, primary health care, timekeeping, working time standards.*

To improve the quality of primary health care, the child population is required not only to improve the material base of the medical organization, but also to improve the working methods of its employees [2].

At the present time, at the legislative level, requirements are being developed for the formation of new approaches to the organization of medical and preventive work, among which the issues of the standardization of the work of medical personnel are also considered [1].

The work of paramedical personnel in providing primary health care to children in an outpatient stage is of sufficient weight in terms of providing affordable and quality medical services. At the same time, the rational distribution of working time contributes to the increase in labor productivity, and also improves the quality and effectiveness of the medical care provided [2,3,5].

As a rule, working hours are taken as a basis for calculating the normative norms for the workload of average medical personnel. The research of its costs for any particular operation is possible with the help of timing [4,7,8].

The current time standards for nurses do not always take into account real needs and at the same time do not contribute to improving the quality of medical services provided. The rationalization procedure implies the most optimal distribution of the work day, taking into account the allocation of time for individual manipulations [6,7].

Thus, at this stage, there is a need to perform timekeeping for nurses with further proposal to revise existing standards, which will allow expanding the available resources in children's polyclinics in Ryazan [7,8].

**The purpose of the research:** to research the distribution of working time of nurses, working at the reception together with the district doctor, pediatrician.

**Methods:** The research was conducted on the basis of the City Children's Polyclinic No. 1 in Ryazan for two months. As a method of research, timekeeping was used, according to the "Methodology for the development of time and load standards for medical personnel" [4,8]. The above method allows you to form a full-fledged structure of working time expenses for certain types of activities, to establish the sequence of performance of the elements of work, to reveal the presence of uncharacteristic functions for them and inefficient working time [3].

The research we conducted was based on the following classification of labor costs of paramedical personnel by type of activity: basic, auxiliary, work with medical documentation, service conversations, personal time (Table 1).

**Results:**

Timekeeping of working time was spent during two working weeks at the nurse with the same post. The obtained data were recorded in the list of observations with the name of labor operations and time cos

**Classification of labor costs of medical personnel by type of activity**

*Table 1.*

Primary activity:
Before the reception
Preparation of office equipment (printer, PC)
Preparation of tools and materials (gauges, scales, spatulas, thermometers, gloves)
Preparation of medical documentation (outpatient cards, letterheads, etc.)
During the reception
Thermometry, measurement of height and weight of children
Instructing parents (legal representatives) to prepare a child for laboratory and instrumental research
Control of the filling in by the parents (legal representatives) of the voluntary informed consent to medical interventions and / or refusal from them
Teaching parents to conduct treatment at home
At the end of admission
Visiting newborns at home, children after preventive vaccinations
Invitation of parents for medical examinations of children and the provision of preventive vaccinations
Work in a hotbed of infection, collecting information about contacts
Supporting Activities:
Preparation of the workplace
Dressing gown, changing clothes
Washing hands
Cleaning of the workplace
Work with medical documentation:
Checking the availability of outpatient cards of patients recorded at the reception
Obtaining the results of the research of patients attached to the site
Filling out forms for laboratory and instrumental research, directional forms for consultations to narrow specialists
Adding additional studies to the outpatient card
Filling out inquiries in children's camps, kindergartens, sanatoriums
Reporting on various activities, etc.
Service calls (by phone, talking with medical personnel)
Other activities
Conducting classes with medical staff, giving lectures, talks
Researching medical literature
Personal Necessary Time
Rest, eating
Activities of a personal nature
Late work, premature departure from work
Conversations during the working day, not related to the main activity
Unloaded time

According to the results of the research, it was found that the biggest share of working time (51.3%) is spent by a nurse working with a district pediatrician on work with medical documentation, 29.3% on basic activities, 8.5% on auxiliary activities, 5.4% for other activities, 3.0% for personal time needed and 2.5% for service calls. At the same time, an essential element of the main activity of the nursing nurse is work at the reception (72.3%), among which a significant part is taken from the measurement of anthropometric indicators in children (36.5%). A slightly less significant proportion is working after the termination of admission (22.7%), where the leading role is given to visiting newborns at home and children after preventive vaccinations (15.6%). And the least amount of time in the core activity of nursing staff working on an outpatient visit is given to preparatory activities (5.0%).

### **Discussion of the results:**

Currently, the technique of timekeeping of working hours among medical personnel has not become widespread. However, given that most of the medical personnel of polyclinics are nurses, this method has great prospects.

### **Conclusions:**

According to the results of our research, it can be concluded that more than half of the time spent by a district nursing nurse is required to work with medical records. At the same time, this type of activity is a priority and requires a lot of work (filling out outpatient cards with laboratory research results, processing statistical stamps, issuing directions, etc.). In this regard, there is a lack of time to engage in educational work with patients, which is one of the leading directions in the provision of primary health care.

Thus, based on the results of timekeeping, the main areas of work of the district nursing nurse have been identified, which should be used as a tool to improve the quality of medical care provided and to optimize the activities of nursing staff in primary care.

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苋菜果胶在肝毒性损伤中的应用效果  
**Effectiveness of use pectin from *Amaranthus cruentus* L.  
under toxic damage of liver**

**Khasina Eleonora Izrailevna**

*Candidate of Biological Sciences,*

*Senior Research Officer*

*Federal Scientific Center of the East Asia Terrestrial Biodiversity,*

*Far Eastern Branch of the Russian Academy of Sciences,*

*Vladivostok, Russia*

在化学物质四氯甲烷，乙醇和铅对小鼠蚜虫果胶对肝脏毒性损伤保护作用的实验中，口服100mg / kg剂量的果胶会减弱中毒性肝炎的形成并使代谢状态正常化。来自苋菜的果胶干扰ATP和糖原储备的消耗，以及肝脏中的细胞溶解，高胆红素血症和高甘油三酯血症。

**Annotation.** *In experiment on mice protective effect of pectin from *Amaranthus cruentus* L. at toxic damage of a liver by chemicals tetrachlormethane, ethanol and lead is studied. Oral introduction of pectin in dose of 100 mg/kg weakened formation of toxic hepatitis and normalized the metabolic status. Pectin from *Amaranthus cruentus* interfered with exhaustion of ATP and glycogen reserves, and also cytolysis, hyperbilirubinemia and hypertriglyceridemia in liver.*

At present, human and animal contacts with chemicals are expanding ever more. The reason for this are urbanized areas with an abundance of vehicles, uncontrolled use of medications and household chemicals, poor environmental conditions in the workplaces of many industrial production, the consumption of drugs, alcohol and so on. The problem of contamination of the internal environment of the body with a large number of aggressive chemicals is acute before hygienists, physiologists, clinicians and is far from solving it.

The leading role in the inactivation of toxic substances entering the body is played by the liver. In chemical hepatopathies, in addition to detoxifying the body, a metabolic correction is necessary. The search for hepatoprotective agents with high physiological activity for the normalization of liver function, structure and metabolism in toxic hepatitis is very relevant.

Promising as a hepatoprotector is a group of biological substances, such as pectins (pectin polysaccharides), the pharmacological effects of which have

accumulated rich material. Pectins exhibit antimicrobial, antitumor, bactericidal, anti-inflammatory, hypoglycemic, hypolipidemic action. They are effective as immunostimulants, prebiotics, heavy metal chelators and radionuclides, are used for the targeted delivery of a number of drugs [9].

**Purpose:** to evaluate the potentially protective effect of pectin from amaranth purple in hepatopathies caused by toxic substances with tetrachloromethane, ethyl alcohol and lead acetate.

**Materials and methods.** In the experiments we used sexually mature male mice of the CD-1 line (nursery of the Pacific Institute of Bioorganic Chemistry, FEB RAS) with an initial mass of 24-26 g. The animals were kept in standard vivarium conditions, they received food and water without restriction. Each group contained 7 animals. Hepatopathy of mice was modeled using three types of toxic chemicals. The tetrachloromethane (TCM) was administered to the animals once, intragastrically, at a dose of 1 g / kg as a 10% solution in olive oil for five days. Mouse ethyl ethanol (ethanol) was received intragastrically, once a day, at a dose of 7.5 g / kg as a 50% solution for 5 days. Lead intoxication of mice was caused by intragastric administration of lead acetate (lead) at a dose of 50 mg / kg for 14 days.

Pectin extracted from the dry-air green mass of amaranth crimson *Amaranthus cruentus* L. (fam. *Amarantaceae* L.), grown in the Primorsky Territory of the Russian Federation, was used in the work. Pectin had a molecular weight of 25 kDa and a degree of esterification of 65%. Every day the animals received a pectin preparation in a dose of 100 mg kg in the form of a 2% solution, intragastrically, once, on an empty stomach, one hour before the administration of toxicants. Animal control group received an equivalent volume of physiological solution. Decapitation of mice was carried out one day after the end of toxic effects of TCM, ethanol and lead. The work was carried out in accordance with the normative documents: Order No. 708n of the Ministry of Health and Social Development of the Russian Federation of August 23, 2010, "On approval of the rules of laboratory practice" and Directives 2010/63 / EU of the European Parliament and the Council of the European Union for the protection of animals used for scientific purposes. Biochemical indices were determined by unified methods: the activity of alanine transaminase (ALT), the level of total bilirubin (TB) and triglycerides (TG) in blood serum - using the "Bio-La-Test" ("Lachema", Czech Republic) kits, glycogen with the help of an anthrone reagent and adenosine triphosphate (ATP) by spectrophotometric method in the presence of NADF. In the statistical processing of data, the significance of differences between the groups was assessed using the Student's t-criterion. The results in the tables are presented as the arithmetic mean  $\pm$  standard error of the mean ( $M \pm m$ ).

**Results.** As a result of the action of all three used toxicants, marker indicators

of various metabolic links in the liver, such as glycogen and ATP (energy metabolism), ALT (cytolytic process), total bilirubin (excretory function), TG (lipid metabolism) underwent significant changes. The degree of their deviations from the indications of the norm (control) under the action of THU, ethanol and lead varies, but at the same time, they are unidirectional and very pronounced (table). The content of glycogen in the liver, reserve energy substratum, was reduced by the action of TCM for 50, ethanol - 31, lead - 29%. Synchronously with this there was a significant expenditure of ATP, which primarily ensures the metabolism in the body in a critical situation. Against the background of TCM, its level is below the control reading by 29, ethanol - 22, lead - 26%. The cytolytic process in the liver is indicated by a significant increase in ALT activity in the blood serum: with TCM intoxication - 3.7, ethanol - 3.8 and lead - 3.3 times relative to normal. The abnormal condition of the liver is indicated by the violation of its excretory function, as in the blood serum the content of total bilirubin exceeded the control figures when TCM was 3.1, ethanol 2.4 and lead 1.8 times. The action of these toxicants on the animal organism was characterized by a violation of lipid metabolism in the liver. The level of triglycerides in the blood serum exceeded the control on the background of TCM in 2.1, ethanol - 1.8 and lead - 1.1 times. Revealed changes in the liver marker biochemical indicators indicate a violation of a number of its functions, primarily metabolic. Amaranth pectin made a significant correction to the hepatotoxic effects of TCM, ethanol and lead. The drug positively influenced the energy supply of the mice organism, preventing the depletion of glycogen and ATP reserves in the liver. The level of glycogen against the pectin background differed from the control readings only by 21% (TCM), 16% (ethanol) and 15% (lead), while in the corresponding groups not receiving the drug, this difference was 50, 31 and 29% respectively. Under the influence of pectin, the content of macroerges (ATP) in the liver was kept at a higher level: the difference with the norm was 13% (TCM), 4% (ethanol) and 5% (lead), without the drug - by 29, 22 and 26%, respectively. Pectin inhibited the progression of the cytolytic process in the liver, as evidenced by a decrease in ALT activity: the difference between the groups of animals treated with the drug was 114% in the case of TCM, 87% in ethanol, and 128% in lead. There was a significant decrease in the level of total bilirubin in the blood serum. The difference between the groups "TCM" and "TCM + pectin" was 129%, "ethanol" and "ethanol + pectin" - 71%, "lead" and "**lead + pectin**" - **67%**. Simultaneously, there was a regression in the accumulation in the liver of a fraction of lipids, such as triglycerides. The serum level of TG in the animals receiving pectin was lower than in the "TCM" group by 39%, "ethanol" - 43%, "lead" - 57% (table).

**Influence of amaranth pectin on some biochemical indices in toxic hepatitis (M ± m)**

Group of animals	Biochemical indices				
	Glycogen, μmol / g	ATP, μmol / g	ALT, μkat / l	Bilirubin, mmol / l	TG, mmol / l
Control	240.8±18.0	3.12±0.27	0.58±0.03	8.6±0.55	0.98±0.06
TCM	120.8±12.0*	2.20±0.18*	2.14±0.15*	26.7±2.10*	2.04±0.16*
TCM + pectin	190.8±9.1**	2.72±0.20	1.48±0.11**	15.6±1.05**	1.66±0.11**
Ethanol	165.5±11.2*	2.42±0.11*	2.22±0.14*	20.5±1.52*	1.76±0.13*
Ethanol + pectin	203.7±12.6**	2.98±0.14**	1.72±0.10**	14.4±0.98**	1.33±0.10**
Lead	170,5±10,8*	2,31± 0,08*	1.95±0,14*	14,7±1,16*	1,64±0,11*
Lead + pectin	205,2±13,5	2,95± 0,11**	1,17±0,10**	9,6±0,65**	1,08±0,07**

Note: ALT - alanine aminotransferase, ATP - adenosine triphosphate, TCM - tetrachloromethane, TG - triglycerides; \* -  $P < 0.05$  - when compared with the "control" group, \*\* -  $P < 0.05$  - when compared with the groups "toxicant" and "toxicant + pectin".

**Discussion.** To conduct this research, three types of toxic hepatitis were modeled. Pathogenetic mechanisms of liver damage by TCM, ethanol and lead have been thoroughly studied and are not discussed in this article. Amaranth pectin increased the natural protective systems of the animal organism and made a noticeable correction to a number of universal links in the pathogenesis of toxic hepatitis. Pectin prevented a critical deficit of ATP. Simultaneously, the drug limited in the liver tissue the process of glycogenolysis - the decomposition of glycogen, the energy function of which is well known. The main indicator of cytolysis - one of the main indicators of the pathological process in the liver - are enzymes of aminotransferase. Against the background of pectin, the activity of ALT in the blood serum was significantly lower than in the groups of mice receiving TCM, ethanol and lead without the drug. The stabilization of the excretory function of hepatocytes with pectin indicates a decrease in the level of total bilirubin in the blood. Pectin weakened the development of fatty dystrophy (steatosis) of the liver, as indicated by a significant decrease in triglyceride levels in the serum of mice. So, from the data obtained, it follows that amaranth pectin removed the risk of developing severe forms of hepatopathies induced by TCM, ethanol and lead.

Activation of the protective mechanisms of the organism of animals and humans with chemical damage of the liver with polysaccharides obtained from terrestrial and aquatic plants, fungi, insect chitin and crustaceans is shown by a large number of scientific works. Thus, polysaccharides from *Stellaria media* L., reduced ALT activity and bilirubin level in the blood, the density of inflammatory infiltrate

of the organ parenchyma, total number of necrotic hepatocytes, fat and protein dystrophy in tetrachloromethane hepatitis in the liver [2]. Polysaccharide from the common *Lycium barbatum* L. inhibited the progression of fatty degeneration of hepatotheliocytes and lipid peroxidation in alcoholic hepatitis [7]. It is shown that citrus pectin significantly reduced the degree of a number of biochemical and morphological alterations in the liver of animals exposed to lead [8].

To date, the green mass and grain of numerous species of amaranth are popular as food products among the people of Latin America, Africa and Asia. A number of biologically active substances (BAS) obtained from different kinds of amaranth are actively used in preventive medicine and food industry. This amaranth oil containing unsaturated fatty acids and squalene, amaranth flour with a gluten-free high quality protein for the treatment of celiac disease, food coloring agents, and many other [6]. The physiological activity of such a group of BASes as pectins has been little studied. However, it is known that pectin amaranth crimson inhibits contractile activity of myometrium [1], has a positive inotropic action on the myocardium [3], reduces the level of cholesterol in blood and eggs (egg powder) chickens and the liver of animals with lipid disorders [5 ], binds bile acids [10], has a gastroprotective effect [4].

The study of the mechanism of action on the metabolic and functionally related systems of the animal and human body of amaranth pectin, however, and others, is still not clear and requires further study. Pectin from crimson amaranth is interesting not only because of the few pharmacological effects that have already been identified, but also the possibility of its production in a significant amount. This type of amaranth has a high climatic plasticity and is easily introduced.

**Conclusion.** Amaranth pectin reduces the risk of development of metabolic and functional disorders in the liver when exposed to the human body and animals aggressive chemicals and can be recommended as a hepatoprotective agent in the prevention of toxic hepatitis of various origins.

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传染病的防疫措施

**Anti-epidemic measures in infectious diseases**

**Smetanin Viktor Nikolaevich**

*Candidate of Medical Sciences,*

*Associate Professor*

*Ryazan State Medical University named after academician I.P. Pavlov*

摘要。 这篇文章包含了最重要的特殊术语的定义，并简要回顾了这个问题的历史和抗流行病的细节。 后者被认为是组织，医疗卫生，兽医，工程技术，行政和其他措施的科学基础复合体，用于防止传染病的传播，定位和消除其病灶，爆发和流行病。

关键词：传染病疫情重点流行过程防疫措施

**Annotation.** *The article contains definitions of the main special terms, briefly examines the history of the issue and describes in detail the anti-epidemic measures. The latter are considered as a scientifically grounded complex of organizational, medical-sanitary, veterinary, engineering-technical, administrative and other measures implemented to prevent the spread of infectious diseases, localization and elimination of their foci, outbreaks and epidemics.*

**Keywords:** *infectious diseases, epidemic focus, epidemic process, antiepidemic measures.*

The epidemic focus, by definition, L.V. Gromashevsky, - the location of the source of the pathogen with the surrounding area in those limits in which the infectious factor can be transmitted to others [1].

The intensity of the epidemic process is different. There are three of its degrees: sporadic incidence, epidemic and pandemic.

Sporadic incidence is the usual (minimal) level of morbidity inherent in a particular infectious disease in a particular locality or country. For many infectious diseases is identified with single cases of the disease.

The epidemic is characterized by a significant increase in the incidence rate compared with sporadic (3-10 or more times).

The pandemic, the massive spread of infectious disease, far exceeds the intensity of epidemics that have been observed in a particular disease in historical conditions that have developed in a certain territory [2].

The concept of “natural focal infection” introduced E.N. Pavlovsky. In nature, regardless of man, there are originally territories inhabited by animals, among which circulate pathogenic microorganisms (or other parasites). Transmission of pathogens in the animal world is carried out by means of various mechanisms, however, the leading significance, as E.N. Pavlovsky, has a transmission (3).

Man is more likely a random link in the circulation of the pathogen in nature, the so-called “epidemic deadlock.” A natural focal infection existed before a person, can exist even after people leave the enzootic territory.

Epidemiological diagnosis is the study of the epidemic situation with the use of all methods of modern epidemiology and epidemiological thinking. Thus, it is a way of obtaining objective views about the epidemic situation. In practice, two methods are used to evaluate it. One of them is to quantify the incidence rate when the epidemiologist compares the current level with the indicator in the previous period, or the number of diseases for the same period in the past, stating thus the stabilization or reduction of the incidence, in addition, diagnostic researches aimed at identifying the cause and effect connection [4].

Preventative measures (PM) - scientifically based recommendations aimed at preventing the occurrence of an epidemic complication, are conducted during the interepidemic period, characterized by a state of well-being, and are aimed at preventing the formation of an epidemic variant of the pathogen distribution. Anti-epidemic measures are a scientifically based complex of organizational, medical-sanitary, veterinary, engineering-technical, administrative and other measures implemented to prevent the spread of infectious diseases, localization and elimination of their foci, outbreaks and epidemics. The basis for planning and conducting preventive and anti-epidemic measures is based on the principles of complexity and influence on the leading link of the epidemic process.

Anti-epidemic measures include impact on all three elements of the epidemic process, with additional emphasis on a group of people at risk of infection. The first group of measures provides for the timely detection of infectious patients and carriers among people, their blocking (isolation), which is carried out with the sanitary protection of the sea, air and land borders of the state; at epidemiological observation; when conducting sanitary and epidemiological exploration; with a periodic examination for the carriage of infection in persons of certain professions and who have recovered; their sanitation and treatment.

When determining the complex of necessary preventive and antiepidemic measures, it is important to correctly assess the epidemic danger of the patient. The measures aimed at reducing the epidemic danger of the patient as the source of the pathogen include: early detection, timely diagnosis of the disease, isolation, treatment, laboratory control during therapy and at discharge from hospital, dispensary observation

The detection of an infectious patient is active and passive. Active detection of such a person occurs during the implementation of preventive examinations of certain population groups, in the outbreaks of infectious diseases, in house visits in the territory of settlements. Passive identification of the patient occurs in the clinic or at home - when the patient himself is seeking medical help. With such a finding, due to late seeking medical help, isolation and hospitalization of the patient are sometimes untimely.

Early diagnosis of infectious diseases allows timely initiation of anti-epidemic measures, in particular such important ones as isolation of the source of infectious agents. Isolation can occur in a hospital or at home. With some infectious diseases (abdominal and typhus, Brill's disease, diphtheria, plague, cholera, anthrax, rabies, tetanus, etc.), hospitalization is compulsory. In other infectious diseases, hospitalization is performed according to clinical or epidemiological indications. Hospitalization according to clinical indications is performed taking into account the severity of the disease (severe or moderate severity), the presence of complications and the age of the patient [5].

Hospitalization according to epidemiological indications is carried out at the absence of the patient's conditions for isolation (a flat without communal facilities, a hostel, a boarding school, a closed children's pre-school institution, etc.) or where the patient belongs to a decreed group of the population.

Isolation at home is possible with less dangerous infections (measles, rubella, influenza, whooping cough, chicken pox, mumps, shigellosis, viral hepatitis) with satisfactory communal conditions; the presence of people who can care for the sick; absence of children who did not previously suffer from this infectious disease at a sufficiently high level of sanitary culture of the population.

Recovering the patient (that is, a condition where he is no longer the source of the pathogen) is confirmed by the results of a laboratory study, which is carried out to check the release of the organism from an infectious agent. Particular attention is paid to persons belonging to the decreed groups of the population (employees of children's preschool institutions, medical institutions, food enterprises, water pipelines, etc.).

These persons are obliged to carry out bacteriological monitoring before admission to work. Anti-epidemic measures for carriers of infection include: detection of carriers, their isolation (in some cases) and sanitation, removal from work or other activities where they represent epidemic danger, laboratory examination, dispensary observation [7,8].

Measures to interrupt or destroy the mechanism of transmission of infection are an important component of the complex of general sanitary measures. Priority areas are preventive disinsection, disinfection, sterilization [9].

Competent and timely implementation of anti-epidemic measures in case of infectious diseases can prevent the spread of infection, reduce the incidence rate, and, in case of severe infections, save a large number of human lives.

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使用枯草芽孢杆菌菌株制备奶牛乳房的方法的开发

**Development of a method for the sanitation of the udder of cows using strains of *Bacillus subtilis* bacteria**

**Tarabukina Nadezda Petrovna**

*Doctor of Veterinary Sciences, Professor, Head of laboratory*

**Dulova Sargylana Vitalievna,**

*Postgraduate*

**Parnikova Svetlana Ivanovna**

*Candidate of Veterinary Sciences, Senior Research Officer*

*Yakut Research Institute of Agriculture named after M.G. Safronov*

摘要。作为卫生卫生代理商，测试了新制剂“Probiodez 3 + 5”的原型。该制剂是基于菌株枯草芽孢杆菌TNP-3和枯草芽孢杆菌TNP-5，其含量为 $1.5 \times 10^5$  CFU / ml。Probiodez 3 + 5“有助于将微生物污染总量减少50倍。从长期来看，基于枯草芽孢杆菌TNP-3菌株和枯草芽孢杆菌TPN-5菌株的卫生卫生手段可用于生产高质量牛奶和预防乳腺炎。在研究的基础上，申请被提交。

关键词：牛，乳房，微生物污染，枯草芽孢杆菌。

**Abstract.** *As a sanitary-hygienic means, a prototype of the new preparation “Probiodez 3 + 5” was tested. The preparation is based on strains of bacteria *Bacillus subtilis* TNP - 3 and *Bacillus subtilis* TNP - 5 with a content of  $1.5 \times 10^5$  CFU / ml. Treatment of the skin of the nipples of the udders of cows after milking with the preparation “Probiodez 3 + 5” helps to reduce the total microbial contamination by 50 times. In the long term, the use of sanitary-hygienic means based on strains of bacteria *Bacillus subtilis* TNP-3 and *Bacillus subtilis* TPN-5 isolated from permafrost soils can contribute to the production of high-quality milk and the prevention of mastitis. On the basis of the research, an application was filed for obtaining a patent of the Russian Federation for inventing.*

**Keywords:** *cow, udder, microbial contamination, *Bacillus subtilis*.*

The development of agricultural production, including dairy farming, requires not only an increase in milk production, but also an increase in its sanitary quality, which directly affects human health, the economic potential of farms and dairy enterprises [1].

Currently, one of the promising areas in the prevention of animal diseases

caused by opportunistic microflora is the use of probiotics. The use of buyoiotic drugs can significantly reduce the level of pathogens in the premises, since the main and most massive source of their contamination is sick animals [2].

Probiotics based on strains of the bacterium *Bacillus subtilis* are a new class of drugs that affect the regular systems of the body and thereby activate metabolic processes, nonspecific resistance and immune status [3,4].

All over the world, bactericidal agents are being searched for effective removal of microbial contaminants from the skin of the uterine nipples. Antiseptic agents should have high bactericidal activity against the main pathogens of mastitis, does not irritate the skin of the udder nipples and stay on the surface for a long time, creating a protective film [1].

In this regard, the relevance to the study and the method of their obtaining safe and with highly bactericidal activity of probiotic sanitary-hygienic means is growing at the present time.

For the first time in veterinary science and practice, in particular in veterinary sanitation, a new technology will be proposed for the use of probiotic sanitary and hygienic agents for animals based on the strain of *Bacillus subtilis* bacteria isolated from permafrost soils.

The investigations were carried out in the Laboratory for the Development of Microbial Preparations of the Yakut Research Institute of Agriculture named after M.G. Safronov. The scientific and production experience was conducted in the cattle - breeding farm of the village of Hatassy of the Sakha Republic (Yakutia). This farm specializes in the commercial production of milk. The content of cows of Kholmogory breed is tied, the experience was carried out in the period of mass calving at the end of March, and also in the summer pasture period. Milking two-fold, on a linear milking machine.

In the experimental group of cows, immediately after milking, the udder nipple was treated with the test substance by the method of small-drop spraying at a flow rate of 1 ml per each teat. Control animals were not subjected to treatment.

Experimental series of the solution “Probiodez 3 + 5” in combination with strains of bacteria *Bacillus subtilis* TNP-3 and *Bacillus subtilis* TNP-5 at the rate of  $1.5 \times 10^3$  cfu / ml were tested as a sanitizing agent for the treatment of nipples of udder cows. Strains of bacteria *Bacillus subtilis* TNP-3 and *Bacillus subtilis* TNP-5 were isolated from the frozen soils of Yakutia, passportized and deposited in the All-Russian Collection of Microorganisms of Livestock and Veterinary Use (VGNKI, Moscow). The effectiveness of sanitizing with a probiotic preparation was taken into account according to the level of bacterial contamination-the number of mesophilic aerobic and facultative-anaerobic microorganisms (QMAFAnM) on the skin of the nipple.

As shown by the results of the sanitary treatment of the udder nipple after

milking, the use of the preparation “Probiodez 3 + 5” at the rate of 4 ml / cow contributed to a decrease in the total microbial contamination (QMAFAnM) of the udder nipple by a factor of 50, while in the control group of cows without treatment an increase in QMAFAnM in 2,2 times. In the experimental group of cows, the total microbial contamination of the udder nipples is 450 times less than in the control group.

The development of new highly effective and multifunctional sanitary and hygienic means for animals is a priority in the development of veterinary sanitation. A possible alternative to the traditional method of treatment with chemical disinfectants is a sanitizing - disinfecting probiotic preparation based on strains of *Bacillus subtilis* bacteria, which possesses a unique combination of a complex of biologically active properties that affect the body's regulatory systems and, thereby, activate metabolic processes, nonspecific resistance and immune status.

Based on the data obtained, it is possible to conclude that the probiotic “Probiodez 3 + 5” tested with the content of *Bacillus subtilis* strains for sanitary and hygienic treatment of the udder of the cows after milking, contributed to a decrease in the total microbial population (QMAFAnM) of the udder nipple by 50 times, when both the control group of cows without treatment showed an increase in QMAFAnM by 2.2 times. In the experimental group of cows, the total microbial contamination of the udder nipples is 450 times less than in the control group. The number of spore-forming bacteria, staphylococci and *Escherichia* decreases, it also has no side effect and does not cause allergic reactions of the skin of the nipples of the udders of cows.

In our studies, a high incidence of mastitis, especially subclinical, was established, according to our observations - up to 24.7% of the total number of livestock. The application of “probiodez 3 + 5” for the post-child treatment of the udder nipples within a month reduces the number of cows with subclinical mastitis by 12%. On the basis of the conducted researches, the application “Method of sanitation of the udder of cows using strains of bacterium *Bacillus subtilis*” was filed for obtaining the patent of the Russian Federation for the invention.

In the long term, the use of sanitary-hygienic means based on strains of bacteria *Bacillus subtilis* TNP-3 and *Bacillus subtilis* TPN-5 isolated from permafrost soils can contribute to the production of high-quality milk and the prevention of mastitis.

Thus, a possible alternative to traditional methods of processing chemical disinfectants can be preparations based on probiotic strains of *Bacillus subtilis* bacteria.

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现代生物技术中从冻土中分离出的枯草芽孢杆菌菌株的前瞻性应用  
**Prospective application of strains of *Bacillus subtilis* bacteria isolated from permafrost soils in modern biotechnology**

**Tarabukina Nadezhda Petrovna**

*Doctor of Veterinary Sciences, Professor, Head of laboratory  
Yakut Research Institute of Agriculture named after M.G. Safronov*

**Stepanova Anna Mikhailovna**

*Yakut Research Institute of Agriculture named after M.G. Safronov*

**Neustroev Mikhail Mikhailovich**

*“Republican Information and Analytical Center  
for Environmental Monitoring”*

*of the Ministry of Nature Protection of the Republic of Sakha (Yakutia)*

摘要。现代生态学的主要任务是保护环境免受潜在的自然污染。其中之一，污染是由动物和采矿废物造成的。本文介绍了在环境生物技术中使用枯草芽孢杆菌菌株的研究结果。环境生物技术意味着利用生物体来处理危险废物和防治环境污染。通过使用枯草芽孢杆菌菌株，TNP-3和枯草芽孢杆菌TNP-5，已经在鸟粪的基础上开发了用于获得用于油污污染永久冻土的生物修复的饲料添加剂和有机微生物肥料的方法。

关键词：凋落物，益生菌，枯草芽孢杆菌菌株，饲料添加剂，微生物肥料，石油污染土壤，生物修复。

**Abstract.** *The main task of modern ecology is to protect the environment from potential pollutants of nature. To one of which, pollution is caused by animal and mining waste. This article presents the results of research on the use of strains of *Bacillus subtilis* bacteria in environmental biotechnology. Environmental biotechnology means the use of living organisms for processing hazardous waste and combating environmental pollution. With the use of strains of *Bacillus subtilis* bacteria TNP-3 and *Bacillus subtilis* TNP-5, methods for obtaining fodder additives and organic microbial fertilizers for bioremediation of oil-polluted permafrost soils have been developed on the basis of bird droppings.*

**Keywords:** *litter, probiotic, strains of *Bacillus subtilis* bacteria, fodder additive, microbial fertilizers, oil contaminated soils, bioremediation.*

Bacteria of the genus *Bacillus* due to spore formation occupy a special place in the microbial world of our planet. Aerobic spore-forming bacteria of the genus *Bacillus* are widely distributed in nature, where they take an active part in the

circulation of substances. The extremely high adaptive capacity of bacteria of the genus *Bacillus* ensures their existence and dominance in the extreme conditions of the North. According to reports, bacteria of the genus *Bacillus* dominate the microbiota of cryogenic soils [2, 8, 12]. Aerobic spore-forming bacteria of the genus *Bacillus* are one of the promising groups of microorganisms used in modern biotechnology

In recent decades Yakutsky Agricultural Research Institute has developed a number of innovative probiotic preparations based on active, unique natural bacterial strains *Bacillus subtilis* TNP-3 and *Bacillus subtilis* TNP-5 isolated from Yakutia permafrost soil, which have been certified and deposited in the Russian National Collection of Microorganisms used in livestock and veterinary medicine (Moscow, 2000). Probiotic preparations are successfully used in northern livestock.

The main task of modern ecology is to protect the environment from potential pollutants of nature. To one of which, pollution is caused by animal and mining waste. Rates of growth in agricultural production does not provide the full problem of processing manure primarily poultry manure, which according SANPiN refers to the group II of hazardous wastes to humans and animals. The amount of poultry waste often exceeds the output. Especially large economic damage is caused by non-recyclable waste. Bird droppings, depending on the conditions of feeding and keeping the poultry, can be a valuable organic fertilizer or environmental pollutant.

Also, an environmental problem in the regions of development of the oil and gas industry is pollution of the environment with oil and oil products. At present, work is being carried out on the extraction, processing, transportation, consumption of oil and gas in the northern regions of Russia, soils that are characterized by severe bioclimatic conditions with relatively low self-cleaning ability. Oil and products of its processing, many of which are extremely toxic, are carcinogenic and persistent, that is, they are destroyed extremely slowly, in particular, in Siberia with its cold climate [3, 5]. Automediation of oil contaminated soils can last up to 30 years, in the northern regions, the destruction period is 50 years or more, and the toxic properties of oil disappear 10-12 years after reclamation work [1, 6]. Restoration of degraded soil is a complex and lengthy process, since of the three main components of the natural environment of components - soil, water, air - it is the soil that can accumulate and fix toxic substances. The use of living organisms, in particular microorganisms, plays a special role in solving environmental problems. With great efficiency, microbial fertilizers based on the microflora of manure and manure are used for bioremediation of oil contaminated soils. Microbial fertilizers are able to decompose oil pollution in the soil cenosis.

Manure, bird droppings are the sources of a huge number of diverse microorganisms capable of decomposing various substrates [11]. It is assumed that organic matter, being a source of carbon and energy for microorganisms,

increases the efficiency of soil self-purification due to the intensification of microbiological processes and the phenomenon of cometabolism [13]. In addition, manure and droppings are dangerous factors of infection transmission and at the same time valuable organic fertilizers, therefore various technologies are provided for obtaining safe livestock wastes [12].

In order to ensure the ecological safety of food products in the countries of the European Union, the use of antibiotics in the cultivation of farm animals and the receipt of livestock products is prohibited. Therefore, worldwide, including Russia, is actively developing and implementing safe, effective probiotic drugs, as an alternative to antibiotics [7].

We have developed the probiotic “Nord-Bact” from an equal combination of strains of bacteria *Bac. subtilis* “TNP-3” and *Bac. subtilis* “TNP-5”, suspended in a 1% solution of glucose, contains up to  $5 \times 10^9$  CFU of *B. subtilis* in 1 ml. The use of the probiotic “Nord-Bact” in poultry breeding has a high preventive effect: it actively forms intestinal microbiocenosis, increasing the level of colonization of representatives of normal microflora (spore-forming aerobic bacteria, lacto- and bifidobacteria, enterococci), inhibiting the growth and development of enteropathogenic and opportunistic microorganisms. After using the probiotic “Nord-bact” microbiological safety of egg products is ensured, moreover, the content of vitally important minerals and vitamins significantly increases in the yolk, protein and shell, egg fighting (by 1.4%), impurity (by 4, 7%), and productivity (4%) increases. [10].

This article presents the results of research on the development of methods for processing bird droppings using microbiological synthesis methods and their use to produce fodder additives and organic fertilizers for bioremediation of oil-polluted permafrost soils.

A feed additive was obtained from poultry waste. Litter after a 10-day application of the probiotic “Nord-Bact” does not contain pathogenic staphylococci, microscopic fungi unlike the litter obtained from chickens without the use of a probiotic. When developing the regimes for obtaining a feed additive (powder) using an extruder, also infrared drying at various temperatures and exposures, were based on the results of microbiological and biochemical studies. According to the results of the research, an effective mode of obtaining a fodder additive (powder) has been developed - with infrared drying at a temperature of  $90^\circ \text{C}$  and an exposure of 30 minutes, providing lactobacilli in the feed additive up to  $8 \times 10^9$  CFU / g, and bifidobacteria up to  $2 \times 10^3$  CFU / g and enterococci  $5 \times 10^4$  CFU / g, and a significantly high content of essential amino acids.

Also, when using the bioremediation of oil-contaminated soils in the litter of chickens, in which the dietary supplement “Nord-Bact” was added, the destruction of oil in the soil for 3 months was 98.07%. And when using chicken manure

(without feeding a probiotic), the content of oil products in the soil during the same period is reduced by only 37.6%. The scientific novelty of the developments is confirmed by the receipt of 3 patents of the Russian Federation “Method for purification of permafrost soils from oil by spore-forming bacteria *Bacillus subtilis*”, “Method for bioremediation of oil-polluted permafrost soils”, “Method for preparing feed additive from bird droppings using strains of *Bacillus subtilis* bacteria TNP-3-DEP” and “*Bacillus subtilis* TNP-5-DEP”.

Thus, based on the studies carried out, it is possible to conclude that the use of strains of *Bacillus subtilis* bacteria in the creation and introduction of non-waste technologies is promising, allowing to include in the economic circulation all raw materials that are constantly formed and accumulated in poultry farms in the production of basic poultry products.

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各种生殖阶段对动物血液某些组分的影响  
**Influence of various reproductive stages  
on some components of blood in animals**

**Tantawy Abuelkassem Abubakr Abdelwahab Ahme†**  
**Abd-El Moty Khairy Ibrahim Abd-El Moty**  
**Abdelhakim Abdelhady Abdelnaby**  
**Fahmy Samir Tawfek Mohamed**  
*Department of Animal Husbandry*  
*Faculty of Agriculture*  
*University of Minium - Egypt*

**摘要。** 文章介绍了氨基酸平衡饮食的研究，该研究允许减少尿素的合成并节约能量，这反过来又可以针对更重要的需求，这在泌乳开始时尤其重要。在负能量平衡期间，奶牛给奶时。这可以让你减少代谢紊乱。繁殖效率是奶牛场盈利的核心。当女性早期构思服务数量较少（少于三次）时，可以实现最大的经济回报。为了克服奶牛养殖场中长期产犊间隔的不便现象，GnRH和pros-taglandin (PGF2 $\alpha$ ) 已被用于不同的组合以提高动物的繁殖效率。

**关键词：**氨基酸，奶牛，氨基酸平衡，消化氨基酸，赖氨酸和蛋氨酸。

**Abstract.** *The article presents a review of the research of balancing diets by amino acids that allows to reduce synthesis of urea and save energy, which, in turn, can be directed to more essential needs, which is especially important at the beginning of lactation during a negative energy balance, when cows are given with milk has more energy than it consumes with food. This allows you to reduce the metabolic disorders. Reproductive efficiency is the core of dairy farms profitability. Maximum economic return could be achieved when females conceived early with fewer number of services (less than three inseminations). To overcome the inconvenient phenomenon of long calving interval in dairy farms, GnRH and pros-taglandin (PGF2 $\alpha$ ) have been used in different combinations to improve the reproductive efficiency in animals.*

**Keywords:** *amino acids, dairy cows, amino acid balance, digested amino acids, lysine and methionine.†*

### 1. *Total protein and its fractions*

In cows, (1) reported that the sum of serum  $\beta$  ( $\beta$  1 and  $\beta$  2) globulins measured in estrus was ( $0.91 \pm 0.1$  g/dl), met-estrus was ( $1.7 \pm 0.1$  g/dl) and di-estrus was ( $0.91 \pm 0.04$  g/dl). He also reported that serum globulin values in pro-estrus were higher ( $0.63 \pm 0.04$  g/dl) and in es-truss were lower ( $0.03 \pm 0.05$  g/dl) than other phases. (2) reported that, se-rum total protein signifi-cantly increased in early, mid and late lactation compared to di-estrus and early gestation. They added that, this increase may be due to the increase in globulin concentration. Total pro-tein and albumin significantly differed during the different phases of reproductive stages in ewes (3). They reported that total protein and albumin concentrations in serum were lower in estrus compared to the other phases of reproductive stage. (4) reported that the variation of serum total protein values of cows in different stages of estrus cycle was statistically signifi-cant ( $4.92 \pm 0.406$  in estrus stage and  $6.22 \pm 0.361$  in met-estrus and  $5.56 \pm 0.218$  in di-estrus). Also, serum globulin values in different stages of estrus cy-cle was statistically significant. The lowest value was recorded in estrus stage. However, serum albumin values in pro-estrus were the highest ( $2.36 \pm 0.14$  g/dl) and in estrus was the lowest ( $2.08 \pm 0.16$  g/dl).

(5) reported that serum total protein showed a significant increase during early pregnan-cy in ewes compared to estrus. Also, (6) reported that serum total protein value in estrus phase was  $7.13 \pm 0.04$  g/dl which was lower than in the first month of pregnancy ( $7.21 \pm 0.08$  g/dl) and in the second month of pregnancy ( $7.26 \pm 0.08$  g/dl) in goats. They added that, albumin value in estrus phase was  $3.00 \pm 0.01$  g/dl which was the same in the first month of pregnancy ( $3.00 \pm 0.01$  g/dl), but lower than that ( $3.04 \pm 0.02$  g/dl) in the second month of pregnancy. (7) reported that, the normal cyclic buffaloes had a significantly higher concentration of serum protein as compared to the anestrus. Similar findings have been reported by other workers (8 and 9). Also, (10) indicated that high plasma proteins were found in cycling dairy cattle com-pared to non-cycling at the time of estrus. In Red Sokoto goats, (11) found that serum total protein was significantly lower at early estrus phase than other phases of the cycle. They also found that globulin concentration was lower at early estrus phase than mid-diastral phase.

On the other hand, (12) reported that total protein level was higher in estrus phase in cows ( $7.98 \pm 0.12$  g/dL) as compared to post 60 day in pregnancy stage ( $7.90 \pm 0.18$  g/dL). The same result was observed in albumin, which was higher in estrus phase ( $2.18 \pm 0.35$  g/dL) as compared to post 60 day in pregnancy stage ( $2.13 \pm 0.07$  g/dL). Decline of total protein and albumin with progress of gestation agreed with result obtained by (13) and (14).

While, (15) reported that there was no significant effect of the reproductive stage on the serum concentration of total protein in Karakul sheep.

## 2. *Sodium and potassium*

The potential of minerals plays a significant role in herd fertility (16). (17) indicated that minerals in organic compounds have a beneficial role in resumption of follicular growth and fertility in dairy cow. (18) found no significant difference in sodium concentration between estrus cycle and pregnancy stage ( $145.29 \pm 3.90$  mmol/l and  $145.29 \pm 3.84$  mmol/l, respectively). He also reported no significant effect on potassium concentration between estrus cycle and pregnancy stage ( $3.95 \pm 0.16$  mmol/l and  $3.83 \pm 0.14$  mmol/l, respectively). (19) indicated that the concentration of sodium and potassium was non-significant among normal cyclic buffa-lose (in the day of estrus) and anestrus buffaloes and repeat breeder. These results agreed with (20) in cows.

On other hand, negative correlation between sodium level and months of pregnancy in cat-tle was obtained by (21). (22) found that Na and K levels increased during pregnancy insheep. (23) reported a significantly higher sodium level in normal cyclic compared to repeat breeder Egyptian buffaloes. Sodium was higher ( $P < 0.05$ ) at estrus than at day 21 post estrus in multiparous cows and concentrations of serum potassium (K) were the lowest ( $P < 0.05$ ) at es-trus than those of conceived cows (24). There was a significant increase in serum K concentra-tion in cattle and sheep during pregnancy (25).

## 3. *Glucose and cholesterol*

(26) illustrated that there was a significant difference in plasma glucose between cows that became pregnant and those that did not. Optimum concentrations of blood glucose induce estrus cyclicity via hypothalamus-hypophyseal system (27). (28) in dairy cows, indicated that glucose was a limiting factor to improve oocyte quality. They added that, follicular glucose availability has been the reason for the global improvement in oocyte quality.

(29) and (30) reported significantly lower serum glucose level in an-estrus than normally cycling animals. (31) reported significantly higher serum glucose in cyclic cows than the non-cycling one's. (32) indicated that high plasma glucose was reported in cycling dairy cattle compared to non-cycling at the time of estrus.

On the other hand, (32) reported that mean concentrations of serum glucose in cyclic and non-cyclic cows was  $50.72 \pm 1.12$  and  $50.56 \pm 1.13$  g/dL, respectively and this difference was non-significant. Also, (7) reported that the normal cyclic animals had no-significant effect on glucose concentrations compared to the anestrus animals, (33) reviewed that glucose concen-trations of cows on day of estrus was significantly low in comparison with pregnant cows. (12) reported that glucose level was higher in pregnancy stage compared to estrus phase in cows and buffaloes.

(3) stated that blood glucose was low during estrus and 21 days of pregnancy

and rapidly increased at 90 days of pregnancy in Egyptian ewes the differences was significant ( $p < 0.05$ ). These results agreed with those obtained by (34). Recently, (35) illustrated positive effect of pregnancy stage on the concentrations of plasma glucose.

(6) reported that serum cholesterol values of goats in estrus phase ( $76.35 \pm 1.98$  mg/dl) were lower than in the first and second months of pregnancy. These differences between the two phases were significant ( $p < 0.05$ ). Significant decrease ( $p < 0.05$ ) in total cholesterol in late pregnancy in Friesian cows has been reported by (36). Similar result was reported by (38) in cows and (39) in goats. While, (36) found that the stage of pregnancy did not significantly influence serum cholesterol level in dairy cows.

#### **4. Progesterone and triiodothyronine**

Progesterone on the day of estrus ranged from 0.19 to 0.33 ng/ml in dairy cows (39). (40) reported that in buffalo's progesterone levels continue to increase in animals with the progress of pregnancy. They added that the onset of decline in progesterone concentrations is variable, depending upon the time of regression of corpus luteum. Peripheral progesterone concentrations are minimal on the day of estrus (0.1 ng/ml), rise to peak concentrations of 1.6-3.6 ng/ml on days 13 to 15 of the cycle in buffaloes (41) or even on day 17 in buffaloes (42). (43) in buffaloes found that buffaloes progesterone concentration gradually increased from estrus to reach the maximum concentration of 5.5 ng/ml on day 17 of the estrus cycle.

(44) showed that plasma progesterone level increased during pregnancy. Also, (45) found that progesterone concentration is minimal on the day of estrus in Zebu cattle (less than 1 ng/ml) and highly increased after 60 days throughout pregnancy (more than 7 ng/ml). (46) showed that plasma progesterone level increased after 19 days from estrus than estrus day in dairy cattle. (3) found that progesterone concentrations were minimal on the day of estrus in Egyptian ewes ( $0.56 \pm 0.18$  ng/ml) and significantly increased throughout pregnancy ( $7.11 \pm 0.18$  ng/ml). (47) showed that plasma progesterone level in cows increased after 24 days from estrus than estrus day (2.82 and 0.61 ng/ml respectively). (48) showed that plasma progesterone level in buffaloes increased after 23 days from estrus than estrus day (0.90 and 0.20, respectively). (49) found that progesterone concentration is minimal on the day of estrus in goats ( $0.28 \pm 0.07$  ng/ml) and significantly increased ( $4.27 \pm 0.85$ ) after 30 days throughout pregnancy. Recently, (50) showed that plasma progesterone level increased after 17 days from estrus than estrus day in cows.

Generally, thyroid activity exerts an important influence on energy metabolism in mammals (51). Epidemiological studies have suggested that the role of thyroid hormones in the onset of ovarian activity, is part of the complex hormonal

mechanism that regulates steroidogenesis in the ovary (52). (10) reported that, thyroid activity in lactating buffaloes may have some impact on their fertility status and cycling. A cycling lactating buffaloes had lower ( $p < 0.05$ ) concentrations of thyroid hormones.

Mean plasma triiodothyronine concentrations have been reported to vary between  $0.84 \pm 0.16$  and  $1.88 \pm 0.10$  ng/ml during the estrus cycle of buffaloes (53). (54) reported a fall in thyroid hormones in Egyptian buffaloes exhibiting silent estrus. T3 levels have been reported to be significantly higher in cycling buffalo heifers compared to anoestrus heifers (55). (3) re-reported that T3 in ewes increased numerically throughout the stages of estrus, 21 and 90 days of pregnancy ( $33.60 \pm 13.63$ ,  $45.01 \pm 13.63$  and  $51.79 \pm 13.63$  ng/dl, respectively). (56) illustrated that the highest T3 level was observed on the day of estrus. On the other hand, (36) reported that serum level of triiodothyronine (T3) was not significantly affected by stage of pregnancy.

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马疾病“扼杀”在马养殖  
Disease of horses “Strangles” in horse breeding

**Neustroev Mikhail Petrovich**

*Doctor of Veterinary Sciences, Professor, Head of laboratory*

**Elbyadova Evdokya Ignatievna**

*Research Assistant, Postgraduate*

**Popov Andrian Afanasievich**

*Postgraduate*

*Yakut Research Institute of Agriculture named after M.G. Safronov*

摘要。扼杀是马的传染病，主要是马驹，这是由鼻咽粘膜和区域淋巴结的卡他 - 化脓性炎症所表现的。马很容易受到几乎所有年龄段的扼杀。据了解，约有20-30%的母马是感染源，并导致驹之间的窒息蔓延[2]。俄罗斯和独联体国家的扼杀现象十分普遍。目前在俄罗斯没有针对扼杀的具体预防措施。开发抗窒息疫苗是兽药的一项紧迫任务。作为实验室研究的结果，从临床上患病的马驹中分离并鉴定了新的高免疫原性马链球菌H-5/1株，其用于开发针对扼杀的灭活疫苗。

关键词：马，免疫，扼杀，感染，疫苗，菌株，链球菌，马链球菌。

**Abstract.** *Strangles is an acute infectious disease of horses, mainly foals, which is manifested by catarrhal-purulent inflammation of the nasopharyngeal mucosa and regional lymph nodes. Horses are susceptible to strangles of almost all ages. It is known that about 20-30% of mares are sources of infection and contribute to the spread of the strangles among the foals [2]. Strangles in Russia and CIS countries is widespread. At this time in Russia there is no specific prevention against the strangles. The development of a vaccine against the strangles is an urgent task of veterinary medicine. As a result of laboratory researches, a new highly immunogenic Streptococcus equi H-5/1 strain was isolated and identified from clinically sick foals, which is used to develop an inactivated vaccine against strangles..*

**Keywords:** *horse, immunity, Strangles, infection, vaccine, strain, streptococcus, Streptococcus equi.*

Yakutia is one of the first regions where herd horse breeding is developed. Here the most enduring and resistant to severe, extreme environmental conditions, horses of local Yakut breed are grown. Horses, being under constant influence of

unfavorable climatic factors, in the process of their development for thousands of years have developed high adaptive qualities: ability to tebenevke, high endurance and unpretentiousness to forages. They have a high feeding and fattening ability and in a short period of summer and pasture season lay a large amount of fat that serves as an energy reserve in more critical periods.

However, despite such positive qualities of the local breed of horses, the development of herd horse breeding is closely related to the well-being of infectious and invasive diseases of horses. At this time, the fight against infectious and invasive diseases of animals is the main task of the veterinary service.

One of the most common infectious diseases among horses is the strangles, which occurs in almost all regions of the republic and in other regions of Russia, as well as in the CIS countries where the horse breeding industry is developed. Mostly stallions are 6-12 months of age. But there is evidence that horses are very susceptible to strangles of almost all ages. It is known that about 20-30% of mares are sources of infection and contribute to the spread of the sooth among the foals [2]. It is believed that after a natural illness, horses wash their natural immunity [1]. However, in some literature there is information about repeated disease of horses with strangles for a year after recovery [4].

This disease is characterized by the defeat of the mucous membranes of the upper respiratory tract, pharynx and the development of abscesses of regional lymph nodes, mainly submandibular nodes. The causative agent of this disease is *Streptococcus equi*. At present, according to the taxonomy of The Taxonomicon and Systema Naturae 2000, three subspecies of *Streptococcus equi* are known: *Streptococcus equi* subsp. *Equi*; *Streptococcus equi* subsp. *Zoopidemicus* and *Streptococcus equi* subsp. *Ruminatorum*. And from them the pathogen, which affects the respiratory tract of foals - is *Streptococcus equi* subsp. *Equi*. The disease caused by them is characterized by fever, mucopurulent outflow from the nose and the formation of abscesses of regional lymph nodes. There is evidence that the causative agent of the strangles is isolated from cattle, pigs, dogs, rabbits, birds and even people [5, 6]

The rapid spread of the disease is facilitated by a large accumulation of horses, uncontrolled delivery of riding horses from other regions and the exchange of animals between farms within the republic, stressful situations caused by extreme conditions of tebenevka, a decrease in immunobiological resistance in the winter-spring period and high resistance of the causative agent in the environment [2, 3]

According to our observations and researches, the incidence of strangles remains high. So, the incidence is annually - 62%, and the lethality - 4-22%. We and other authors noted that this disease is complicated by rhinopneumonia, salmonella, influenza and mycotoxicosis. With such complications, lethality can reach up to 22% [2, 7].

The fight against the disease consists in the identification of sick animals, their isolation, the provision of therapeutic and preventive measures. Scientists of YANIISH in 2000 developed and implemented inactivated vaccine against the strangles with immunomodulator. The vaccine was made on the basis of *Streptococcus equi* strain H-34, which was deposited in the collection of the All-Russian State Control Institute of Veterinary Preparations. As an immunomodulator, polyribonate was used. Wide production trials showed high efficiency (up to 95%) of specific vaccine prevention. Currently, the vaccine is not produced due to the expiry of the registration period in the Russian Federation. In Russia there is no vaccine against the strangles.

At present, the vaccine “Akyntai” is applied on the territory of the Republic of Kazakhstan, which includes antibiotics of a wide spectrum of action. The use of the vaccine “Akyntai” in Russia is prohibited, since the vaccine is not registered in the Rosselkhoz nadzor registry.

Proceeding from the foregoing, to date the radical task of veterinary medicine is the development of a vaccine against the strangles, as well as effective and safe treatments and general preventive measures.

Based on this, we were tasked to: identify and identify a new strain of *Streptococcus equi* for the development of a new effective vaccine against the strangles. To isolate under laboratory conditions, biological materials from clinically ill foals have been researched. Primary microscopy of some smears-prints made from the contents of abscesses of lymph nodes and washings of nasal outflows showed the presence of a Gram of positive streptococci, as well as the accompanying microflora (diplococci, gram-negative rods, fungal spores, etc.) in researched materials. It should be noted that primary microscopy of print smears has an approximate diagnostic value.

In the broth, the *Streptococcus equi* strain gives rise to the formation of a benthic flocculent deposit, which, when shaken, rises with a pigtail upward. In smears from daily broth cultures, streptococci are located in the form of long filaments, which are characteristic of a streptococcus (from 10 and above microbial cells).

On dense nutrient media the *Streptococcus equi* strain grows in the form of small, glassy, dewy, mucous colonies. In smears made of agar cultures, streptococci are located in short chains sometimes in pairs and singly. On the blood agar, form a shiny, small and mucous colonies with a hemolysis zone of type  $\beta$ .

A new strain of *Streptococcus equi* H-5/1 on morphological, tinctorial, cultural and genetic properties was identified and confirmed as a strangles streptococcus.

Currently, a new effective inactivated vaccine against the strangles with immunomodulator has been developed on the basis of *Streptococcus equi* H-5/1 strain. As the immunomodulator, a culture liquid of the bacterial strain *Bacillus subtilis* TNP-3, deposited in VGNKI veterinary preparations, was used. The new

vaccine is completely harmless to animals and has a high immunogenic ability, does not give post-vaccination complications, due to the components that make up its composition.

At this time, a new inactivated vaccine with an immunomodulator against the washing of horses is in the approval stage in the Rosselkhoznadzor registry.

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免疫预防牧马繁殖中的感染性流产

## Immunoprophylaxis of infectious abortions in herd horse breeding

**Neustroev Mikhail Petrovich**

*Doctor of Veterinary Sciences, Professor, Head of laboratory*

**Petrova Sargylana Guryevna**

*Candidate of Veterinary Sciences, laboratory employee*

**Tarabukina Nadezhda Petrovna**

*Doctor of Veterinary Sciences, Professor*

*Yakut Research Institute of Agriculture named after M.G. Safronov*

**摘要。** 马匹繁殖的发展受到细菌和病毒病原学马传染性流产的抑制。经济损失包括刺猬生殖能力的丧失，后代的不足和动物的淘汰。在这些疾病的不利农场中，马驹的产量为30-55%。为了预防传染性流产，已开发出针对沙门氏菌流产和马，鼻肺炎的灭活疫苗以及相关的沙门氏菌流产和鼻肺炎二价疫苗。疫苗无害，面源性，将马驹的经营产量提高10.2-36.0%，用于养马场的改良。

**关键词：**马，沙门氏菌败育，猪肺炎，马驹流失，疫苗。

**Abstract.** *The development of herd horse breeding is restrained by infectious abortions of horses of bacterial and viral etiology. The economic damage consists of the loss of the reproductive ability of the hedgehogs, the shortage of the offspring and the culling of animals. In disadvantaged farms for these diseases, the yield of foals is 30-55%. For the prevention of infectious abortions, inactivated vaccines against salmonella abortion and horses' rhinopneumonia, as well as an associated bivalent vaccine against salmonella abortion and rhinopneumonia were developed. Vaccines are harmless, areactogenic, increase the business yield of foals by 10.2-36.0%, are used in the improvement of horse farms.*

**Keywords:** *horses, salmonella abortion, rinopneumonia, loss of foals, vaccine.*

The Republic of Sakha (Yakutia) is located in the north-eastern part of the Russian Federation. Over 40% of the territory is beyond the Arctic Circle. Located in various landscape areas of Yakutia is characterized by a very diverse soil and vegetation cover. Despite extreme conditions, in comparison with other regions of the Far North, the Republic of Sakha (Yakutia) has a fairly developed agricultural production. Tabun horse breeding is one of the main branches of agriculture.

Equine farming in Yakutia is associated with year-round pasture and chaff [1].

The development of herd horse breeding depends on epizootic well-being, the timely conduct of preventive measures and the production of high-quality veterinary-sanitary products. In horse breeding farms of the republic the most common diseases that cause abortions in horses of infectious etiology are salmonella abortion and rinopneumonia. In conditions of Yakutia, abortions in horses are most often recorded between March and May, covering a significant number of mare mares. Extreme natural and climatic conditions (long cold period), peculiarities of the industry (the concentration of a significant number of horses during the weaning of foals), a decrease in the natural resistance of the organism of foal mares in the winter-spring period, prolonged survival of pathogens in the external environment cause a significant spread and stationarity of salmonella abortion and rhinopneumonia of horses in Yakutia. In the horse farms that are not healthy for these diseases, the losses of foals remain low (30-55%) [2].

For the prevention of salmonella abortion in horses, we developed, tested and approved the Rosselkhoznadzor of the Russian Federation (in 2012) an inactivated vaccine made from the strain of bacteria *Salmonella abortus equi* BN-12, an immunomodulator was added to increase the immunogenicity. The mare is immunized from 4 to 7 months of pregnancy. The vaccine is harmless and areoagentous, prevents 90-95% of vaccinated horses from salmonella abortion. The business level of foals is increased by 15.7-23%. The use of the vaccine ensures the recovery of farms from salmonellosis in horses. The vaccine is widely used in horse farms of the Republic of Sakha (Yakutia), Khakassia, Altai, Novosibirsk Region, Krasnoyarsk Territory and the Republic of Kazakhstan.

In the Russian Federation, live culture virus vaccine from the CB / 69 strain is used to prevent rhinopneumonia. Production tests in the conditions of horse herd showed the technological difficulties of the vaccination scheme, which provides for 2-fold administration. The second injection of the vaccine falls on January-February. The herd's arrival in this period causes certain difficulties because of the laboriousness and danger of abortion of a traumatic nature.

As the results of our research show, rinopneumonia in the conditions of herd horse breeding is recorded as a mixed viral-bacterial infection [3]. Therefore, we proposed a vaccination scheme for foal mares with an inactivated vaccine against salmonella abortion and a live culture virus vaccine from the CB / 69 strain against the horse's rhinopneumonia. Vaccines are administered simultaneously. With a mixed viral-bacterial infection, this vaccination increases the business yield of foals by 10.2-36.0%.

In recent years, we are working on the development of new vaccines. So, we have developed an inactivated vaccine against horses' rhinopneumonia [4, 5]. Immunization of pregnant mares with this vaccine causes the production of specific

hemagglutinating antibodies in high titers, stimulates the immunobiological reactivity of mares. The inactivated vaccine, once administered, is not inferior in effectiveness to living culture virus vaccine from the CB / 69 strain. Immunization of foal mares in dysfunctional points on rinopneumonia increases the business yield of foals by 10.9-33.3%.

Production tests of an inactivated associated vaccine against rhinopneumonia and salmonella abortion of horses were conducted. Associated divalent vaccine prevents from experimental infection with the virus of rinopneumonia by 87.5%, and from salmonella abortion - 100% of immunized animals [6].

Thus, new effective vaccine preparations have been developed by the staff of the Yakutsk Research Institute of Agriculture and the All-Russian Institute of Experimental Veterinary Medicine (Moscow). The vaccines developed by us have no analogues in Russia. The scientific novelty of developments is protected by 6 patents of the Russian Federation.

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民族菜在传播危险侵入性疾病方面的重要性  
**Importance of national dishes  
in the transmission of dangerous invasive diseases**

**Kokolova Luidmila Mikhailovna**

*Doctor of Veterinary Sciences, Head of laboratory*

*Chief Researcher*

**Gavrilieva Lyubov Yurevna**

*Candidate of Veterinary Sciences, Senior Research Officer*

**Stepanova Svetlana Maksimovna**

*Research Assistant*

*Yakut Scientific Research Institute of Agriculture. M.G. Safronov*

注释。雅库特北部人民的菜肴是特定的。它们通常由动物制成，鱼类生活在苔原状况下，被冰河缠住。古代北方的土著人民从事驯鹿放牧，狩猎和捕鱼。因此，菜肴占主导地位，主要来自他们行业的产品。菜肴非常令人满意，因为它们必须支持一个人的能量。

关键词：人，鱼，狩猎，民族菜肴，雅库特，条件，入侵，转移。

**Annotation.** *Dishes of the peoples of the North of Yakutia are specific. They are usually made from animals, fish that live in tundra conditions and are caught in cold rivers. Indigenous peoples of the north from ancient times were engaged in reindeer herding, hunting and fishing. Therefore, the dishes predominate, mainly from the products of their trades. Dishes are very satisfying, because they must support energy in a person.*

**Keywords:** *people, fish, hunting, national dishes, Yakutia, conditions, invasion, transfer.*

According to bioclimatic zoning (Yakutia) refers to the extreme-severe zone. The climate is sharply continental, characterized by a prolonged winter and short summer periods. The maximum amplitude of the average temperatures of the coldest month of January and the warmest July is 102.8°C. The absolute value of the minimum temperature and its total duration of the cold period from 6.5 to 9 months per year, the republic has no analogues in the Northern Hemisphere.

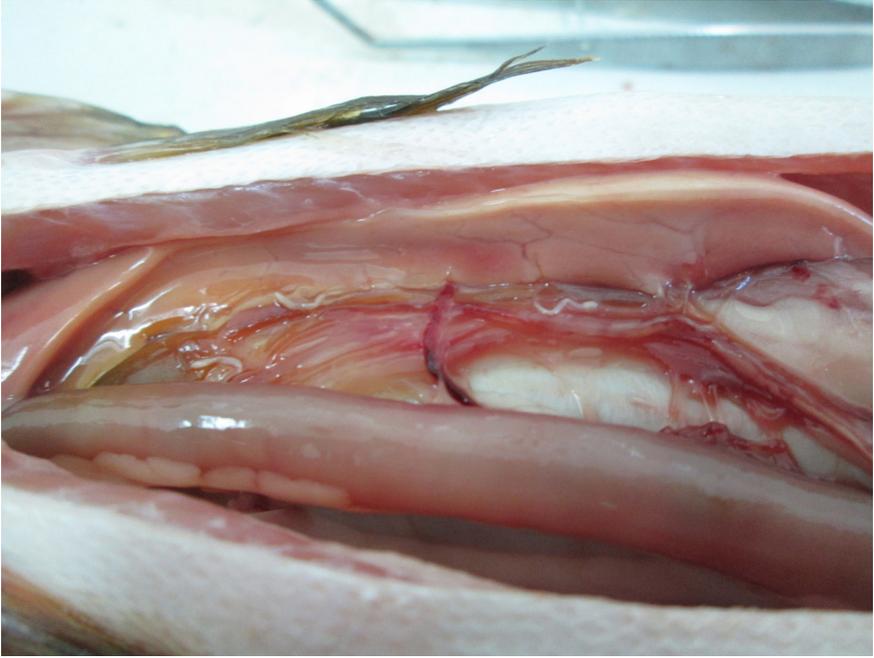
Yakutia consists of 35 administrative territorial units: 33 uluses and 7 cities, the total population is 949.8 thousand people, 80% of the population lives in rural areas. Engaged in fishing, reindeer herding, horse breeding and cattle breeding.

The indigenous population of Yakutia is characterized by a protein-lipid type of food, which contributes to the formation of a “polar metabolic type.” It is characterized by a high content of protein in the daily diet of more than 15%, fat above 35%, below 50% carbohydrates, in contrast to the “European type of population”, in a diet which is dominated by carbohydrates. Nutrition of the peoples of Yakutia was previously characterized by a number of features the first place in the structure of consumption of major food groups, owned by meat, dairy products and fish.

Yakutia is famous for its valuable fish. Stroganina from fresh-frozen “white” fish and all kinds of fish dishes at all times were a supplier of not only valuable protein, phosphorus, calcium, vitamins gr. A, D and others, but also valuable fish oil, replenishing the lack of vegetable fats. In addition, fats of fish living in cold waters have specific polyunsaturated elements, so necessary for the human body - for its beauty, strength and endurance.

Currently, among the population, more and more popular dishes are dishes for the preparation of which raw, marinated or smoked fish are used (sushi, role, sashimi, etc.). However, it is necessary to know and remember that fish is often an infected helminth, usually a larval stage of helminths. They are harmful to human health, the infection of some species of helminths poses a great danger to human health and can cause serious consequences.

Many locals like salted fish, salting is only 15-20 minutes, having parasites in the fish and their larvae remain alive.



**Fig. 1 Plerocercoids *Diphyllobothrium latum* - wide lente**

*Diphyllobothrium latum* is a type of tapeworm whose final hosts are people, dogs, bears and other animals, intermediate - freshwater crayfish, additional - freshwater fish. Infection of mammals occurs when eating fish, in which there were larvae of the parasite (plerocercoids) - this causes the disease of diphyllobothriasis. *Diphyllobothrium latum* has a long history of infecting people who regularly consume fish. Especially those whose customs include the consumption of raw or poorly processed fish.

Bear cubs, bear meat in its gastronomic properties is very much appreciated, especially among the indigenous population. Among hunters of the Yakuts, many prefer the bear cub. It should be remembered that bearish meat in most cases is infected with larvae of *Trichinella spiralis*. According to the results of our studies 98 brown bears, *Trichinella* larvae were found in 43 (43.9%). Recall that the last major outbreak of trichinosis, which was officially announced in Yakutia in 1999, in Neryungri, 60 people became ill, including four children under the age of 14 years, in 2002, 10 people. Infection occurred when residents used to eat jerky and smoked meat of a brown bear.

A very dangerous echinococcosis disease in the larval stage of the cestode *Echinococcus granulosus* parasitizes in the parenchymal organs - lungs, liver and

larynx in deer, moose and roe deer.



*Fig.2 Echinococcus blisters in the liver of roe deer*

Our long-term researches show that *Echinococcus granulosus* (larva) echinococcus bubbles were found in 76.2% of elk (*alces alces*), 17.2% of deer (*rangifer tarandu*) and 1.21% of roe deer (*capriolus capreolus*). The maximum amount of echinococcosis in the Khangalas, Gorny and Amginsky regions was found in the elk, in the Anabar, Olenek, Oymyakonsky districts. Five roe deer were found for the first time echinococcal blisters in the liver and lungs in the territory of Central Yakutia.

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葡萄对低温胁迫抗性的代谢组学研究  
**Metabolomic characterization**  
**of plants resistance of grapes to low temperature stress**

**Nenko Nataliya Ivanovna**

*Doctor of Agricultural Science, Professor*

*Head of the plants physiology and biochemistry laboratory*

**Ilyina Irina Anatolievna**

*Doctor of Technical Science, Professor*

*Deputy Director for Science*

**Petrov Valery Semenovich**

*Doctor of Agricultural Science, Professor*

*Head of the Department of viticulture and winemaking*

*North-Caucasian federal scientific center of horticulture,  
viticulture and winemaking*

**摘要。**现代葡萄栽培在气候变化中最重要的任务之一。在这一点上，葡萄品种的不同生态地理起源于Anapo河 - 塔曼区的严冬期的应激适应的生理生化规律进行了研究基因型表达的代谢评估的基础上。工作用来确定生化参数（水分，通过重量法，通过光谱法过氧化物酶活性的酶，过氧化物酶同工酶组合物由垂直电泳，phenolcarbon（绿原，咖啡），抗坏血酸，脯氨酸氨基游离和结合水含量的现代和原始的研究方法酸，丙二醛 - 通过毛细管电泳的使用现代化设备（UNICO分光光度计2800，毛细管电泳卡佩尔105R装置，该方法秤JW-1-3000 ACOM和分析天平，离心机LE-402，类型310，CLN-16中，设备为垂直电泳。）冷应力具有过氧化物酶活性的特异性蛋白质被挑出来。冷胁迫，活性和葡萄品种的各种生态和地理来源的，低温耐应力过氧化物酶的同功酶组合物的蛋白质的分子量，耐低温品种的各种生态地理学对低温的生理生化规律在基因型表达代谢评估的基础上研究抗逆应激。

**关键词：**葡萄，抗冻性，规律性，代谢评价

**Abstract.** *One of the most important tasks of modern viticulture in a changing climate is the creation of ampeloceneses that are resistant to stress factors, including the winter period. In this regard, the physiological and biochemical regularities of adaptation of grape varieties of different eco-geographical origin to stressors of the*

winter period of the Anapo-Taman zone have been studied on the basis of metabolic evaluation of genotype expression. The work uses modern and original research methods for determination of biochemical parameters (moisture, free and bound water content by weight method, peroxidase activity by spectral method, peroxidase isozyme composition by vertical electrophoresis, phenolcarbon (chlorogenic, coffee), ascorbic acid, proline amino acid, malonic dialdehyde - by the method of capillary electrophoresis using modern equipment (UNICO spectrophotometer 2800, device for capillary electrophoresis Capel 105 R, scales JW-1-3000 Acom and analytical scales, centrifuges LE-402, Type-310, CLN-16, device for vertical electrophoresis.) Specific proteins of cold stress with peroxidase activity were singled out. The molecular weight of proteins of cold stress, activity and isoenzyme composition of peroxidase of grape varieties of various ecological and geographical origin, resistant to low-temperature stress, physiological-biochemical regularities of resistance of grape varieties of various eco-geography to low-temperature stress on the basis of metabolic evaluation of genotype expression.

**Key words:** grapes, frost resistance, regularities, metabolic evaluation

**Introduction.** One of the promising trends in the development of modern viticulture is the creation of ampelocenos resistant to abiotic, biotic and anthropogenic factors and the stabilization of the production process [1, 2]. In this regard, it is important to study the regularity of the formation of resistance of grape plants to abiotic stressors in a changing climate. The natural and climatic conditions of the south of Russia favor the production of high yields of grapes, but the receipt of stable high yields is limited by the influence of unfavorable environmental factors such as winter frosts, especially after prolonged warm weather. Therefore, only varieties combining high quality with adaptation to the conditions of a given region can be successfully cultivated here on a fairly wide scale [3, 4].

This necessitates the improvement of the assortment by cultivating varieties better adapted to the weather conditions of the growing places. In this regard, it is especially important not only to identify promising genotypes, but also to determine the expressiveness of genetic systems, that is, the ability to realize the potential possibilities of the genotype in changing environmental conditions.

The aim of the work is to reveal the patterns of adaptation of grapes of varieties of different ecological and geographical origin to stressors of the winter period on the basis of metabolic evaluation of genotype expression.

**Materials and methods of research.**

Studies were carried out on the basis of the ampelographic collection of the Anapa Zonal Experimental Station for Viticulture and Wine-making, located in the

city of Anapa, a quarter of technical varieties of grapes on the chernozem of the southern carbonate, Krasnodar, the center for collective use of the Instrument and Analytical Laboratory and the Laboratory of Plant Physiology and Biochemistry of the North Caucasus Area Scientific Research Institute of Horticulture, Viticulture and Wine-making. Plants one 1995 planting, a stock of Kober 5BB. Formation is a two-sided, high-stitch spiral cordon of AZOS. The planting scheme is 3 x 2.5 m. The research objects are grape varieties of different ecological and geographical origin and maturity, Control - Crystal (frost-resistant grade) (Table 1) [5].

**Table 1 -**  
*Characteristics of research objects*

Interspecific hybrid of Euro-Amur-American origin Crystal (control)	Interspecific hybrid of Euro-Amur-American origin Crystal (control)
Interspecific hybrids of Euro-American origin Krasnostop AZOS Jemete	Interspecific hybrids of Euro-American origin Krasnostop AZOS Jemete
Dostoiny, Riesling AZOS, Delight	Dostoiny, Riesling AZOS, Delight
Eastern European origin Barhatnyj, Zarif	Eastern European origin Barhatnyj, Zarif
Western European origin Riesling Rhine, Aligote	Western European origin Riesling Rhine, Aligote

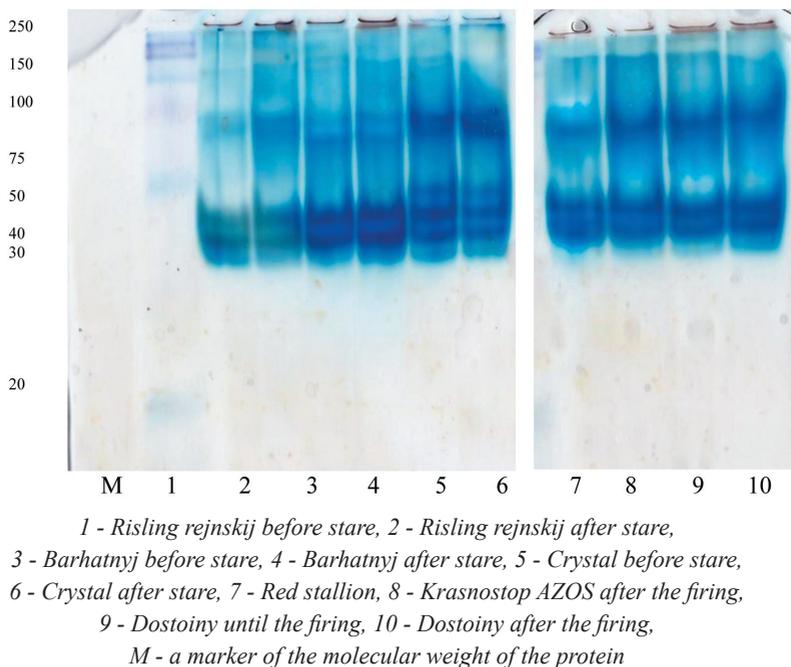
Complex assessment of varieties on physiological and biochemical characteristics allows to obtain a more reliable characterization of genotypes for resistance to unfavorable weather and climatic conditions of the winter period and adaptivity and can be used as indirect methods for diagnosing varieties for frost resistance [6].

To assess the adaptive resistance to abiotic stresses, grape plants, physiological and biochemical parameters (moisture, free and bound water content by weight method, peroxidase activity by spectral method, peroxidase isozyme composition by vertical electrophoresis, phenolcarbon (chlorogenic, coffee), ascorbic acid, proline, malonic dialdehyde - by capillary electrophoresis on the Kapel 105 R instrument. Experimental data were processed using conventional methods variational statistics [7].

For physiological and biochemical studies, UNICO 2800 spectrophotometer, Capillary Electrophoresis instrument Cap 105 R, JW-1-3000 Acom scales and analytical scales, LE-402, Type-310 centrifuges, and CLN-16 centrifuges were used.

**Research results and discussion.** Hydrothermal conditions in the winter periods 2015 - 2017. On the territory of the Anapo-Taman zone, they were favorable for wintering the grapes. In the winter period 2016-2017. The precipitation in the territory of the Anapo-Taman zone was more leveled (47-80 mm) than in 2015-2016. (28 - 113 mm). The air temperature dropped from  $-2^{\circ}\text{C}$  to  $-16^{\circ}\text{C}$ , and the maximum air temperature reached  $25^{\circ}\text{C}$  in November and  $11^{\circ}\text{C}$  in December and February. The temperature drop reached  $22^{\circ}\text{C}$  in February and  $30^{\circ}\text{C}$  in January 2017.

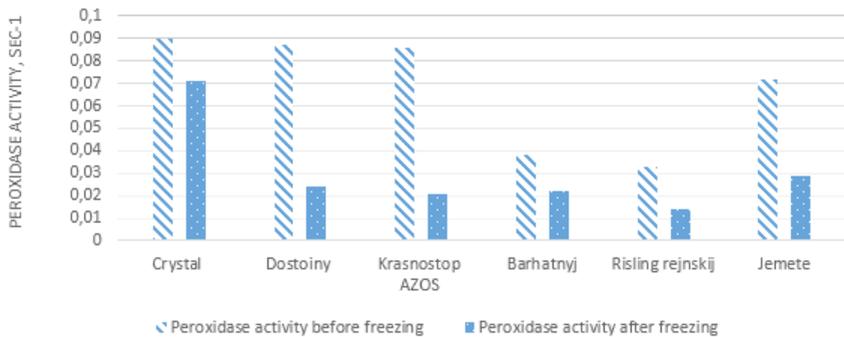
To characterize the expressiveness of the genetic systems of adaptation of the studied grape varieties to low temperatures of the winter period 2016-2017. proteins with peroxidase activity, proteins of cold stress were studied, the activity of the enzyme peroxidase oxidizing phenolic compounds, stress-protective properties (Fig. 1) was determined.



**Figure 1** - Electrophoretogram of water-soluble fraction of proteins with peroxidase activity of grapes before and after shoot shoots in December 2016

It was found that the protein complex with peroxidase activity in the studied grape varieties is represented by proteins with a molecular weight of 250, 240, 150, 140, 100, 90, 75, 70, 50, 40 and 30 kDa. Variety The Euro-Amur-American crystal differs from other investigated grape varieties by the presence of a protein with a molecular mass of 50 kD and a high content of proteins with a molecular weight of 75 and 70 kD, which may be due to its ecological and geographical origin. Unlike varieties of Barhatnyj Oriental origin, Risling rejnskij of Western European origin and Crystal in varieties Dostoiny and Krasnostop AZOS of Euro-American origin, proteins with a molecular mass of 75 kDa are absent, and with a molecular mass of 70 kDa are contained in a larger amount.

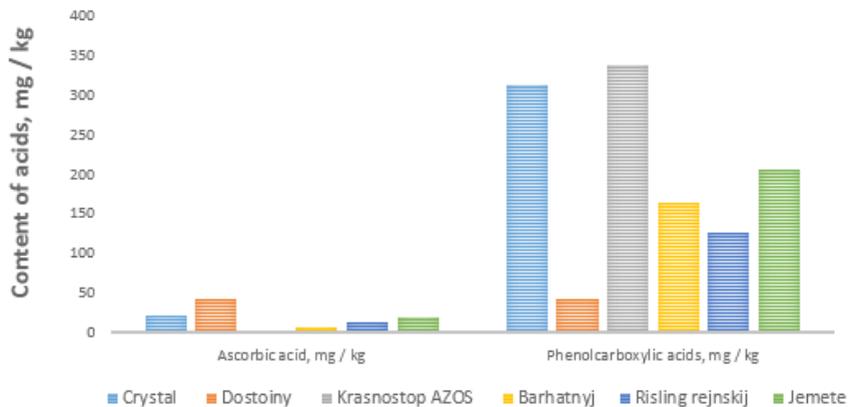
Peroxidase activity in the varieties under study ranges from 0.03 to 0.09 sec<sup>-1</sup>. A high activity of peroxidase is observed in varieties Crystal (0.09 sec<sup>-1</sup>), Dostoiny and Krasnostop AZOS (0,086-0,087 sec<sup>-1</sup>) and lesser in varieties Barhatnyj (0.038 sec<sup>-1</sup>) and Risling rejnskij (0.033 sec<sup>-1</sup>), which characterizes the specificity of varieties and can be associated with differences in the spectra of proteins that have peroxidase activity (rice. 2).



**Figure 2 - Peroxidase activity in grapes shoots in December 2016 before and after sprouting of shoots**

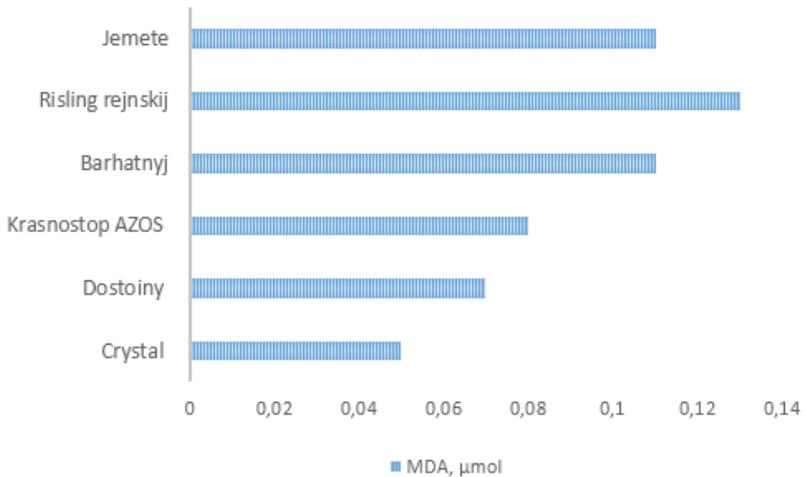
When the grapes shoots were frozen in the model experiment, it was established that proteins with peroxidase activity with a molecular weight of 140 kD and 90 kDa appear in the velvet and Riesling Rhenish varieties, while the content of proteins with a molecular mass of 90 kD increases in the varieties Crystal, Dostoiny and Krasnostop.

Thus, it can be assumed that the high activity of peroxidase in the vine of the grape varieties Crystal, Dostoiny and Krasnostop AZOS characterizes their increased resistance to oxidative stress. In all studied varieties under the influence of low-temperature stress, the proteins of cold stress are represented by proteins



**Figure 3 - Content of ascorbic and phenol carboxylic acids in grapes shoots in December 2016.**

The increased content of ascorbic acid reduces the intensity of lipid oxidation of cell membranes, while maintaining their fluidity [8,9]. The indicator of lipid oxidation is the content of malonic dialdehyde (MDA), the degradation product of polyunsaturated fatty acids [10, 11]. In the varieties Crystal, Dostoiny and Krasnostop AZOS, the MDA content is less (0.05-0.08  $\mu\text{mol}$ ) than in the Barhatnyj, Risling rejskij and Jemete varieties, in which the MDA content agrees predominantly with the content of phenolic carboxylic acids (Fig. 4).



**Figure 4 - Malonic dialdehyde (MDA) content in grapes shoots in December 2016.**

Consequently, the mechanism of protective action against oxidative stress in the varieties under study is different, in accordance with their ecological and geographical origin.

Greater resistance of varieties Crystal, Dostoiny and Krasnostop AZOS to low-temperature stress can be associated with their entry into a state of organic rest and a large content of bound water form.

Evaluation of the mechanism of vine resistance to dehydration showed that in the Crystal variety, proline ( $K_{\text{korrel}} = 0.9$ ) and lesser sucrose ( $K_{\text{korrel}} = 0.5$ ) exert a greater influence on the content of the bound form of water in the vine; in Krasnostop AZOS, it proline, and sucrose ( $K_{\text{korrel}} = 0.8$ ), while in the Dostoiny variety, proline and sucrose exert a negligible influence on it ( $K_{\text{korrel}} = 0.3$ )

This allows them to assume in their state of organic rest various mechanisms of adaptation to changing environmental conditions, better stability of the vine of the variety Crystal.

Thus, due to the warming of the climate in the winter period 2016 - 2017, the grape plants did not enter a state of deep peace and did not differ in resistance to extremely low temperatures during this period (the second component of winter hardiness). The appearance of low temperatures ( $-16^{\circ}\text{C}$ ) in January 2017 resulted in a slight freezing of the grape plants, caused slight changes in the vine bole and did not damage its core, which would undoubtedly affect their productivity.

**Conclusions.** The physiological and biochemical patterns of adaptation of grape varieties of various ecological and geographical origin to abiotic stressors of the winter period on the basis of metabolic evaluation of genotype expression are revealed.

Specific proteins of cold stress with peroxidase activity of grape varieties of different eco-geographical origin are identified, their molecular weight, activity and isoenzyme composition of peroxidase are determined.

The dependence of the water-retaining capacity of grape varieties of different eco-geographical origin on the content of osmoprotectors has been established, which suggests that the studied varieties have different mechanisms of adaptation to changing environmental conditions and better adaptation of the Euro-Amur-American variety.

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使用藻类和植物清理污染水域  
**Cleaning of polluted waters with using Algae and Plants**

**Artamonov Sergey Vladimirovich**

*Omsk State Agrarian University named after Stolypin*

**摘要。** 本文对使用不同类型的高级水生植物进行有机和无机化合物生活污水净化技术的比较分析。例如，工业工程和石化企业的家庭和工业废水将被列出。高等水生植物在净化水中积累化合物和其他毒物的能力。

**关键词：**大型水生植物，Eichornia，浮萍，浮萍，苦草，废水，生物处理。

**Abstract.** *In this paper, a comparative analysis of technologies for the purification of domestic wastewater from organic and inorganic compounds using different types of higher aquatic vegetation will be carried out. As an example, domestic and industrial wastewater from industrial engineering and petrochemical enterprises will be listed. The ability of higher aquatic plants to accumulate compounds of metals and other toxicants in the purification of water has been studied.*

**Keywords:** *macrophytes, eichornia, duckweed, pistia, vallisneria, waste water, biological treatment.*

At present, the problem of pollution of reservoirs with domestic waste water has become quite acute. According to the results of a number of scientific researches, water quality deterioration up to the 3rd class of the discharge “b” (“very polluted” water) and the 4th class (“dirty” water) has been observed in most water objects in recent years. The usual methods of treating contaminated waste water in most cases show their inefficiency, high cost and energy intensity.

In this situation, there is only one way out - it is necessary to clean waste water directly in the places of their origin. The most effective and affordable is the biological method for cleaning domestic sewage.

One of the most important participants in the natural processes of self-purification of water are aquatic plants, including macrophytes. They perform the task of phytoremediation of sewage.

Depending on the lifestyle, macrophytes are divided into several ecological groups, regardless of their systematic position. The first ecological group includes

immersed hydrophytes (rdest), the second group includes semi-submerged macrophytes (reeds and reeds), the third group includes free-floating plants (duckweed) [2].

With the help of plants and algae, pollution can be rendered harmless, and also extracted in various ways as a result of degradation, extraction (accumulation, accumulation), isolation or immobilization.

Coastal and aquatic vegetation, releasing oxygen during photosynthesis, has a beneficial effect on the oxygen regime of the reservoir, and bacteria and algae (periphyton) that live on the surface of the plant participate in water purification, which increases its transparency and decreases the nutrient content [4].

The aim of this work is to study the species of higher water plants for waste water treatment, their accumulating properties for various pollution, and to develop recommendations on the use of certain types of aquatic vegetation for the purification of waste water of various compositions from organic and inorganic compounds.

For this it will be necessary to solve a number of tasks:

1. to study the prevalence of technology of plant cleaning.
2. to study the species of higher plants, as well as the mechanisms for removing pollutants from sewage by higher aquatic plants.
3. Identify the individual accumulative capacity of higher aquatic plants in relation to ions of heavy metals for their use in purification and post-treatment of water and their ability to accumulate nitrogen, phenol and chloride compounds from waste water.
4. To study the component composition of domestic and industrial waste water.
5. Identify which types of aquatic vegetation should be used for which waste water.

To date, biological treatment of waste water with the help of higher aquatic plants has not yet become widespread in practice. Most of the studies on this topic are experimental and are not mass use in the purification of municipal and industrial waste water. As a rule, in natural conditions, biological ponds, irrigation fields or filtration fields are used for biological post-treatment of waste water [4].

The subject of the study are the waste waters of the city of Omsk.

The main aquatic plants capable of accumulating toxic compounds and presented in this work are:

1. Vallisneria spiral
2. Pistia or water salad
3. Duckweed
4. Eichornia or aquatic geocint

It is known that in waste water produced in modern industrial enterprises, impurities predominate that do not belong to the category of highly toxic: chlorides, sulphates,

nitrates and phosphates of sodium, potassium, calcium, ammonium, magnesium, iron, copper, organic products, suspended substances, oil products and oils.

The main pollutants of waste water petrochemical plants are oil and phenols. The maximum allowable concentration of petroleum products in drinking and fishery ponds is 0.1 mg / m<sup>3</sup>, phenol 0.25 mg / m<sup>3</sup>. The issue of waste water treatment from these contaminants is topical.

Studies were conducted on the example of sewage of JSC «Gazpromneft-OORP» using higher plants of vallisneria, duckweed and eichornia, and according to the results of the samples taken it was revealed that among the species studied the highest purification result for a number of parameters, mg / l, such as BON (biological oxygen necessity), phenols, phosphate ions and petroleum products received an aquarian plant of eichornia.

The accumulation of chlorides, total nitrogen and ammonium by eichornia and vallisneria, the accumulation of nitric oxide and iron by eichornia and duckweed are carried out with approximately equal efficiency.

According to the table of the results of studies of chemical indicators of waste water in treatment plants of JSC «Gazpromneft-OORP» [4], it was carried out a comparative analysis of existing indicators. The difference in the amount of chemical indices in mg / l was revealed in the usual cleaning at sedimentation tanks and flotators, and with additional purification by aquatic plants, the average values of each index were also determined when one of the plant species was used.

The waste water treatment by eichornia is about 59% more effective than cleaning the duckweed, and about 93% more efficient than vallisneria. The effectiveness of the use of eichornia was demonstrated when it was used in treatment plants at the Kuibyshev refinery [5].

In addition, plants such as eichornia and duckweed, and to a lesser extent vallisneria and Pistia, for the purification of iron compounds and other metals, are also best used in machine-building plants for waste water treatment.

Further in the work, studies were carried out on the example of household waste water of a water canal. A comparative evaluation of the efficiency of post-treatment on different physical parameters was made, and several water samples were taken for example. For comparison, samples were also taken with water plants: vallisneria, pistia and duckweed.

According to the results of the study, the content of suspended solids after purification by vallisneria, mg/l, decreased 25 times, after pistia 24 times, after duckweed 28 times compared with the content of substances at the entrance to the sewer system [3]. The dry residue, mg/l, when used by vallisneria, decreased more than 3 times, after pistia 2.9 times, after duckweed, 3.5 times.

On the basis of the analysis of the obtained data, the species differences of plants were confirmed by the ability to accumulate toxic substances. Among the species

studied, the highest purification result for a whole series of parameters, mg/l, such as aluminum, chromium, lead and phosphorus, is shared by duckweed. Copper cleaning is more efficiently carried out by pistia, iron purification is most effectively carried out by vallisneria. The purification from cadmium, zinc and nickel is carried out by all represented species of plants with approximately the same efficiency.

The duckweed is the most adapted to the conditions of the south of Western Siberia. It quickly multiplies and does not require the creation of special conditions for cleaning up waste water.

According to the research results of chemical indicators of domestic wastewater at sewage treatment facilities of «OmskVodokanal» [3] was the comparative analysis of the available indicators.

The difference in the number of chemical indices in mg / l was revealed during mechanical, biological treatment and filtration, and after additional treatment with aquatic plants, the average values of each index were revealed by using the results of the calculation when using one of the plant species.

Waste water treatment for duckweed is, on average, 7% more effective than cleaning with vallisneria, and 12% more effective than pistia.

In this article, the species of higher aquatic plants for waste water treatment were investigated and a comparative analysis of technologies for purification of domestic waste water by higher aquatic vegetation from organic and inorganic compounds was carried out.

The individual accumulative potentialities of macrophytes with respect to ions of heavy metals for their use in purification and post-treatment of water have been revealed and the ability of higher aquatic plants to accumulate nitrogen compounds, chlorides, phenols and metals from waste water on various examples has been studied.

When cleaning oil-contaminated waste water, it was found out that among the studied species the highest purification result for a number of parameters, mg/l, such as BOD, phenols, phosphate ions and petroleum products, was obtained by the aquarian plant of eichornia. The accumulation of chlorides, total nitrogen and ammonium by eichornia and vallisneria, the accumulation of nitric oxide and iron by eichornia and duckweed are carried out with approximately equal efficiency.

The waste water treatment by eichornia is, on average, about 1.5 times more effective than cleaning the duckweed, and about twice as effective as vallisneria.

At the same time, a comparative analysis of the obtained chemical composition sewer wastewater data using eel, pistia and duckweed species differences were confirmed by ability plants accumulate toxic substances. Among the species studied, the highest purification result for a whole series of parameters, mg/l, such as aluminum, chromium, lead and phosphorus, is shared by duckweed.

Copper cleaning is more efficiently carried out by pistia, iron purification is

most effectively carried out by vallisneria. The purification from cadmium, zinc and nickel is carried out by all represented species of plants with approximately the same efficiency.

A comparative analysis of the available indicators was carried out. According to the results of a brief study, it was concluded that the cleaning of waste water from duckweed is, on average, 7% more effective than cleaning with vallisneria, and 12% more effective than pistia.

Based on the comparative analysis of the effectiveness of different types of higher water plants for the extraction of priority pollutants, the following scheme of their application for the purification of various types of waste water is proposed.

**Table 1**

*The effectiveness of various higher aquatic plants for extraction of priority pollutants*

Types of higher aquatic plants	Priority waste water pollutants			
	oil products	metals	nitrogen compounds	CON (chemical oxygen necessity)
Duckweed		+		
Vallisneria				+
Pistia				
Eichornia	+		+	+

According to the table, the use of such higher aquatic plants as eichornia is recommended for petrochemical enterprises. For the post-treatment of waste water in urban waste water treatment plants, it is best to use duckweed. For production waters of machine-building enterprises for the purification of waste water from metals such as iron, it is recommended to use together eichornia and duckweed.

It has been shown that the use of higher aquatic plants in waste water treatment is effective for different pollutants. Their use in the post-treatment of discharged waste water into reservoirs will protect the environment from ecotoxicants.

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地球表面上各种等级物质流的空间自组织  
**The spatial self-organization of matter flows  
of various ranks on the Earth's Surface**

**Sokolova Nadezhda Vasilyevna**

*Senior Research Officer, Candidate of Engineering Sciences  
Institute of Oil and Gas Problems of the Russian Academy of Sciences,  
Moscow, Russia*

摘要。 本文提供了关于地球表面物质流空间自组织的实际数据。 显示的新信息是根据这些实际数据获得的。

关键词：地球适应系统，自然动力学，相对独立的陆地物质流动，减压区，凝聚物通道，分解物质区，现代积累池，增强聚集核心，增加拆迁过程，增加过程 物质的积累。

**Annotation.** *The article gives actual data on the spatial self-organization of the flows of matter on the earth's surface. New information was shown, which was obtained on the basis of these actual data.*

**Keywords:** *Earth adaptation systems, nature dynamics, relatively independent flows of terrestrial matter, stress-relief zones, channels of condensing matter, zones of decomposing matter, modern accumulation pools, the core of enhanced accumulation, processes of increasing demolition, processes of increasing accumulation of matter.*

Obtaining information about the spatial self-organization of the flows of matter on the earth's surface is a new and very important problem. This information will make it possible to clarify not only the patterns of changes in natural conditions and resources (including climate), the geological environment and the Earth as a whole, but also develop advanced technologies for predicting and timely use of energy negative (for human) processes: floods, earthquakes, tornadoes and etc.

As studies have shown, the entire space is filled with organized flows of structured matter of different rank. In the context of dynamic geography [1], flows are structured by dynamic boundaries and stress-relieving zones. There are two main opposite definitions: the zones of maximum changes, the release of stresses, potential ruptures, cracks of different rank and dynamic boundaries of the same rank, each of which is located between two relatively independent (parallel with a backlash of 45 degrees) flows and fixes the limit of the action of the suppressed opposite inflow [ 2]. The formation of modern stress-relieving zones is always

connected with the functioning of the system of continuous motions of matter. Indicators of this system are the rivers. For the operation of rivers, the most important conditions are necessary: stimulation of the supply system, continuous lowering of the local erosion bases, confined to the lowest parts of the funnels at the junction points of the three flows (and three zones of stress relief). Each such node has a minimum and maximum scope, the limits of rank change. In this case, such a node can move vertically and horizontally. Vertically, it develops in two opposite modes: deepening the funnel (into the interior of the Earth) or activating the release of matter from the earth's interior. It is determined that all the nodes of the articulation of the stress-relief zones do not develop chaotically, but according to the ranking matrix. There was an opportunity to identify dynamic sections, delineated by stress-relieving zones of a certain rank. Each of these sections has four nodes that connect it to neighboring dynamic sections of the same rank [3].

The significance of the problem of changes in the nodes of the confluence of rivers for man is enormous. For example, the work of R.S. Chalova (2005) reflects the dynamics (with a change in rank) of the node of the confluence of the Amur and Ussuri rivers over a period of 1946-2004 in terms of, indicating that this not only affects the interests of various sectors of the economy, but also the state interests in general [4]. The nature of the functioning of this node contributes to a change in its rank, the formation of extensive flood zones within certain limits of the action of this node.

A continuous transit stream is a set of nodes of its junction with active tributaries, and the river bottom of such a flow is the connection of funnels passing one another from rank to rank. Within each similar node operates its own funnel, its local basis of erosion (for flows flowing into the node). From the dynamics of it in three-dimensional space, the development of a specific section of the river depends [5].

Due to the failure to take into account the dynamics of local basins of river erosion, the management practice is greatly impoverished. Anthropogenic objects do not adapt in time to natural changes in the natural environment, during which the resource base changes. It is necessary to note the correctness of the well-known geographer Ivanov PV, who in 1949 suggested calculating local erosion bases for each flow [6].

In this connection, the ranking and diagnostics of the nodes of articulation of stress-relief zones, the allocation of modern pools of substance accumulation, in which their local bases of erosion operate, become relevant.

Each natural object is the result of the action of a single open system of matter flows. With the prevalence of flows from space, one develops natural objects, with the prevalence of flows from the earth's interior - other objects. External currents contribute to the propagation of vertical channels of compaction matter. They are

placed on the earth's surface and at a depth in three orthogonal planes. To such objects the rivers gravitate. These channels are contoured by fractured zones of decompaction and together constitute stress relief zones [7].

As practice shows, because of formal study of rivers and the generalization of their sites developing in opposite regimes, extensive primary actual information on the self-organization of the flows of matter on the earth's surface was unclaimed. This is primarily data on systems of relatively independent substance flows (parallel, with a 45-degree backlash), about nodes of river confluence as indicators of funnels of different rank, about lines of minimum resistance for the relationship of opposite flows with different local erosion bases, on the hierarchy of flows (transit flow and active inflow to it) in three-dimensional space and its change.

The noted primary information made it possible to obtain new information about the zones of stress relaxation, about the internal structure of the Earth. Under these conditions, systems of relatively independent flows act as indicators of stress relaxation zones in which the channels of a compaction substance develop, contoured by zones of a decompensating substance of different rank [7]. As a result of the research, hexahedrons structures of different rank were identified. The earth in a single stream system is a convex hexahedrons of the first (conditionally) rank [3]. It, in turn, consists of the central part (the inner core of the Earth) and associated with it eight blocks (also hexahedrons) of the second rank. The boundaries (ribs) of these hexahedrons are the channels of the condensing substance in the zones of discharge of stresses of the second (conditionally) rank. At the same time, four such blocks are connected in the Arctic Ocean, four in the Antarctica (also in the zone of the Earth's rotation axis). In each of the nine hexahedral blocks of this rank, the core of the third (conditionally) rank develops [7].

Thus, the core of the Earth is the compaction channels and the associated accumulation nuclei of different rank. Each such nucleus is a system of consolidation of matter. Autonomously without a kernel, the surrounding blocks can not form. They are not only strictly connected with the core, but also are the products of the functioning of a kernel of a particular rank. Uncompacted regions located in the zones of stress relaxation are favorable for the formation of fluid flows that rise from the earth's interior.

The zones of stress relaxation are very dynamic formations. Based on the analysis of actual materials, the main variants of changes in such zones in the regime of compaction and dilatancy were identified, leading to radical changes in the natural environment within the current basins of accumulation of matter of different rank [5].

Despite the abundance of factual data, changes in stress relaxation zones have not been investigated in practice due to the failure to account for the interconnection of structured water flows and channels of a compaction substance of a certain rank.

Natural objects are clear indicators of the opposite processes of increasing drift and increasing accumulation of matter and the dynamics of stress-relieving zones. As practice shows, these objects behave differently under conditions of lowering the local basis of erosion of flows (with activation of vertical motions in the bowels of the Earth) and in conditions of increasing the basis of erosion (with activation of vertical flow from the earth's interior) [8].

Continuous natural transformations of natural objects under the conditions of the opposite processes of intensification of accumulation and intensification of the demolition of matter occur in different ways, the sections of the river (degrading and rejuvenating) are distinguished; lake basins (overflowing and actively drying); marshes (waterlogged and actively drying); plantings (waterlogged and progressively draining). These natural objects and the chains of their transformation are reliable indicators of the dynamics of local bases of erosion (or denudation) [1, 8].

On general geographic maps of various scales and materials of remote sensing of the Earth, features of the dismemberment of the territory by zones of discharge of stresses of different rank, a huge number of interconnected natural objects are recorded. Each of these objects plays its role in a single system of independent flows of matter and is an indicator of the dynamics of stress-relieving zones. With the help of the cartographic method of research and the information obtained earlier on the zones of discharge of stresses of different ranks, it was possible to gradually reveal modern basins of accumulation of different rank acting on the earth's surface [5]. At the same time, the extensive information on the relief of the terrestrial surface (land and bottom of water bodies of various levels) and the natural objects developing on it was taken into account.

Dedicated modern basins of accumulation of different rank differ in the ability to accumulate substances. The zones of stress relaxation and dynamic boundaries of different rank are interrelated and act simultaneously. Zones of discharge of stresses of one rank outline the dynamic section within which the interconnections of flows in two orthogonal planes are realized. Inside such a section of a particular rank, a modern accumulation pool and the largest flow node operate.

Using the actual data on the self-organization of the earth's surface fluxes and on the processes of increasing drift and increasing the accumulation of matter of different rank, an investigation of the changes in natural objects was carried out. Indicators of the vertical communication channels of the nuclei (of different ranks at various depths) with the earth's surface were revealed.

The new information obtained on the spatial self-organization of flows of matter of the earth's surface of different rank together with other data will allow solving many practical issues, including the development of hydrocarbon deposits taking into account their natural dynamics, as well as the problem of identifying areas of

compaction and dilatancy at different depths that contribute to the development of the earth's surface flooding and flooding areas, the manifestation of earthquakes. There were opportunities to identify indicators of changes in global movements of the Earth (systems of its adaptation to these changes [9]), as well as to create a single digital model of the Earth's dynamics.

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用比较法确定悬浮液的动力粘度系数  
**The definition of the coefficient  
of dynamic viscosity of suspensions using the comparative method**

**Smirnov Petr Alekseevish**  
**Prokopeva Elena Vladimirovna**  
*Chuvash State Agricultural Academy*  
*Cheboksary, Russia*

摘要。 透视农业动物的非色素沉着导致非稀土肥料加工和使用的非常紧迫的问题。 另外，粪便排水，液体肥料。 同时，问题的技术和技术解决方案，动态误差系数。

关键词：粪便悬浮液，液体肥料部分，粪便排水，液化底层粪肥，比较方法，层流，分散介质。

**Annotation.** *Perspective non-pigmentation of agricultural animals leads to very urgent problems of processing and the use of undiluted manure. In addition, manure drains, liquid manure fraction also do not find effective application. At the same time, the technical and technological resolution of the problem is hampered by the lack of these key characteristics of these suspensions and the methods for their prompt determination of current parameters, for example, the dynamic viscosity coefficient.*

**Keywords:** *manure suspension, liquid manure fraction, manure drains, liquefied underlay manure, comparative method, laminar flow, dispersed medium*

**Introduction.** In the conditions of a market economy, a number of large livestock enterprises switched to the almost all types of agricultural animals. Since 2/3 of livestock buildings were converted to their previously built, immediately there was an acute problem of collecting and disposing of undesirable manure, which in previous projects was not envisaged [1, 2]. But already there are a number of practical developments in the effective use of the liquid fraction of manure [3].

In the solution of problems on this problem, the absence of a number of applied studies on hydrodynamics was also revealed. For example, in the practical determination of the costs of non-bedded manure in different concentrations, both during removal and when collecting and introducing uninstalled remains its important parameter - dynamic viscosity.

Different kinds of manure, which is a mixture of liquid and solid particles: liquid manure, slurry, liquefied non-bedded manure, is taken as a slurry with solid particles in a liquid in a uniformly suspended state throughout its volume. It is assumed that the dispersed state is achieved by constant active mixing of these manure media. We believe that the developed design of laying studies is applicable for determining the dynamic viscosity of similar suspensions: extraction, processing and application of sapropel and bottom silt, mixtures of liquefied manure and sapropel to agricultural lands.

As a basis for the study, a very common comparative method was adopted, that is, the determination of the dynamic viscosity coefficient in comparison with an analogous material with known dynamic characteristics, for example, technical water. The authors consider that to determine the dynamic viscosity coefficient by the indicated method, an important parameter is the temperature of the liquids and suspensions being compared. Therefore, they are allowed to have the same temperature at the time of removal of the characteristics. Thus, the comparative method shows the actual and actual situation with respect to the object under study.

Conditions, materials and methods of research. Determination of the viscosity of undifferentiated manure of different humidity is associated with the impossibility and not practical use of viscosimeters for Newtonian fluids. The simplest solution to the problem is to use the Newton equation, which relates the fluid viscosity and the flow velocity characteristics:

$$\mu = \frac{F(r_2 - r_1)}{(v_1 - v_2)s}, \quad (1)$$

$\mu$  – coefficient of dynamic viscosity, Pa·c;

F- shear force, N;

$r_2 - r_1$  – distance between layers of liquid, m;

$\Delta v = v_1 - v_2$  – distance between layers of liquid, m;

$s = 2 \cdot \pi \cdot r_1 \cdot \Delta v \cdot t$  the area of shear of layers for the flow of liquid in the pipe, m<sup>2</sup>.

As already indicated, for practical problems, the most optimal is to determine the viscosity of an unknown non-Newtonian fluid with respect to the known and sufficiently studied Newtonian fluid. Secondly, the objects under consideration (non-dyeing manure, liquefied unblocked manure, divided liquid fraction of manure from cattle and pigs) are a dispersed medium-a suspension consisting of a liquid, a heavier fraction, and a light fraction. The liquid mainly consists of water and dissolved in it chemical compounds. The heavy fraction within 15 ... 20 minutes completely settles on the bottom of the vessel, is represented by

products saturated with insoluble chemical compounds of the gastrointestinal tract of animals. There may also be heavy mineral soil particles, most likely carried by the hooves of animals from the walk-in courtyards to the premises or by the tires of tractors and feeders. A light fraction floats to the surface; consists of residues of litter, feed; is a pulp. Preliminary experimental studies of such a suspension showed that gravity mass movement occurs in the laminar regime. In our opinion, the explanation for this fact is the following: the turbulent regime is hindered by both heavy and light fractions of manure. The fibrous mass of the light fraction on both the micro- and macrolevels under laminar conditions extends along the axis of the tube, preventing propagation transverse pulsations of elementary particles of a fluid with increasing velocity of its motion. The heavy fraction in a uniformly distributed state quenches the resulting longitudinal oscillations of the elementary particles of the liquid.

So, we choose two arbitrary points of velocities and movements of layers of water and manure in the flow, we calculate them.

Expression (1) takes the form:

$$\text{for water} \quad \mu^g = \frac{F^g (r_2^g - r_1^g)}{\Delta v^g \cdot s^g}, \text{ Па} \cdot \text{с}, \quad (2)$$

$$\text{for manure} \quad \mu^h = \frac{F^h \cdot (r_2^h - r_1^h)}{\Delta v^h \cdot s^h}, \text{ Па} \cdot \text{с}. \quad (3)$$

Let us consider the relationship between the dependences (2) and (3), which makes it possible to determine the viscosity of liquid manure with respect to the known viscosity of water:

$$\frac{\mu^h}{\mu^g} = \frac{F^h \cdot (r_2^h - r_1^h) \cdot \Delta v^g \cdot s^g}{F^g \cdot (r_2^g - r_1^g) \cdot \Delta v^h \cdot s^h} \quad (4)$$

Assuming the radii of the layers of liquid water and liquefied manure are the same and in the case of examination in the same pipe, then:

$$(r_2^g - r_1^g) = (r_2^h - r_1^h) \quad (5)$$

Taking into account the assumption (5), expression (4) is transformed:

$$\frac{\mu^h}{\mu^g} = \frac{F^g \cdot \Delta v^g \cdot s^g}{F^h \cdot \Delta v^h \cdot s^h} \quad (6)$$

Consequently, the dynamic viscosity of liquid manure in a uniformly dispersed state with respect to the viscosity of water will be expressed:

$$\mu^h = \frac{\mu^g \cdot F^h \cdot \Delta v^g \cdot S^g}{F^g \cdot \Delta v^h \cdot S^h} \quad , \text{Па} \cdot \text{с} \quad (7)$$

We group the resulting expression (7):

$$\mu^h = f \left( \mu^g, \frac{F^g}{F^h}, \frac{\Delta v^h S^h}{\Delta v^g S^g} \right) \quad (8)$$

Researches at the Siberian State Technological University (Erofeeva AA) [4,5] experimentally established the proportionality of the second and third components of the expression (8):

$$\frac{F^g}{F^h} = \frac{\Delta v^h S^h}{\Delta v^g S^g} \quad (9)$$

Using expressions (9) and substituting in (7) we obtain:

$$\mu = \frac{\mu^g \frac{F^g \Delta v^g \cdot 2 \cdot \pi \cdot r_1 \cdot \Delta v^g \cdot t}{\Delta v^h \cdot 2 \cdot \pi \cdot r_1 \cdot \Delta v^h \cdot t} \cdot \Delta v^g \cdot 2 \cdot \pi \cdot r_1 \cdot \Delta v^g \cdot t}{F^g \cdot \Delta v^h \cdot 2 \cdot \pi \cdot r_1 \cdot \Delta v^h \cdot t} = \frac{\mu^g \Delta v^{g^4}}{\Delta v^{h^4}} = \frac{\mu^g (v_1^g - v_2^g)^4}{(v_1^h - v_2^h)^4} \quad (10)$$

Where  $\mu^g$  – coefficient of dynamic viscosity of water, Па·с;

$\Delta v^g = v_1^g - v_2^g$  – the difference in the velocities of the neighboring water layers, m / s;

$\Delta v^h = v_1^h - v_2^h$  – the difference in the speeds of movement of adjacent layers of manure, m / s.

$$\text{or } \mu = \mu^g \cdot \left( \frac{\Delta v^g}{\Delta v^h} \right)^4$$

In our opinion, expression (10) has the following further solution. Equations are known for determining the mean, maximum velocities, and velocities of the liquid layer  $v$  :

$$v_{cp} = \frac{Q}{S}, \text{ m/c} \quad (11)$$

where  $v_{cp}$  – average flow velocity for laminar flow, m / s;

$Q$  – second flow rate  $\text{m}^3 / \text{s}$ ;

$S$  – the area of the live section of the cavity of the working channels,  $\text{m}^2$ .

$$v_{\max} = 2 \cdot v_{cp}, \text{ m/c} \quad (12)$$

$$v = v_{\max} \left[ 1 - \left( \frac{r}{r_0} \right)^2 \right], \text{ m/c} \quad (13)$$

For two adjacent layers of liquid, expression (13) is rewritten:

$$v_1 = 2 \frac{Q}{S} \left[ 1 - \left( \frac{r_1}{r_0} \right)^2 \right], \text{ m/c}$$

$$v_2 = 2 \frac{Q}{S} \left[ 1 - \left( \frac{r_2}{r_0} \right)^2 \right], \text{ m/c equals:}$$

Correspondingly  $\Delta v$  equals:

$$\Delta v = 2 \frac{Q}{S} \left[ \left( \frac{r_2}{r_0} \right)^2 - \left( \frac{r_1}{r_0} \right)^2 \right], \text{ m/c} \tag{14}$$

Consequently, the expression (10) is rewritten:

$$\mu_n = \frac{\left\{ 2 \frac{Q_g}{S} \left[ \left( \frac{r_2}{r_0} \right)^2 - \left( \frac{r_1}{r_0} \right)^2 \right] \right\}^4}{\left\{ 2 \frac{Q_n}{S} \left[ \left( \frac{r_2}{r_0} \right)^2 - \left( \frac{r_1}{r_0} \right)^2 \right] \right\}^4},$$

after the abbreviations in the following form:

$$\mu_n = \mu_g \frac{Q_g^4}{Q_n^4} \tag{15}$$

**Analysis and discussion of the results.**

Thus, the determination of the viscosity of an unknown suspension, in our case - liquid manure, liquid manure fraction, manure and liquefied, unmodified manure, is reduced to the determination of the seconds spent on the same test channel (pipe), temperature, pressure and recalculation by the obtained formula (15).

To confirm the validity of the calculations, the data of the same fibrous suspensions based on the waste paper mass were recalculated [4, 5]. The original data and the results of the recalculation of the dynamic viscosity coefficient from Eq. (15), the experimental data on Poiseuille and the laboratory apparatus for the verification, The formulas of formula (15) are presented in the table.

**Table.**  
*Initial data and results of theoretical calculations and experiments*

Initial data			Results of calculations					
Scope cavity, m <sup>3</sup>	Jew-bone	Concentration, %	Expiration time, s	Secondary consumption, m <sup>3</sup> / s	$\mu$ , Pa • s according to [4, 5]	$\mu$ , According to expression (15)	$\mu$ , Pa • s to Poiseuille	$\mu$ , according to the experimental installation according to (15)
1	2	3	4	5	6	7	8	9
0,008	water		30,03	$4,235 \times 10^5$	0,001	0,001	-	
		0,5	32,80	$3,877 \times 10^5$	0,0014	0,001423	0,0015	0,0013
	1,0	34,56	$3,680 \times 10^5$	0,0017	0,001754	0,0021	0,0019	
	1,5	36,00	$3,533 \times 10^5$	0,0020	0,002066	0,0033	0,0024	

The analysis of the results obtained (according to the table) is as follows:

1. The recalculations of the results of studies on a junk slurry conducted at the Siberian State Technological University (Erofeeva AA) [4,5] show the complete identity (columns of Table 6 and 7).

2. The relative discrepancy between the results of checking the dynamic viscosity coefficients (column 6) according to the Poiseuille method (column 8) is, according to cellulose, respectively, concentrations of 7.1, 23, and 65%; the discrepancy with our experimental data (column 9) is 13, 6.9 and 27%.

3. The discrepancy between the indices between the laboratory facilities by the Poiseuille method (column 8) and our laboratory facility (column 9) is 13, 6.9 and 27%.

4. The Kazan GAU (Trakhunova IA) also carried out studies to determine the dynamic viscosity of pig manure, but with a higher concentration of dry matter - from 6 to 12% depending on the temperature, in order to determine the dynamic mixing parameters [6].

**Conclusions.** 1. In the work for the laminar motion of suspensions, a theoretical dependence of the dynamic viscosity coefficient of the detected suspension on the coefficient of dynamic viscosity of a known liquid and the ratio of the second flow of an unknown suspension to the second flow of a known fluid in the fourth step obtained on the same same laboratory installation. At the same time theoretical calculations are identical with the previous ones.

2. Unfortunately, an experimental verification of the results obtained by [4,5] and the Poiseuille method yields significant differences (up to 65%). The differences between our experimental data (column 9) are 13, 6.9 and 27%. The reason for the differences is possible in contrast to the details of the experimental setups.

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萨哈共和国（雅库特）的战略发展和养马

**Strategy development and horse breeding in the Republic of Sakha (Yakutia)**

**Ivanov Revory Vasilyevich**

*Doctor of Agricultural Sciences, Head of laboratory*

**Hompodoeva Uygulana Viktorovna**

*Candidate of Agricultural Sciences, Senior Research Officer*

**Slobodchikova Maria Nikolaevna**

*Candidate of Agricultural Sciences, Senior Research Officer*

*Yakut Research Institute of Agriculture named after M.G. Safronov*

As the great Soviet scientist M.I. Rogalevich (1941) in the world community for the management of livestock, as an independently functioning system in the Arctic circumpolar environment, the Republic of Sakha has no analogues.

M.F. Gabyshev (1957) asserted that the breeding and breeding of native breeds of animals (Yakut cattle, horses and reindeer) in the coldest region of terrestrial land is a historical achievement of the indigenous peoples of the republic before the world civilization. For centuries, horse breeding in Yakutia is associated with the specific use of horses and is based on the principles of combining with traditional management. In recent years, there has been an increase in the number of horses in the republic, which is primarily due to the relative simplicity of their breeding in comparison with cattle, the protectionist policies of the republic's leadership and the warming of the climate. As of January 1, 2018, the number of horses totaled 183,889 thousand heads, or 104.2% of the level of the previous year. At present, 99.0% of the stock of meat herd horses in agricultural enterprises and peasant farms of the Far Eastern Federal District and 27.3% of the Russian Federation are concentrated in Yakutia [1].

It should be noted that in Yakutia pasture areas are traditionally used haphazardly, cattle and horses are grazed together. Around the 1960s, the policy of enlarging small collective farms into large state farms was initiated, which was the main reason for the detrimental impact of human activity through agricultural production on the environment [2, 3]. Particularly haymaking and pasture lands were affected in those localities where nearby settlements of populated areas along the floodplain of the Lena River, Megino-Kangalassky, Ust-Aldansky and other uluses of the republic were created.

Digression of the grass stand as a result of joint grazing of cattle and horses is observed in every settlement where livestock are engaged.

At low rates cattle are located in summer in remote pasture lands - “saylyk”, the organization of a pasture-regulated pasture regulated by shepherds - the basis for the rational use of land is almost not practiced.

In the horse breeding of Yakutia, a freestanding mowing system is practiced, in which the schools of horses themselves choose the location. Therefore, in the horse breeding of Yakutia, the organization of a rational system of pasture use according to the classical pasture rotation scheme is practically impossible. On the basis of the study of the behavior of horses on pasture, the peculiarities of the formation of the spatial structure of the schools of horses and the conduct of special experiments, optimal rates of loading on the pasture have been established [4, 5, 6, 7].

At present, taking into account the level of technological development of the country’s livestock sector, further digression of the herbage of meadows and pastures employed for breeding cattle and horses can be stopped only by optimizing the livestock population.

It seems to us that in the development strategy of the industry, absolute priority should be given to increasing the productivity of animals, and not to the growth of their numbers.

In the horse breeding of Yakutia, the transition to the realization of young animals at 6-7 months of age occurred in the 70s of the last century and was dictated by the lack of feed. At that time the main livestock of livestock and horses was kept on state farms, while organizing wintering the provision of horses with forages was done according to the residual principle.

Due to biological characteristics, during the first 6-7 months of life there is an intensive growth and development of young animals, daily increments reach 1000-1200 g per day, and by the onset of winter in young animals with an anthrax live weight of 210 kg, carcass weighs 122 kg. Slaughter yield is 58%. In this case, the fat comb in the region of the cervical vertebrae can reach 5-6 cm, fatty watering covers the entire carcass with an even layer.

In the carcass, the percentage of fat reaches 12-14% at this age, with 66% of meat, 18-15% of bones and 4.5% of tendons. In this regard, the foal is poorly stored, the fatty water quickly ransoms. When preparing many traditional dishes, the foal is inferior to the meat of adult horses and cattle.

Moreover, in recent years, the desire of the population for the consumption of lean meat has clearly become evident, many consumers have simply cut out and do not use fatty tissue of the foal for cooking dishes.

Although polyunsaturated fatty acids (PUFAs) are not more harmful to human health in adipose tissue, meat and internal fat foals than other types of agricultural animals, they also have enough other fats [8,9,10].

We consider it necessary for medical scientists to conduct special studies on the influence of long consumption of foals on human health, to determine the norms for safe consumption of national dishes “harta”, “isa”, “haya”, etc.

Carrying out such research would become the scientific basis of healthy nutrition and expansion of the market, advertising and even wider application of national dishes from foals.

Returning to discussing the strategy of development of herd horse breeding, we propose to shift to the implementation of a heavier contingent of young and adult horses. We have made such proposals long ago and repeatedly [11,12,13].

The basis of our proposals, as we have already noted, is that the increase in production of meat in the implementation of foals is only due to the increase in the number of horses. In this case, the increase in livestock is mainly due to the use of meadows and pastures close to populated areas and leads to their trampling and a decrease in productivity, digression of the grass stand. At the same time, the apparent economic efficiency of the foal implementation results in the costs of overcoming the digression of the grass stand, the organization of radical improvement of degraded lands, the carrying out of reclamation works and other activities in the development of separated unused lands.

A fundamentally new direction of livestock, in particular herd horse breeding, will be the production of biologically active substances for medicine and the food industry [14,15]. The market of the Republic of Sakha (Yakutia) organic products has a huge potential due to a number of reasons:

Firstly, these are the broad possibilities of the resource base of Yakutia: the presence of a huge territory with a favorable ecological situation, with its richest flora and fauna, and high water availability. It is also important that there are vast areas remote from industrial centers with ecologically clean virgin nature that meet the concept of eco products.

Secondly, this is a high agricultural potential. The area of productive land in Yakutia is about 3.1 million square meters. km, which represents 34% of the total Russian indicator [16].

Organic livestock is considered a way of producing products with a minimized content of harmful substances and high quality, satisfying environmental requirements, humane in relation to animals and nature.

Success in the development of organic horse breeding in Yakutia is directly dependent on scientifically based strategies and methods of horse breeding, the development of which requires the solution of the following problems:

- restoration of the herd structure of the herd of horses of the Yakut, Prilensk and Megezhe breeds, its preservation and rational use.
- Technology of horse breeding (free-chest method).
- development of strategies and methods for rational use of pasture land and hayfields;

- development of breeding programs;
- obtaining environmentally friendly and biologically complete dietary food products and medicines of animal origin.

In order for the end product to become organic, it must go all the way from the farm to the counter with a number of basic parameters: organic methods of farming and livestock, organic raw materials, organic ingredients and technological process.

Quality control in production begins directly from the ground. Land allocated for organic crops must be treated for at least three years without the use of chemical fertilizers. After all, healthy soil gives not only a good harvest, but also immunity to plants for pest control. Seeds for organic farming should be adapted to local conditions, resistant to pests and weeds and, most importantly, not to be genetically modified.

The first stage in the development of organic livestock breeding in horse breeding is the selection of an ecologically clean area for pasturing animals. Yakutia has vast territories, remote from industrial centers with an environmentally clean untouched nature that meets the concept of eco products. These areas include some arctic and northern regions of the republic where there is no industrial production.

From the northern regions, small businesses in agriculture are mainly engaged in the Srednekolymsky district. Srednekolymsky ulus-municipal formation in the Northeast of Yakutia. The plain relief predominates. A significant part of the region is occupied by the Kolyma lowland, which is characterized by ecological purity. In the west - the Alazey plateau, in the east - the Yukagir plateau. On the territory of the ulus, the Kolyma and Alazey rivers flow. Lots of lakes [17].

The Kolyma lowland is a lowland plain located in the northeast of Yakutia in the basin of the Alazeya, Bolshaya Chukochya and the left banks of the lower reaches of the Kolyma River. Together with the Yano-Indigir lowland, which lies to the west, forms an extensive East Siberian lowland [18].

The relief of the Kolyma lowland is limited by altitudes in the range of 50-100 m above sea level. Plots with a height of up to 300 m are rare, but they are insignificant. The relief of the Kolyma lowland is represented by permafrost-thermokarst forms, and the soils are loam and sandy loam. The Kolyma lowland has cryogenic (permafrost) forms of relief due to the permafrost of the ground: drill holes (hydrolakkolites), thermokarst dips, polygonal wings, ice sheets.

The climate of the territory is subarctic. It is characterized by a prolonged cold winter with occasional precipitation and a short summer. The territory can be divided into tundra and forest-tundra. In the first area, the summer lasts much longer, but the temperature does not rise above +10 degrees. For winter characterized by constant wind and snowstorms. Snow, as a rule, is located evenly.

Northern territory of the Kolyma lowland is used as a pasture for reindeer.

Indigenous peoples of the Arctic in severe conditions have formed a specific culture of traditional industries: northern reindeer herding, marine mammal hunting, hunting and fishing. Unique breeds of cattle and horses were created, well adapted to the harsh extreme conditions of the North. But, at the present time, traditional types of management are uncompetitive, which is due to high transportation costs for the transportation of products, the lack of modern enterprises for integrated processing of raw materials [18].

According to the requirements of organic livestock, we need to monitor the chemical composition of soils and vegetation of the pastures of the Kolyma lowland for mineral composition to detect the concentration of microelements in the soil of the territory and the vegetation response, and also to establish the content of trace elements and amino acids in pasture vegetation.

Animals on these pastures receive natural, environmentally friendly natural conditions, they feed on food, which do not contain chemical and synthetic additives, hormones and genetically modified organisms.

Products of herd horse breeding in Yakutia practically on all territory of the republic fall under requirements of manufacture of organic food stuffs. At the same time, the technology of keeping animals is a big advantage of the industry. In the extreme conditions of Yakutia, there was a free-mongering method of keeping herd horses, where the schools of horses in 10-12 heads were left to themselves when choosing a habitat. They, unlike other types of farm animals, do not scrounge, and this allows animals to graze on the most nutritious pasture land areas throughout the year, that is, to consume only a more nutritious part of pasture fodder [19].

Therefore, thanks to this technology, only the most nutritious, useful pasture products accumulate in the body of horses.

The next stage is the production of ecologically clean and biologically complete dietary food products and medicines of animal origin.

These include meat, offal, blood and fat of horses of the Yakut breed as raw materials for the production of functional foods [20-22].

To verify the conformity of the quality and composition of goods intended for food, it is necessary to conduct an examination in order to:

- Identify the compliance of the biochemical composition of the product with the requirements of organic products;
- Identify bacterial contamination of products;
- Develop recommendations on the timing of storage and consumption;
- Determine the composition of microflora;
- Determine the availability of the most favorable conditions for transportation and the timing of the sale of grocery goods.

Based on the results of the research, an opinion will be obtained on the conformity of the product to standard norms. Analyzes are conducted to determine the quality and factors that affect its deterioration.

Also, for effectiveness, we will introduce work on obtaining a patent for the proposed invention in the field of organic products.

The final stage of the work is the sale of organic food products, the delivery of products to other regions of Russia and foreign countries (USA, China, Japan).

The northern regions (the seaport of Tiksi) have a favorable geopolitical position from the perspective of the development of international relations and trade in the conditions of the operation of the Northern Sea Route. There is an outlet to the Arctic Ocean.

Thus, in modern conditions of Yakutia it is necessary to use its competitive advantages more effectively, especially in the production of ecologically clean products. In Yakutia, meat production has traditionally been considered one of the main and priority areas in agriculture. This is a promising direction in livestock production, which has not yet fully realized its potential. The republic has real opportunities to occupy a worthy niche among the exporters of meat and processed products. These are extensive pasture lands that allow to maximally reduce the cost of production, the presence in the neighborhood of a capacious Chinese market and, finally, the existing national traditions of meat beef breeding.

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纯种粗羊羊的生理参数及其杂交

**Physiological parameters of pure bred coarse-wooled sheep and it's cross-breed**

**Alferov Ivan Vladimirovich**

*Senior Research Officer*

**Shakhurdin Dmitry Nikolaevich**

*Senior Research Officer*

*Yakut Research Institute of Agriculture named after M.G. Safronov*

注释。 我们对粗鲁羊的血液，Buubei杂交种，粗羊羊和大角羊的血液进行了血液学研究，以了解雅库特中心地区的适应能力； 在春季末期采集血样。 进行分析的结果表明，粗制羊在最大的北方（中央雅库特），第一代和第二代的环境中具有消极的适应能力 适合萨哈共和国的农场。

关键词：血液学；杂种杂交；羊；中央雅库特。

*Annotation. We conducted a hematological study of the blood of coarse-wooled sheep, cross-breed of Buubei coarse-wooled sheep and a big-horn on the ability to acclimatize in the conditions of central Yakutia; blood sampling was collected at the end of the spring period. The result of the conducted analyzes shows that coarse-wooled sheep has a negative ability to acclimatize in the conditions of the utmost North (central Yakutia), the first and the second generation cross breed fit to the standart physiological indices, thus developed cross breed are suitable for the farms of the Republic of Sakha.*

*Keywords: hematology; cross-breed of Buubei; sheeps; central Yakutia.*

**Introduction.**

The method of hybridization is one of the ways to improve the adaptive qualities of domestic animals to certain conditions used by humans for a long time. Thus, in the application of hybridization, the breeds of merino sheep and arharomerinos were excreted [3]. A number of researchers note the probability of transferring features of behavior and habits by inheritance from parents to descendants [4]. From this it follows that wild species, when crossing with domestic sheep, can transfer to descendants not only useful, but also unwanted signs, such as late ripeness, low technological qualities of wool and behavioral reactions - savagery, timidity and aggressiveness, which is highly undesirable in further work with hybrids [6, 9].

On the basis of Yakut State Agricultural Academy crossed snow sheep - chibouku with uteras with coarse-wooled sheep for the possibility of breeding a new breed of sheep (sheep-bug). Hybrids of the 1st generation were obtained by the inoculation of the epididymal seed of wild sheep *Ovis nivicola* in the horn of the uterus of coarse-wooled domestic sheep. [2] At this stage of the study, we decided to study the clinical and hematological parameters of these hybrids in the condition of Yakutia

The problem of acclimatization and adaptation of sheep is historically associated with methods and methods of animal husbandry in specific climatic and weather conditions. At the same time, acclimatization, being a special case of adaptation to a complex of external natural and climatic factors, is an integral unit in the general biological problem of the evolution of animals, which determines its relevance at all times [6]

E. Ya. Borisenko [1] noted that acclimatization is the means to live, reproduce and develop correctly in a new geographical area, under new climatic conditions and preserve economic and useful qualities for the sake of which animals are bred.

The process of acclimatization is highly dependent on the anatomical and physiological characteristics of animals [8]. Pilz K. and Winkler H. are of the opinion that, in most cases, within each breed, small and medium-sized, more mobile forms have a greater chance of successfully dealing with the acclimatization process than larger animals. This is explained by the highest metabolic rate in small animals and the best conditions for successful thermoregulation [10].

**The aim of the research** is to study the physiological characteristics of sheep and their hybrids in the conditions of Central Yakutia.

**Material and methods of research:**

In order to conduct a study of the physiological state of animals, blood was sampled for studying their morphological features; five hybrid individuals of the first (3 years), five hybrid second-generation (1 year) and four coarse-grained domestic sheep of the Buubei breed ( 3 years). The conditions of keeping and feeding correspond to the technologies adopted in the educational establishment, in summer animals were in fenced pastures with animals.

**Research results.****Table 1.***Hematologic indices of domestic coarse-wooled sheep*

Indicators	1	2	3	4	Average	Avg. deviation	Normal indicators (sheep)
Leukocytes (WBC), x10 <sup>9</sup> l	4,2	2,4	3,1	3,6	3,325	0,5	4,0-14,0
Erythrocyte (RBC) x10 <sup>12</sup> l	13,8	8,4	10,6	10,4	10,8	1,5	8,0-16,0
Hemoglobin (HGB)%	139	98	112	115	116	11,5	90-133
Hematocrit (HCT)%	45,3	30,0	32,4	32,5	35,11	5,1	24-50

The blood picture is an important indicator that reflects the dynamics of vital processes occurring in the body of animals, the criterion of the state of health and productivity.

As a result of the performed studies of the morphological composition of the blood in experimental sheep, the following regularities were found, which are reduced to the following: when comparing the results obtained (Table 1) with normal blood values, sheep showed abnormalities in the number of leukocytes in all the flares except for the first. This is probably due to the adaptation of animals to the harsh natural and climatic conditions of Yakutia, in a process that significantly reduced immunity during the winter. Our data are confirmed in the article of R.V. Ivanova, W.V. Hompodoeva, I.I. Afanasyev [5] in the study of which depicted the relative decrease in leukocytes by the summer period, and an increase in other important blood indicators in the sheep Romanov and Buubei breeds.

With respect to red blood cells and hemoglobin, all the indices are closer to the physiological norm (Table 1). Changes in hemoglobin and erythrocytes in different sheep are due to the dependence of the morphological parameters of blood on many factors, one of which is the forage base and environmental conditions. In the summer, the indicators in question will increase, as we see from the example of the first sheep, due to herding on green grass rich in nutrients, animals move a lot in the fresh air and enjoy the beneficial effect of moderate radiation.

**Table 2.**

*General hematological parameters*

Indicators	1 ind.	2 ind.	Груб. Ов.	Normal indicators (sheep)
Leukocytes (WBC), x10 9L	5,1	4,3	3,3	4,0-14,0
Erythrocytes (RBC) x10 12 l	12,0	8,2	10,8	7,0-12,0
Hemoglobin (HGB)%	164,4	127,4	116	90-133
Hematocrit (HCT)%	43,3	32,0	35,11	24-50
Average volume of erythrocyte	36	39,6	33,5	35,7-37,5
The mean hemoglobin in erythrocyte (MCH) g / l	14,2	17,3	9,5	24-33
The mean concentration of hemoglobin in erythrocytes (MCHC) g / l	382,2	407,8	288,8	86,8-94,7

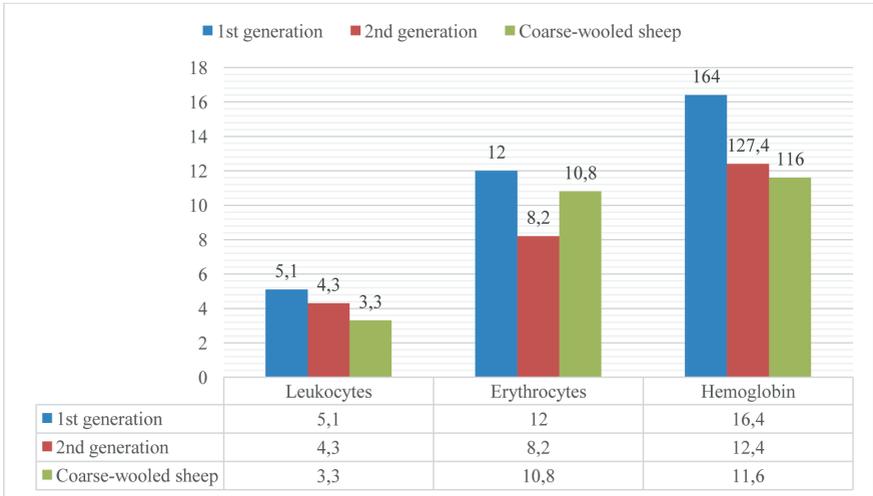
Table 2 shows the haematological parameters of all individuals and normal physiological indicators (sheep).

**Table 3.**

*Comparative leukocyte characteristics of hybrids I and II generation and coarse-wooled sheep*

Individuals	Granulocytes	Lymphocytes	Monocytes
2nd generation	9,66	76,5	4,52
Coarse-wooled sheep	26,325	63,7	9,975
Adults I generation	21,1	64,74	9,16
Normal indicators (sheep)	42-66	40-50	2-5

This table reflects the leukocyte indices of all individuals and normal physiological indicators (sheep) according to the data of foreign authors.

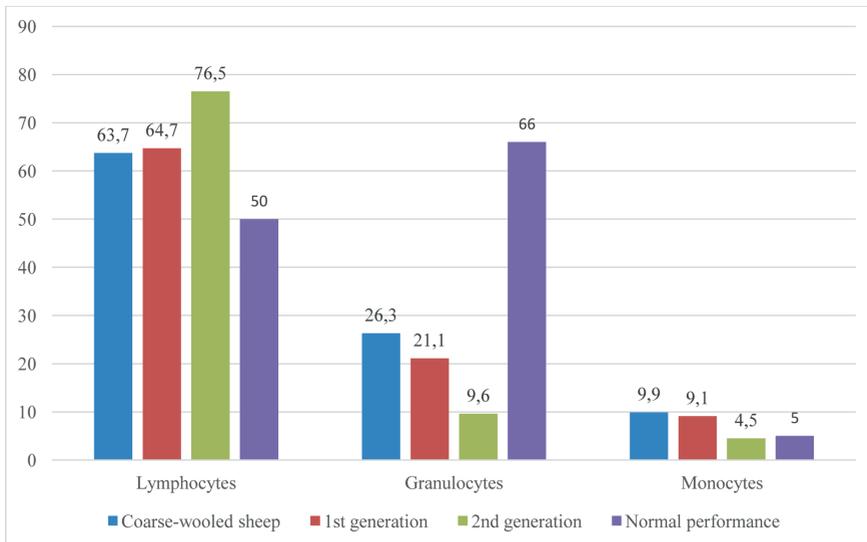


**Fig. 1** Comparative blood indices of all individuals studied.

Leukocytes in the second-generation hybrids reach a threshold of 4,312 (thousands of cells in 1  $\mu$ l), this is due to the genes of the snow sheep (25% of the genes) and in particular to the fact that they are young individuals whose immune system is not yet fully formed. Hybrids of the first generation, with the highest percentage of snow sheep genes and the number of leukocytes 5,158 (thousands of cells in 1  $\mu$ l), are easier to tolerate frosts in Yakutia than the predecessor (coarse-wooled sheep). The lowest values of leukocytes are, most likely, of an adaptive nature.

The amount of hemoglobin corresponds to normal values, only relative to adult individuals of the first generation, in whom it is partially elevated.

Erythrocytes and hematocrit, in hybrids, on the contrary, are raised, this is possibly due to the compensatory response of the hematopoietic organs.



*Fig. 2 Comparative leukocyte counts of all the individuals studied.*

In the individuals we examined, in comparison with the normal indices, both in the coarse-wooled sheep and the hybrids of the first and second generation, we see an increase in the number of lymphocytes and monocytes, while the number of granulocytes is lowered on the contrary. It can be concluded that in coarse-wooled sheep and hybrids of the first and second generation, there is an absolute species leukocytosis - lymphocytosis.

The hybrids excreted are promising for the economy of our republic, due to their adaptive features they tolerate severe winters, thanks to the genes of coarse-woolen sheep can be domesticated.

**Conclusions:**

It is established that the hematological parameters in the body of hybrids of the first generation depend on the ancestor (snow sheep), which were transmitted to hybrids of the domestic sheep and the snow sheep during the adaptive function of the organism to the harsh environment.

It has been suggested that lymphocytosis is observed in the individuals studied.

The remaining parameters, which reflect the different physico-chemical properties of red blood cells, are increased in connection with the adaptive reactions of the hematopoietic organs to the harsh climate.

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西西伯利亚地区春小麦品种生产力与粮食品质的关系

**Crop productivity and grain quality of spring soft wheat varieties depending on the farming intensification level under Western Siberia conditions**

**Galeev Rinat Raifovich**

*Doctor of Agricultural Sciences, professor;*

**Samarin Ivan Sergevich**

*postgraduate*

*Новосибирский государственный аграрный университет*

摘要。在西西伯利亚的粮食经济中，农业科学的春小麦和甘薯是最重要的作物。研究不同层次技术支持下特定气候条件下粮食生产潜力和质量实现的特点，是解决稳产问题，提高粮食产量和质量的前提。在特殊农业气候区获得的实验数据。这项研究的目的是确定西西伯利亚森林草原小麦的质量。2014-2016年在新西伯利亚地区的生产条件下进行了现场试验。在研究过程中，在传统和集约耕作的条件下，估计了4个中早熟和2个中等生长的品种的籽粒产量和品质。结果表明，在不同的天气条件下，生产的集约化可以获得高产量和良好的粮食质量。所有测试的品种都表现出可靠的产量增加和谷物质量的改善。发现谷物产量是35%，基因型是26，天气条件下下降22%。

关键词：软春小麦；密集型技术；产量；籽粒性状；籽粒品质；面粉产量；生面筋

***Annotation.** In the grain economy of Western Siberia, spring wheat and rye are the most important crops of Agricultural Sciences. The study of the features of the realization of the potential for grain productivity and quality in specific climatic conditions at different levels of technological support is a prerequisite for solving the problem of stabilization and increasing grain yield and quality. The experimental data acquire a special role in the creation of new highly productive varieties of wheat and in the development of technologies for their cultivation in specific agroclimatic zones. The purpose of the work is to study the influence of the level of technological support on yields and grain quality of spring wheat varieties of various ripening groups in the forest-steppe of Western Siberia. Field experiments were conducted in 2014-2016 in the production conditions of the Novosibirsk region. In the course of the study, the yield and quality of the grain were estimated at 4 medium-early and 2 medium-ripening varieties under conditions of traditional and intensive farming. It is shown that in different weather conditions the intensification of production makes it possible to obtain*

*high yields in combination with good grain quality. All the varieties tested showed a reliable increase in yield and improved quality of grain with an increase in the level of technological support. It was revealed that among all studied varieties the best technological qualities had the medium-born variety Novosibirskaya 29 and the medium-grade variety Novosibirskaya 18. It was estimated that the level of technological support determined the grain yield by 35%, the genotype by 26, and the weather conditions by 22%.*

**Keywords:** *soft spring wheat, intensive technology, yield, grain nature, grain quality, flour yield, raw gluten*

Spring soft wheat is the main grain crop, both in Western Siberia and in Russia as a whole. The share of wheat in total grain production continues to increase. [1] This is due to a significant increase in acreage under this crop. However, the problem of wheat grain quality remains relevant. [2, 3]

Productivity and quality of grain are subject to large fluctuations depending on years [4]. In addition, a number of studies indicate that, under production conditions, the yields of varieties remain significantly lower than the genetic potential of their productivity. [5,6]

Among the whole complex of factors for increasing the production of high-quality wheat grains, an important place is taken by the variety. Currently cultivated varieties of cereals, including spring wheat, have a rather high yield potential. [7-9] In the current production conditions, this potential is realized in an extremely low degree. [10,11]

Another important factor in increasing the productivity of varieties is a scientifically based farming system. Studies show that technological support determines up to 50% of the yield increase. [12,13] However, the peculiarities of technology influence on the productivity and quality of spring wheat grain, depending on the climatic conditions of the region, are not fully understood. [14,15]

In this regard, in the zone of risky farming in Western Siberia, research on the evaluation of varieties of spring soft wheat and the development of elements of their cultivation technology that allow them to produce high-productive crops with grain quality that meet the requirements of the flour-grinding and baking industry in local natural climatic conditions is an objective necessity.

The aim of the research was to study the influence of the level of technological support on yields and quality of grain varieties of soft spring wheat of various ripening groups in the forest-steppe of Western Siberia.

#### **OBJECTS AND METHODS OF RESEARCH**

In 2014-2016 years. Field trials of wheat varieties of various ripening groups were conducted in the forest-steppe zone of the Novosibirsk Region. The

experiments were laid in fourfold repetition, the total and registration area of the plot was 476 and 420 m<sup>2</sup>, respectively.

The main soil type of the experimental site is chernozem leached medium-humus medium-thick. The humus content in the upper arable layer is 5.7-6.9% and decreases with depth.

In the studies, the yield and grain quality of soft spring wheat varieties of various ripening groups were studied: 4 medium-early varieties (Novosibirskaya 31, Novosibirskaya 29, Omskaya 36, Altai 92) and 2 medium-ripened varieties (Novosibirsk 18, Hercules).

The investigated varieties of wheat were placed in a crop rotation after peas. As a control variant, wheat varieties were cultivated according to traditional technology without the use of chemical means with application of 1 centner / ha of ammonium nitrate.

Intensive technology included the application of fertilizers and the use of herbicides, insecticides and fungicides. Under the wheat, 1.7 centners / hectare of ammonium nitrate and 1.2 centners / hectare of nitroammophoski were introduced. Treatment with the insecticide Aktara was carried out at the end of the tillering phase - the beginning of the earing (0.07 l / ha, the flow rate of the working fluid was 300 l / ha), the herbicide Diallen-Super was used in the tillering phase (0.6 l / ha, / ha), Amistar-Trio fungicide treated the crops at the end of the earing phase - the beginning of flowering (1 l / ha, working fluid flow 300 l / ha).

Productivity of varieties and quality of grain were evaluated in accordance with the methodology of state testing [16]. The data obtained were statistically processed according to the field experience method [17], as well as using the SNEDECOR software package.

### **RESULTS OF THE RESEARCH AND DISCUSSION**

According to the results of the research, the yields of wheat varieties were evaluated. (Table 1) The yield increases were found in all varieties cultivated with intensive technology. The maximum yield increase was observed in the mid-varietal varieties Novosibirskaya 29 - 49.3% in relation to control and Omsk 36 - 57.7%. Wheat varieties Novosibirskaya 31 and Altai 92 when cultivated by intensive technology showed an increase in average yield by 38%. The addition of grain yields in the mid-ripening varieties of wheat Novosibirsk 18 and Hercules amounted to 45.5 and 62.8%, respectively.

**Table 1.***Yield of varieties of soft spring wheat, depending on the level of intensification, t / ha*

Variety	Technology of cultivation	Year of study and productivity of the variety			
		2014	2015	2016	average
Novosibirskaya 31	traditional	2,23	3,18	3,65	3,02
	intensive	3,16	4,39	4,93	4,16
Novosibirskaya 29	traditional	2,36	2,94	3,48	2,92
	intensive	3,48	4,62	4,98	4,36
Omskaya 36	traditional	3,06	3,21	3,56	3,24
	intensive	4,76	5,14	5,38	5,11
Altayskaya 92	traditional	2,24	2,68	3,24	2,72
	intensive	2,76	3,48	4,92	3,76
Novosibirsk 18	traditional	2,47	3,56	3,94	3,32
	intensive	3,48	4,89	6,12	4,83
Hercules	traditional	2,53	2,92	3,42	2,96
	intensive	4,26	4,76	5,43	4,82

*Note. The results of the variance analysis of the three-factor experiment (6x2x3): HCP05 for particular differences 0.26; HCP05 for the main effects of 0.18; HCP05 for paired interactions 0.23. Indices of determination for factor A (genotype) - 25.8%, factor B (level of intensification) - 39.6, factor C (conditions of the year) - 20.5; the interaction of AB - 1,8%, VS - 2,6, AU - 3,1. ABC - 0.8%.*

In the course of the research, such indicators of grain quality as the mass of 1000 grains were assessed, the total vitreousness and nature were evaluated during the research. (Table 2) It was found that the use of intensive technology positively influenced the mass of 1000 grains. The most significant changes in this feature were observed in the mid-season variety Novosibirskaya 29 and the average Novosibirsk 18, in which the increase was 26.7% and 23.7%, respectively, relative to control. The Omsk 36 grade was the least sensitive, with an increase of only 13%. In the remaining investigated varieties grown by intensive technology, the mass of 1000 grains was 16-19% higher than when cultivated according to traditional technology.

**Table 2.**

*Indicators of grain quality, depending on the level of technological support, (average for 2014-2016).*

Variety	Technology of cultivation	Weight of 1000 grains	Total vitrification, %	Natura, g / l
Novosibirskaya 31	traditional	36	51,1	787
	intensive	42	54,4	809
Novosibirskaya 29	traditional	30	51,3	775
	intensive	38	54,4	815
Omskaya 36	traditional	36	51,4	771
	intensive	43	54,3	804
Altayskaya 92	traditional	36	51,8	782
	intensive	41	54,1	809
Novosibirsk 18	traditional	38	58,5	764
	intensive	47	63,6	794
Hercules	traditional	36	49,4	769
	intensive	43	54,5	827
HCP05		2,18	3,98	14,1

Improvement of the level of technological support led to a slight increase in the overall vitreousness of the grain: in the mid-term varieties it increased by 2.3-3.3, in the middle-aged population by 5.1%.

It was found that the technological quality of grain of wheat varieties depended on the level of technological support (Table 3). An increase in the yield of flour by 4-5.5% was noted from grain cultivars cultivated by intensive technology. However, the Novosibirskaya grade 31 showed an increase of only 1.4% relative to traditional technology. The content of crude protein in the grain increased in all of the studied varieties. In the mid-varietal variety Novosibirskaya 29 and in the middle-grade variety Novosibirskaya 18, the highest increase in the content

of crude protein in grain was observed (by 2.17 and 2.13%, respectively). The least increase in the content of crude protein was in the Hercules variety (0.54%), in the other varieties it was 1.2-1.4%.

It was noted that the cultivation of spring soft wheat by intensive technology contributed to a decrease in the gluten deformation index (IDK).

**Table 3.**  
*Technological parameters of grain quality of varieties of spring soft wheat, depending on the level of intensification (average for 2014-2016).*

Variety	Technology of cultivation	Flour yield, %	Crude protein in grain, %	Crude gluten, %	Gluten deformation index, units.
Novosibirskaya 31	traditional	68,1	9,81	28,9	66,72
	intensive	69,5	11,25	32,4	57,68
Novosibirskaya 29	traditional	64,8	9,83	28,6	73,68
	intensive	70,3	12,0	32,3	60
Omskaya 36	traditional	65,8	9,64	27,5	79,6
	intensive	71,1	11,0	32,6	59,84
Altayskaya 92	traditional	68,3	9,67	30,1	86,48
	intensive	72,6	10,82	34,5	68,96
Novosibirsk 18	traditional	67,4	10,25	31,8	68,72
	intensive	73,2	12,38	33,9	54,24
Hercules	traditional	69,3	9,75	28,4	62,72
	intensive	73,3	10,29	36,5	52,32
HCP05		0,89	0,17	0,32	2,18

The greatest decrease in IDC was observed in the Omsk 36 (by 19.8 units) and Altai 92 (by 17.52 units). The least intensive technology of cultivation affected the EDC of wheat of varieties Novosibirskaya 31 by 9 units. and Hercules - by 10.

The variance analysis carried out based on the results of the study made it possible to calculate the share of the influence of the genotype, the level of intensification and the conditions of the year on the phenotypic variation in the content of raw gluten in grain and yield.

It was established that the level of influence of intensification was 35% for wheat yield, 26 for genotype, 22 for year conditions, 10% for all factors. The maximum share of the effect on the phenotypic manifestation of the sign of the content of raw gluten in the grain has an intensification level (35.6%). Weather conditions also make a significant contribution to the phenotypic variation of signs (22.4%), however their share of influence is lower than the share of the genotype (28.3%) and the level of intensification.

As a result of the research, the most responsive to the use of intensive technology of the variety were identified. Of medium-early varieties, the best response was

to increase the level of technological support of the variety Novosibirskaya 29, from the mid-ripening varieties - Novosibirskaya 18. These varieties were marked by the maximum yield increase, a significant improvement in the qualities and technological properties of the grain. Sort Altai 92 least reacted to the change in the level of technological support.

### CONCLUSIONS

1. In the leached chernozem of the forest-steppe of Western Siberia, when cultivating the varieties of ripeness of spring soft wheat, it is established that the grain yield is influenced more by the level of technological support - 35%, the genotype provides 26% and weather conditions - 22%.

2. Application of intensive production technology allows to obtain high yields in combination with good grain quality in different weather conditions.

3. Among all studied varieties the best technological qualities were the mid-varietal variety Novosibirskaya 29 and the middle-grade variety Novosibirskaya 18. These varieties were characterized by maximum responsiveness to the application of intensive cultivation technology. Minimal responsiveness was noted in Altai 92.

4. All the varieties tested showed an increase in yield and improvement in grain quality with an increase in the level of technological support.

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多元宇宙的概念  
**Concept of the Multiverse**

**Rodin Vladimir Alexandrovich**  
*Independent researcher*

在这篇文章中，作者在多元宇宙的一般概念框架内提出了无限的层次结构的宇宙嵌套思想。考虑到我们宇宙的演化规律，包括新的运动基本定律，作者提供了宇宙学模型，为核心理论带来了新的视角。

这篇论文对于处理宇宙物理和哲学问题的学生，研究生和科学家来说很有价值。

关键词：原始元素；原介质；量子；Multiverse的；Emergentness；超对称

**Annotation.** *In this writing, within the framework of the general concept of the Multiverse, the Author puts forward the idea of the infinite hierarchically determined nesting of universes. Considering the laws underlying the evolution of our Universe, including the new fundamental law of motion, the Author offers the cosmological model that brings a new perspective to the Core theory.*

*This paper could be valuable to students, post-graduate students and scientists dealing with physical and philosophical problems of the Universe.*

**Keywords:** *Proto-element; Proto-medium; Quantum; Multiverse; Emergentness; Supersymmetry.*

**Introduction**

In each of the known cosmological models there is a certain amount of common sense, having combined that and adding a few fresh thoughts, one can get a good result. The concept of the Multiverse proposed in the 1950s by Hugh Everett III deserves special attention, despite the fact that the proposed hypothesis of “parallel worlds” is filled with science-like mysticism and attempts to explain quantum effects in any way for the sake of “beautiful” mathematical abstraction. Nevertheless, the very idea of multi-structuring pushes us to comprehend the topology of the space of a multi-level universe, while the topology of the space of any considered universe determines the metric basis for the formation and transmission of all kinds of wave energy disturbances, including corpuscular ones, described by Louis de Broglie. Let’s try to give an ontological justification for this cute hypothesis.

### 1. On the structure of the Global Universe.

Author's view on the structuring of the Multiverse, radically different from Everett model was briefly formulated in [1]. The proposed version of the *Concept infinite nesting worlds* based on the theory of Georg Cantor, considering the idea **endless deterministic hierarchically nesting** material systems (universe). According to this idea, each of the considered universes (including ours), being the seat of discrete isotropic medium (**proto-medium**) formed from **proto-element** (isomorphic Universes lower level), represents the initial unit element (proto-element) protosredy following universe higher level global hierarchy etc.

This principle of constructing a hierarchical series of mutually dependent systems can be formalized using the following expression:

$$\dots \Rightarrow S_k^{n+1} = \sum_{k=1}^{\infty} S_k^n \Rightarrow S_k^n = \sum_{k=1}^{\infty} S_k^{n-1} \Rightarrow S_k^{n-1} = \sum_{k=1}^{\infty} S_k^{n-2} \Rightarrow \dots \quad (1.1)$$

where  $S_k^n$  -  $k$ -th  $n$ -level system,  $k = 1, 2, 3, \dots \infty$  и  $n = 1, 2, 3, \dots \infty$ .

Any  $k$ -th closed system of the  $n$ -level  $S_k^n$ , as a set of homogeneous unit elements (proto-elements) or systems of the lowest level,

$$S_k^n = S_1^{n-1} + S_2^{n-1} + \dots + S_{\infty}^{n-1} \quad (1.2)$$

is a unit of a closed system of the highest level.

$$S_k^{n+1} = S_1^n + S_2^n + \dots + S_{\infty}^n \quad (1.3)$$

Considering the special case of the proved Poincare conjecture for an arbitrary spherical set that is monotonically and infinitely expanding from some initial spherical element with radius  $R_0$  when it is filled with isomorphic elements (see  $R_0$ -distribution [1]), with increments of the radius of the set  $1.75R_0$ , that the relative increment of the volume of the set under consideration will tend to unity:

$$\lim_{n \rightarrow \infty} \frac{V_n}{V_{n-1}} = 1 \quad (1.4)$$

The absolute increase in the volume of such a sphere tends to zero:

$$\lim_{n \rightarrow \infty} (V_n - V_{n-1}) = 0 \quad (1.5)$$

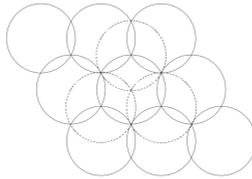
It follows from (1.4) and (1.5) that the monotonically expanding three-dimensional set under consideration must be closed and, consequently, finite. The curvature of the sphere of such a set tends to zero, and the initial element with effective radius  $R_0$  degenerates to the point:

$$\Delta R_{n=\infty} = nR_0 - (n-1)R_0 = 0 \quad , \quad \text{т.е. } R_0 = 0 \quad (1.6)$$

From this it follows that any such spherical set can be identified with the initial element (unit) of an infinite set of the next level, which is also closed, etc. That is, the initial element of such a closed system is a discrete unit of its infinite set, or a point possessing the properties of the Dirac  $\delta$  – function. The volume of the «zero» proto-element in the considered system (the universe) will be equal to unity:

$$\iiint_V \delta(x, y, z) dx dy dz = 1 \tag{1.7}$$

The foregoing confirms the relativity of infinity, determined by the cardinal number of the set, and the validity of the laws of symmetry only within a particular universe. Moreover, the condition of Hausdorff space of a closed material system of the same rank (as our Universe) can not be fulfilled from a physical point of view, since in such a system indivisible unit elements have a common neighborhood. A sufficient continuum condition for space is satisfied if the proto-elements intersect at least a quarter of the effective radius ( $0.25R_\rho$ ), creating a single three-dimensional proto-medium fabric, as shown in Fig. 1.



*Fig. 1. Fragment of a flat image of a space structure.*

With this structuring, each proto-element of a continuous space has 12 common equivalent areas with adjacent proto-elements, taking the form of a dodecahedron with concave faces. The radius of the described sphere of such a dodecahedron is the effective radius of the proto-element. Obviously, the hypothesis that our universe is a dodecahedral Poincaré space, put forward in 2003 on the basis of an analysis of the WMAP (Wilkinson Microwave Anisotropy Probe) spacecraft data on the study of relic radiation, is not far from the truth.

Analyzing the fundamental principle of Heisenberg uncertainty  $\Delta p_x \Delta x \geq \hbar / 2$  in [3], the author came to the remarkable conclusion that the minimum deterministic momentum transfer distance in space starts from exactly three-quarters of the radius of the effective spherical neighborhood of the proto-element (quantum of space)  $\Delta x \geq 3R_\rho / 4$ . That is, uncertainty begins to appear at distances lower than  $3R_\rho / 4$ , which is actually explained by the transition to a different level of the material hierarchy, with another space-time metric.

So, if the Multiverse is built in accordance with the hierarchical principle (1.1), then we can assume that the space of the *i*-th Universe of any level is structured

according to the principle of  $R_0$ -distribution in the form of an ***elastic quantum proto-medium***. The unperturbed proto-media (or vacuum, ether, etc.) is a scalar field of continuously “coupled” isotropic proto-elements (see Fig. 1). Such a space possesses both a property of discreteness (content) and a continuity property (continuum). ***The continuity of space is determined by the cumulative three-dimensional symmetric difference in the content of the universe***

The concept of the quantum structure of space was supported and supported by not a few outstanding scientists, it can be considered, for example, in John Wheeler’s “Quantum Foam”, Frank Wilczek’s Grid, or in Craig Hogan’s “Grainy Space”. The wonderfully visionary notion of space, not as a void, but as some kind of proto-media (Apeiron), was proposed in the sixth century before the birth of Christ by the follower of Thales, Anaximander of Miletus, who believed that Apeiron (Boundless) is something that can not be destroyed, and that everything comes from it [6].

In the context of the global order, in accordance with the simplified model of the Multiverse structure (1.1), any universe can be viewed as a closed material system, and as a single element of the proto-medium of a higher-level universe. Of course, quanta of space should have an even deeper discretization, with its metric and time, which determine the properties of the primary grains of the vacuum itself. Proceeding from this, and also following the meaning of expressions (1.2) and (1.3), it can be assumed that the elements of the primary discrete content of the continuous proto-medium (proto-elements) are a conformal mapping of our Universe. It seems that Plato was right when he said that God took a dodecahedron as a model when creating the World. We can only marvel at the amazing insight of the ancient thinker.

The characteristic size of the minimum vacuum fragment, for example, its effective radius  $R_0$ , can be considered as an initial parameter in describing the mechanism of space self-organization. The proposed idea of the proto-medium is a more convenient physical model in comparison with the accepted abstract definition of the space-time continuum. The mechanism of space self-organization, as a primary emergence, is manifested in the wave characteristics of the transmitted disturbances and the deterministic distribution of the mass of the substance being formed in the case of fractal condensation and matter motion.

The discrete formation of a mass in space with the passage of time is a multiple of the quanta of space and time. The unit of time counting - the time quantum (chronon) is directly related to the quanta of space. We estimate the course of time through a sequence of changes (or conservation) of the states of the perturbed quantum space. The quantum of time is the duration of the transfer of the spin (a perturbation quantum) through a pair of adjacent proto-elements to the next pair, while preserving the initial spin parameters. ***The time quantum is determined by***

*the minimum possible period of oscillations in space.* The duration of a particular process in a unitary system, like our universe, can be related only to a quantity that is a multiple of the quantum of time. Therefore, the question of the relativity of time is not just doubtful, but fundamentally false. The error in positing the relativity of time was laid in STR and GTR in the paradigm of motion [3, 4]. This error was primarily due to the fact that the idea of “changing the pace” of time put forward in the theory of relativity replaced the concept of **changing the period** of the wave transfer of corpuscularly organized material objects in space as a reaction to the change in energy

## 2. Laws that determine the evolution of the Universe.

Following the procedure of the Reverend Thomas Bayes, let us assume with a certain degree of probability that everything that happens in the physical World is subject to a global law [1], manifested in the emergence of the hierarchically determined structure of the Multiverse. Contrary to the accepted ideas, let us affirm that the *evolutionary dynamics of all known interactions is of a negentropic nature.*

Probably following these considerations, the great Newton formulated his famous laws, the third (the most fundamental) of which indicates to us the equilibrium of the action of  $F_a v_a$  and the reaction (reaction to the action -  $F_r v_r$ ) in nature, which reduces to the well-known formula:

$$F_a v_a = -F_r v_r \quad (2.1)$$

This law determines the tool for dynamic reorganization of the disturbed system with a change in energy, aimed at preserving a certain *basic parameter* of the system, which ultimately manifests itself in a change in the wavelength of its fractal components. That is, the change in the energy of the system is associated with a change in its wave characteristics. Thus, Newton’s third law essentially determines the dynamics of the resistance of the material system to a change in its current state

What is the *basic parameter* is the criterion for maintaining the stability of the system, which it tends to keep unchanged under the disturbance, exhibiting the dynamics of its reaction in interactions? Is not this the *supersymmetry* that the physicists of the whole world are trying so hard to achieve? In [1, 2] and further in [3] the author has consistently tried to answer this question by formulating *the fundamental law of conservation of the absolute speed of the motion of matter*, which as a result can be written in the form of a simple expression:

$$v = \frac{2}{3} c = \text{const} \quad (2.2)$$

From this law it follows that the absolute speed of the movement of any material formations in space, at all levels of the fractal hierarchy, is constant and equal to two thirds of the speed of light. The *motion, as a form of existence of physical*

*bodies, is a phase wave fragmentation of the fractally structured perturbation of the vacuum* [2, 3], which is always transmitted at a constant rate. The main error of the physicists who recognized the ether was that they considered the ether (the proto-medium of space) separately from matter, not counting material objects as a derivative of the perturbation substance of the ether itself.

The observed and measured relative displacements of bodies in space is a successive change in the phase states of a hierarchically organized set of excited grains of vacuum, the aggregate that we call matter, from elementary particles to tangible bodies, estimating their movement through relative phase velocities. In other words, *all kinds of matter are dynamical systems, the condition of existence of which is the wave motion, which is transmitted in space with constant speed*. The concept of a particle-wave dualism in this case loses its meaning, for any form of matter is in itself a wave that transmits in space a superposition of phase states of successively and continuously excited fragments of vacuum.

According to the conservation law (2.2), which determines *the new paradigm of the motion of matter* [4], the reaction of the material point to the change in energy is due to the preservation of the absolute speed of motion due to the change in the wavelength of its phase wave fragmentation in space:

$$\Delta E = \frac{2}{3} hc \frac{\Delta \lambda}{\lambda_1 \lambda_2}, \quad (2.3)$$

where  $\Delta \lambda = \lambda_1 - \lambda_2$  - difference between the start and end values of the wavelength.

A discrete change in the energy of a material system is associated with a reactive wave distribution of its new energy state in a certain region of space. The third chapter of [3] contains an analysis of such a distribution:

$$\pm \Delta E \Rightarrow E = \frac{2}{9} mc^2 + \frac{7}{9} mc^2, \quad (2.4)$$

where  $\frac{2}{9} mc^2$  - part of the energy of the system with the initial value of the wavelength;

- part of the energy of the system with a doubled value of the wavelength  $\frac{7}{9} mc^2$  with decreasing energy  $-\Delta E$  («convex» perturbation), or reduced by half the value of the wavelength in the case of an increase in energy  $+\Delta E$  («concave» perturbation).

Expression (2.4) only indicates the principle of the formation of an energy wave in a corpuscularly organized material system under perturbation. The actual distribution in general form can be written as:

$$E = \frac{2}{9} mc^2 + (\frac{7}{9})^2 mc^2 [1 + \frac{2}{9} + (\frac{2}{9})^2 + (\frac{2}{9})^3 + \dots + (\frac{2}{9})^{n-1} + (\frac{2}{9})^n], \quad (2.5)$$

where  $n \rightarrow \infty$ , from which it follows that as the energy of the material system

changes, a damped energy density wave appears that propagates within the boundaries of the system and determines the change in the density of matter, i.e. distributed in the corresponding volume of the mass space of matter, as a function of the wavelength of the fractal components [1, 2]. This mass distribution on the scale of the universe can be described by a matrix of hierarchically structured fractions of matter [5]. In this regard, the reasoning of some scientists about the matrix structure of the universe is not entirely devoid of meaning.

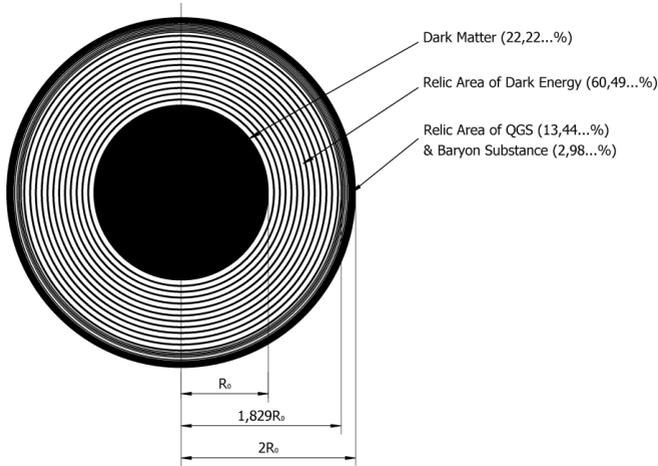
### 3. How was our Universe built?

It is necessary to begin this chapter with the main question - where did the energy of the colossal (from our point of view) perturbation, which supporters of the standard model call the Big Bang, come from. The proposed concept of the Multiverse admits that our Universe ( $S_i^n$ ), being a proto-element of the higher-level Universe ( $S_k^{n+1} = S_1^n + S_2^n + \dots + S_i^n + \dots + S_\infty^n$ ), received an energy pulse from the adjacent Universe when the spin is transferred along a chain of excited quanta of space in a certain process, at a level  $S_k^{n+1}$ . That is, at some point in time within the Universe  $S_k^{n+1}$  proto-element  $S_i^n$  for a moment "twisted", but this instant "from above" turned around at our level for an eternity [1]. As an a priori subjective probability (according to Bayes), this is a perfectly tolerable version of the explanation of the "great beginning", at least for the temporary calm of consciousness. This beginning was just a starting point for one global era of our universe in an endless series of others. The impulse received from the adjacent Universe served as a source of Primary perturbation (PP), the energy of which ( $E_{pp}$ ) was introduced and distributed (continues to be distributed) in the space of our Universe. But this was not so-called. Big Bang.

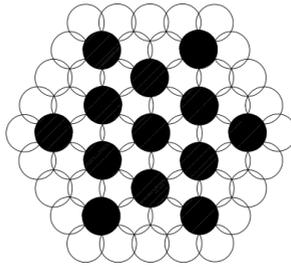
Spherical wave PP rushed to the center of the universe, condensing as it approached it. The condensation was limited to a certain limit when the maximum value of the energy quanta  $E_0 = \hbar c / R_0$ , which is associated with the minimum admissible value of the wavelength  $\lambda_0 = 2\pi R_0$ , was reached, which corresponded to the closure of the energy quanta precisely along the boundary of individual quanta of space (proto-elements), transforming them into corpuscles with mass  $m_0 = \hbar / cR_0$  - **Proto-corpuscles**. As a result of this phase transition, a spherical region of a dense substance with an ideal structure and radius equal to half the radius of the Universe was formed in the center of the Universe (see Fig.3.1.).

The basis of this structure was equal to each other proto-corpuscles, which closed the pulse  $p_0 = \hbar/\lambda_0$  surrounded by the unperturbed proto-media (see Fig.3.2.). In [1] and further in [2], the author suggested that this was the Dark Matter (DM).

The tunneling nature of the formation of Dark Matter in the center of the Universe and caused a secondary disturbance, precisely the one called the Big Bang.



**Fig. 3.1.** The simplified flat model of the Universe



**Fig. 3.2.** Fragment of a flat image of the structure of ideal matter.

By analogy with expression (2.5), the energy of the Primary perturbation was distributed in the Universe space as follows:

$$E_{PP} = E_{DM} + E_{DE} \quad , \quad (3.1)$$

where:  $E_{DM} = \frac{2}{9} M_{pp} c^2$  - the fraction of primary disturbance energy required to form DM, or 22,222 ...% of  $E_{PP}$ ;

$E_{DE} = \frac{7}{9} M_{pp} c^2$  - Dark Energy (DE) - heterogeneous structural wave substance [2], or 77,777 ...% of  $E_{PP}$ , equal to the energy of the Big Bang.

Spreading of the spherical wave of the secondary disturbance (Big Bang) from the center to the periphery of the Universe was accompanied by a decrease in the energy density of the corpuscular perturbation, which led to the gradual formation of hierarchically organized material layers. In this case, the decrease in the aggregate matter density, in accordance with the conservation law (2.2), was compen-

sated by an increase in the density of the fragmentary.

Applying the distribution law (2.5) to the energy of the Primary disturbance  $E_{pp}$ , it can be represented as the sum of the relic constituents of successively formed types of matter:

$$E_{pp} = \frac{2}{9} M_{pp} c^2 + (\frac{7}{9})^2 M_{pp} c^2 [1 + \frac{2}{9} + (\frac{2}{9})^2 + (\frac{2}{9})^3 + \dots + (\frac{2}{9})^{n-1} + (\frac{2}{9})^n] \quad (3.2)$$

where:  $(\frac{7}{9})^2 M_{pp} c^2 = E_{DE}$  - energy of relict formation DE, or 0,60493...  $E_{pp}$ ;

$(\frac{7}{9})^2 (\frac{2}{9}) M_{pp} c^2 = E_{QGS}$  - the energy of formation of the relict region of the Quark-gluon substance (QGS), or 0,13443...  $E_{pp}$  ;

$(\frac{7}{9})^2 (\frac{2}{9})^2 M_{pp} c^2 = E_H$  - the energy of formation of hydrogen gas, or 0,2987...  $E_{pp}$ , etc.

For clarity, let us summarize our reasoning in Table 1, in which we indicate the content of various types of matter formed in the process of hierarchical condensation upon the expansion of the spherical front of a corpuscular perturbation.

**Table 1.** Distribution of matter (energy) in the universe.

Phase of fractal coagulation	Type of corpuscular matter in hierarchical condensation	Percentage of energy $E_{pp}$
Primary perturbation (PP) 100%		
⇓		
<b>Dark area of the Universe</b>		
0	Dark matter (DM)	22,22%
1	Dark energy (DE)	77,77%
⇓		
2	Relict area DE	60,49%
	Quark-gluon substance (QGS)	17,28%
⇓		
3	Relict (dark) area QGS	13,44%
	Solid protium (the basis of all baryonic matter)	3,84%
⇓		



<b>Bright area of the Universe</b>		
4	Gaseous protium	2,98%
	Helium ( <sup>2</sup> He)	0,853%
⇓		
5	Relic helium ( <sup>2</sup> He )	0,663%
	Helium ( <sup>4</sup> He)	0,190%
	$\gamma$ - radiation, neutrino	
⇓		
...	...	...

### Conclusion

I was always impressed by the life position of those scientists who followed the motto, known as the “Jesuit Creed”, the essence of which boils down to the assertion that the one praying for forgiveness is blessed to pray for permission. Following this motto always gave freedom of creative thought, deepening and development of accumulated knowledge. To me, as an independent researcher, besides the fallibilist by conviction, of course, it’s easier to afford an immodest neighborhood with daredevils from science, so I confidently sum up the results:

1. Following the proposed model, our universe can be imagined as a unitary, but not a unique system, rather, on the contrary, being among a set of interconnected and similar points connecting in our consciousness the space of micro- and macro-worlds. In this connection, the evolution of our Universe, eternal and infinite in its own interpretation, is only an instant of events at the point of space of the next-level Universe.

2. The relative equilibrium or dynamics of the behavior of any material system is determined by **supersymmetry**, which is based on **the Law of conservation of the absolute speed of matter motion**, manifested in a reaction to the change in energy in the form of known interactions. This fundamental law radically changes the paradigm of the Core Theory, including in the field of cosmology. In accordance with this law, motion is represented as a condition and mode of existence of matter.

From the point of view of the new paradigm, the conclusions of the Theory of Relativity, with all due respect, can be recognized only as one of not the most elegant versions of the explanation of the physical World. The basic principles of

SRT and GTR, which form the basis of this version, can be attributed to the particular case of a mathematical interpretation of the objective laws of nature.

3. The obtained relative values of the distribution of matter (energy) in the universe, summarized in Table 1, give a good correlation with the empirical data and allow us to optimally calculate, at least, the interest in the proposed model

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UDC 681



经济指标格式  
**Economy indicator format**

**Patral Albert Vladimirovich**

*Senior researcher of the all-Union Scientific Research  
 Institute of techniques and technology of exploration.  
 St. Petersburg, Russia*

**摘要。** 最小指标格式输出的数字设备信息设备或系统，提供可视形式的信息（可见），由人类以便利的形式进行监控。基于4像素指示器格式以项目组合形式生成的数字标志。

**关键词。** 4像素格式，尺寸格式，并排位置格式，眼图测试图，条形码。

**Annotation.** *Minimum indicator format-output digital device information the device or system, providing a Visual display of information (visible), perceived by humans in a convenient form for observation. Digital signs that are generated in the form of combinations of items based on a 4-pixel indicator format, have the lowest electricity consumption on devices with the smallest dimensions for them.*

**Keywords.** *4-pixel format, size formats, side-by-side location formats, eye test chart, barcode.*

The minimum overall size of the format of the 4-segment indicator [1], with the minimum linear dimension of the horizontal segment of 2 pixels and the vertical segment of 2px is 4x4 pixels (Fig. 1).

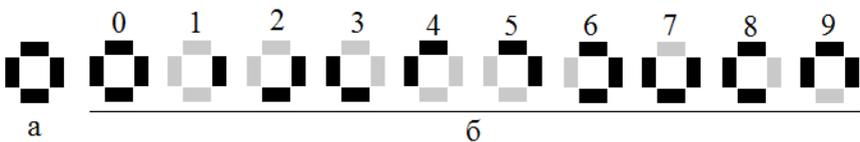
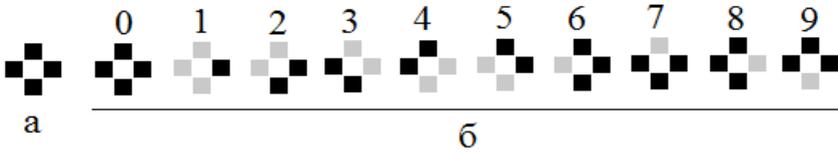


Fig.1. Format 4-segment (a) and numeric characters on its basis (b).

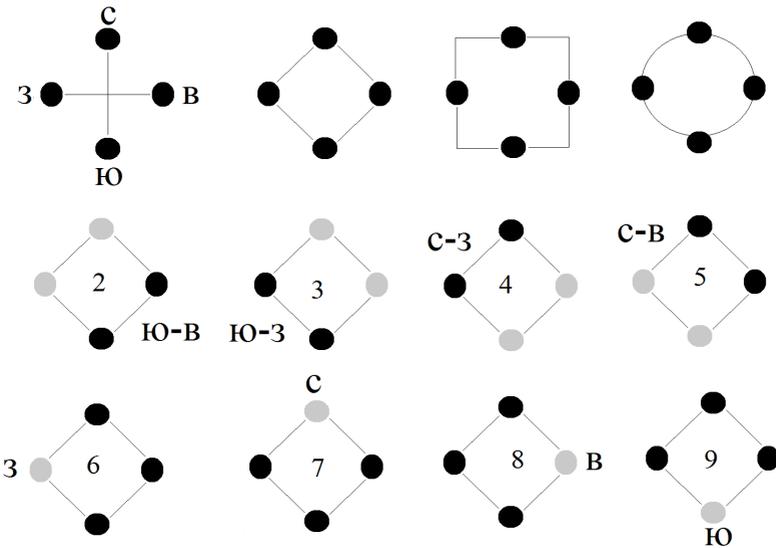
With a linear segment size of 1px, the 4-segment indicator format is converted to a 4-pixel format (Fig. 2).



*Fig.2. The minimum size of the 4-pixel format (a) and the numeric characters on its basis (b).*

The average number of (n) dot elements per sign in the 4-pixel format is 2.5 (n = 2.5). Minimum overall dimensions of formats: for a 4-segment format of the indicator 4x4 pixels (Fig. 1); 4-pixel indicator format 3x3 pixels (Fig. 2).

When forming characters on the basis of a 4-pixel format, it is convenient to use the designation assigned to them. When the digit 1 is formed, only the point «B» - the east (Fig. 2b, Fig. 3) is highlighted. When the digit 2 (Fig. 2b, Fig. 3) is formed, two points are displayed in the direction «IO-B» - southeast. When the figure 3 is formed, two points «IO-3» - south-west (Fig. 2b, Fig. 3) are displayed. When the figure 4 is formed, two points «C-3» - north-west (Fig. 3b, Fig. 3) are highlighted. When the figure 5 is formed, two «C-B» points are highlighted (Fig. 2b, Fig. 3). When forming the digits 6, 7, 8, 9, the unselected points are «3» - «C» - «B» - «IO», respectively (Fig. 2b, Fig. 3).



*Fig.3. The smallest format of the indicator.*

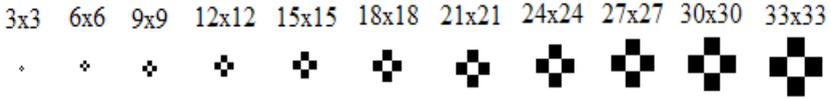


Fig.4. 4-pixel indicator from the minimum overall size of the format.

The change in the overall size of the four-point format of the indicator from the smallest of its value from 3x3 pixels (at 8-fold increase) to 10-fold in 33x33 pixels is shown on the monitor (Fig. 4).

Four-point digital format, in addition to the formation of digital signs, can find application as a table for checking visual acuity in ophthalmology (Fig. 5).

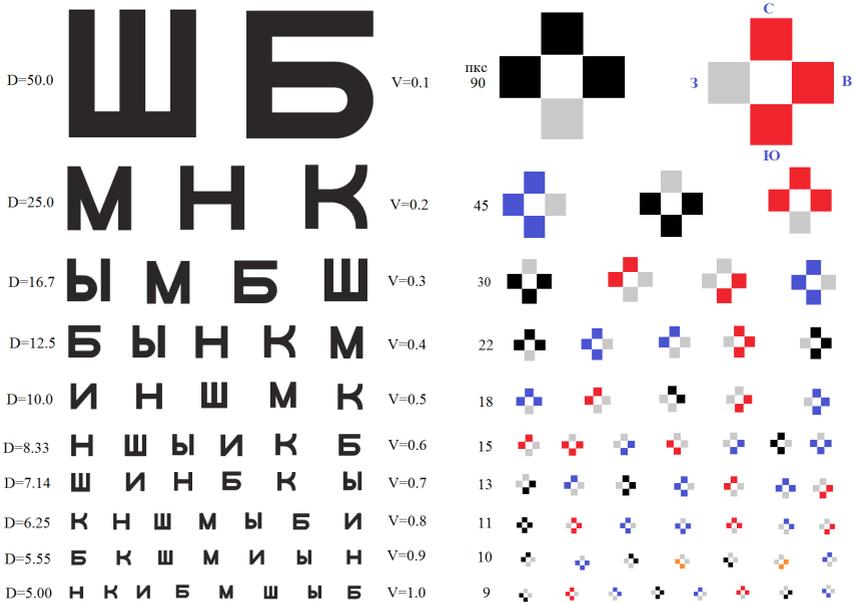


Fig.5. Golovin-Sivtsev table and a table based on the 4-pixel indicator format for determining visual acuity.

The table for checking visual acuity specifies the size of the dot element for all rows in the monitor's pixels (from 100 pixels, corresponding to the largest optotype size, up to 9 pixels corresponding to the smallest optotype size). Recognizing only one element of the optotype on a line, an optotype consisting of similar elements is fully recognized. Even the gaps between the elements of the optotype have dimensions equal to the dimensions of the illuminated element of the optotype.

When checking the visual acuity according to the Golovin-Sivtsev table, the identifications of optotypes are oriented to the angular dimensions of the gaps between the elements of unlettered signs (letters). When checking the visual acuity according to the table on the basis of the 4-pixel format, the identification of optotypes is oriented both on the angular dimensions of the intervals between the inscriptions of the signs and on the angular dimensions of the dot signs along the width and height of them. The angular dimensions of the point elements and the intervals between them are equal in width and height in each row of the table. The normalized elements of the optotype on the line, including the gaps between them, provide an unmistakable identification of it.

On the basis of the 4-pixel format, you can create a bar code of the smallest size (Fig. 6).

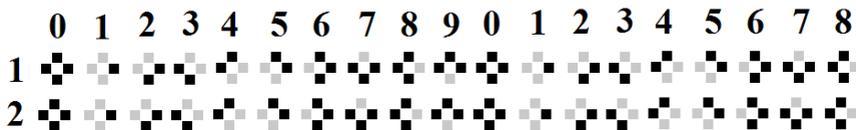


*Fig.6. 10-digit barcode [N] x [L]*

For the application of the barcode to those or other products, a digital code based on

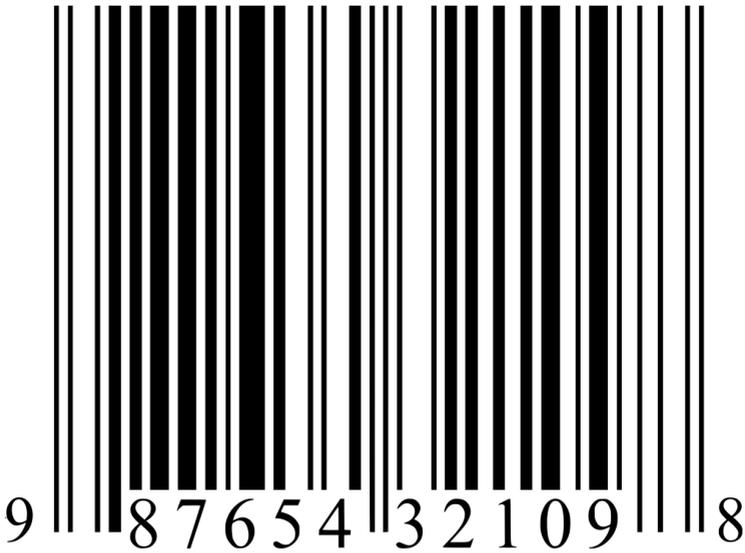
4-pixel formats can easily be rearranged to the overall dimensions of the product, changing the number of lines of code (N) and its length (L).

Since the digital format consists of point elements, the point represented by the format element can be reduced to the limit determined by the technical capabilities of modern technology. When the bar code is enlarged, either the length of the code increases, or the length of the code and the number of lines in the code increases (Fig. 7).



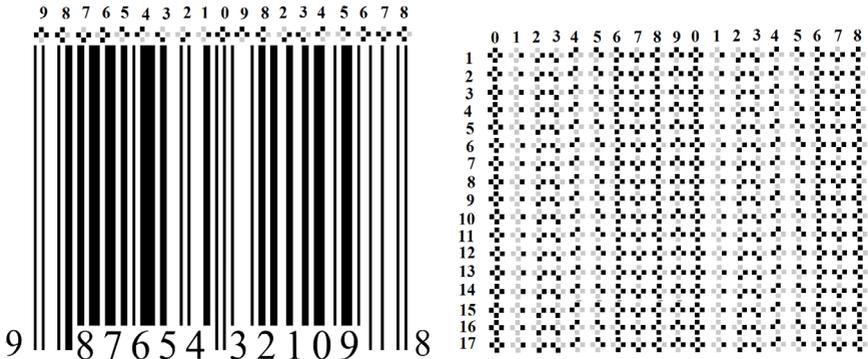
*Fig.7. Digital barcode 19x2 - digit.*

A linear 12-character barcode of fixed length is known for encoding numeric data (Fig. 8b).



**Fig.8.** Linear 12-character barcode.

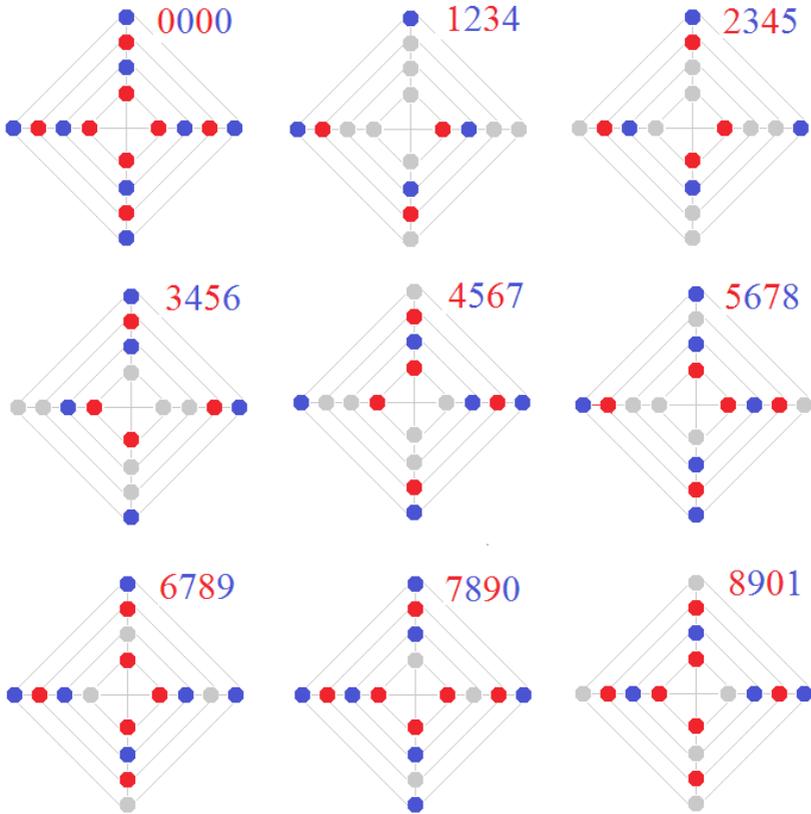
A comparison of the linear 12-digit barcode and bar code  $[N] \times [L]$  on the basis of 4-pixel formats is shown in Fig.



**Fig.9.** Linear 12-digit barcode and bar codes  $[N] \times [L]$  based on 4-pixel formats: 19-character barcode  $[1] \times [19]$  at the top and 342-digit barcode  $[18] \times [19]$  on right.

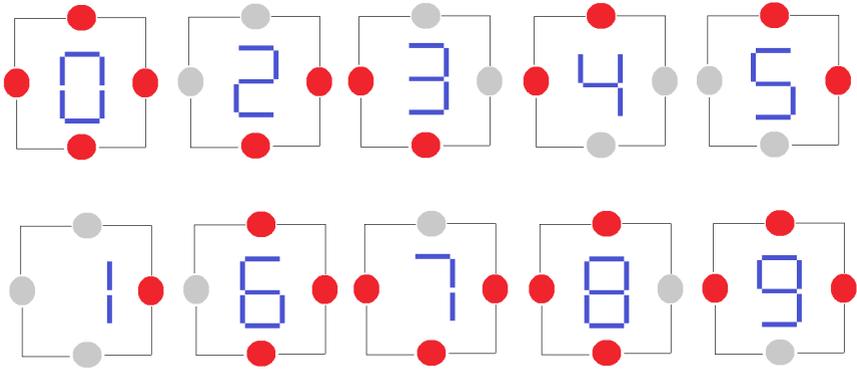
**Application of 4-pixel format in everyday life.**

In home archives, photos of relatives and friends are usually kept unaccompanied by the age, date of birth and time of birth.

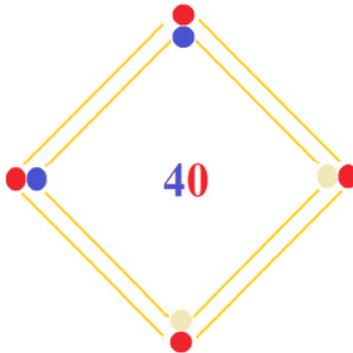


**Fig.10.** The outlines of 4-digit recording of digital signs based on 4-pixel formats located in parallel.

The four-dot format seems to be for intended for colorful home archives only. Moreover, it is convenient to represent the symbol maps by the parallel recording of numbers [2]. Reading a numerical record begins with the highest digits represented by the smallest format. The farther from the center of the layout of the sign, the larger the size of the format of the signs of a smaller digit. With an increase in the 4-pixel format, increases bezinformatsionnoe the “window” it is possible to use the mark for the development of digital characters (Figure 11), confirming the usual numbers of Arab origin.



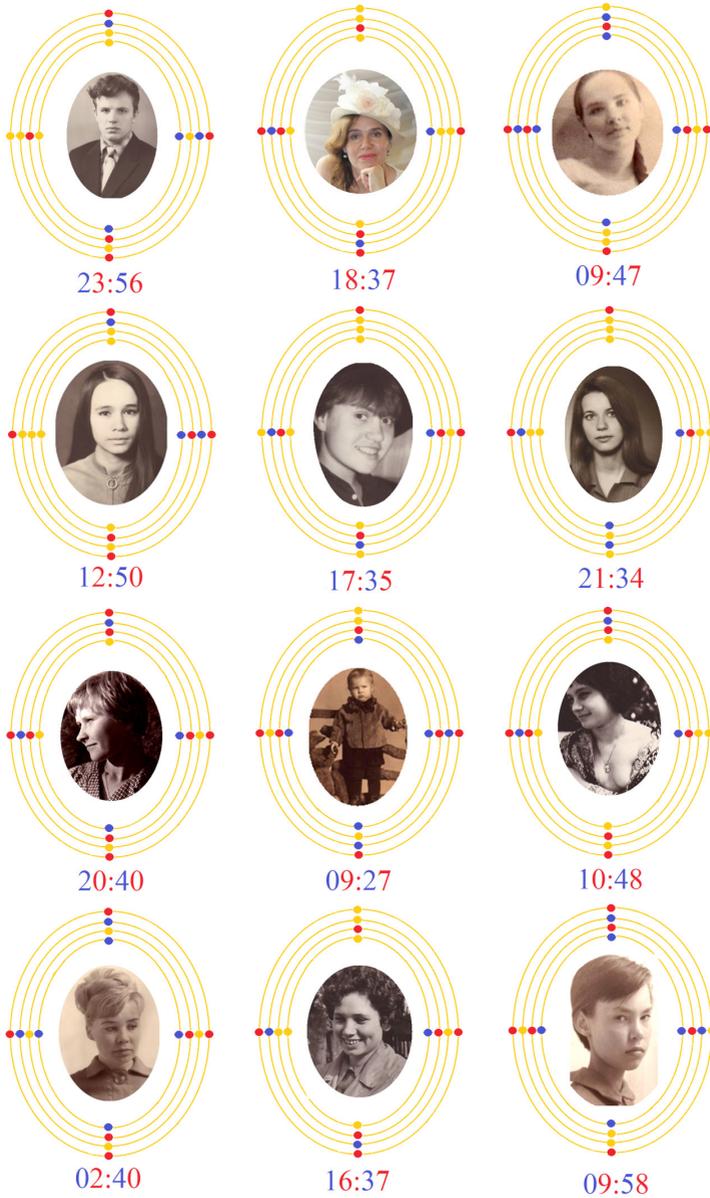
*Fig.11. Correspondence of the outline of digital signs of 4-pixel format and usual digital signs on the basis of 7-segment format.*



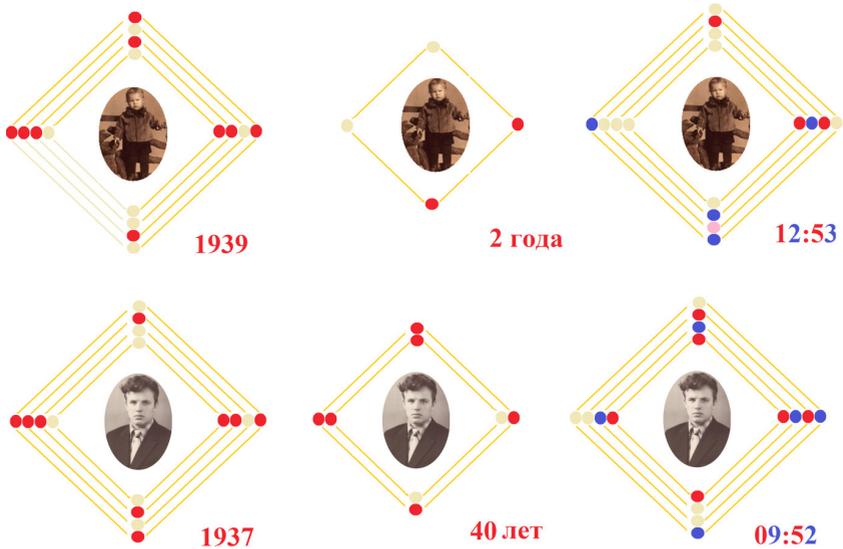
*Fig.12. Two-digit indicator with parallel display of signs (40 years).*

In Figure 12, the number 40 is written. The high-order bit in the smaller format displays the number 4 (in blue). With close arrangement of the formats from each other, it is better to distinguish between the digit digits recorded in two colors. The low order digit with a large format displays the number 0 (red color).

Figure 13 shows a placard of registered electronic watches, the digital signs of which are easy to master in a home environment so that they become familiar.



*Fig.13. Home electronic watches with portraits of family favorites.*



*Fig.14. Combinations of digital signs by parallel recording in a home archive.*

In the first column, the family member's year of birth was recorded vertically. In the second column, the age of a family member is recorded vertically. In the third column on the vertical there is a display of electronic name hours. The yellow background represents the imaginary formats of a 4-pixel indicator with non-illuminated yellow dots of the format.

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感应式农业导航的新机遇

**New opportunities in inductive agricultural navigation**

**Kalyujniy Anatoliy Timoffeevich**

*Novosibirsk State Agrarian University*

摘要。用于精确编程自走式机器轨迹的导航电感的说明。描述了一种确定机器人自走式机器位置的新型感应方法，该方法具有高抗扰度和高定位精度。

关键词：感应式农业导航，导航感应器，拖拉机集料定位，两级定位方法。

***Annotation.** A description of the navigation inductor for the precise programming of trajectories of self-propelled agricultural machinery and tractor units operating without a human being is given. A new induction method for determining the location of robotic self-propelled machinery is described, which has high noise immunity and provides high positioning accuracy.*

***Keywords:** induction agricultural navigation, navigational inductor, location of tractor aggregates, two-level method of position determination.*

**Introduction**

The most important kind of human activity is plant growing, supplying people with food, animal feed, and industry with raw materials for production. The efficiency of crop production can be significantly increased through the robotization of mobile agricultural machinery, that is, automation at a level that ensures field work without human intervention. Robotics eliminates the hard work of tractor-drivers in its modern form, shortens the terms of field works and improves their quality, will allow to optimize the technical and operational parameters of tractor units according to the criteria of fuel efficiency and environmental safety.

**Rationale for agricultural navigation**

Field agricultural work is performed by moving machines, therefore automation of the process of trajectory control is a task of primary importance. This task can be successfully solved only within the framework of agricultural navigation - the scientific direction on methods and means of controlling the movement of agricultural machine and tractor units (AMT) in the process of performing field work.

The current state of agricultural navigation is characterized by the application

of biological management methods. The tractor driver is visually determining the location of the tractor relative to the required one, based on his own knowledge and experience, mentally makes decisions about the need to correct the trajectory, the muscular strength of the hands and feet affects the steering mechanism of the tractor. The robotization of AMT requires the development of instrumental methods and the creation of technical means for performing these rather routine operations.

The level of development of microelectronics provides ample opportunities for robotization of AMT in the shortest possible time. The only reason why this possibility has not been realized so far is the lack of necessary knowledge, the rudimentary state of agricultural navigation.

The management of the movement of AMT, in terms of agricultural navigation, includes three operations:

1. Preliminary programming of the forthcoming trajectory of motion.
2. Execution of the movement program, i.e. monitoring of actual traffic parameters, and generation of a path error signal as a difference between the planned and actual location of the AMT.
3. Motion specification, i.e. the transformation of the trajectory mismatch signal into a power action on the steering mechanism of the tractor (or other self-propelled machine).

Agricultural navigation has a wide range of physical phenomena that can be used to program trajectories and determine the actual location of the AMT relative to what is required. So, as a program of motion, the track of the previous pass on the soil can be used, as in the case of manual control. However, the lack of trace programs is low reliability - the track on the soil is easily destroyed.

Devices for determining the location of the AMT should have:

- high accuracy - positioning error not more than 1-2 cm;
- universality - their performance should not depend on the composition of the AMT, the type of cultivated crops or the soil-climatic conditions of operation;
- autonomy and high readiness to work at any time of the day and year;
- low cost and low operating costs.

These requirements are met to the fullest by induction devices of position determination (DPD), which allow programming the trajectories of motion of the AMT with the help of alternating magnetic fields created by currents of navigational inductors in the form of a series of underground insulated wires connected to each other and to a current source in a certain way. Measuring the parameters of the magnetic field, from the measured values, it is possible to determine the position of the measuring point with respect to the wire with high accuracy. Measurements are carried out using the phenomenon of magnetic induction, which consists in the appearance of an electrical voltage in the electrically conductive circuit

when the magnetic flux through the circuit changes. As such a circuit, use a frame with a certain number of turns of wire, or a small coil.

### The experience of creating induction systems of auto-driving

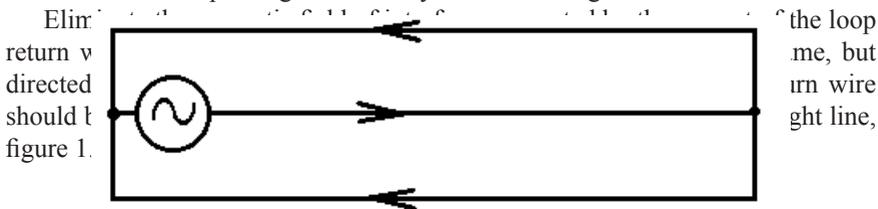
Inductive driving systems AMTs were intensively developed in the second half of the last century in many countries. The greatest success was achieved by scientists at the Reading University in England who worked on the creation of an auto-driving system for 15 years. Since 1972, planned production and annual sales of up to 1000 pcs. induction systems of auto-driving, for which the company “Auto-track Ltd Co” was founded [1, 2]. Which, however, never got down to business. That was the basis for the widely spread opinion that the inductive methods of driving the agricultural machinery are useless [3], and the actual reasons for the termination of the works remained unknown to the general public.

Deeper researches of the author have shown that for pessimism and unbelief there are no grounds, since the potential possibilities of the magnetic induction phenomenon for the location of the AMT far surpass the well-known creators of the systems of auto-driving of the last century [4]. The use of these previously unknown capabilities allows you to overcome the difficulties that the creators of Auto-track seemed insurmountable.

The true reason for the termination of works on mastering the serial production of Auto-track systems was the mismatch of the actual trajectories of the AMT movement with the required ones. The cause of the discrepancy was the influence of magnetic fields of interference created by the currents of others - not the working wire.

Magnetic interference fields spread to many tens of meters, while the distance between adjacent wires was 5.5 m. To reduce the noise level, the wires were supplied with switches, which allow only the direct and reverse working wires forming individual loops to form a current. The laying of the wires ensured the movement of the AMT in a corrugated way, however, in the middle of each pen there was a blemish or overlapping of the treated areas, which is unacceptable for agro-technical requirements for the quality of field agricultural work.

### Methods for improving the accuracy of self-steering



*Figure 1. Navigation inductor “Double loop”*

The current of the middle - straight - wire is divided into 2 equal parts on the turning strips, one of which returns to the source on the upper side of the loop, and the second on the lower side. The magnetic fluxes generated by the wire wires above the middle wire are equal in magnitude and directed counter-clockwise, so they compensate each other. As a result, the path error signal, formed along the vertical component of the magnetic flux, is equal to zero above the middle wire, which ensures a complete coincidence of the actual trajectory with the underground wire. And the flow of currents on the turning strips in opposite directions ensures full compensation of the interference created by them, as a result of which the actual path of the AMT coincides with the average wire along the entire length.

The creation of wire switches and the synchronization of their work with the movement of the AMT 50 years ago presented to the creators of Auto-track a rather complex technical problem, which at present, with the current level of development of microelectronics and instrumentation, presents no difficulties.

There is another, more promising solution to the problem of combining the actual AMT trajectories with wires, not requiring their commutation. It consists in the use of an error-prone algorithm for the formation of the signal of the trajectory mismatch. Namely - in the application of the differential principle, i.e. the signal of trajectory mismatch as a difference of two signals with the same interference, which are mutually compensated upon subtraction.

The use of small-size coils as induction converters makes it possible to replace the description of magnetic fluxes with a simpler description of the projection of the magnetic field strength vector at the location of the coil on its longitudinal axis. This makes it possible to generate a trajectory mismatch signal  $\delta$  directly from the projection of the vector of intensity Hz:

$$\delta \equiv H_z = M \frac{y}{y^2 + z^2},$$

where  $y$  and  $z$  are the rectangular coordinates of the location of the coil in the XOYZ coordinate system, whose axis OX is aligned with the wire, and OZ is directed vertically;

M - coefficient of proportionality.

In Fig. 2, the normalized Hz ( $y$ ) graphs at  $z_1 = 1$  m and  $z_2 = 1.25$  m are shown in logarithmic scale, as well as their difference  $\delta$ . The values of Hz are given in percentage to the value of the intensity H at the point with the coordinates  $z_1 = 1$ ,  $y = 0$ .

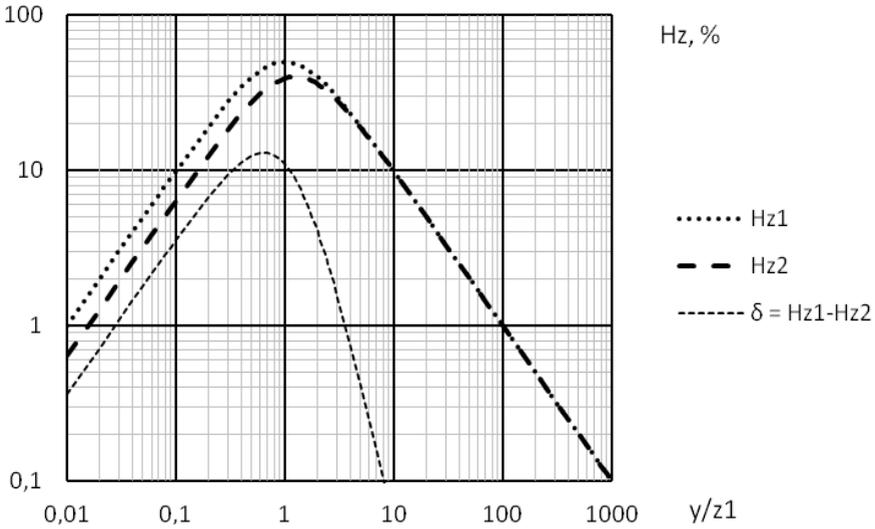


Figure 2. Dependence of Hz on y at  $z_1 = 1\text{ m}$ ,  $z_2 = 1,25\text{ m}$ .

The graphs in Fig. 2 show that for  $y < z$  the Hz values are proportional to the y coordinate and are inversely proportional to the square of the z coordinate - the z coordinate increase by a factor of 1.25 reduces the Hz by 1.56 times. For  $y \gg z$ , the value of z has an insignificant effect on Hz. So, for  $y / z = 5$ , increasing the z coordinate by a factor of 1.25 reduces Hz by 1.022 times.

Suppose that  $y / z_1 = 0,1$ . Then  $Hz_1 = 10\%$ ,  $Hz_2 = 6.4\%$ ,  $\delta = Hz_1 - Hz_2 = 3.5\%$ . If the second wire with the same current is removed from the first one by a distance  $y / z_1 = 5$ , its interference field will be 19.23% at  $z = 1$ , 18.82% at  $z = 1.25$ , and the difference of these values is 0.41 %. Accordingly, when the error signal is generated in Hz1, the displacement of the actual AMT trajectory will be 0.2 m, in Hz2 - 0.3 m, and according to their difference Hz1 - Hz2 only 0.03 m. The same proportions will be maintained for other values of the coordinate z1, which differ from 1m.

If the third wire with the same current, in phase with the current of the second wire, is located on the opposite side relative to the working one, above the working wire the projections Hz2 and Hz3 completely compensate each other, and the displacement of the trajectory will be caused only by the magnetic field of the fourth wire,  $y = 15 z$ . In this case, the difference  $Hz_1 - Hz_2$  is  $0.0165 \approx 0\%$ .

Consequently, the “two-level” method of trajectory mismatch signal generation provides complete suppression of magnetic interference, whose sources are removed from the working wire by distances greater than  $10z_1$ . This circumstance also solves the problem of electromagnetic compatibility of the same type of equipment used on other AMTs operating on this or on adjacent fields.

### **Conclusion**

Potential possibilities of the physical phenomenon of magnetic induction in agricultural navigation are not fully revealed. The use of these capabilities allows in a few months to create highly efficient automatic control systems for the trajectories of mobile agricultural machinery, and to begin its complex automation for the purpose of performing field agricultural work without direct human participation.

*P.S. Cooperation is welcomed. Contact by e-mail: atik102@mail.ru*

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基于热力工程废弃物的路基底混凝土

**Road primer-concrete on the basis of wastes of heat power engineering**

**Konovalova Nataliya Anatolievna**

**Dabizha Olga Nikolaevna**

**Pankov Pavel Pavlovich**

*Transbaikal Institute of Railway Transport*

摘要。 在多层稳定化基础上的研究成果文章中， 初始矿物的化学成分， 物理和物理力学特性。 这些研究是通过考虑测试方法和技术要求的国家标准来进行的。 结果表明， 水的温度很高， 不能用于生产高温材料， M-M 60可减少昂贵材料的消耗并解决复杂问题 严重的环境问题。

关键词： 道路建设， 地面混凝土， 生产废料， 粉煤灰， 稳定添加剂。

**Annotation.** *In the article results of researches on reception of road ground-concretes on the basis of multitonous wastes of manufacture modified by stabilizing additive of polymeric type are resulted. The chemical composition, physical and physicomechanical characteristics of the initial mineral raw material and soil-concrete samples were studied. The studies were carried out taking into account state standards for test methods and technical requirements. It is shown that the waste of heat power engineering and the chipping industry can be used to produce frost-resistant cobb-concrete, corresponding to the brands of strength M 40 - M 60, which will reduce the consumption of expensive materials and solve a complex of acute environmental problems.*

**Keywords:** *road construction, ground-concrete, production waste, fly ash, stabilizing additive.*

The annual output of ash and slag wastes at thermal power plants of the Russian Federation is about 40 million tons, and the reserves accumulated in the ash dumps reach 1.2-1.5 billion tons [1]. One of the ways to solve this problem is the use of multi-tonnage waste heat power in road construction [2; 3]. The introduction of ash-and-slag wastes in the road cinder concrete will reduce the cost of expensive materials and solve a complex of acute environmental problems.

The purpose of this study was to develop road road concrete mixes based on crushing of rock and fly ash modified by a stabilizing additive developed at the Transbaikal Railway Transport Institute (Chita, Russia).

For the preparation of samples, the crushing of rocks of fraction 0-5 mm, fly ash (Zabaikalsky Krai), and portland cement of the Angarsk cement-mining plant (Irkutsk region) were screened. In this paper we use a set of research methods, including atomic emission spectrometry with inductively coupled plasma, scanning electron microscopy, X-ray phase analysis, and infrared spectroscopy. The chemical composition of Portland cement and fly ash was determined using an Optima 5300DV emission spectrometer (167-403 nm) PerkinElmer, USA. Samples were previously dissolved in a mixture of acids HCl, HNO<sub>3</sub>, HClO<sub>4</sub> and HF. The IR spectrum was recorded with a SHI-MADZU FTIR-8400S Fourier Transform Infrared Spectrometer on tablets prepared according to a standard procedure from the well-calcined KBr calcine. The X-ray diffraction analysis was carried out by the method of powder diffraction with a DRON-3.0 diffractometer, the radiation by CuK<sub>α</sub>, Ni-filter, U = 25 kV, I = 20 mA, angular range: 2θ, ° = 3-55, measurement rate 1 ° / min. The roentgenograms were identified using a phase search program. The dosage of raw materials in the samples was determined by the selection method. Strength characteristics of the samples were obtained in accordance with GOST 23558-94 on samples aged 28 days subjected to complete water saturation.

It is found that the investigated sample dropouts and fly ash on the basis of radiation refers to class 1, since the value of the specific effective activity of natural radionuclides (A<sub>eff</sub>) not more than 370 Bq / kg. Consequently, the raw material can be used in construction without restrictions.

The fly ash studied has an aluminosilicate composition: ω, wt. %: 36.1 SiO<sub>2</sub>; 10.2 Al<sub>2</sub>O<sub>3</sub>; 7.80 Fe<sub>2</sub>O<sub>3</sub>; 1.42 MgO; 0.56 Na<sub>2</sub>O; 1.21 K<sub>2</sub>O; 0.41 TiO<sub>2</sub>; 0.61 SO<sub>3</sub>; 9.37 CaO; 0.4 CaO<sub>CB</sub> and belongs to the group of latent-active.

According to infrared spectroscopy data, fly ash contains calcite, as evidenced by absorption bands with maxima at 1454; 1435 and 876 cm<sup>-1</sup>, related to the valence and deformation vibrations of the group CO<sub>3</sub><sup>2-</sup>. The presence in the fly ash of quartz and cristobalite is indicated by characteristic absorption bands with maxima at 797; 779 cm<sup>-1</sup> and 692; 671 cm<sup>-1</sup>, respectively. Hematite contains absorption bands with maxima at 563 and 461 cm<sup>-1</sup> (Fe-O). The absorption bands 3458 and 1092 cm<sup>-1</sup> correspond to valence vibrations of groups O-H and Si-O-Si (Al).

According to the results of X-ray analysis of Portland cement revealed that becoming a co-binder comprises alite, belite, Portland, and quartz. The chemical composition of Portland cement is given in Table 1.

**Table 1**  
*Chemical composition of Portland cement*

w					
Al <sub>2</sub> O <sub>3</sub>	CaO	Fe <sub>2</sub> O <sub>3</sub>	MgO	SiO <sub>2</sub>	SO <sub>3</sub>
7,40	40,80	4,20	3,90	27,90	2,80

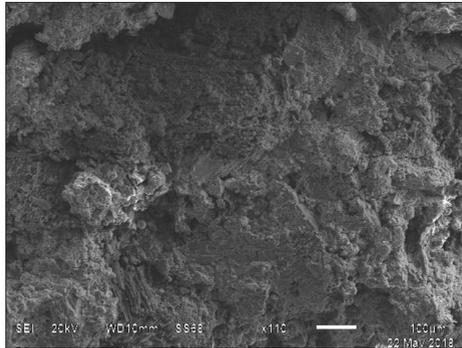
Physicomechanical characteristics of soil-concrete modified with stabilizing additive of polymer type ( $\omega = 1$  wt.%) are presented in Table 2.

**Table 2**  
*Physicomechanical characteristics of cinder concrete*

Primer concretes	$\omega$ (fly ash), wt. %	$\omega$ (Portland cement), wt. %	R <sub>сжк</sub> (compressive strength), MPa	R <sub>нжг</sub> (tensile strength at bending), MPa	Brand by frost-bones
<b>I</b>	10	6	4,5	0,8	F 15
	20		3,2	0,5	
	30		2,1	0,4	< F 15
<b>II</b>	10	8	6,8	1,2	F 25
	20		4,8	0,8	
	30		2,6	0,4	
<b>III</b>	10	10	5,7	0,8	F 15
	20		4,3	0,8	
	30		3,4	0,4	

It was found that the optimum content of Portland cement and fly ash in the samples is 8 and 10 wt. % respectively. Physico-mechanical characteristics of samples with a Portland cement content of 10 wt. % slightly differ from composites with 8 wt. % Portland cement, but their use is not economically appropriate. It was found that an increase in ash fly ash content of up to 30 wt. % leads to a gradual decompaction of the concrete and its strength characteristics, including frost resistance.

Figure 1 shows the complex microstructure of the II series sample with the highest frost resistance mark. Analysis of Figure 1 showed that the formation of the microstructure of the concrete is accompanied by aggregation processes. The polymer additive promotes the formation of coagulation mesh, filling defects and wetting of mineral components. As a result, it is possible to observe the fusion of individual fragments of the structure. This is the reason for the compaction of samples of soil-concrete.



**Figure 1 - SEM micrograph of microstructure of sample II**  
(content: fly ash - 10%, Portland cement - 8%;  
the scale line in the figure is 100 µm)

The obtained results of the research make it possible to recommend for use in road construction large-tonnage waste of crushed stone production and waste heat and power engineering, modified by stabilizing additives, including in regions with severe climatic conditions.

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使用统计方法处理用户键盘手写的特征

**The use of statistical methods for processing the characteristics of the user's keyboard handwriting**

**Olynina Julia Sergeevna**

*Postgraduate*

*Starooskolsky Technological Institute*

*(branch of the National University of Science and Technology MISIS)*

摘要。 本文讨论保护公司网络数据的问题。 为确保信息安全，建议使用生物识别方法，特别是通过键盘手写。 对该主题的研究分析具有多重信息性特征，因此选择一种处理方法。 为了解决这个问题，作者提出了使用统计方法，即回归分析。

关键词：用户识别，生物识别，键盘笔迹，回归分析。

**Annotation.** *This article discusses the problem of protecting corporate network data. To ensure information security, the use of biometric methods of identification, in particular, by keyboard handwriting, is suggested. Analysis of research on this topic has shown that keyboard writing is a multi-informative characteristic, so choosing a method for processing its parameters is a difficult task. To solve it, the authors proposed the use of statistical methods, namely, regression analysis.*

**Keywords:** *user identification, biometrics, keyboard handwriting, regression analysis.*

Today it is impossible to imagine a large enterprise that does not have its own corporate network. Its use allows solving many important tasks: data consolidation, quick information dissemination to all employees of the company, provision of unified access to important information. However, along with the growth of corporate networks, the number of threats to data security also increases. The problem of data protection in corporate networks today is very acute for companies of any level. Data leakage, hacker attacks on the system, password stealing, breach of confidentiality and information integrity - this list of possible threats can be continued indefinitely.

The most actively developing threat is the threat of data leakage, which for modern companies increases in proportion to the intensity of IT use. Analytical Center InfoWatch found that the former and current employees of the organization represent the greatest threat to the security of confidential information [1].

If the impact of external threats can be controlled by such hardware-technical measures as protection of data transmission channels, anti-virus protection of external WEB-resources of the organization, content filtering of traffic for the presence of malicious software, etc., then it is much more difficult to track the occurrence of internal threats. Ensuring effective control of employee access to the system will improve the reliability of data protection of the corporate system, and as a result, will reduce financial losses [4].

The most common means to date is password protection. Executed in recent years, serious and well-grounded criticism, password authentication does not allow you to provide the necessary level of IT security, as evidenced by regular reports on leaks of corporate information. "Password ... methods of identification and authentication have a number of significant shortcomings. The main one is the ambiguous identification of the operator of the key system and the possibility of deceiving the security system, for example, by stealing or imitating an attribute or hacking a password. The second drawback of these methods ... is the impossibility of detecting the substitution of a legitimate authorized user "[6]. In this case, an attacker can harm data when the operator leaves unattended his computer with the authorization procedure passed, i.e. When an employee leaves the workplace, an attacker can use his computer to access the necessary information.

Password protection does not allow for continuous identification, that is, after performing the identification procedure, the system actually remains unprotected, and the attacker, using the absence of an employee in the workplace, can freely access the necessary files.

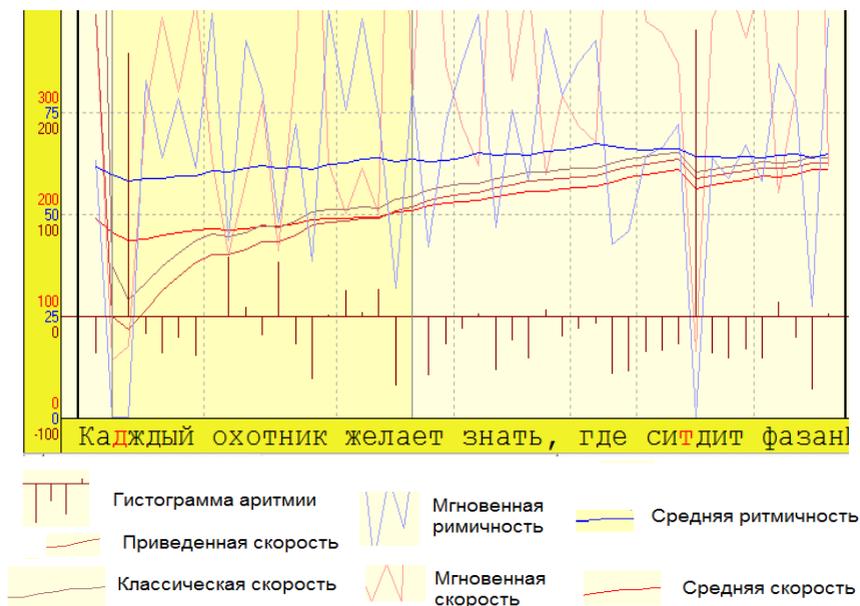
In this regard, the development of new methods and algorithms of identification is urgent.

Among the existing means of data protection, a promising direction is the use of biometric characteristics, in particular, keyboard handwriting. The advantages of biometric identification methods are the possibility of hidden identification, the inseparability of the biometric characteristic from the owner and the extreme complexity of the forgery [3]. In the work [5] it is noted that the user's identification by the keyboard handwriting "does not require the installation of special hardware, does not need maintenance, is transparent to the end user, i.e. does not cause him any inconvenience, and allows for hidden authentication, "that is, it is the least expensive method of identification [2]. Keyboard handwriting is a multi-information biometric characteristic and includes a number of parameters described in the works [6,7]:

1. The number of characters. Clean text size without taking into account the characters deleted with the help of BackSpace.
2. The total time. It is counted from the moment the first key is pressed until the last key is pressed.

3. Min pause. Minimal pause between presses.
4. Max pause. Maximum pause between presses.
5. Speed spm - the number of typed characters per minute.
6. Net speed. Net typing speed. It is considered for all undefined symbols of the text.
7. Speed wpm - the number of characters per minute, etc.

Figure 1 shows an example of processing the parameters of the user's keyboard handwriting using the Typing Statistics software.



**Figure 1** – Example of processing the parameters of the user's keyboard handwriting

Таким образом, выбор метода обработки потока данных с целью выявления скрытых характеристик клавиатурного почерка является сложной многофакторной задачей, требующей тщательного анализа веса и значимости тех или иных факторов, определяющих биометрическую идентичность.

To solve this problem, various methods of data processing can be used, including, for example, factor analysis, the principal component method, correlation analysis, regression analysis, in which the relationship of one random variable to one or more other random variables is modeled. The advantages of this method include simplicity of computational algorithms, as well as visibility and interpretability of the results [8].

Based on the above advantages of this method, the following regression model was proposed (1):

$$y_n = a_0 + a_1 * x_1 + a_2 * x_2 + \dots + a_n * x_n, \quad (1)$$

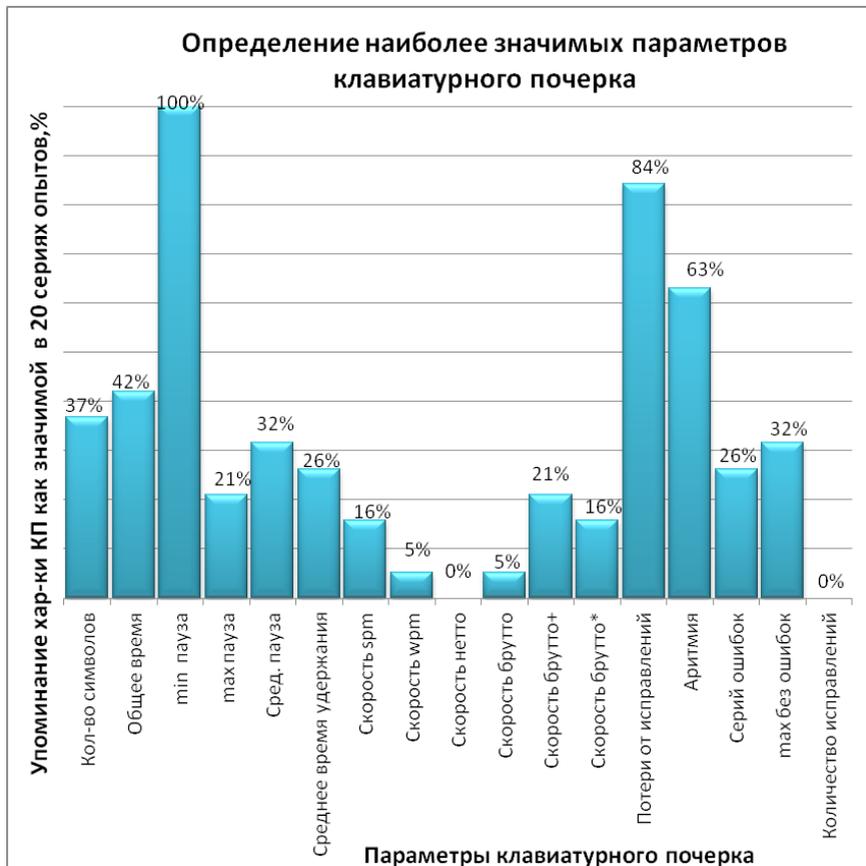
Where  $a_n$  - is the weight coefficient of each characteristic

$y_n$  - an output parameter characterizing the probability that the handwriting sample belongs to the user N

$x_n$  - input parameter, keypad handwriting characteristic.

The regression model was constructed sequentially for 10 series of experiments with a sample volume from 10 to 100 samples. As the sample size increases, the value of the determination coefficient, reflecting the quality measure of the regression model, decreases. So, with a sample size of 10 handwriting samples, it is 88.21%, and with a volume of 100 samples - 9.33%. Such a value indicates a high dispersion of the dependent variable, explained by the model under consideration.

The regression model was constructed in the software package Statistica, which in addition to assessing the quality of the regression model allows us to identify significant coefficients of the regression equation. Ten series of experiments were conducted, each of which was a model for a sample of 10, 20, 30 ... 100 samples of the keyboard handwriting. For each experiment, some parameters were identified, which are the most significant. Figure 2 shows the frequency of appearance of certain characteristics of the keyboard handwriting as significant parameters in 10 series of experiments. It can be concluded that when constructing a regression model to determine whether a handwriting specimen belongs to a specific handwriting, these parameters will have the greatest significance.



Using regression analysis to solve problems of this kind is due to the ability to determine the most significant parameters of the regression model, however, the use of regression analysis has a number of drawbacks. It should be taken into account that the choice of the type of specific dependence is subjective in nature, that is, a formal fit of the model for empirical models, as well as the lack of explanatory function (impossibility of explaining the cause-effect relationship) [8].

In addition, the keyboard handwriting is a dynamic biometric characteristic, a feature of its use for identification is the possibility of temporary change of the handwriting pattern for users under the influence of stressful situations. This, in turn, can lead to denial of access to a person who has authorization rights [9].

In connection with this, it is important to use other methods of data processing, in particular, methods of artificial intelligence. Due to their peculiarities, the most interesting are the artificial neural networks that have the ability to detect

hidden regularities in the input data stream and thus solve identification problems even when the input stream is affected by a large number of uninformative data, noises.

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基于壳聚糖的食用薄膜的研制及对野生樱桃果实贮藏性和品质的影响研究

**Development of chitosan-based edible films and studying effects on storability and quality of fresh wild cherry fruits.**

**Ayman Younes Fathy Allam, N. V. Dolganova**

*Astrakhan State Technical University*

摘要。制备了一种新型可食用生物膜，并研究了其对保存野樱桃 (*Prunus avium*) 的影响。食用活性涂层的主要好处是维护质量，延长新鲜水果的保质期，防止微生物腐败。成膜溶液的浓度 (0.5%，1%，1.5%，2.0%和2.5%脱乙酰壳多糖具有分子量47千道尔顿的 $M_w$ ，葡萄糖酸钙CaGlu的0.5%和0.1ml吐温80中乙酸)的建立是为了形成用作盖阻挡膜由25-40%野生樱桃(甜樱桃)储存期间缓慢的浆果成熟和随后的时效以及体重减轻10天无定形结晶的半透膜。通过几个参数的变化评估涂层的有效性：呼吸率，硬度和感官评估。感官分析显示壳聚糖涂覆的样品优于10天持续期结束。该包衣不影响野樱桃的天然味道，这实际上是重要的，因为这是不希望的。野生樱桃的 $O_2$ 水平。涂层的果实壳聚糖溶液以2%大于0.5%时，脱乙酰壳多糖的1%和1.5%降低呼吸率，与更大的效果。涂覆有2.0%脱乙酰壳多糖野生樱桃表现出重量损失少，减少变黑比那些用0.5，壳聚糖1%和1%处理。涂布的样品具有比未处理的果实更大的视觉可接受性。

关键词：基于壳聚糖的食用葡萄糖酸钙，呼吸速率，硬度，感官评价。

**Abstract.** *A novel edible bio-film was prepared and its effects on preserving wild cherry (*Prunus avium*) were investigated. The main benefits of edible active coatings are to maintain the quality and extend shelf-life of fresh fruits and prevent microbial spoilage. Concentration of film-forming solution (0.5%, 1%, 1.5%, 2.0% and 2.5% chitosan with a molecular weight  $M_w$  of 47 kDa, 0.5% of calcium gluconate CaGlu and 0.1 ml Tween-80 in acetic acid) was established to form amorphous-crystalline semipermeable membranes that function as cover barrier films to slow maturation and subsequent aging of berries as well as weight loss during storage for 10 days by 25-40% for wild cherry (*Prunus avium*). The effectiveness of the coatings was evaluated by the changes of several parameters: respiration rate, firmness, and sensory evaluation. Sensorial analysis revealed that chitosan-coated samples were superior at the end of a 10-days holding period. The coating did not change affect the natural taste of wild cherry, which in fact is important since is undesirable. Coating increased the internal  $CO_2$  and decreased the internal  $O_2$  levels of wild cherry. Coating fruits with chitosan solutions reduced the respiration rate, with greater effect at 2% than 0.5, 1% and 1.5% chitosan. Wild cherries coated with 2.0% chitosan exhibited less weight loss and reduced*

*darkening than did those treated with 0.5, 1% and 1% chitosan. Coated samples had greater visual acceptability than had untreated fruits.*

**Keywords:** *Chitosan-based edible, calcium gluconate, respiration rate, firmness, sensory evaluation.*

**Introduction:** The main benefits of edible active coatings are to maintain the quality and extend shelf-life of fresh fruits and prevent microbial spoilage. Chitosan has a wide range of potential application in different fields of chemical sciences, biological systems, food sciences, pharmaceutical and medical industries. Recently, considerable research has been conducted to develop and apply bio-based polymers made from a variety of agricultural commodities and/or of food waste products [1]. This increased interest was intensified due to concerns about limited natural resources of the fossil fuel reserve and the environmental impact caused using nonbiodegradable plastic-based packaging materials [2]. Such biopolymers include starches, cellulose derivatives, chitosan/chitin, gums, proteins (animal or plant-based) and lipids [3]. These materials offer the possibility of obtaining thin films and coatings to cover fresh or processed foods to extend their shelf life.

Edible films and coatings offer extra advantages such as edibility, biocompatibility, esthetic appearance, barrier to gasses properties, non-toxicity, non-polluting and its low cost [4]. In addition, biofilms and coatings, by themselves or acting as carriers of foods additives (i.e.: antioxidants, antimicrobials), have been particularly considered in food preservation due to their ability to extend the shelf life [5]. Chitosan is also an excellent film forming material [6,12,13]. Chitosan films have a selective permeability to gasses ( $\text{CO}_2$  and  $\text{O}_2$ ) and good mechanical properties. However, the fact that chitosan films are highly permeable to water vapor limits their use as being an important drawback since an effective control of moisture transfer is a desirable property for most foods, especially in moist environments. Therefore, several strategies have been used to improve the physical properties of biopolymer-based films. Edible coatings have the potential to improve the quality and to extend the shelf life of lightly processed produce. Chitosan has been successfully used as a food wrap because of its film-forming properties. It has thus been used to maintain the quality of post-harvest fruits and vegetables, as examined by [12, 13]. Chitosan is of great interest because of their all-around properties and applications in almost every field with great potential in diverse industries (Figure A).

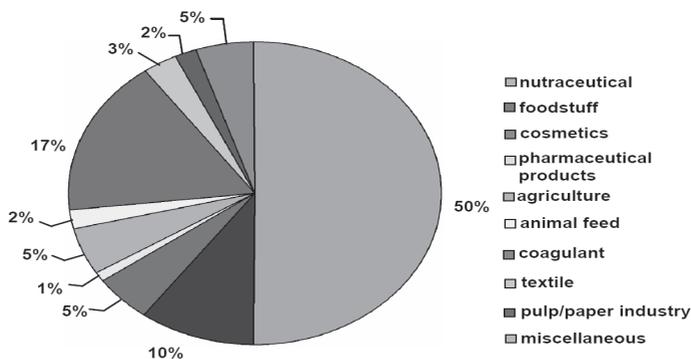


Fig. A. Chitosan utilization in various fields of application.

**The objectives of this research** were to assess the effects of chitosan treatment on decay of wild cherry fruits to determine if chitosan coating reduces ethylene production, carbon dioxide evolution, and delays ripening. Therefore, the aim of this work is to elucidate the effects of chitosan coating on quality and shelf life of wild cherry fruit.

## MATERIAL AND METHODS

Fruits and chemicals wild cherries (*Prunus avium*) grown in local farms were harvested and immediately cooled in a refrigerated truck on the previous day, and sorted based on size, color, freedom from blemishes, free of physical damage and fungal infection was used. Fruit were surface disinfected by immersion in 10% commercial bleach for 3 min, air dried, and individually dipped in 0.5%, 1%, 1.5% and 2% chitosan solution (w/v) in 0.5% acetic acid solution. Chitosan coatings containing calcium gluconate were prepared by dissolving calcium salt at 0.5% in water prior to the incorporation of the acetic acid. Chitosan was prepared from green shrimp *Penaeus semisulcatus* waste by chemical treatment.

Acetic acid was purchased from Sigma Chemical Co (St. Louis, MO, USA). Coating solutions were prepared by dissolving 0.5, 1.0, 1.5 and 2.0% chitosan, respectively in 0.5% acetic acid solution (w/v) and homogenized (*Polytron PT 10-35, Kinematica AG, Littau, Switzerland*) for 1 min with. The solutions were centrifuged to remove undissolved particles, and the pH was adjusted to 5.6 with 1 N NaOH, and 0.1 ml of Tween 80 was added to the solution to improve wettability (All treatments and controls contained 0.1% Tween 80 (*Sigma Chemical Co, St Louis, MO, USA*) to improve wettability and make the coating soft). The solution was then made up to 100 ml. An acid solution containing Tween 80 without chitosan, pH 5.6, was used as a control.

Each treatment consisted of five replicates of 35 fruit (a total of 175 fruit) in a randomized complete-block design. Wild cherry fruits were randomly distributed into five groups. Four groups were assigned to one of four treatments whilst the fifth group provided the untreated control. The treatments consisted in immersing fruits for 5 min in: (a) 0.5% chitosan in 0.5% acetic acid solution; (b) 1.0% chitosan in 0.5% acetic acid solution; (c) 1.5 chitosan in 0.5% acetic acid solution; (d) 2.0% chitosan in 0.5% acetic acid solution and the fifth group provided the untreated control.

All chitosan-based coating solutions were homogenized again and filtered using a vacuum filter to remove bubbles during solution making. Solutions were then placed inside glass jars and sterilized in an electric pressure steam sterilizer (Model 25X, Wisconsin Aluminum Foundry Co., Manitowoc, Wis., USA) at 115°C for 20 min. Fruits could dry for 2 h at 20 °C. after air drying, fruits were stored at 15 °C in plastic containers (10 fruit per container) with a continuous flow of humidified air (60-70% relative humidity-RH).

Sensory evaluation, based on general visual appeal, colour and visible structural integrity, was conducted using a 7-point hedonic scale. The scores were: like extremely (7); like very much (6); like moderately (5); neither like nor dislike (4), dislike moderately (3); dislike very much (2); and dislike extremely (1). Fruit scored above 4 was considered acceptable. Sensory evaluation was performed by 30 members of an untrained panel. Twenty-five fruits from each treatment were evaluated on the initial day and on 0, 2, 4, 6, 8, and 10 days. Only fruits lacking signs of fungal decay were evaluated.

Respiration rate and ethylene production were assayed according to the method of Zhang et. al. [7] with slight modifications. Five berries were placed in hermetically sealed 750 ml glass jars and kept at 15 °C. After 1 h of enclosure, a 100 µl sample was withdrawn from the headspace and analyzed for Co<sub>2</sub> using a gas chromatograph (*Hewlett-Packard 5890 series II GC, Agilent Technology, Barcelona, Spain*) equipped with a thermal conductivity detector (TCD) and a Chromosorb 102 column (*Restek, Technokroma, Barcelona, Spain*). Helium was the gas carrier. Injector, oven and detector temperatures were 100, 32 and 100 °C, respectively. After sampling, jars were opened, and wild cherries were kept at 10-15 °C and 60-70% RH until the next measurement. Results were expressed in mg kg<sup>-1</sup> h<sup>-1</sup>. Three replicates of each treatment were analyzed. To assess the effect of coating on the internal atmosphere, 1-ml samples of internal gas were withdrawn from the fruit on 0, 2, 4, 6, 8, and 10 days of storage using the method of Zhang et. al. [7] and analyzed for CO<sub>2</sub> and O<sub>2</sub>. Gas samples were drawn from five to 7 fruits per treatment.

Firmness was measured as the maximum penetration force (N) reached during tissue breakage and determined with a 5 mm diameter flat probe. The penetration

depth was 5 mm and the cross-head speed was 5 mm s<sup>-1</sup> using a *TA-XT2* Texture Analyzer (*Stable Micro Systems, Godalming, UK*), MA. All berries fruit were sliced into halves and each half was measured in the central zone. Fruit firmness values were an average of 5 wild cherries.

Wild cherries external colour was evaluated with a Hunter Labscan II colorimeter (Hunter Laboratory, Inc., Reston, VA). CIE  $L^*a^*b^*$  coordinates were recorded using D65 illuminant and a 10° Standard Observer as a reference system.  $L^*$  is lightness,  $a^*$  (-greenness to +redness) and  $b^*$  (-blueness to + yellowness) are the chromaticity coordinates. The  $a^*$  and  $b^*$  values were converted to chroma ( $C=(a^{*2}+b^{*2})^{1/2}$ ) and hue angle ( $h=\tan^{-1}(b^*/a^*)$ ). Four readings were taken at different locations on each cherry, using a total of 25 fruits from each treatment. Measurements were done in triplicate [8].

Statistical analysis of the results was performed using a one-way analysis of variance (*ANOVA*). Means were separated using the Tukey test ( $P<0.05$ ) (*SPSS commercial software, SPSS Inc., Chicago, IL*). The data were analyzed and graphically plotted using Sigma-plot software (*Systat Software Inc., Richmond, CA*).

## RESULTS AND DISCUSSION

**Sensory data** for wild cherry stored for 10 days at 10±3 °C and 60- 70% RH, are presented in Fig. 1. Initially (0-day), consumers showed a preference for coated fruit, as shown by the higher mean acceptance scores obtained. Treatments did not alter wild cherry colour and the greater acceptance for coated fruit could be due to the glossy appearance imparted by the coating. Chitosan coating concentration did not significantly alter the appearance of fruit had no effect on the glossiness and transparency of the coating. Throughout the storage time, all the fruit showed a loss of visual acceptance.

Both of chemical and sensory evaluation of wild cherry samples control without chitosan decreased quickly during the storage period at 10±3 °C. Chitosan coating delayed the drop in sensory quality and extend the shelf life. The addition of chitosan 2% coated to improving the quality and extending the shelf life of wild cherry fruit. In this work, the chitosan coating on wild cherry fruits improved its quality and prevented surface cracking and the leaking of juice. Sensory evaluation of the coated wild cherries showed that the chitosan 2% coatings gave better visual appearance and taste and were, therefore, more preferably by 90% of the judges than 0,5%, 1% and 1.5% chitosan coatings, even though the later had a higher protective effect of the overall quality of the wild cherry. The beneficial effect of chitosan was enhanced when the chitosan was applied at a greater concentration (2.0% chitosan).

Sensory analysis of berries based on visual appeal showed that chitosan

coatings delayed fruit senescence associated with colour changes and dehydration. The beneficial effect of the elevated chitosan concentration on firmness has also been reported for peach, Japanese pear, kiwifruit, papaya [10] and guava [11]. Fruit firmness is a major attribute that dictates the postharvest life and quality of fruit. The retention of firmness with chitosan coating agrees with the results of [13], where solo papayas treated with 1.5% chitosan coating were firmer than the control for 14 days storage, at ambient temperature. Fruits, such as mango and pears, have also been reported to be firmer when coated with chitosan [13].

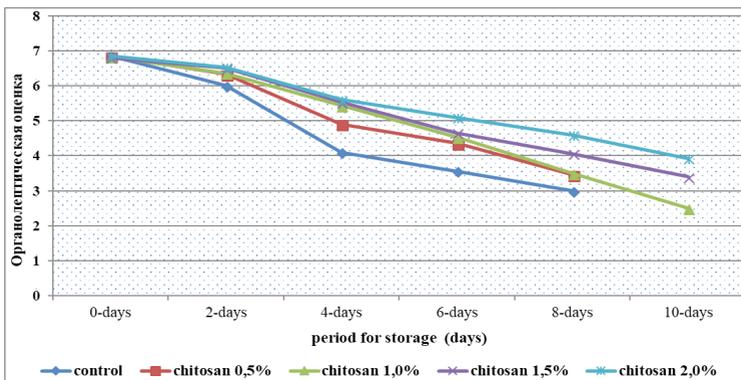
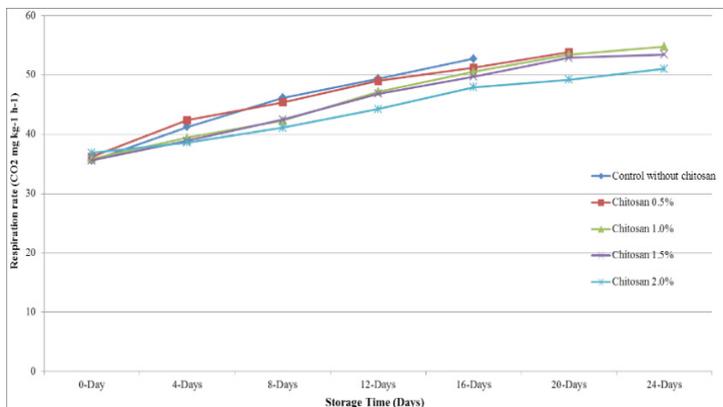


Fig. 1. Effect of different concentrations of chitosan on the sensory evaluation (Overall visual appearance) of wild cherry fruits during storage for 10 days at  $10\pm 3$  °C and 60-70% RH.

**Respiration Rate:** during storage at  $10\pm 3$  °C, the respiration rate of wild cherries increased gradually. Between 4 and 6 days following the mature green stage (0-days), chitosan coated fruit had a slightly higher respiration rate than the control. There was a slight decrease in  $\text{CO}_2$  production in chitosan-coated fruits in comparison to the uncoated fruits after 4 - 6 days of storage. After 6-8 days of storage, control fruit exhibited a significantly higher respiration rate ( $P < 0.05$ ) than the treated fruit. There was no difference in respiration rate between 1.5% and 2% chitosan-coated fruit until 6 to 8 days of storage when the respiration rate of chitosan 2% fruit was markedly lower than that of chitosan 1% fruit. Ethylene production and  $\text{CO}_2$  followed a climacteric pattern during the storage of all fruit; however, the climacteric trend was suppressed in chitosan-coated wild cherries.



**Fig. 2.** Effect of different concentrations of chitosan on the respiration rate of wild cherry fruits during storage for 10 days at  $10 \pm 3$  °C and 60-70% RH.

Fruit coated with chitosan had a significantly lower rate of respiration production ( $P \leq 0.05$ ) than the control fruit. Thereafter, the chitosan 2% fruit had a lower CO<sub>2</sub> production than chitosan 0.5%, 1% chitosan fruit and samples of wild cherry without chitosan. Chitosan coating decreased the O<sub>2</sub> and raised the CO<sub>2</sub>, levels within wild cherry fruit stored at  $10 \pm 3$  °C, with a greater effect at the higher coating concentration (Fig. 2).

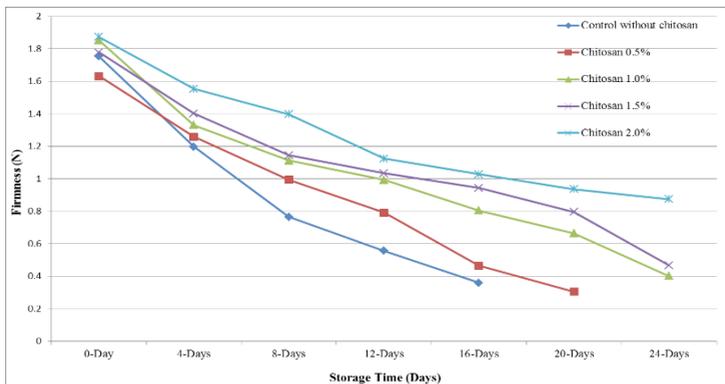
Reduction of respiration rate by chitosan coating became evident beyond the 6-10 days of storage. The effect of chitosan coating on respiration rate was greater at the higher concentration during storage period at 15 ° (1.5% and 2% chitosan). This suggests that coating process might have affected the course of senescence (as indicated by respiration rate) more effectively in wild cherry coating with 1.5 and 2% chitosan than in control without chitosan, 0.5% and 1% chitosan until 6 to 10 days of storage. Chitosan coating reduced the incidence of decay, mainly that caused by *Botrytis cinerea*. By the end of storage period, the percentage of decayed coated fruit was significantly ( $P < 0.05$ ) lower than that of the control. The effect of chitosan coating on CO<sub>2</sub>, production was greater at higher concentration.

**Firmness:** Fruit firmness is often the first of many quality major attributes judged by the consumer and is, therefore, extremely important in overall product acceptance. A texture is a critical quality attribute in the consumer acceptability of fresh fruit and vegetables. Wild cherry suffers a rapid loss of firmness during senescence which contributes greatly to its short postharvest life and susceptibility to fungal contamination. Changes in flesh firmness between control and coated fruit samples during 10 days at  $10 \pm 3$  °C and 60-70% RH, are shown in Fig. 3.

Initial flesh firmness values were similar for control and coated samples. On the

fourth day of storage, uncoated wild cherry began to show a gradual loss of firmness. Indeed, chitosan treatment retained the initial flesh firmness of fruit and significant differences were found on the eighth day of storage. About coated samples, 2.0% chitosan coating was more effective in preventing a decrease of fruit firmness than the other treatments at  $10\pm 3\text{ }^{\circ}\text{C}$ . Chitosan 2% wild cherry fruit were significantly firmer ( $P\leq 0.05$ ), and both groups were higher in firmness than the non-coated fruit after 4-6 days at  $10\pm 3\text{ }^{\circ}\text{C}$ .

The firmness of coated wild cherry also decreased progressively, but on and after the 6-8 days of storage firmness values for coated samples 0.5% and 1% chitosan was higher compared to the control samples, and then significant differences were noted between 0.5% and 2.0% chitosan coating treatments for the same period. By contrast, uncoated fruit loses its firmness gradually during the storage period. Chitosan coatings significantly reduced the loss of firmness of fruits during storage. Fruit firmness increased as chitosan concentration increased (2 % chitosan). The control and 0.5% treated fruit lost their textural integrity faster than the higher concentration coatings, which largely maintained the fruit appearance and quality until the end of storage (10 days).



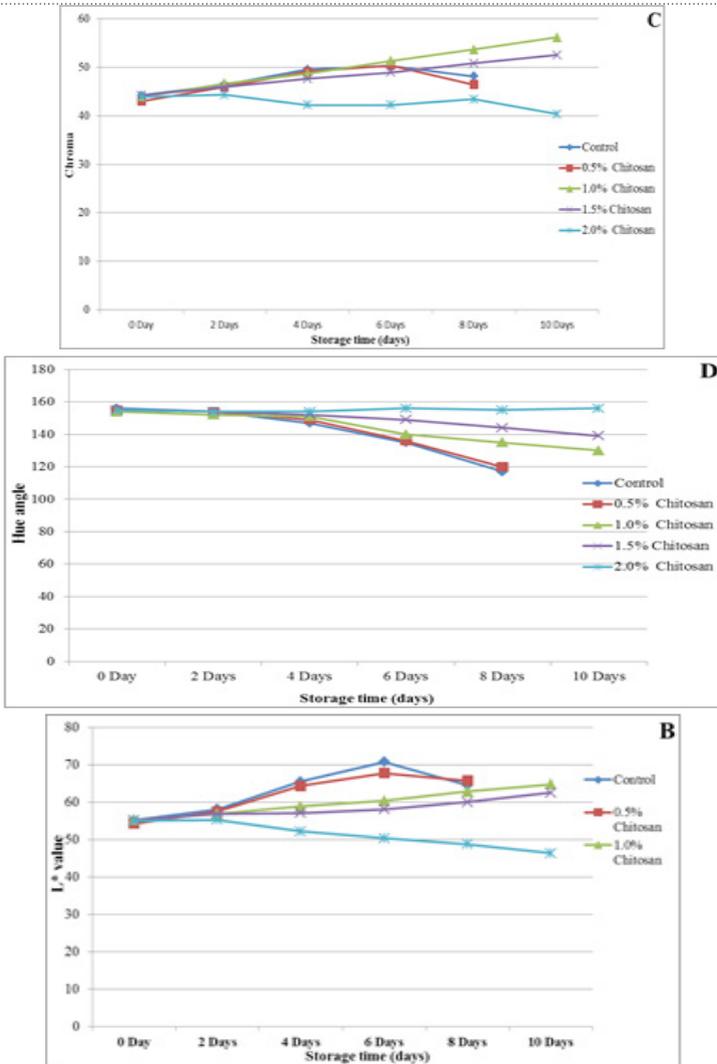
**Fig. 3.** Effect of different concentrations of chitosan on the firmness (N) of wild cherry fruits during storage for 10 days at  $10\pm 3\text{ }^{\circ}\text{C}$  and 60-70% RH.

It is a biochemical process involving the hydrolysis of pectin and starch by enzymes, such as wall hydrolases. The maintenance of firmness in the fruits treated with 1.0%, 1.5% and 2.0% chitosan coatings could be due to their higher antifungal activity and covering of the cuticle and lenticels, thereby reducing infection, respiration, and other ripening processes during storage. By the end of storage, all coated wild cherry samples were deteriorated except wild cherry coated with 2% shrimp chitosan were deteriorated. Chitosan coatings exerted a

beneficial effect on fruit firmness such that, by the end of the storage period, all the treatments gave rise to fruit with higher flesh firmness values than untreated fruit.

**External Colour:** colour is an important factor in the perception of wild cherry fruit quality. Fig. 4-B, C, and D, shows the changes in the surface colour of wild cherries stored at 10 °C and  $70 \pm 5\%$  RH for ten days, as given by  $L^*$ , hue angle, and chroma. Coating treatments did not impart significant changes in initial colour coordinates of fruit. The  $L^*$  parameter is an indicator of fruit darkening. As can be observed in Fig. 4-B, all the samples showed decreasing  $L^*$  values with storage time. The uncoated fruit was significantly ( $P < 0.05$ ) darker than coated fruit throughout the storage period. The chitosan concentration of the coating solution gave rise to significant differences in fruit colour. By the end of the storage period,  $L^*$  had decreased by around 29% for control fruit and by around 16% and 6% for fruit coated with 1.5% and 2.0% chitosan, respectively. Incorporation of 0.5% chitosan in the coating formulation did not exert any additional effect on delaying fruit darkening.

Changes in the chroma value of the wild cherry surface during storage are presented in Fig. 4-B. Fruit developed a less vivid coloration, as evidenced by lower values of chroma. The reduction in chroma values was significantly greater for uncoated fruit, and significant differences with respect to initial values were found after the second day ( $P < 0.05$ ). About coated fruit, no significant differences were found among samples treated with different concentrations of chitosan. Changes in the chroma of coated fruit with storage time were slight and only became significant at the end of the storage period. The hue angle of uncoated wild cherry began to decrease after the second day of storage and at the end of the storage period the decline was 35%. The hue angle of coated fruit did not show any significant change during storage.



**Fig. 9.** External colour evolution (B) lightness, (C) chroma and (D) hue angle of control and chitosan coated wild cherries stored at 10 days at  $10\pm 3\text{ }^{\circ}\text{C}$  and 60- 70% RH. Vertical bars indicate standard deviation.

Colour changes in harvested, fully red, ripe wild cherries occur progressively during storage. Fruit darkens, skin colour becomes less chromatic and surface browning develops. Less red skin and darkening due to oxidative browning reactions have been found to be more marked in ripe wild cherries that suffer greater moisture loss during storage [18]. The control of moisture loss by chitosan coatings contributes to minimizing external colour changes in fully ripe wild cherries. Along with water loss, colour changes in wild cherry fruit are greatly influenced by storage temperature. It is thus to be expected that colour differences between control and coated wild cherries be more accentuated in fruit stored at higher temperatures.

The calcium content of wild cherries was  $2001 \pm 98$  ppm Ca (g kg<sup>-1</sup> dry matter). The concentration of chitosan coating to increase the calcium content of 17% for wild cherries coated with 1.5% chitosan and by 35% in fruit coated with 2.0% chitosan. This increase in Ca content when a higher concentration of chitosan was applied can be related to the greater viscosity of the 2.0% chitosan solution and the greater solid content expected on the fruit surface. Calcium chloride is commonly employed as a firming agent to improve the texture of fresh and processed fruit, and it has also been reported to delay the fungal decay of several commodities, including wild cherries. Its use, however, is limited, since it imparts a bitter and salty taste and gives rise to other flavor changes in fruit. Alternatives to the use of calcium chloride are calcium lactates and gluconates which impart a more neutral taste without altering fruit flavor [10, 13]. The employment of organic acid salts of calcium as firming agents enhances the nutritional value of foods since organic calcium salts are more bioavailable than are the inorganic salts. Organic calcium salts are already employed in therapeutic applications, such as nutraceutical dietary supplements and in the fortification of foods. In this regard, edible coatings represent an alternative means to enrich the nutritional value of foods. Sensory analysis of wild cherries based on visual appeal showed that chitosan coatings delayed fruit senescence associated with colour changes and dehydration.

In this study, fruit softening was reduced with increasing chitosan concentrations, and as a result, the control and 0.5%, 1% treated fruit lost their textural integrity faster than fruit coated with 2.0% chitosan. Fruit softening is due to deterioration in the cell structure, the cell wall composition, and the intracellular materials. The maintenance of firmness in the wild cherry treated with chitosan coatings could be due to their higher antifungal activity, and covering of the cuticle and lenticels, thereby reducing infection, respiration rate, and other ripening processes during storage, according to previous reports in papaya and sweet cherry coated with chitosan.

**In conclusion**, the experiment conducted here indicated that the application of chitosan coating, especially 2.0% (w/v) chitosan solution combined with a temperature  $10 \pm 3$  °C inhibited wild cherry fruit ripening and maintained the

quality of the fruit. The results suggested that chitosan showed positive effects in maintaining membrane integrity and thus in delaying ripening process in wild cherry fruit mainly through decrease oxidative stress. The effect of chitosan-based coating on O<sub>2</sub> uptake and CO<sub>2</sub> evolution was studied on wild cherry. A 2% solution used for dipping the fruits was most effective for maintaining respiration rate, firmness and preventing decay in the fruits, compared with control without chitosan. Sensory analysis of wild cherries based on visual appeal showed that chitosan coatings delayed fruit senescence associated with colour changes and dehydration. This research demonstrated investigates that chitosan has the potential to maintain the qualities of the postharvest fruit and prolong its storage life.

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