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

Materials of the International Conference

Date: March 25-26

Beijing, China 2019

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

International Conference
"Scientific research of the SCO countries: synergy and integration"

Part 1: Participants' reports in English

2019年3月26日。中国北京
March 26, 2019. Beijing, PRC

Materials of the International Conference
"Scientific research of the SCO countries: synergy and integration" - Reports in English. Part 1.

(March 26, 2019. Beijing, PRC)

这些会议文集结合了会议的材料 – 研究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。
作者对所引用的出版物，事实，数字，引用，统计数据，专有名称和其他信息的准确性负责

These Conference Proceedings combine materials of the conference – research papers and thesis reports of scientific workers. They examines tecnical and sociological issues of research issues. Some articles deal with theoretical and methodological approaches and principles of research questions of personality professionalization.

Authors are responsible for the accuracy of cited publications, facts, figures, quotations, statistics, proper names and other information.

CONTENT

ECONOMICS

PEDAGOGICAL SCIENCES

PHILOLOGY

HISTORICAL SCIENCES

MEDICAL SCIENCES

PHARMACEUTICAL SCIENCES

BIOLOGICAL SCIENCES

CHEMICAL SCIENCES

TECHNICAL SCIENCE

AGRICULTURAL SCIENCES

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 56 authors from 7 countries (China, Russia, Uzbekistan, Kazakhstan, Azerbaijan, Tajikistan, Kyrgyzstan).

This conference was a result of the serious interest of the world academic community, the state authorities of China and the Chinese Communist Party to preserve and strengthen international cooperation in the field of science. 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 this conference will be useful to a wide range of readers. It will help to consider issues, that would interest the public, under a new point of view. It will also allow to find contacts among scientists of common interests.

Fan Fukuan,
Chairman of the organizing committee of the conference
"Scientific research of the SCO countries: synergy and integration"
Full 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"

二十一世纪俄中投资合作的具体方面
SPECIFIC ASPECTS OF RUSSIA-CHINA INVESTMENT COOPERATION IN THE TWENTY-FIRST CENTURY

Okorokova Margarita Alexandrovna
student (bachelor)
Lomonosov Moscow State University Institute of Asia and Africa,
Department of International Economic Relations, Moscow, Russia

注解。 本文讨论了俄中投资合作的理论和实践方面，并探讨了在第三个千年中发展这种合作的先决条件。 特别注意对俄中最重要的投资计划进行简要的地域分析。
关键词：资本，外资，转向东方，俄罗斯，中国，合作，资源。

Annotation. T*he article discusses the theoretical and practical aspects of the Russian-Chinese investment cooperation, and also examines the prerequisites for the development of this cooperation in the third millennium. Special attention is paid to a brief territorial analysis of the most significant Russian-Chinese investment initiatives.*

Keywords: *capital, foreign investment, turn to the East, Russia, China, cooperation, resources.*

International migration of capital is one of the forms of international economic relations that have a huge impact on the global economy. In the XXI century, the movement of capital between countries is actively increasing, due to such factors as the high rates of development of international trade, interbank lending, and intergovernmental loans. Migration of capital is designed to ensure a more rational use of resources and for investors to receive additional income in recipient countries. This paper discusses foreign direct investment, the purpose of which is to make profit on a long-term basis.

Today, one of the main exporters of capital in the world is China. According to some calculations, by 2020, the Celestial Empire will become the largest international investor. This trend is largely due to the foreign economic course of the government of the republic: first, the "openness policy", where the goal is to build an open economic system in which openness would become an engine of development and competitiveness. Secondly, in recent years, against the backdrop of

strengthening China's position in the world's geopolitical arena, and also because of changes in the country's economy, the government has shifted its focus from attracting foreign capital into the country to investment expansion abroad. This expansion was made possible largely due to the surplus of capital in the country. It is designed to expand the international presence, provide access to new sources of industrial and agricultural raw materials, new sales markets and the latest technologies, as well as meet domestic demand. Within the framework of the Chinese foreign policy strategy, Russia is one of the key partners.

First of all, the importance of the political prerequisites of close cooperation between the two countries follows. Back in 1997, the heads of the two powers signed a joint declaration on a multipolar world, in which they advocated the creation of a new system of international relations without military blocs and the threat of armed aggression. That is, both countries advocate the proclamation of a new world order with several poles of power, approximately equal in economic and military potential. Partly similar views on the most acute international problems, for example, on North Korea, Iran, Iraq and Syria, are the basis of interaction between Russia and China within the framework of international organizations.

It may be noted that the positions of Moscow and Beijing coincide in many economic issues. Being in a similar transformational period, Russia and China sometimes face the same problems and have the opportunity to solve some of them together, borrowing from each other's experience and not repeating other people's mistakes. Moreover, in some areas, the complementary nature of the two countries' economies manifests itself. Thus, the tendency towards diversification of sources of resources of the Chinese side is fully consistent with Russia's plans to diversify sales markets.

A significant prerequisite for the investment interaction of the two countries is their military cooperation. For example, Lyle Goldstein, a professor at the US Naval College, assumes that Russia's actions in Syria will be studied in detail by Chinese strategists, who will find proper use of the knowledge gained in conducting antiterrorist operations in remote territories. Both states are interested in further military-technical cooperation. As part of this cooperation, Russia may find additional funding for the development of individual sectors of the domestic defense industry. For China, this interaction provides access to some of the latest technologies and developments, which will allow it to accelerate the modernization of its armed forces.

Finally, both countries, the length of the common border of which exceeds 4,000 kilometers, are interested in preserving and strengthening good-neighborly relations, cultural and humanitarian exchanges between the peoples of the two states, an integral part of which is the migration of capital.

Next, it is advisable to go to the reasons for which Russia is making the so-

called turn to the East. Its development, begun in the second half of the 2000s, was a delayed response to the economic recovery of Asian countries. This rise has opened up new horizons for the development of Zauralie and the Far East, which have gained new strategic significance. Already at that time, many experts predicted a slowdown in European economies, an increase in contradictions with the West, and the need to diversify economic ties and external growth drivers that had come to the forefront underlined the correctness and relevance of the new foreign policy strategy. In addition, the trend towards regionalization of world economic relations has become increasingly obvious. It should be noted that a real, noticeable change in the vector of political and economic interaction with other countries towards the Asian direction occurred only in 2011-2012. There is reason to believe that the decision to finally move to concrete steps in the issue of reorientation to Asian countries was largely due to the economic crisis of the eurozone that erupted in 2011, which grew out of the debt crisis of Greece. It should be noted that the crisis was caused not only by the local economic upheavals of the EU, but also by the fact that the US national debt reached the maximum level established by law. Do not forget that in August 2011 there was a real threat of default, the expectations of which, undoubtedly, had a great influence on the behavior of investors around the world. Secondly, the policy of turning to the East is not only a response to the challenges of the current economic crisis, but also an alternative way of developing the country in conflict with the West. Indeed, besides the sanctions imposed on Russia directly, the scale and nature of FDI coming from the West reflects increased risks and uncertainties due to political events such as the UK's withdrawal from the EU, the United States 'refusal to participate in the Trans-Pacific Partnership, and agreement. In such conditions, the Russian turn to the East and investment cooperation with China in particular can indeed become a promising alternative to Western "partners."

At the same time, in addition to external, there are a number of internal prerequisites for the development of investment cooperation with China. Thus, the fuel and energy complex of Russia needs a stable and capacious sales market, which will become a stable source of petrodollars and, therefore, one of the drivers of the country's development. Secondly, investment cooperation with China, a partner interested in ensuring the supply of energy resources to its domestic market, will allow the creation of a well-developed network of pipelines and gas pipelines in Russia. Raising capital from China will provide an opportunity not only to implement a number of major energy, infrastructure and other projects, but also to increase the country's competitiveness, as well as the standard of living of the population of individual regions.

Now we turn to the consideration of the reasons why China is in one way or actively developing investment cooperation with Russia.

For almost 20 years, China has been one of the largest energy consumers in the world, due to the high share of industry in GDP and the increased energy intensity of production. Recently, thanks to the introduction of new technologies, optimization of production, a general slowdown in economic growth, and the fact that the problem of green energy has finally got on the agenda of the Chinese leadership, the consumption of energy resources in the country has been significantly reduced. By 2040, more than 80% of the growth in energy consumption in the PRC will be accounted for renewable energy sources, hydropower and atomic energy.

However, the reduction of Chinese energy imports is not a quick process, so the need to purchase them in large quantities from other countries is still an important factor in the context of China's economy and foreign policy. In many respects, this factor dictates the desire of the PRC to expand its expansion into the countries of Africa, Latin America, and the Middle East, that is, countries with substantial reserves of energy resources.

But the development of this vector of China's foreign policy is limited by opposition from the United States, a state that controls many important sources of energy. In 2011, the United States began, not without reliance on the military power of the country, to pursue an active policy in the Middle East and Central Asia. If necessary, the US Navy can block China's transportation of energy from the Middle East through the Malay Strait. In the light of the trade war unfolding in our eyes, we can expect a further increase in tensions in Sino-US relations, so China is extremely interested in finding alternative ways to import energy.

Secondly, the planned conclusion of an agreement on the Trans-Atlantic Trade and Investment Partnership will give the United States the opportunity to isolate China, which is gaining more and more weight in the international arena. It can be said that, realizing this potential threat, China continues the policy of creating a security belt at its borders - a kind of economic buffer zone, designed to act as a guarantor of the stability of the country's economy as independent as possible, primarily from the political rhetoric of the West.

Thus, in view of the above factors, it can be said that it is Russia - the country with the largest mineral resource base, which is almost the only land corridor from China to Europe today and also set by the West in conditions of some kind of isolation - more and more significant partner. Especially important is the stable economic and political interaction between Russia and China for the northeastern provinces of Heilongjiang, Jilin, Liaoning and Inner Mongolia, which is largely due to geographical and historical factors.

One of the leaders in attracting foreign, in particular Chinese, investment in Russia is the Far East - a territory whose development is a priority direction of Russia's domestic policy. In the Far Eastern Federal District, 17 advanced development territories (ADT) have been created; the free port of Vladivostok is

functioning. Experts point out that these regimes are unique for the country and extremely attractive for investors. Indeed, 26% of all FDI entering the Russian economy in 2017[1] was attracted to this region. The share of foreign investments in the total amount of attracted capital was 8%. Chinese capital accounted for 30% of total foreign investment in ADT and the free port of Vladivostok. At the end of 2018, 211 projects were implemented and planned for implementation in the region. The portfolio of Russian-Chinese investment projects in the Far East amounts to $ 3.5 billion, of which 210 billion rubles. - in ADTs.

Based on the analysis of the most significant from the point of view of the author of the projects of Russian-Chinese investment cooperation in recent years, we can draw the following conclusions. First, the leader in the number of joint investment initiatives of the two countries in Russia is the Far Eastern Federal District. Indeed, very close economic and socio-cultural ties have historically formed between the border regions of Russia and China, which are one of the drivers of the development of the Far East. Secondly, in some regions (the Southern Federal District and the North Caucasus Federal District), Chinese investment activity is relatively inactive. Thirdly, the sectoral analysis of Russian-Chinese projects showed that an important role is still assigned to domestic raw materials, partially exported to China. Finally, the projects of Russian-Chinese investment cooperation are at different stages of implementation: some of them have already proven their economic efficiency, and some still exist only in the form of memorandums of intent.

[1]Balandin Roman. Alexander Galushka: The Far East has become the leading region of the Russian Federation in attracting investments // Russian Ministry of the East and East Development 04/27/2018

References

1. Azatyan M. O. Analysis of the structure and dynamics of foreign direct investment in the Russian Federation // Economy, management, finance: materials VII International. scientific conf. (Krasnodar, February 2017). - Krasnodar: Novation, 2017. - p. 10-14. - URL https://moluch.ru/conf/econ/archive/220/11698/ (appeal date: 03/06/2019).

2. Balandin Roman. Alexander Galushka: The Far East has become the leading region of the Russian Federation for attracting investments // Ministry of Eastern and Eastern Development of Russia 04/27/2018 URL: https://minvr.ru/press-center/news/15177/?sphrase_id=387602 (appeal date: 03/05/2019).

3. China's investments account for 30% of foreign investments in the Torah and the Free-Far East Federal District // East Russia news agency 05/09/2017 URL: https://www.eastrussia.ru/material/most-plyus-tarif-ravno/ (date references: 03/06/2019).

4. Kashin V. How much does China invest in Russia? // International Discussion Club Valdai. 09.06.2017 URL: http://www.valdaiclub.com/a/highlights/mnogo-li-kitay-investiruet-v-rossiyu/ (appeal date: 03/05/2019).

5. Musaev U. M., Abdullaev D. M. Improving the policy of attracting foreign investment in the economy of the Russian Federation // Young Scientist. - 2017. - №4. - p. 507-509. - URL https://moluch.ru/archive/138/38890/ (access date: 03/06/2019).

6. Annex to the Minutes of the fourth meeting of the Russian-Chinese Intergovernmental Commission on Investment Cooperation.

7. UNCTAD, database on FDI / MNE URL: www.unctad.org/fdistatistics, (contact date: 13.12.2018).

8. Goldstein Lynn Glacier. 5. Musaev U. M., Abdullaev D. M. Improving the policy of attracting foreign investment in the economy of the Russian Federation // Young Scientist. - 2017. - №4. - p. 507-509. - URL https://moluch.ru/archive/138/38890/ (access date: 03/06/2019).

油气综合企业投资控制项目评价
EVALUATION OF PROJECTS IN THE INVESTMENT CONTROLLING AT THE ENTERPRISES OF OIL AND GAS COMPLEX

Luneva Natalya Nikolaevna
Candidate of Economic Sciences
Director of the Branch of Ufa State Oil Technical University in Salavat
Evdokimova Natalya Georgiyevna
Doctor of Technical Sciences
Professor at the Department of Chemical Engineering Processes
Ufa State Petroleum Technical University
Branch of the University in the City of Salavat.
Russian Federation

注解。投资过程的特点，创建控制石油和天然气行业投资的系统的过程的阶段。企业的投资决策方案基于信息流，以及提供处理信息的分析程序，以便做出有效的管理决策，使项目发起人能够跟踪变化，分析和调整，使用主管投资管理水平，通常有助于提高项目管理的效率。

为了确定优先投资项目，建议采用多标准评估方法 – 效率的一个整体指标。在石油和天然气综合企业的投资项目的选择和理由中使用综合评估，这使得有可能客观地评估投资项目的有效性，并在经济上有理由选择投资项目。拟议的替代方案。

关键词：投资控制，管理决策，投资项目实施过程，投资项目，活动效率，效率积分指标。

Annotation. *The features of the investment process, the stages of the process of creating a system of controlling investments in the oil and gas industry. The scheme of investment decision-making at the enterprise is based on information flows, as well as analytical procedures with the provision of processed information for making effective management decisions, which allows the project initiator to track changes, analyze and adjust them, use the competent level of investment management, which generally contributes to improving the efficiency of project management.*

To identify priority investment projects, it is proposed to use multi – criteria methods of evaluation-an integral indicator of efficiency. The use of integrated assessment in the selection and justification of the investment project at the enterprises of the oil and gas complex is shown, which makes it possible to objectively

assess the effectiveness of investment projects and economically justified to make the choice of an investment project from the proposed alternatives.

Keywords: *investment controlling, management decisions, the process of implementation of the investment project, investment project, efficiency of activity, integral indicator of efficiency.*

Investment Controlling is a comprehensive system that involves monitoring, evaluating and controlling investment projects. Controlling investment activity should be based on an assessment of the effectiveness of investing in the creation of new products, technological re-equipment, organizational improvement of the oil refining complex, development of new markets [1, 2].

The existence of a regulation of investment-related activities implies a clear algorithm for planning and organizing the investment activity of an enterprise, and accordingly, the controlling service for investment projects, which includes developing, executing, monitoring and adjusting for the direction of the investment activity of an enterprise.

Investment controlling [3] is focused on achieving the strategic goals of an enterprise, which is to create a system for evaluating and controlling investment projects to make management decisions that allow the best use of free resources of an enterprise or, if necessary, attracted resources, in order to obtain the greatest profit.

The features of the investment process in the enterprise are [4-5]:

- long and fixed terms for the implementation of investment projects;

- the influence of external and internal environment factors on the project implementation process;

- a large number of responsibility centers involved in the investment process, the relationship between which should be optimized and coordinated;

- the complexity of accounting for financial flows associated with investment activities.

The outlined features of investment activity simultaneously cause difficulties, when faced with which an enterprise may not achieve its investment and, as a result, strategic goals, which may threaten the company's sustainability in the market.

The main activities of controlling investments are the follows:

- planning and coordination of activities in the field of investment;

- implementation of investments;

- budget control of the investment project;

- control the implementation of investments.

The process of creating a system of controlling investments in an enterprise involves the following steps:

1. Selection and justification of the investment project in accordance with the

objectives and strategy of the enterprise. Establish the goal of the project and identify the nature and extent of the influence of external and internal factors on the achievement of the goal. The basis for budgeting the investments are: balance of production facilities, a list of necessary technological equipment; calculation of own financial resources. The volume of capital investments and construction and installation works is determined.

2. The choice of criteria for achieving the project goal. The goal of the project in petro chemistry and oil refining may be to increase the depth of oil refining and the yield of light oil products, improve their quality, reduce the negative impact on the environment, create new production technologies, etc.

3. Development of criteria for achieving goals and control indicators for each responsibility center, taking into accounts the capabilities and powers of the managers of such centers.

4. Elaboration of organizational aspects of controlling investments and, above all, organizational aspects of monitoring and control. The reporting records the planned and actual indicators for the stages of work, terms, costs, as well as deviations of the actual values from the planned ones with the determination of the degree of influence of deviations on the achievement of the project goal.

5. The organization of effective workflow between the centers of responsibility, which allows you to monitor the occurring deviations.

For the implementation of investment controlling in the enterprise, information is generated by performing management functions (planning, accounting, analysis and control). The investment decision making scheme for an enterprise is based on information flows, as well as analytical procedures with the provision of processed information for making effective management decisions. This scheme allows to take into account the multi-level control of "tracking" the investment decision at all stages, starting from the idea of initiating an investment project, calculating basic investment indicators, coordinating an investment project at all management levels and, finally, making a decision on the project implementation [10, 11] .

After completion of the pre-investment phase, before entering the investment phase, it is necessary to prepare a package of documents that will be agreed with all interested parties (project participants): the business plan of the project; network (calendar) schedule of the project with the dates of control points and the critical path; project's budget; financial and economic model of the project.

The whole process of implementing an investment project can be represented as a diagram (Figure 1).

Контроль   Ход реализации проекта   Результат этапа

Завершение прединвестиционной фазы

Согласование документов с участниками

Бизнес-план, сетевой график, бюджет проекта, финансовая модель

Контроль сроков, бюджета и качества

Работа 1

Работа 2

…

Работа N

Работы, лежащие на критическом пути, согласно сетевому графику

Отклонение от показателей в модели — Нет

Да

Новые показатели устраивают участников? — Да

Нет

Акты выполненных работ, отчеты об оплатах, отчет о достижении целей

Отказ от инвестирования

Завершение инвестиционной фазы

Готовый к эксплуатации актив

Мониторинг деятельности

Эксплуатация актива

Figure 1 - The process of implementing an investment project

To analyze the effectiveness, such indicators as simple and discounted payback period (term), PVP (net present value of the project), IRR (internal rate of return), return on investment, etc. are calculated. An important feature of investment projects in the oil and gas complex is the presence of a number of uncertain factors. That has an impact on their implementation. The factors of uncertainty include: energy prices, the volatility of the ruble exchange rate and the effect of sanctions, customs duties, the availability of technology, etc. All this leads to the need to consider alternative

investment projects with different production technologies, licensors, and, accordingly, various capital investments, implementation dates, costs, and the possibility of liquidating the project in the event of unfavorable economic conditions.

To identify priority projects, it is advisable to use multi-criteria methods of evaluation [6, 7], which allow to take into account a large number of heterogeneous indicators, and both relative and absolute values can be used.

If several variants of investment projects are offered for implementation, the rationale for the most effective option is proposed to be carried out using an integral performance indicator, which allows you to make an economically sound investment decision.

To conduct an integrated assessment it is necessary:
- highlight the technical and economic indicators of the project;
- determine the best value for each indicator;
- calculate standardized coefficients for projects;
- calculate the integral indicator of efficiency for projects;
- to carry out the ranking of projects in accordance with the integral indicator of efficiency.

The calculation of the integral indicator of efficiency will be carried out according to the method of "Euclidean distances" [8]:

$$K = \sqrt{\sum(k_i \cdot r_i^2)}, \qquad (1)$$

where k_i – weight factors; r_i – standardized investment project ratios.

Standardized coefficients depending on what is economically advantageous - the maximum or minimum value of the indicator - we define the formulas:

$$r_i = x_i / x_{max} \text{ или } r_i = x_i / x_{min}, \qquad (2)$$

where x_i – the actual value of the investment project indicator; x_{max}, x_{min} – respectively, the maximum and minimum value of the indicator of the investment project.

The different degree of importance of each indicator of an investment project when evaluating them determines the need for calculating weighting factors. Weight coefficients are proposed to be determined on the Fishburn scale [9]:

$$k_i = 2(m - i + 1) / [m(m+1)], \qquad (3)$$

where m – number of investment project indicators; i – number of the current indicator of the investment project.

At the same time $\sum k_i = 1$, $k_i \geq 0$.

According to the obtained integral indicators, investment projects are ranked in descending order. The priority will be the investment project that will have the highest value of the integral indicator.

The results of the use of an integrated assessment in the selection and justification of an investment project in the oil and gas complex are presented in Tables 1 - 3, from which it can be seen that Project A.

Table 1 - Indicators of the effectiveness of alternative investment projects

Indicators	Project A	Project B	Project C	Project D
1 Capital investment million rubles	7 695	8 500	8 250	7 300
2 Cost of production, mln. rub.	4 300	4 450	4 400	4 350
3 Profit from sales, million rubles	1 650	1 300	1 350	1 550
4 Net profit, mln. rub.	1 084	800	845	1 017
5 NPV, million rubles	4 019	2 070	2 420	3 804
6 IRR,%	17	12	14	18
7 Payback period, years	5,8	7,5	6,5	5,5
8 Installation capacity, thous.	434	434	434	434

Table 2 - Calculation of standardized coefficients

Indicators	Project A	Project B	Project C	Project D	Weight coefficient
1 Capital investment, mln. Rub.	1,054	1,164	1,130	1	0,25
2 Cost of production, mln. Rub.	1	1,035	1,023	1,012	0,21
3 Profit from sales, mln. Rub.	1	0,788	0,818	0,939	0,18
4 Net profit, mln. Rub.	1	0,738	0,779	0,938	0,14
5 NPV, million rubles	1	0,515	0,602	0,947	0,11
6 IRR,%	0,944	0,667	0,778	1	0,07
7 Payback period, years	1,054	1,364	1,182	1	0,04

Table 3 - Ranking of investment projects

№ of project	Comprehensive integrated assessment	Place
Проект A	1,012	1
Проект B	0,941	3
Проект C	0,938	4
Проект D	0,977	2

Thus, the use of an integral assessment in the selection and justification of an investment project, the proposed investment decision making schemes make it possible to:

- firstly, to objectively evaluate the effectiveness of investment projects and to make economically reasonable choices of an investment project from the proposed alternatives;

- secondly, the project initiator can track changes in the main factors affecting the project, analyze and correct them, as well as use a competent level of investment management for making management decisions, which makes it possible in general to improve the efficiency of project management.

References

1. http://minenergo.gov.ru/ Forecast scientific and technological development of industries of fuel and energy complex of Russia for the period up to 2035. Approved by the Russian energy Minister Alexander Novak from 14.10.2016;

2. Investment management: textbook. a manual for students. high schools / under the editorship of V. V. Mishchenko. – 2nd ed. Rev. and extra – Moscow: KnoRus, 2008. – 400 p.;

3. Controlling as a tool of enterprise management / E. A. Anankina, N. G. Danilochkina and others; ed. Danilochkina. M.: YUNITI-DANA, 2003. 98 p.;

4. Danilochkina N. Controlling of investment projects // Electronic journal (www.consulting1c.ru): business management N6 (6), July 2011;

5. Medvedev A. V. Closed loop controlling of investment: technology and tools // the Bulletin]. state University. Sir. 3, 2010. № 1 (16): Finance. Accounting. – P. 123 – 129;

6. Keeney R.L, rife Huy decision-Making at many criteria: preferences and substitution. – Moscow: Radio and communication, 1981. – 560 p.;

7. Pluta V. Comparative multivariate analysis in economic research: methods of taxonomy and factorial analysis. – Moscow: Statistics, 1980;

8. Pavlovskaya A.V. Andrukhov O. V. Estimation of efficiency of vertically integrated oil companies of Russia on the basis of multidimensional comparative analysis // Problems of Economics and management of oil and gas complex. – Moscow: PJSC "VNIIOENG", 2016. - No. 5. – P. 13 - 19;

9. Pavlovskaya A.V. Complex assessment of the effectiveness of main oil pipelines of JSC "Transneft" // Problems of Economics and management of oil and gas complex. – Moscow: PJSC "VNIIOENG", 2017. - No. 6. – P. 4 - 9;

10. Luneva N. N., Levina T. M. a Software tool for making management decisions // journal of Economics and management, 2016. Issue 3, P. 31-35;

11. Luneva N. N., Levina T. M Analysis and risk assessment in investment projects // Journal of Economics and Management, 2016. Issue 2, P. 51-56.

导入替代策略的建模工具包
MODELING TOOLKIT OF IMPORT SUBSTITUTION STRATEGY

Baranova Nina Mikhailovna
Candidate of Pedagogic Sciences, Associate Professor
The Peoples' Friendship University of Russia, Moscow, Russia
Larin Sergey Nikolaevich
Candidate of Technical Sciences, Leading Research Officer
Central Economics and Mathematics Institute RAS, Moscow, Russia
Stebenyaeva Tatyana Viktorovna
Candidate of Economic Sciences, Leading Expert
Institute of International Standards of Accounting and Management,
Moscow, Russia

注解。本文主题的相关性取决于制定与俄罗斯经济主要部门有关的进口替代和发展战略的系统方法。其实施在于，在形成各部门的进口替代和发展战略时，考虑了生产组织的功能特征和原则。在实践中，这使得可以将一些主要部门分类为确定性的，而将其他部分分类为随机系统。本研究的主要目的是证实利用现有经济和数学模型方法建立进口替代战略模型和俄罗斯经济领先部门的发展模式的可能性，这些模式基于其功能特征和表现形式为确定性和/或随机性系统。本研究的主题是现有的工具包，用于为俄罗斯经济的主要部门建立进口替代和发展战略的模型。该研究的目的是俄罗斯经济的主要部门的功能特征以及它们作为确定性和随机系统呈现的可能性的基本原理。作为该研究的方法论基础，使用经济和数学建模方法。研究结果表明，为了形成进口替代战略模型和俄罗斯经济领先部门的发展，可以使用信息和分析工具对确定性和随机系统进行建模。

关键词：俄罗斯经济，主导部门，功能特征，进口替代和发展战略，一致性原则，建模，确定性和随机系统。

Annotation. *The relevance of the topic of the article is determined by the systematic approach used in developing strategies for import substitution and development in relation to the leading sectors of the Russian economy. Its implementation lies in the fact that in forming the strategy of import substitution and development of each sector, functional features and principles of production organization were taken into account. In practice, this makes it possible to classify some of the leading sectors as deterministic, and others as stochastic systems. The main objective of this study is to substantiate the possibility of using existing methods of eco-*

nomic and mathematical modeling to develop models of import substitution strategies and the development of leading sectors of the Russian economy based on their functional features and presentation as deterministic and / or stochastic systems. The subject of this research is the existing toolkit for modeling import substitution and development strategies for the leading sectors of the Russian economy. The object of the study was the functional features of the leading sectors of the Russian economy and the rationale for the possibility of their presentation as deterministic and stochastic systems. As a methodological basis of the study, methods of economic and mathematical modeling were used. The results of the study showed that for the formation of models of import substitution strategies and the development of the leading sectors of the Russian economy, it is possible to use information and analytical tools for modeling deterministic and stochastic systems.

Keywords: Russian economy, leading sectors, functional features, strategies of import substitution and development, the principle of consistency, modeling, deterministic and stochastic systems.

Introduction

The Russian economy is a complex system, which includes enterprises of more than 70 industries. Obviously, the formation of a model of its strategic development in accordance with the traditional sectoral approach is doomed to serious difficulties in advance because of the need to take into account an excessively large aggregate of multidirectional factors that directly affect the functioning of enterprises in different industries. To simplify the approach to solving this problem, it is advisable to use a systematic approach, which will allow identifying leading sectors of the economy, as well as significantly reducing the dimension of the system being modeled to a number of models of import substitution strategies and development of these sectors [3, p. 807]. Effective formation of models of import substitution strategies and the development of leading sectors of the economy is possible through the use of existing methods of economic and mathematical modeling and their presentation as deterministic and / or stochastic systems.

Purpose of the study

The main objective of this study is to substantiate the possibility of using existing methods of economic and mathematical modeling to develop models of import substitution strategies and the development of leading sectors of the Russian economy based on their functional features and presentation as deterministic and / or stochastic systems.

Material and research methods

The leading sectors of the Russian economy include a fairly large number of business entities, many of which have a number of specific features. It is the presence of such features that makes it possible to quite clearly determine the affilia-

tion of a business entity to one of the leading sectors of the Russian economy. For the overwhelming majority of business entities, these features are expressed in the functional principles of production organization. In practice, they are manifested in the fact that, depending on the type and conditions of organization and management of production and economic activities, taking them into account when modeling import substitution strategies and the development of leading sectors makes some of them deterministic, and others stochastic [5, p. 82].

Let us show the features of modeling import substitution strategies and the development of leading sectors of the Russian economy in the case when they can be attributed to deterministic systems.

Deterministic is considered to be such a system, the future state of which can be accurately predicted based on information about its current state. The relationships between the input $u(t,x)$ and the output $y(t,x)$ of such systems are described using the operator θ, whose properties do not change over time, or these changes are precisely known. In the simplest case, the deterministic system can be represented as follows:

$$y(t,x) = \theta\, u(t,x). \tag{1}$$

In this case, the functions of the input $u(t,x)$ and output $y(t,x)$ parameters of the system are considered known, and the deterministic operator θ remains unknown.

In the case of modeling import substitution strategies and the development of the leading sectors of the Russian economy as a deterministic system (1), an auxiliary model is formed with the input $u(t,x)$ and output $\hat{y}(t,x)$, which is characterized by the operator $\hat{\theta}$. We represent this model as the following equation:

$$\hat{y}(t,x) = \hat{\theta}\, u(t,x). \tag{2}$$

The task of modeling the deterministic system (1) will be to determine the value of the operator $\hat{\theta}$ while observing the condition of maximum proximity of the output parameters of the subsystem $y(t,x)$ and its model $\hat{y}(t,x)$. The difference between the values of these parameters characterizes the index of their differences (residuals, errors), which can be expressed by the following equation:

$$\varepsilon(t,x) = y(t,x) - \hat{y}(t,x). \tag{3}$$

The residual $\varepsilon(t,x)$ is a function of time and the spatial coordinates of the simulated system. Moreover, each of its arguments is defined on the corresponding bounded sets: T is the time interval; X is the set of localization of the spatial coordinates of the system. Thus, the residual characterizes the closeness of the output parameters of the system and its model at any time from the interval T and at each point of the set of localization of the spatial coordinates X.

For a quantitative estimate of proximity, certain numerical characteristics $\tilde{\varepsilon}$ of the residual ε can be used, namely: the maximum residual (4), the integral absolute residual (5) and the integral quadratic residual (6) [1, p. 79]. The formulas for determining these characteristics are given below:

$$\tilde{\varepsilon}(\hat{\theta}) = \varepsilon_{max} = max\varepsilon(t,x),\ t\in T,\ x\in X. \tag{4}$$

$$\tilde{\varepsilon}(\hat{\theta}) = \varepsilon_{abc} = \int_{t\in T}\int_{x\in X} |\varepsilon(t,x)|\,dtdx\ . \tag{5}$$

$$\tilde{\varepsilon}(\hat{\theta}) = \varepsilon_{sqr} = \int_{t\in T}\int_{x\in X} (\varepsilon(t,x))^2\,dtdx. \tag{6}$$

Choosing one of the above characteristics to assess the proximity of the output parameters of the system and its model, you can get a quantitative assessment of the quality of the model or, in other words, a quantitative measure of the compliance of the model operator $\hat{\theta}$ with the system operator θ.

This makes it possible to select operators for the formation of a model of import substitution strategies and the development of leading sectors of the Russian economy in order to reduce the calculated values of assessing its proximity as compared to the simulated deterministic system. As a result of the above reasoning and the corresponding transformations, it can be argued that the model of import substitution strategies and the development of the leading sector of the economy as a deterministic system should be understood as a model with a deterministic operator $\hat{\theta}^*$, which minimizes the estimated value of assessing the proximity of the output parameters of the system and its model, that is, $\min \tilde{\varepsilon}(\hat{\theta})$.

To form an algorithm for solving such problems, a class of model operators is usually specified with an accuracy of a finite set of unknown parameters. From a mathematical point of view, this is equivalent to the parameterization of the operator $\hat{\theta}$. This means that this operator must be represented by a certain set of unknown, but numeric parameters.

For a parameterized operator, we introduce the notation $\hat{\theta}(W)$, where under W we mean the vector of parameters. If in a parameterized operator we select elementary operators and specify relations between them, then these parameters can be considered characteristics of these relations. With parameterized operators, the residuals become functions of the parameters W, that is, $\tilde{\varepsilon}(W)$.

After parameterization of the model operator, the task of modeling the deterministic subsystem is reduced to determining the parameters W * of the model operator $\hat{\theta}$ so that

$$W^* = arg\ min\ \tilde{\varepsilon}(W). \tag{7}$$

Let us show the features of modeling import substitution strategies and the development of leading sectors of the Russian economy if they can be attributed to stochastic systems.

The main distinguishing characteristic of a stochastic system is that its state at a specific point in time can determine its future state only with a certain degree of probability [2, p. 85]. Accordingly, the output parameters of such a system will be a random process $y_\omega(t,x)$. From this follows the fundamental difference between the stochastic system and

the deterministic one, which consists in the fact that the connection between the input and output parameters of such a system is described by the stochastic operator θ_ω:

$$y_\omega(t,x) = \theta_\omega u(t,x) \tag{8}$$

A stochastic operator can be considered as a set of S deterministic operators, each of which is realized with a certain probability, where under ω we mean the number of a particular deterministic operator in this set.

There are two classes of realization of operators from the set S in the time interval T [4, p. 144].

For the first class, deterministic operators that are realized with probability p retain their properties over the entire time interval T. As the simplest example of this implementation class, there can be a finite numbered set of deterministic operators $\theta_1,\dots,\ \theta_s$, a ω is a random integer a value that takes values in the interval [1, s] with a certain probability distribution function $P(\omega)$.

For the second class, deterministic operators from the set S can be realized at an arbitrary time on the whole interval T. In this case, ω will be a random function $\omega(m,h)$ with values from the interval [1,s] and the probability distribution function $P(\omega(m\_h),\dots,\omega(m_0,h))$.

To model the strategy of import substitution and development of the leading sector of the Russian economy as a stochastic system (8), we will form an auxiliary subsystem with a stochastic operator $\hat{\theta}_\omega$:

$$\hat{y}_\omega(t,x) = \hat{\theta}_\omega u(t,x). \tag{9}$$

Later we come to the conclusion that the calculated value of the residual between the output parameters of the stochastic system and its model also becomes a random process:

$$\varepsilon_\omega(t,x) = y_\omega(t,x) - \hat{y}_\omega(t,x), \tag{10}$$

where ω is either a random function or a random variable.

Accordingly, the calculated values of the indicators for assessing the proximity of the output parameters of the system and its model (8) - (9) also become random variables. Therefore, to obtain a quantitative estimate of the proximity of the output parameters of the subsystem and its model, numerical characteristics of the corresponding random variables are used. Usually, it is enough to use their average values. In other words, instead of maximum, integral absolute and integral quadratic residual estimates, the following set of estimates will be used: average maximum discrepancy (11), average integral absolute discrepancy (12), and average integral quadratic discrepancy (13). Formulas for their definition are given below [6, p. 176]:

$$\tilde{\varepsilon} = \varepsilon_{max} = M\left\{\max | \varepsilon_\omega(t,x)|\right\}, t \in T, \ x \in X. \tag{11}$$

$$\tilde{\varepsilon} = \varepsilon_{abs} = M\left\{\int\limits_{t \in T} \int\limits_{x \in X} | \varepsilon_\omega(t,x)| \, dtdx\right\}. \tag{12}$$

$$\tilde{\varepsilon} = \varepsilon_{sqr} = M\left\{\int\limits_{t \in T} \int\limits_{x \in X} (\varepsilon_\omega(t,x))^2 \, dtdx\right\} \tag{13}$$

In expressions (11) - (13), the symbol M denotes a mathematical expectation operation. In the future, the process of forming a model for the stochastic subsystem is similar to the process of forming a model for a deterministic system discussed above. The only difference will be that the minimum calculated value of the residual index will be determined among the stochastic operators of the selected class. In this case, any selected class of operators must be described in a parameterized form. However, unlike the deterministic subsystem, the parameters W are treated as random variables, which are characterized by the corresponding probability distribution functions $p(W,\beta)$. The type of probability distribution functions is usually established on the basis of qualitative a priori information, and their parameters β (mean values, variances, and higher moments) form a group of non-random model parameters of the stochastic model operator. They are determined from the following expression:

$$\beta^* = \arg \min \tilde{\varepsilon}(\beta), \tag{14}$$

where the mean residuals will be determined from expressions (11) - (13).

Random parameters of the stochastic subsystem model are generated using random number sources and the probability distribution laws $p(W,\beta^*)$.

Research results and discussion

Our results allow us to conclude that in the process of conducting research, the features of modeling import substitution strategies and the development of leading sectors of the Russian economy as deterministic and stochastic systems were identified and the need to take them into account the functional features of the leading sectors of the Russian economy in modeling their development strategies was justified.

Conclusion

The results obtained in the course of the research show that when forming strategies for import substitution and development of the leading sectors of the Russian economy, such types of existing information and analytical tools as modeling of deterministic and stochastic systems are quite applicable. Together with the functional features of the organization and conduct of production and business activities by economic entities of leading sectors, this tool can also be used to evaluate the developed models of import substitution strategies and the development of leading sectors of the Russian economy to minimize the estimated values of residual indicators.

Thanks

References

1. Gubar L.N., Ermolenko A.V. Probability theory and mathematical statistics: educational allowance. - Syktyvkar: Publishing House of SSU. Pitirima Sorokina, 2015. - 120 p.

2. Kuzmin E.A. Uncertainty in economics: concepts and positions / E.A. Kuzmin // Management issues. 2012. № 2 (2). Pp. 80-92.

3. Larin S.N., Znamenskaya A.N., Stebenyaeva T.V. Analysis of measures for import substitution in the development strategies of the leading sectors of the Russian economy // National interests: priorities and security, 2017. Volume 13. Issue. 5. p. 804-813. https://doi.org/10.24891/ni. 13.5.804

4. Makarenkov A.M. Application of averaged projection models for identifying parameters of stochastic systems // News of Tula State University. Technical science. 2011. Vol. 5. Part 1. Pp. 143-147.

5. Pisaruk N.N. Operations Research / N.N. Pisaruk. - Minsk: BSU, 2013. - 272 p.

6. Spirin MS, Spirin P.A. Theory of Probability and Mathematical Statistics. - Moscow: Edit. Center "Academy", 2011. - 352 p.

实施部门进口替代战略作为利用竞争优势的一个因素
IMPLEMENTATION OF SECTORAL IMPORT SUBSTITUTION STRATEGIES AS A FACTOR USE OF COMPETITIVE ADVANTAGES

Larin Sergey Nikolaevich
Candidate of Technical Sciences, Leading Research Officer
Central Economics and Mathematics Institute RAS, Moscow, Russia
Stebenyaeva Tatyana Viktorovna
Candidate of Economic Sciences, Leading Specialist
Institute of International Standards of Accounting and Management, Moscow, Russia
Yuryatina Natalya Nikolaevna
Research Officer
Institute of International Standards of Accounting and Management, Moscow, Russia

注解。西方国家对俄罗斯经济的制裁限制的引入很难归因于市场监管的方法。为应对美国及其盟国的不友好行动,俄罗斯对这些国家的个别行业实施了有针对性的制裁,并制定了针对特定行业的进口替代战略。一方面,实施进口替代部门战略将确保俄罗斯经济在制裁的压力下发展,另一方面,将使其主导产业有效利用其竞争优势,从而最大限度地减少制裁限制。本研究的主要目的是确定可在实践中使用的竞争优势,作为实施工业进口替代战略的一部分。作为研究方法,我们使用系统分析和综合方法,以及经济理论的主要规定。研究结果表明,俄罗斯背景下的进口替代战略具有许多特征,这些特征决定了其实施过程中的行业竞争优势,并在工程行业企业的工作中得到了体现。得出的结论是,为了确保俄罗斯经济的发展,有必要迅速为制造业和采掘业创造有效的创新基础设施,并利用军工综合体的技术资源来发展民用工业。

关键词:制裁限制,政治目标,俄罗斯制裁,部门进口替代战略,竞争优势,实施机制。

Annotation. *The introduction by Western countries of sanctions restrictions against the Russian economy is difficult to attribute to the methods of market regulation. In response to the unfriendly actions of the United States and its allies, Russia imposed targeted sanctions against individual industries in these countries and developed industry-specific import substitution strategies. The implementation of import substitution sectoral strategies, on the one hand, will ensure the*

development of the Russian economy under pressure from sanctions, and on the other hand, will allow its leading industries to use their competitive advantages effectively, which can minimize the impact of sanctions restrictions. The main objective of this study is to identify competitive advantages that can be used in practice as part of the implementation of industry import substitution strategies. As methods of research, we used a system analysis and an integrated approach, as well as the main provisions of economic theory. As a result of the research, it was found that the strategies of import substitution in the Russian context have a number of features that determine the industry competitive advantages in their implementation and are disclosed in the work with respect to enterprises of the engineering industry. It was concluded that in order to ensure the development of the Russian economy, it is necessary to quickly create an effective innovation infrastructure for both manufacturing and extractive industries, as well as to use the technological resources of the military-industrial complex for the development of civilian industries.

Keywords: *sanctions restrictions, political goals, Russian sanctions, sectoral import substitution strategies, competitive advantages, implementation mechanisms.*

Introduction

The illegality of the sanctions restrictions imposed by the countries of the West against Russia today is extremely clear and understandable. Such measures cannot be attributed to the procedures of market regulation of the economy. On the contrary, the main thrust of the sanctions restrictions is all sorts of deterrence and strangulation of the development of the Russian economy, which in the era of globalization is clearly perceived as an expression of an undeclared but widespread war, in the areas of trade, finance, information communications and many others. And this is tantamount to the desire to solve political problems through sanctions restrictions for the economy of one country - Russia, whose actions on the international arena are increasingly and more convincingly going against the desires of world domination of the United States and its allies. At the same time, none of the developed countries feel free to support, essentially, the illegitimate introduction of all new sanctions restrictions implemented without the sanction of the UN Security Council regarding the country that is its permanent member, as well as one of the initiators of the UN.

It is clear that in such a situation, Russia could not but respond to the unfriendly actions of many Western countries. This response was the introduction of targeted sanctions against individual industries and specific enterprises. However, a more serious answer was the development and implementation of sectoral import substitution strategies and programs for the accelerated development of indus-

trial production in their composition. At the same time, their developers were well aware that imposing sanctions in response would not be the main stimulus for the development of the Russian economy, on the contrary, this would require replacing the existing mechanisms for the formation of macroeconomic policies with more effective tools for innovation development, which would allow to quickly change the structure of the entire economy countries [1, 2].

Purpose of the study

The main goal of this study is to identify competitive advantages that can be realized in practice as part of industry import substitution strategies. Its implementation will allow the Russian economy to quickly identify key imperatives of its development in the near future, as well as develop and implement a set of measures within the framework of industry import substitution strategies aimed at minimizing the negative impact of sanctions restrictions on its development.

Research methods

The continuation of the policy of sanctions restrictions substantially destabilizes the entire world economic system, since no one, including their initiators, is able to adequately assess the expected damage to the Russian economy. Even Barack Obama, being the president of the United States, in 2014 declared that, thanks to the imposition of sanctions restrictions, the Russian economy would be "torn to shreds". However, the president has changed, the US policy of sanctions restrictions continues to tighten, and the Russian economy has managed to withstand and, moreover, over the past two years has shown a slight growth rate. Only one conclusion can be drawn from this - the situation with the imposition of sanctions restrictions against the Russian economy has once again confirmed the historical experience, according to which sanctions have never contributed to the achievement of political goals. On the contrary, they are likely to become a catalyst for a new global economic crisis or a local military conflict with unpredictable consequences.

A characteristic feature of modern sanctions restrictions is the impossibility of a sufficiently accurate determination of costs, both for the country against which they are directed and for the countries that have acted as their initiators. Practice shows that, in any case, all the participants in the war of sanctions will be forced to incur losses, and quite substantial ones. However, the ability to extract certain benefits from the imposition of sanctions restrictions may be more valuable here. Western countries are not yet able to do this, but Russia has managed to respond quickly enough and, for a variety of components, to minimize the negative impact of sanctions restrictions. For example, the imposed sanctions restrictions actually contributed to the completion of the creation of the national payment system; in leading sectors of the economy, import substitution strategies have been developed and are being put into practice [3, p. 603]. In addition, at the government level,

measures were introduced in a timely manner to support domestic production, as well as retaliatory sanctions were taken against specific industries and enterprises of those countries that imposed sanctions restrictions against Russia.

As a result of these actions, a certain positive effect was obtained due to which the Russian economy achieved a slight increase in production. However, the expectations of its significant increase only due to sanctions restrictions do not withstand any criticism, since there are and there are a number of other restrictions on the growth of the Russian economy. First of all, this is a low level of technological effectiveness of industrial production at many enterprises of leading sectors of the economy, the lack of the necessary volumes of innovative production capacities, significant restrictions for attracting foreign investment and insufficient own investment resources [5, p. 95].

Practice has shown that defense industry enterprises continue to be potential drivers for the development of the Russian economy. It is in these sectors that import substitution strategies were developed, the implementation of which ensured the maintenance of our country's defense capability at the proper level. This direction was central because it created favorable conditions for the implementation of import substitution strategies in other sectors of the Russian economy [6, p. 21]. In conditions of a significant limitation and complete cessation of imports of relevant equipment and components, Russian enterprises were forced to reorient their production to produce their domestic counterparts that are not inferior in quality to foreign originals. The restriction by Western countries of the possibility of procurement by Russian enterprises of modern technologies has led to the fact that in most industries producing civil products, a stochastic character has become inherent in import substitution strategies. At the same time, the number of industries in which import substitution strategies need to be implemented first include space activities, nuclear energy, microelectronics, transport and power engineering [7, p. 51].

Enterprises of the engineering industry ensure the implementation of the innovation component of the development of the domestic economy and have a significant impact on the development of enterprises in other industries. The introduction of an innovative model for the development of the engineering industry in modern conditions is becoming one of the promising ways to increase the competitiveness of the Russian economy in the international arena.

When implementing import substitution strategies in these and other industries, enterprises with a fully closed production cycle will be primarily supported, because only they can ensure the production of domestic products, the quality of which will meet international standards. Only after that will it be possible to create an internal market for products of the engineering industry, based on detailed, substantive, functional and technological specialization. In the near term, it is nec-

essary to develop an explosive specialization, but the future of the engineering industry will most likely be based on the dominance of a combination of functional and technological specialization. At the same time, explosive and subject specialization will also be saved where it will be necessary.

To reduce dependence on foreign equipment, it is necessary to increase the localization of domestic production. This can be done in two ways. The first is the development of the so-called "screwdriver production", under which domestic enterprises produce certain components. The second way is based on the manufacture of its own products, for the production of which imported components are purchased. In the first case, the localization of production does not determine the development strategy of the industry. In the second case, on the contrary, it is the localization of production that determines the strategy of sectoral development and the corresponding option of import substitution [4, p. 621]. Russia should be guided by this path of development. In addition, the localization of production in defense industries, as well as in relation to dual-use products in space activities will give the necessary impetus to the development of civilian industries.

Results and discussion

As a result of the research, it was found that the strategies of import substitution in the Russian context have a number of features that determine the industry's competitive advantages in their implementation. The main ones are the following:

1. Enterprises of the engineering industry of the Russian economy, like most enterprises of other industries engaged in manufacturing, showed a short-term increase in exports of products only in the late 1990s after the devaluation of the national currency and in the second half of 2000 after the global financial and economic crisis. For the same periods of time, there was a significant decline in import opportunities, which resulted in the forced import substitution in individual manufacturing enterprises of the manufacturing industries. However, over the past 20 years, the coefficient of structural independence of the processing industries, in particular at the enterprises of the engineering industry, continued to decline. As a result of this process, there was an increase in the dependence of domestic production on the purchases of imported equipment and components, the "import infrastructure" of the engineering industry was formed and developed.

2. The growth of purchases of imported equipment and components leads to the displacement of domestic products from the Russian market. With a further increase in prices, the demand for imported products is reduced, but price increases inevitably affect the fall in demand for domestic products. In this case, two fundamentally different mechanisms are included in the work. The first of these is that, dependent on the supply of imported products and components, enterprises of the engineering industry are forced to raise prices for their own products with an increase in prices for imported components. The essence of the second mecha-

nism is that with a general increase in prices it is necessary to raise the level of wages, rents and profits, but the high dependence of total domestic consumption on imported goods will reduce the elasticity of demand for imported products and components at a price and increase it income. In addition, price increases can be significantly multiplied due to the length of the speculative supply chains and the maintenance of imported products and components in the domestic market.

3. If imported products and components dominate in the structure of national consumption, then even an increase in exports of domestic products of a low level of processing (value added) will not provide a wage increase for a long period. Thus, price increases worsen purchasing power parity, and price parity entails a decline in revenues even from commodity exports. Therefore, one of the main directions of development of the Russian economy should be the production of equipment and components for the primary industries, the agro-industrial complex, which should be able to provide the population of our country with quality food in the required volumes. This direction of development of the Russian economy will become the main competitive advantage of its industries for the long term.

Other competitive advantages of the development of branches of the real sector of the Russian economy in the context of the negative impact of sanctions restrictions and the implementation of import substitution strategies are seen as follows.

1. The development strategy of the sectors of the real sector of the Russian economy should be based on its structural adjustment. In the Russian economy there are industries (financial, banking, services, raw materials and other resources) with a high level of profitability and wages with low risks of core business. At the same time, the Russian economy has other industries (engineering, manufacturing, etc.) in which the level of profitability is not high, and the risks of operating the core business are quite high. To overcome this structural imbalance, it is necessary to direct structural restructuring at the sectoral level of the economy to reduce the difference in profitability levels and risks between all sectors of the Russian economy.

2. To stimulate investment in the real sector of the economy, it is advisable to attract banking resources while reducing and differentiating interest rates across sectors. Such an approach will allow varying the prices of attracted credit resources, taking into account the solution of tasks within the framework of industry-specific import substitution strategies in various sectors of the Russian economy.

3. It is possible to stimulate the production of high technology products by reinvesting profits by directing it to the development and expansion of capacities in the processing industries of the engineering industry. In addition, a regressive income tax may be introduced, if it is sent for investments in the renewal of fixed assets of domestic production.

4. When implementing import substitution strategies at the enterprises of the

military-industrial complex, it is necessary to achieve one hundred percent complete production of Russian armaments and military equipment, components and auxiliary units with the placement of the state defense order at domestic enterprises. It is necessary to use all available resources to develop technologies that are not produced in Russia, or to organize their replacement from countries that did not impose sanctions on our country, or from countries that are their only producers, using technical intelligence or industrial espionage through country.

5. To support the proper quality of commercially produced domestically produced products, it is necessary to develop a system of protectionist measures as part of the implementation of industry import substitution strategies. With further tightening of sanctions restrictions, which, strictly speaking, is currently taking place, Russian enterprises that fall under their negative influence may freeze or restructure their obligations to pay external debt, if any. The development of new financial institutions within inter-country alliances (SCO, BRICS, etc.) in order to redistribute foreign exchange reserves, as well as the creation of a full-fledged national payment system, can be an equally important factor in obtaining competitive advantages as a result of the implementation of sectoral import substitution strategies.

Conclusion

Thus, for the strategic development of the Russian economy, it is important to focus on stimulating its structural adjustment and solving production and technological problems of introducing innovations. Sanctions restrictions can only be considered a response, and not the main measure of strategic development. To ensure the development of the Russian economy, an effective innovation structure is needed in both manufacturing and extractive industries, as well as the use of technological resources of the defense industry for the development of civilian industries.

References

1. On the use of certain special economic measures in order to ensure the security of the Russian Federation: Decree of the President of the Russian Federation of August 6, 2014 No. 560 (as amended on June 24, 2015). URL: http://consultant. ru/ (appeal date: 03/09/2019).

2. On the Concept of the long-term socio-economic development of the Russian Federation for the period up to 2020 (and the Concept of the long-term socio-economic development of the Russian Federation for the period up to 2020): Government Decree of 17 November 2008 No. 1662-p. URL: http://consultant.ru/ (appeal date: 03/09/2019).

3. Larin S.N., Sokolov N.A. Development of import substitution strategies as a key factor in the development of enterprises in leading sectors of the Russian economy. International Journal of Economics and Entrepreneurship, 2017, No. 1 (78). P. 602-606.

4. Myshkina NP, Fedonina O.V. Prospects for the implementation of import substitution policies in the domestic economy in terms of innovative development // Basic Research. 2015. No. 12. P. 620-623.

5. Pavlov P.N., Kaukin A.S. Import substitution of investment goods in Russia // Questions of economy. 2017. No. 8. P. 92-103.

6. Pankova E.O., Andreev S.Yu. Tools and mechanisms for the regulation of import substitution // Young Scientist. 2016. No. 8. P. 21.

7. Tolkachev S., Teplyakov A. Import substitution in Russia: the need for a system-strategic approach // Economist. 2017. No. 8. P.47-66.

两用空间技术转让的现代决定因素和实践
MODERN DETERMINANTS AND PRACTICE OF THE TRANSFER OF DUAL-PURPOSE SPACE TECHNOLOGIES

Elizarova Marianna Ioanovna
Candidate of Economic Sciences, Leading Research Officer
Larin Sergey Nikolaevich
Candidate of Technical Sciences, Leading Research Officer
Sokolov Nikolai Aleksandrovich
Candidate of Physico-mathematical Sciences, Leading Research Officer
Central Economics and Mathematics Institute RAS,
Moscow, Russia

注解。本文确定了现代决定因素，并总结了两用空间技术转让的实践经验，这些技术被用于预测世界经济的地域和工业基础设施的发展。已经确定，两用空间技术转让机制主要涉及各工业部门技术进程的整合及其对东道工业发展的实际应用。两用空间技术的发展意味着它们用于解决外层空间复杂问题的效率显着提高，并有助于有效利用航天工业在俄罗斯经济其他部门的技术成就。此外，许多现代两用空间技术转让的决定因素得到了证实。所获得的结果是直接参与两用空间技术转让的专家感兴趣的。

关键词: 两用空间技术，转移实践，现代决定因素，生产基础设施，效率提高，经济部门基础设施，发展。

Annotation. The article identifies modern determinants and summarizes the practical experience of the transfer of dual-use space technologies, which are used in forecasting the development of the territorial and industrial infrastructure of the world economy. It has been established that the mechanisms for the transfer of dual-use space technologies are mainly related to the integration of technical processes in various industrial sectors and their practical use for the development of host industries. The development of dual-use space technologies implies a significant increase in the efficiency of their use to solve complex problems in outer space, and also contributes to the effective use of the technological achievements of the space industry in other sectors of the Russian economy. In addition, a number of modern determinants of the transfer of dual-use space technology have been substantiated. The results obtained are of interest to specialists directly involved in the transfer of dual-use space technologies.

Key words: dual-use space technologies, transfer practices, modern determinants, production infrastructure, efficiency increase, economy's sectoral infrastructure, development.

Introduction

The rapid increase in the cost of space activities over the past two - three decades and the loss of the ability of even large countries to bear these costs on their own led to the expansion of the use of dual-use space technologies. There was a reorientation of their use not only for solving complex problems in outer space, but also for practical application in solving many problems of individual industrial sectors of the Russian economy. Thereby, space technologies began to be used in several fields of application and were called dual-purpose space technologies. In most of the major industrialized countries (the USA, Japan, EU countries, etc.) space agencies are actively developing and using new approaches to the transfer of space technologies to the production infrastructure of a number of sectors of their economies [12, p. 51].

However, the practice of transferring space technologies revealed a number of rather complex problems caused by the following reasons:

1). for many years, space technology developers were focused only on their use for the needs of this sector of the economy and in fact excluded the possibility of using their scientific and technical functionality in other potential sectors of the economy;

2). during the years of the "cold war", the development of space technologies was of a "closed nature", since it was often associated with state secrets, which did not allow for any interaction between military organizations and industrial enterprises;

Even today, the concept of "dual use" technology (for the civil or military sphere) in some cases also limits the transfer of space technologies that were originally developed to perform specific tasks in a particular area.

3). technologies used in outer space are usually the most complex scientific and technological complexes that require a high level of knowledge from their operators to process the information received;

In other words, they were intended for specific use and, therefore, their transfer to other industries required significant work on their readjustment and / or adaptation.

4) in modern conditions, space agencies play an important role in the transfer of dual-use space technologies, which guide the development of space activities in their own countries and can apply new approaches to their transfer to other industries through numerous specialized agencies.

Some of the modern approaches that are quite successfully used by space agencies of developed countries for the transfer of dual-use space technologies in the industry, as well as the features of their practical implementation will be considered in this paper.

Main part

References review

Despite the undoubted advantages of the transfer of dual-use space technologies for use in the industrial infrastructure and the generation of useful services, products and technologies both in the industrial sphere and in the life of society as a whole, the technological features of this process are not well understood in the scientific literature. Some studies focus on "gaining effect" and other benefits to the country from the development of its space industry [1, p. 341; 6]. Other researchers give priority to the development of national policies regarding the transfer of dual-use space technologies for use in industrial infrastructure [11, p. 352]. A number of researchers consider the most important issues to develop strategies for transferring space technologies and direct participation in their implementation by space agencies [2, p. 327; 7, p. 53; 13, p. 346; 15, p. 209]. Despite the presence of research in certain areas, it should be noted that in this area there are still quite a lot of completely unexplored issues.

Determinants of dual-purpose space technology transfer

As a rule, the process of transfer of dual-use space technologies from the space sector is the possibility of its adaptation and subsequent use in the activities of one or a number of enterprises from other industrial sectors or services of the national economy. The key factors that generally determine the success of the transfer of dual-use space technologies include the following:

a) functional characteristics of the technology;

b) the presence of agents involved in the transfer process, the ability to adapt and organize the production process.

As for the functional characteristics, technologies that are considered to be simpler to transfer are:

- universal and have a wide range of possible applications in various industries [2, p. 329; 8, p. 378];

- have high quality of development and easily predictable behavior in relation to various industries [2, p. 331];

- have been successfully modernized in industries that are quite close to the space industry (aeronautics, telecommunications, some engineering fields and electronics) [1, p. 344].

The above factors can be identified as specific determinants of the transfer of dual-use space technology. In addition, a number of factors can be attributed to them, namely: limiting the mass of products and / or equipment; their high reliability and performance; the possibility of integration with other technologies for the formation of complex space systems [9].

Analyzing the behavior of agents involved in the transfer of dual-use space technologies, it is necessary to identify the following determinant factors:

- enterprises that receive dual-use space technologies for their use should have personnel with an appropriate level of technical knowledge [10, p. 49; 14], as well as sufficient amounts of technical and financial resources to ensure the adaptation of any technology to the organization of production processes;

- enterprises that receive dual-use space technologies for their use should adequately represent the purpose, functional features of products and / or services created as a result of using technology to achieve new goals, and also know the mechanisms for their launch into the market [4, p. 44];

- enterprises that receive dual-use space technologies for their use should be ready to cooperate both with the space agency and with the organizations that are their developers [5, p. 296; 15, p. 335].

An enterprise introducing dual-use space technology into production should also maintain the level of costs for the production of innovative products and / or services that was originally provided for by the developers of this technology. The main reason of failures in this area in many cases is the inability of an enterprise that receives dual-use space technologies to solve this problem [3].

The practice of transferring dual-use space technology

For ease of understanding, let us point out that the approach to technology transfer, which was originally used in various industries, will then be presented, and then through their deep modernization and increase in productivity, they were successfully used in the space industry, with subsequent transfer back to other industrial sectors (see figure). So, for technologies aimed at diversification and being created by organizations already operating in the space industry, research was carried out to identify a possible non-spatial technology transfer matrix, increase their productivity, the main determinants of technology transfer success, as well as the degree of "the Earth – Cosmos – the Earth" contributed to the development of these determinants.
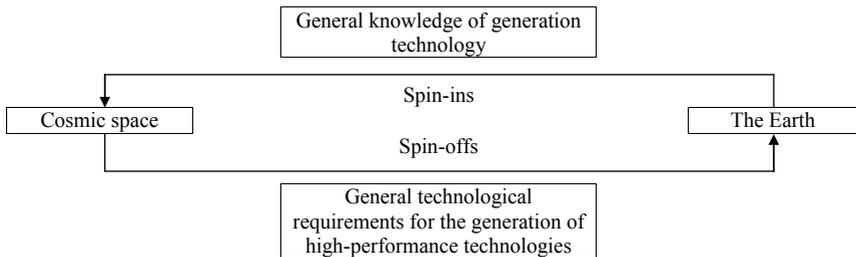
Fig. *Approach to the transfer of space technology "the Earth - Cosmos – the Earth" [2].*

To obtain the results, surveys of personnel from space technology development organizations were used. They mainly focused on innovative spin-in technologies that are known and available in various industries, but due to modernization they were also used in the conditions of open space. According to the survey results, space technology developers attached the greatest importance to such determinants as:

- the similarity of requirements and operational goals that exist between the space industry and other industries for the practical use of technology for production purposes;

- the cost-benefit ratio of the transfer of space technology to the industrial production infrastructure;

- the ability of the transmitted space technology to ensure high performance in industrial production;

- high reliability of space technology;

- the willingness of space technology developers to provide its recipients with services to support its use with appropriate software and applications.

In general, in the practice of the transfer of dual-use space technologies, the importance of organizational and managerial determinants is rated somewhat lower than the importance of well-defined technological determinants. However, it seems obvious that the relationship and mutual influence of the identified determinants should be considered in connection with the transfer of specific space technologies. For this reason, it is rather difficult to form an objective assessment of the market potential of a specific space technology, that is, to substantiate the real possibilities of its transfer to other industries. In turn, this situation creates additional difficulties for reliable and reliable design of investments and revenues associated with the transfer of specific space technologies.

Conclusion

Summing up and determining the results of the research, we can draw the following conclusions:

1) The practice of transferring space technologies revealed a number of rather complex problems caused by the presence of a set of specific causes, some of which were disclosed in this article;

2) it is found that the spin-in innovations, which are based on the use of existing technologies that have been improved for use in space, affect the transfer of space technologies of dual use to the greatest extent; as a result of the further improvement of this type of innovation, industrial enterprises can return to their use for their production purposes;

3) the successful implementation of the transfer process of dual-use space technologies is determined by the ability of the receiving enterprise to change and adapt this technology to the needs and requirements of production; in most cases,

this requires an increase in the level of staff knowledge, as well as significant efforts to incorporate technology into the actual process of producing an innovative product and / or service;

4) the main determinants and identified practical approaches to the transfer of dual-use space technologies used in the activities of space agencies of developed countries are identified.

5) the experience of the transfer of dual-use space technologies in developed countries should be adapted to the current realities of the Russian economy in order to use the existing developments in organizing the interaction of the Russian Space Agency with organizations of other sectors of the economy in order to increase the efficiency of using dual-use space technologies.

Thanks

References

1. Amesse F, Cohendet P, Poirier A, Chouinard J. Economic effects and spin-offs in a small space economy: the case of Canada. Journal of Technology Transfer, 2002. No. 27(4). Pp. 339-348.

2. Bach L., Cohendet P., Schenk E. Technological transfer from the European space programs: a dynamic view and comparison with other R&D projects. Journal of Technology Transfer, 2002. No. 27(4). Pp. 321-338.

3. Bach L., Cohendet P., Lambert G., Ledoux M.J. Measuring and managing spin-offs: case of the spin-offs generated by ESA programs. In: Hertzfeld H.R., Greenberg J., editors. Economics of space activities. Washington: AIAA, 1992.

4. Becerra-Fernandez I. Identifying potential markets for the intellectual property at Kennedy space center and initial results. International Journal of Technology Transfer and Commercialisation, 2002. No. 1(1/2). Pp. 40-55.

5. Gulati R. Alliances and network. Strategic Management Journal 1998, No. 19. Pp. 293-317.

6. Hertzfeld H.R. Measuring the economic returns from successful NASA life sciences technology transfer. Journal of Technology Transfer, 2002.

7. ISU e International Space University. Bridging space and society with technology transfer. Space Policy, 1997. No. 14. Pp. 49-60.

8. Maine E., Garnsey E. Commercializing generic technologies: the case of advanced materials ventures. Research Policy, 2006. No. 35(3). Pp. 375-393.

9. NASA. Spin-off (2008). Available at: http://www.sti.nasa.gov/tto/Spin-off2008/pdf.

10. NRC - National research council. Satellite observations of the Earth's environment: accelerating the transition of research to operations. Washington DC: National Academies Press, 2003. P. 49.

11. Pakova L. Transfer of space technologies past and present: the Russian case. Journal of Technology Transfer, 2002. No. 27(4). Pp. 349-360.

12. Petroni G, Venturini K, Cantarello S, Verbano C. Discovering the basic strategic orientation of big space agencies. Space Policy 2009. No. 25 (1). Pp. 45-62.

13. Petroni G., Verbano C. The development of a technology transfer strategy in the aerospace industry: the case of the Italian space agency. Technovation, 2000. No.20. Pp. 345-351.

14. Sung T.K., Gibson D.V. Knowledge and technology transfer: levels and key factors. In: Proceedings CURITIBA meeting. Available online: http://in3.dem.ist.utl.pt/downloads/ cur2000/papers/S04P04.PDF.2000.

15. Whitney P.L., Leshner R.B. The transition from research to operations in earth observation: the case of NASDA and NOAA in the US. Space Policy, 2004. No. 20. Pp. 207-215.

俄罗斯在全球航天器发射服务市场：现状和发展前景
RUSSIA IN THE GLOBAL MARKET FOR SPACECRAFT LAUNCH SERVICES: CURRENT SITUATION AND DEVELOPMENT PROSPECTS

Ermakova Yasmina Maratovna
Research Officer
Elizarova Marianna Ioanovna
Candidate of Economic Sciences, Leading Research Officer
Larin Sergey Nikolaevich
Candidate of Technical Sciences, Leading Research Officer
Central Economics and Mathematics Institute RAS,
Moscow, Russia

注解。在世界经济发展的现阶段，空间活动以相当快的速度发展，不仅成为国际合作和竞争的创新领域之一，而且也是一项非常有利可图的业务。本文简要分析了世界航天器（SC）进入轨道的现状，表明俄罗斯仍然是发射服务领域的领导者之一。然而，有许多因素，在我们国家正在逐渐失去其在这一领域的地位的影响下。为了保留它们，已经为Roscosmos国家公司的发展制定了一项战略，其中确定了具体措施，确定了财政资源，使我国不仅能够保留，而且能够再次在全球占据领先地位。航天器发射服务市场。

关键词：全球服务市场，发射服务，航天器，俄罗斯的份额，发展前景。

Annotation. *At the present stage of development of the world economy, space activity at a fairly fast pace is becoming not only one of the innovative areas of international cooperation and competition, but also a very profitable business. A brief analysis of the current state of the world market for launching spacecraft (SC) into orbit in the article indicates that Russia continues to be among the leaders in the launch services segment. However, there are a number of factors, under the influence of which our country is currently gradually losing its position in this field. To retain them, a strategy has been developed for the development of the Roscosmos State Corporation, in which specific measures are fixed and sources of financial resources are identified that enable our country not only to retain, but again to take a leading position in the global market for spacecraft launch services.*

Keywords: *global services market, launch services, spacecraft, Russia's share, development prospects.*

Introduction

Keeping a leading position in the global spacecraft launch services market allows Russia to be among a number of a small number of countries with innovative breakthrough technologies and developments in space activities, which are one of the drivers of the global economy as a whole. In addition, maintaining a leading position in the space services market makes it possible to more effectively counteract the negative impact of sanctions restrictions and contributes to the development of related sectors of the Russian economy.

Research materials

Dynamics of development of the spacecraft launch services market

According to the research report of the company ASD Reports, the volume of the space services market for launching spacecraft (SC) in 2017 amounted to $ 8.88 billion, and by 2025 it will reach $ 27.18 billion with a cumulative average annual rate of growth over the forecast period - 15.01% [2]. Increased demand for small satellites, increased activity in space exploration, and technological advances in the development of low-cost launch vehicles are key factors driving the growth of the space services market.

By type of service, it is expected that the segment on launching spacecraft in the very near future will take a leading position in the market. The increase in the share of this segment is associated with an increase in the number of launch service providers and a reduction in launch costs and related services, including hardware support and flight control. In addition, technological advances in space systems have led to the expansion of the capabilities of spacecraft payloads, thereby contributing to the growth of the share of this segment of the space services market.

The increase in the number of small satellites for commercial and military purposes and the increase in investment in the development of small launch vehicles (LV) are factors contributing to the growth of the small cargo launch vehicle segment on the launch services market. Accordingly, the size of launch vehicles leading from 2017 to 2025 will be low-load launch vehicles [1].

Russia in the global market for space launch services

Russia has quite competitive launch vehicles (LV) capable of solving the problems of the withdrawal of various classes of spacecraft into various orbits. Among Russian launchers, the most effective one can recognize the Soyuz family of rockets, which have the highest, among domestic rockets, reliability combined with the low cost of delivering spacecraft and cargo to orbit. To meet the challenges of delivering large and heavy loads, currently used Proton-M missiles have a more than triple advantage over foreign counterparts in the cost of services, although they lose in reliability to some American counterparts.

However, despite the advantages in the cost of launches, Russia is losing its position in the space services market in this segment, which is clearly reflected in

the diagram shown in Figure 1 [3]. It can be seen from the above diagram (see Fig. 1) that Russia (21%) lags far behind the United States (35%) and is slightly ahead of China (19%), which is now in third place for spacecraft launch services. In addition, Americans and Europeans have a much lower accident rate of launches, since all other participants in 2017 lost one rocket with a payload.
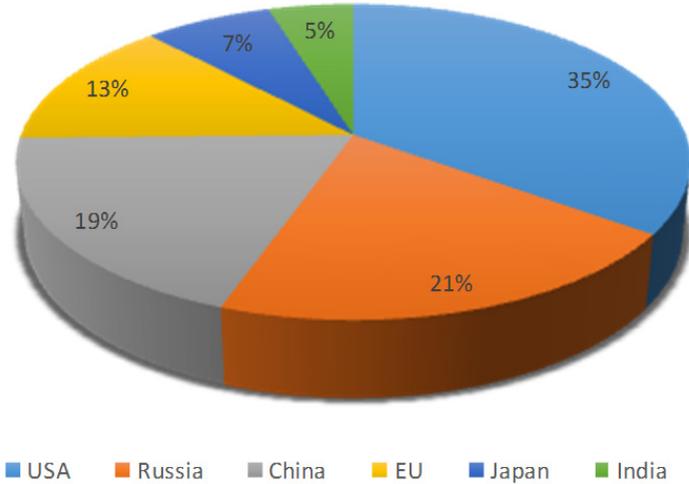
Fig. 1. *The global market for spacecraft launch services in 2017*

Russia began to lose its position in the launch services market in 2014. This is evidenced by the data given in table 1 [3]. If Russia does not succeed in changing negative trends, then by the beginning of the third decade of the 21st century, our country could be ousted by the main competitors from the world market of spacecraft launch services.

Table 1

The share of Russia and the United States in the space services market for spacecraft launch in 2009-2017.

Country	Years								
	2009	2010	2011	2012	2013	2014	2015	2016	2017
Russia	0,40	0,42	0,38	0,31	0,43	0,35	0,30	0,23	0,21
The USA	0,30	0,20	0,21	0,17	0,23	0,25	0,23	0,28	0,35

In Russia, almost all spacecraft are produced in the interests of military and state needs. The commercial component of the Russian space market is negligible compared to other countries. Practically all the technological, design and technical

solutions used for the manufacture of the spacecraft belong to the enterprises of Roscosmos GC and are not transferable to private companies. Unlike the United States, in Russia the state is the main customer, investor and consumer of spacecraft launch services. Due to this circumstance, the share of Russian commercial spacecraft manufactured and launched into orbit from 2000 to 2017 is only 5.6% [3].

In Russia, starting from 2015, the production and launch of commercial spacecraft has almost ceased. The latest commercial launches of the spacecraft were:

- launch of communications and broadcasting satellite at GSO Express AM7;

- launch of a communications and broadcasting satellite at the GSO Express-AMU1;

- launch of three Gonets-M communication satellites into a non-stationary near-earth orbit (LEO).

In April 2016, a satellite of MSU Lomonosov was launched from the civilian spacecraft, and in June of the same year, the experienced satellite Aist-2. The sharp drop in the release of the Russian spacecraft can be explained by restrictions from foreign partners.

The diagram in Figure 2 shows the share of Russia and other countries in the world market for the production of spacecraft [3]. The diagram in the figure clearly shows that most commercial satellites of various types are produced in the USA and in the European Union countries. Russia accounts for an insignificant part of the total number of spacecraft produced and put into orbit.
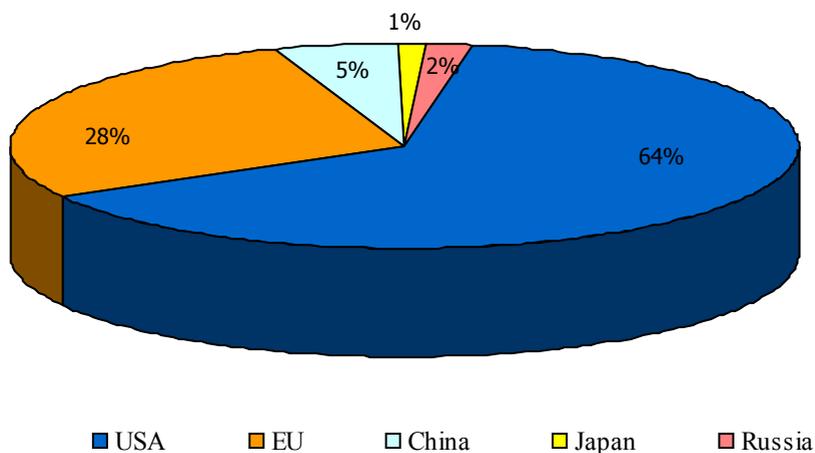
Fig. 2. *The share of Russia and other countries in the global market for the production and launch of spacecraft*

In order to eliminate the emerging backlog and maintain a leading position in the global market for launching spacecraft into orbit, Roskosmos GC's development strategy provides specific measures and costs for their implementation, which allow Russia to increase its share in the accessible global market for space services, including services. spacecraft launch into orbit [4]. The strategy is designed for the period up to 2030, and the funding of its main activities over the years will be: 2019 - $ 5.3 billion; 2020 - $ 5.5 billion; 2021-2025 - $ 8.3 billion; 2026-2030 - $ 9.5 billion. In total, US $ 28.6 billion will be allocated from the budget for the implementation of the Roskosmos GC Development Strategy from 2020 to 2030. Including in the context of the main areas: navigation services and equipment - $ 9.6 billion; spacecraft launch services - $ 2.8 billion; Earth remote sensing (RS) —1.9 billion dollars; new businesses based on remote sensing - $ 2.9 billion; automatic spacecraft - $ 2.2 billion; Cosmonauts delivery services to the ISS - $ 2.2 billion; satellite communications services - $ 1.8 billion.

Prospects for the development and increase of the share of Russia in the world market for launching spacecraft into orbit

In rocket production, there have been tendencies to use a modular layout of rockets, which makes it possible to form different types of LV from a different class - from light to heavy. An important trend in rocket production can be considered the use of engines designed for ecological fuel - methane and hydrogen. Such a solution allows not only reducing harm to the environment and risks to personnel, but also the load on the engine and other elements of the LV, which can later be reused. This is a new trend that will dominate the development of space activities [1].

Currently, intensive tests of the reusable American spacecraft Boeing X-37B, which is able to maneuver and quickly change orbits, are underway. The spacecraft can deliver small loads into orbit and return them to Earth. In other countries, research and experiments are also being conducted on the creation of reusable LV and spacecraft: IXV - the project of a European reusable spacecraft; SPACE-RIDER - European project reusable unmanned ship; RLV-TD - Indian project reusable ship; "Shenlong" - Chinese project reusable ship; Dream Chaser is an American project of a reusable manned / unmanned ship. Experiments with the first Falkone-9 rocket stage returned to Earth (Falkone-9) can be considered relatively successful, although a significant reduction in costs is not yet achieved [1].

Russia is also carrying out design work on the return of parts of the Angara missile, which must be completed with tests of the new system in 2019-2020.

In launching a spacecraft into orbit, the geographical coordinates of the cosmodrome play an important role. The closer the cosmodrome is located to the equator, the more opportunities the PH has to use the rotational speed of the Earth. This is reflected in the amount of fuel needed and the payload, and ultimately the cost of

launching the spacecraft. In Russia, cosmodromes are located far enough from the equator (Plesetsk - 63 ° N, Vostochny - 51 ° N), which reduces the competitiveness of Russia's provision of services for launching spacecraft into orbit compared to those countries with launch pad closer to the equator.

One of the options for increasing the efficiency of spacecraft launches can be a sea-based cosmodrome located at the equator in the Pacific Ocean at the point with coordinates 0 ° 00 ′ N. 154 ° 00 ′ W., near Christmas Island. In 2009, as a result of the bankruptcy of the Sea Launch consortium, which included the USA, Norway, Ukraine and Russia, our country began to play a major role in the project. The implementation of this project to launch the spacecraft involves the use of the new Soyuz-5, Angara LV [2].

The use of the offshore platform located at the equator will significantly improve the effectiveness of spacecraft launches, reduce environmental risks and increase Russia's competitiveness in this market.

The miniaturization and the introduction of new technologies in instrument engineering have led to the emergence of so-called nano- and micro-satellites, which can solve various tasks at the LEO. For the withdrawal of spacecraft of small weight and size, it was proposed to launch them from the aircraft at an altitude of 15000-20000 m. This solution allows launching spacecraft from different points on the earth's surface and in different directions, which solves the problem of their subsequent output to almost any orbit. Developments in this direction are already underway in the USA and other countries. Since 1990, the Boeing B-52 Balls 8 system was tested in the United States using the Pegas LV, in 2006 the Pegas LV with three Space Technology satellites was launched from an L-1011 aircraft. The aircraft in these systems performs the functions of the returnable first stage of the LV.

In Russia, there is a project to launch small spacecraft at Burlak, which consists of:

- liquid two-stage space rocket (ILV) "Burlak";
- aircraft carrier Tu-160SK;
- Il-76 planes equipped for command and measurement points;
- a complex of ground handling facilities.

The Burlak complex makes it possible to output to the LEO KA with a total weight of up to 1,100 kg, the flight range is more than five thousand kilometers. The prospects for development in the global market for launching small spacecraft show the promise given in Figure 3 [2].

Рис. 3. Динамика запусков малых спутников в мире и прогноз до 2020 года, единиц

Источники: данные компаний, SpaceWorks, прогноз Json & Partners Consulting

Fig.3 *Dynamics of launch services for small spacecraft in the world, pieces.*

The air launch complex, based on the AN-124-100 Ruslan aircraft, is being developed at the project stage. The special launch vehicle Polet has been developed. Problems of aerospace launches are still in their low efficiency associated with the aircraft carrying capacity, which is limited to 120 tons for the AN-124 and 220 tons for the An-225. For launching a payload of 2 tons into orbit, the required weight of the LV should be about 100 tons.

There are projects of orbital planes capable of going out into space from an atmospheric flight to launch a spacecraft into Earth's orbit.

As one of the prospects for the near future is considered the concept of reusable space rocket (RSR). RSR is an aircraft with a vertical start and a horizontal landing for launching payloads of light and medium classes. The appearance of hypersonic rockets using fundamentally new engines allows solving all the problems associated with spacecraft launches into orbit with the help of rocket planes and aerospace complexes. With the current level of technology development, aerospace systems can be an effective means of launching spacecraft into orbit, provided that their payload does not exceed five tons, and hypersonic rockets will be used as a LV.

Results and discussion

As a result of the study, the place of Russia in the world market of space services and the share of its services in launching the spacecraft into orbit were determined. At the moment, these figures tend to be slightly reduced. However, despite the loss of leading positions in a number of segments of the global space services market, our country has every opportunity to stay among the leaders and

re-occupy a dominant position in this market. Evidence of this can be considered the development and adoption of the Development Strategy of Roscosmos GC, calculated until 2030. This document contains a list of key events and sources of their financing, which will allow Russia to regain its positions in the global space services market.

Conclusion

Based on the results obtained in the course of the research, the following conclusions can be formulated:

1) the global market for spacecraft launch services is a fairly profitable innovative business, the development of which entails the development of the entire Russian economy;

2) despite the loss of individual positions in recent years, Russia continues to be one of the leaders in the launch services segment;

3) the Development Strategy of Roscosmos GC until 2025 and up to 2030 was developed for returning to leading roles, identifying the main activities and sources of their financing, the implementation of which will contribute to the development of space activities in our country.

Thanks

References

1. Launch services market: 2017 [Electronic resource]. The URL is http: // ecoruspace. me / report / launch_report_2017.pdf.

2. The market for spacecraft launch services will reach $ 27.18 billion by 2025 [Electronic resource]. URL - https://aboutspacejornal.net/2018/01/18 / market-for-launch-space-ap /.

3. Statistics. Russia's share in the global space launch services market is 2000-2017 [Electronic resource]. The URL is http://ecoruspace.me/report/ RL_2000_2016.png.

4. The development strategy of Roscosmos GC for the period until 2025 and for the future until 2030 [Electronic resource]. URL - https://www.roscosmos.ru/ media/files/docs/2017/doklad strategia.pdf.

NECESSITY OF MODERN MARKETING APPROACHES IN ORDER TO SUPPORT THE COMPETITIVENESS IN SERVICE SECTOR

Muradova Nargiza Uljaevna
Assistant in the Institute of Economy and Service

Annotation. The article reveals the need to improve competitiveness through marketing approaches, in particular, presents the basis for the use of marketing controlling.

Keywords: competitiveness of the service sector; controlling; marketing controlling functions; types of marketing controlling.

Nowadays service market is strategic aspect of economy by which all areas of economic have opportunity to improve the competitiveness. In other words, service sector can be identified as a connecting link between actors of the economy.

Uzbekistan has huge potentiality of developing and improving the competitiveness of areas of economy, and one of the priorities is service sector, particularly financial market distinguishes with active growth. By decree of the President of Uzbekistan "About additional measures to ensure further develop of the economy and efficiency of economical policy" issued on 8th January of 2019 for number UP-5614, which targets include further develop of financial sector taking into account next:

 - expansion of the inter-bank market and capital market, including stock and insurance markets, also leasing service market;

 - measures to improve business environment for electronic digital financial services;

 - the development of strategies to expand financial inclusion, consumer protection in financial sector and improvement of financial literacy.

We agree that in the design of road map of implementation above-mentioned conceptions should take into account the need of marketing approaches, because it has a great potential to solve the task. Also, marketing can help to determine specific sides of doing business in service sector.

One of the characteristic features of today's doing of business is set of tools used in the management and organization of competitiveness. This phenomenon is clearly expressed in the service sector. It should be noted that marketing has par-

ticular importance in the execution of this strategy, as it is reflected more clearly in the marketing strategy

The central place in the development and implementation of a marketing strategy belongs to controlling and its important component as a marketing audit. Because, controlling allows to identify and mobilize internal resources and reserves of the enterprise.

The controlling system is increasingly gaining the attention of researchers from all directions - financiers, accountants, managers who view this problem from their point of view - through the prism of management accounting, accounting, enterprise management and as an integral function forming the basis for the formation of the organizational and economic mechanism.

Controlling is very important for marketing, as it performs the functions of coordination and support. Marketing Controlling - the process of measuring and evaluating the results of marketing plans implementation, the implementation of corrective actions that ensure the achievement of advertising goals.

The functions of marketing controlling can be given in the following scheme (see figure 1):

In general terms, the purpose of marketing controlling is to track the implementation of plans, analyze the profitability and effectiveness of promotional activities, constant research of the market situation in order to quickly adapt the company to it.

Four types of control can be distinguished: control of annual plans; profitability control; performance monitoring; strategic control (see figure 2).

Marketing activity in the service sector is related to the development of personal customer service programs, because consumers are no longer satisfied with the sample offers. Developing a marketing strategy in the service sector, needs to take into account new business trends:

 - small growth in ordinary industries;
 - building a client base by abandoning "unprofitable" clients and recruiting promising clients, increasing the efficiency of services even by reducing market share;
 - increase the level of advertising campaign;
 - a thorough study of consumer behavior, the impact of services to increase customer efficiency.
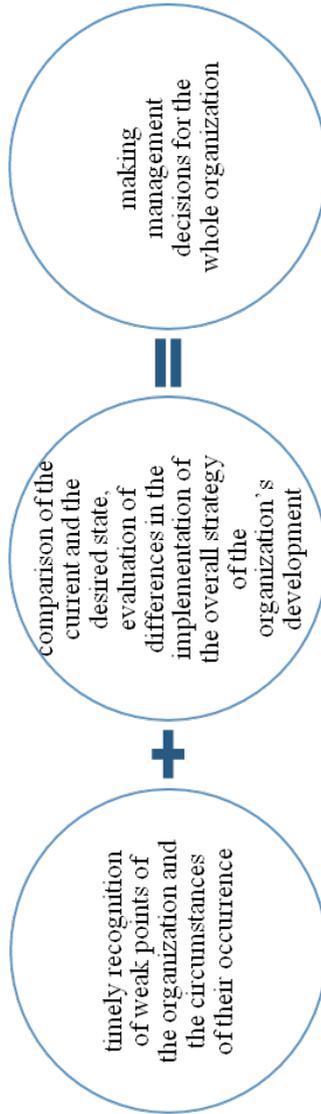
Figure 1. *Functions and purpose of controlling in marketing*
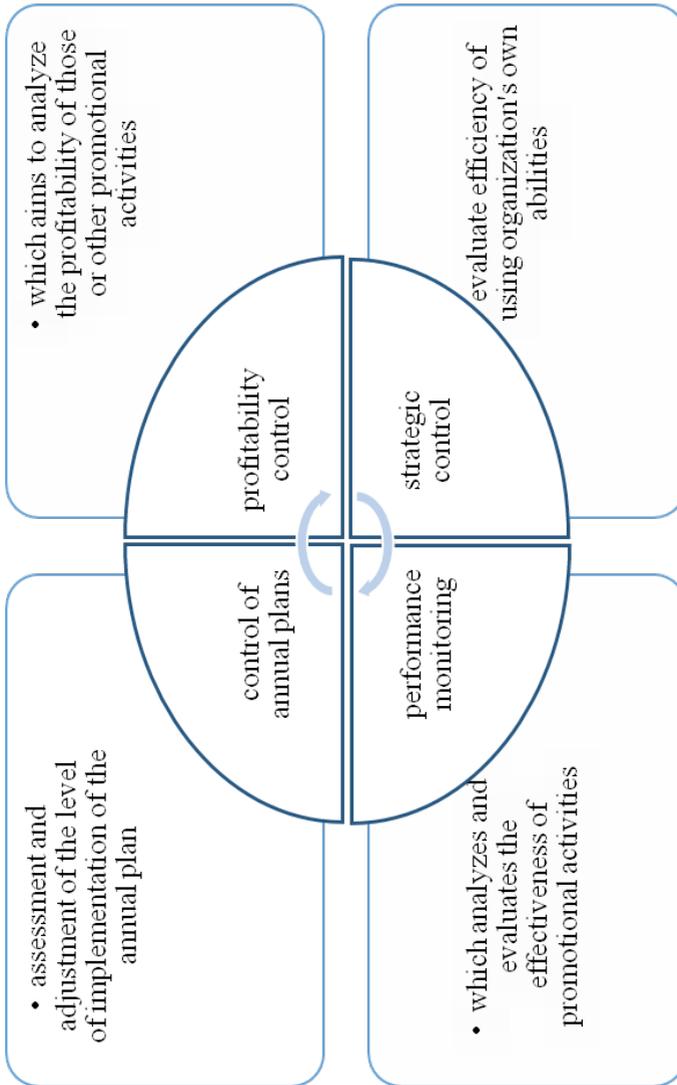
Figure 2. Types of marketing controlling

定量评估组织内部环境因素
QUANTITATIVE EVALUATION OF FACTORS
OF THE INTERNAL ENVIRONMENT OF THE ORGANIZATION

Krylov Vasily Evgenievich

Candidate of Physical and Mathematical Sciences, Lecture
Vladimir State University Alexander G. and Nicholas G. Stoletovs
Vladimir, Russia

注解。 本文讨论了建立社会经济系统主要指标模型的问题 – 其状态。 确定形成系统状态的因素。 确定了被认为是优势和劣势的其他因素，并指出了考虑优势和劣势的具体情况。 然后制定建立状态模型的问题。 提出了多因子状态模型 – 静态和动态。 考虑它们的优点和缺点。 调查他们的经济意义。 然后，读者将获得一对系统状态的模型，仅取决于时间。 我们研究模型的质量指标。

关键词：社会经济系统，内部环境，内部环境因素，系统状态。

Annotation. *The article deals with the problem of building a model of the main indicator of the socio - economic system - its state. The factors that form the state of the system are determined. Further factors that are considered to be strengths and weaknesses are identified, specifics of taking into account strengths and weaknesses are indicated. Then the problem of building a state model is formulated. Multifactor state models are proposed - static and dynamic. Their advantages and disadvantages are considered. Their economic meaning is investigated. Then, the reader is offered a pair of models of the state of the system, depending solely on time. We study the quality indicators of models.*

Key words*: social and economic system, internal environment, internal environment factors, system state.*

The initial stage of the development strategy of the organization is to determine its strengths and weaknesses.

Strengths of the organization determine, first of all, its competitive advantages, are the key to successful achievement of target indicators. The strengths of the organization include: a clearly formulated strategy for achieving the goal; Skillful and reliable organization management; availability of stable financial sources; high level of competence and qualification of personnel; ability to compete; suc-

cessful work with suppliers; access to unique resources; fame, "promoted" brand; effective advertising; best manufacturing capacity compared to competitors; use of modern advanced equipment; application in the production of advanced technologies; high quality of products. Accordingly, weaknesses have a negative impact on the development of the organization, on the possibility of achieving its goal. Here are some of them: the absence of a formulated strategy; poor management, loss of control over the development of the organization; the absence or outflow of competent personnel; poor motivation of staff; weak promotion policy; lack of information about the potential consumer of products; weak competition policy; low reputation of the organization in the market; narrow range of products; inefficient product distribution network; insufficient financing of the enterprise; high level of equipment wear; availability of obsolete and inefficient technologies.

Note that under certain circumstances, the strengths may become weak and vice versa. Moreover, these inversions in the process of strategy implementation can be observed more than once.

Also when analyzing the strengths and weaknesses, the synergistic effect should be taken into account. The really strong (weak) sides can reinforce each other's actions, while the weak sides compensate, level the effect of the presence of the strong. Note that compensating for each other is not necessarily the opposite characteristics (for example, the presence / absence of the organization's development strategy). For example, the existing outdated, inefficient technologies, negate the presence of qualified personnel.

An analysis of the sources (Etzkovitz, 2000; Freeman, 1995; Daskovskiy & Kiselev, 2013; Lucas, 1988; Podshivalova, 2014) shows that practically no quantitative assessment was given to either the individual parties of the organization or the total result.

The purpose of the article is to obtain numerical estimates for determining the state of the organization, as well as a description of approaches to the prediction of the state.

In the study of the organization, we adhere to a systematic approach. In accordance with it, it is a socio - economic system. She has all the system properties. In the future, the concepts of "organization" and "socio-economic system" will be synonymous for us.

A set of factors affecting the socio - economic system is called the environment (organizational environment). It is divided into internal and external. Internal is called part of the organizational environment, limited by the organization.

In control theory, there are five main factors of the internal environment: goals, objectives, structure, personnel, technology (Mescon, Albert & Khedouri, 2002).

The first factor of the internal environment is the goal $\left(f_1 \right)$. The goal is defined as the desired result, which the system seeks to achieve. We believe that the

factor should be considered local goals that are set for the structural units of the organization.

The formulated goal in many respects defines the tasks for its achievement (factor f_2). Tasks provide a set of activities that must be performed by the organization at a prescribed time interval. Tasks are put before the elements of the system (employees of the organization) or its subsystems (structural divisions of the organization). Task accomplishment depends a lot on available resources.

An important factor in the internal environment of the socio - economic system is the structure (factor f_3). The structure defines and characterizes the interrelations between the elements of the socio - economic system and its subsystems, as well as the level of these interrelations. From the choice of structure depends on the success of the tasks. The structure can both contribute to the achievement of the goal, and prevent it.

The implementation of the goal and the solution of tasks depends on the personnel (factor f_4). The correctness of personnel selection is the key to the success of the organization, the criterion of the effectiveness of achieving the target indicators.

Finally, an important factor in the internal environment is the factor f_5 - technology. In a broad sense, technology means a means of converting raw materials of any kind into products and / or services. The level of technology used at the enterprise is determined by the purpose, the structure and staff qualifications.

To each factor of the internal environment we assign the number - the value of the factors. It is determined by the degree to which the factors correspond to the numerical evaluation criteria. Values can be determined by one of the known heuristic methods (for example, using the method of expert estimates).

Let each factor f_i be ranged from 1 to 10,

$$1 \leq f_i \leq 10, i=1,2,3,4,5.$$

Если, $1 \leq f_i \leq 5$, то характеристики фактора f_i можно отнести к слабым сторонам организации. В этом случае необходимо ввести корректирующие действия по изменению ситуации. Если же оценка фактора находится в пределах от 5 до 10, $5 < f_i \leq 10$, то фактор можно считать сильной стороной.

We assume that any factor may change over time. Therefore, the factor f_i can be considered a function of time,

$$f_i = f_i(t_j).$$

For simplicity, we assume that time measurement occurs discretely at regular intervals t_j, j = 1,2, ..., n. The set of empirical estimates of environmental factors at the observed points in time form a matrix

$$F = \left(f_i(t_j) \right) = \begin{pmatrix} f_1(t_1) & f_1(t_2) & \ldots & f_1(t_n) \\ f_2(t_1) & f_2(t_2) & \ldots & f_2(t_n) \\ \vdots & \vdots & \ldots & \vdots \\ f_5(t_1) & f_5(t_1) & \ldots & f_5(t_n) \end{pmatrix}$$

dimensionality $\dim F = 5 \times n$.

Each factor plays a different role in the system of indicators of the internal environment. Therefore it is necessary to enter the value

$$p_i = p_i(t_j)$$

- factor weight f_i, i = 1,2,3,4,5. Weight is measured from 0 to 1, $0 \le p_i \le 1$.

The sum of the weights of all environments at a given time is 1, $\sum_{i=1}^{5} p_i(t_j) = 1$.

Weights can be determined by any known method. The weights form the matrix

$$P = \left(p_i(t_j) \right) = \begin{pmatrix} p_1(t_1) & p_1(t_2) & \ldots & p_1(t_n) \\ p_2(t_1) & p_2(t_2) & \ldots & p_2(t_n) \\ \vdots & \vdots & \ldots & \vdots \\ p_5(t_1) & p_5(t_1) & \ldots & p_5(t_n) \end{pmatrix}.$$

A variety of factors of the internal environment, their influence on each other, a synergistic effect of the influence of factors makes it necessary to introduce an indicator, which is an integral characteristic of the internal environment of the system. We call this indicator the state of the socio-economic system (the state of the organization). The state is a dynamic characteristic of the system, since it can obviously change with time.

So, the state of the system

$$s = s_j = s(t_j)$$

at the moment of time t_j is called a characteristic that combines the estimates of all factors of its internal environment. State s determines the internal potential of an organization, the ability to both adapt and resist changes in the external environment. The state determines the potential competitiveness of the organization. It is the value of the state that is the determining indicator of the possibility of

achieving the goal, the availability of internal resources for this. By calculating the state of the system, you can build management strategies and choose the optimal one from them.

We propose to determine the value of the state for a given point in time as the mathematical expectation of estimates of its internal environment factors:

$$s = s_j = s(t_j) = \sum_{i=1}^{5} f_i(t_j) \cdot p_i(t_j)$$

In this case, the state estimates will vary from 1 to 10, $1 \le s_j \le 10$. Based on the calculations made, we draw conclusions about the strengths and weaknesses of the organization. We have: if $1 \le s_j < 5$, then the weaknesses prevail over the strong, in the organization there are signs of crisis phenomena (the closer the status value to 1, the stronger the crisis); when $s_j = 5$, it can be argued that the state of the system at the moment of time t_j is neutral (strengths and weaknesses compensate each other); if $5 < s_j \le 10$, then the state of the organization can be assessed as crisis-free; the closer the score is to 10, the more prosperous the organization can be considered.

Imagine some dynamic models that allow for a long-term forecast of the state of the organization.

The most natural is the state modeling as a function of variables f_i,

$$s = s(f_1; f_2; ...; f_5).$$

The exogenous variables are the numerical estimates of the factors of the internal environment, and the endogenous variable is the state *s*. Model parameters can be found using the least squares method.

Another way to model dynamic processes is to include the time factor *t* as an exogenous variable,

$$s = s(f_1; f_2; ...; f_5; t).$$

Finally, the state of the socio-economic system can be represented as a two-factor dynamic model:

$$s = s(t).$$

References

1. Etzkovitz H. (2000) The Dynamics of innovation: from National Systems and «Mode 2'» to a Triple Helix of university–industry–government relations. Research Policy, no 29, p.p. 109–123.

2. Freeman C. (1995) The «National System of Innovation» in Historical Perspective. Cambridge Journal of Economics, no 1, p.p.. 5–24.

3. Daskovskiy V.B., Kiselev V. B. (2013) On the neo-industrial model and strategy of economic development. Ekonomist, no 6, p.p. 34 – 49.

4. Lucas R. E. (1988). On the Mechanics of Economic Development. Journal of Monetary Economics, no 22, p.p. 3–42.

5. Mescon M.H., Albert M., Khedouri F. (2002), Fundamentals of Management, Delo, Moscow.

6. Podshivalova, M. V. (2014). The quality of socio-economic institutions that form the environment for small business development. Voprosy ekonomiki, no 6, p.p. 97 – 111.

形成民族服装学士学位的艺术活动
FORMATION OF CREATIVE ACTIVITY OF STUDENTS-BACHELORS BY MEANS OF DESIGN OF NATIONAL COSTUME

Salahova Rada Insafovna
Candidate of Pedagogic Sciences, Associate Professor
Department of Design and National Arts
Kazan State Institute of Culture
Salyakhieva Guzaliya Rinatovna
2nd year undergraduate student
Federal Autonomous Educational Institution of Higher Education
«Kazan (Volga region) Federal University»

抽象。 在本文中，作者通过设计民族服装来探讨艺术活动的发展问题，旨在发出和描述艺术活动的组成部分。 本文论述了本科生在设计民族服装时艺术活动的形成，考虑了创作活动形成的阶段。
关键词：艺术活动，模特，服装设计，组件，民族服装。
Abstract. *In the current article, author examines the problem of development of the art activity by designing national costume, aims to emit and describe components of the art-activity. The paper discusses formation of the art-activity of bachelor students on designing the national costume, considers the stages of the formation of creative activity.*
Keywords: *Art-activity, model, costume design, components, national costume.*

Modern society needs active individuals who are able to quickly respond to changes and find creative, high-quality solutions to problem situations. There is also increased attention to the inner world and the unique capabilities of each individual.

The current structure of education should purposefully form and develop such properties and personality traits of students that would allow it to act effectively in any life circumstances, skillfully use not only the knowledge and skills obtained during the training, but also find a creative solution to the problems encountered.

By virtue of these needs, the goal of a student-oriented, creative development of bachelor students is set before higher education and solved with the help of two main activities: first, the student develops on the basis of the past experience

of humanity through familiarity with modern culture, secondly, in the process of development, the student realizes his / her possibilities autonomously, thanks to the development of creative activity in extracurricular activities.

The development of students' creative activity was studied by scientists from diverse fields of scientific knowledge - philosophy, psychology, pedagogy, and others. The authors (V.I. Andreev, G.S. Altshuller, M.I. Makhmutov, T.V. Kudryavtsev, A.M. Matushkin, A.I. Uma and others) of modern psychological-pedagogical literature pay attention to growth. efficiency of cognitive activity, organization and management of joint creative activities of students; many-sided issues of organizing students' creative activities using problem-solving situations, developing and improving creative activity of students' methodological culture in the process of performing various creative tasks.

One of the early psychological concepts of creative activity is the concept of S. Mednick. The creative process, according to S. Mednick, is the restructuring of associative elements into new combinations, as well as the overcoming of stereotypes [4]. J. Renzulli considers creative activity as personality traits expressed in the original means of product production, problem solving achievements, new approaches to the problem from different points of view [9], F. Barron [8] considers the creative activity of the person as the ability to bring something something new to experience; S. Taylor - as a set of different abilities, each of which can be represented to a certain extent; He singled out the criterion of giftedness [10]. Morozov, summarizing these studies, notes that all of them are combined by the assumption that each individual has some hypothetical properties relevant to creative abilities [5].

Thus, the **problem** of our research is the study of the conditions for the formation of creative activity among bachelor students by means of the design of a national costume.

The main goal of the research is the analysis of theoretical approaches to the problem of developing the creative activity of bachelor students, highlighting the conditions for creating creative activity of bachelor students by means of the design of a national costume and creating a theoretical model based on the selected conditions.

The generalization of the theoretical foundations of research on the phenomenon of creative activity of an individual allowed us to single out a broader definition of the concept of "creative activity" as an individual's ability to adaptively respond to the need for new approaches and new products / activities, which makes it possible to realize the variability of objective reality reflected in subjective images.

Accordingly, a creative person is considered today not as a passive organism reacting to external stimuli, but as a researcher seeking to understand, interpret and control systems of personal choices and experiences, with the goal of effective interaction with the environment, flexible adaptation to changing conditions of existence.

Thus, forming the creative activity of the student bachelor, we form personally significant qualities, because students, being realized in creativity, manifest themselves in various activities. Education of creative activity based on the study of national costume, is formed in stages.

The first level can be considered the presence of a multicultural educational environment that orients students towards immersing students in cultural diversity. In this environment, students gradually begin to understand the cultural heritage of each nation, an individual as a carrier of its various culture samples: historical facts, legal knowledge, traditions, national clothes, principles of a healthy lifestyle, etc.

At this stage, the emotional value and cognitive component of the creative activity of the individual is being formed.

A student subconsciously accepts an emotional choice in favor of one or another cultural aspect, experiences emotional experiences, shows openness, interest, communication, trust in another nation. In this situation, we can say, on the one hand, that a multicultural environment with a variety of nationalities forms a tolerant, interested attitude, on the other, a tolerant student himself forms an external and internal cultural environment.

At the second level, communion with other cultures is carried out through folk culture and craft - embroidery, costume. This is only possible through dialogue, the productivity of which depends on the identity of the individual with his own cultural affiliation and dialogue with other cultures. Being a complex system, culture includes different levels, subsystems. The most important place in its production belongs to the spiritual culture, which represents, "in a broad interpretation, the cumulative spiritual experience of humanity, spiritual activity and its results" [6].

At the initial stage, the formation of creative activity of students in the university involves familiarity with the multicultural educational environment, the presentation of values and traditions of different cultures. The result will be students' understanding of the essence of national creativity and, as a result, creative behavior. The means of acquaintance at this stage can be: presentations of different cultures, festivals, national dance classes, etc.

At the initial stage, the formation of creative activity of students in the university involves familiarity with the multicultural educational environment, the presentation of values and traditions of different cultures. The result will be students' understanding of the essence of national creativity and, as a result, creative behavior. The means of acquaintance at this stage can be: presentations of different cultures, festivals, national dance classes, etc.

For an intercultural dialogue, it is important to gain experience of creative activity in new conditions, which presupposes a reflection of the individual in re-

lation to the content of a foreign culture, rethinking their cultural experience. The results of this experience may be different:

- the assimilation of the values and norms of a foreign culture and the adoption of their personality;

- rejection of the values of the new culture and the preservation of their own cultural identity;

- the emergence of a crisis of identity, when a person does not perceive any of the cultures as native;

- a balance between identifying individuals with a new culture and preserving their own.

The last named result is the most preferable because it provides a smooth entry of the personality into a new socio-cultural environment, which contributes to the formation of tolerant thinking and creative activity of students.

In this regard, we have identified three levels of creative activity of students of the university:

- motivational and value level - the desire for creativity;

- cognitive level - knowledge of how to create;

- activity level - the creation of a product of creativity.

Thus, the formation of creative activity of students occurs under the influence of various external and internal factors, such as:

a) an education system that creates the conditions for the formation of creative consciousness, thinking and behavior;

b) the educational activities of the student himself, ensuring the formation of a system of his personal qualities;

c) training and education as a factor in the integration of the student into the multicultural environment and the source of knowledge about the cultural values of other nationalities based on the study of national costume [7].

For example, undergraduate bachelor students in the course of educational detail on special disciplines: "Costume Design" and "Volga Costume History" study and become familiar with the costumes of various nations, accessories and their stylistic décor features. Since 2010, at the Department of Design and National Arts of the Institute of Philology and Intercultural Communication of the Kazan Federal University, the costume studio "Tatarstyle" has been working in extracurricular activities. In its archive copyright, stylized collections of students in the ethnic style of various peoples of the Volga region are kept. The main activities of the studio costume:

-development of creative and practical skills of students in the field of modeling, designing and designing a suit;

- promotion of new fashion trends, avant-garde ideas and national trends in costume design.

Also, the creative team participates at various levels of contests and festivals, travels and exchanges experience in foreign countries, such as Germany, Stockholm, Finland, France, Sweden and neighboring countries Kyrgyzstan, Kazakhstan.

Since 2011, the annual Volga student festival of folk art "National Treasure" has been organized and held at the IPIC KFU. The festival aims to foster a culture of tolerance among young people of different nationalities and religions and is designed to instill in the younger generation a love for their homeland, a distinctive and unique culture of peoples, and their traditions. Students of all nationalities can present their individual and collective creativity in all directions: dance, artistic expression, vocal and costume design.

It should be noted that the educational process at the university assumes the existence of different levels of the formation of creative activity, which are facilitated by filling the content with ideas of creativity.

Involvement of the future student-designer in such a dialogue with the aim of shaping creative activity is possible when creating the corresponding multicultural educational environment of a higher educational institution.

Culture in modern society, on the one hand, is the custodian of the spiritual and moral values of the nation, on the other - the condition for the realization of the creative and spiritual potential of the individual and society, a form of affirming the identity of the people.

Knowledge of specific historical experience, its positive results and the formation on its basis of a new professional thinking can provide substantial assistance in the preparation of modern high-level specialists [1].

Based on the analysis, we have proposed a theoretical model for the development of the creative activity of bachelor students at the IPIC KFU based on the design of the national costume (see Figure 1).

Figure 1. Theoretical model of creating conditions for the formation of creative activity of bachelor students by means of the design of national costume

The proposed model of the formation of creative activity of bachelor students by means of the design of a national costume has a systematic nature, it sequentially, in blocks, reflects the sequence of the teacher's activities, indicates the didactic mechanism of the formation of creative activity. The stages of the formation of creative activity are highlighted and the form of activity that contributes to the formation of creative activity at each stage is indicated. The pedagogical conditions for the formation of creative activity of bachelor students are determined.

We have identified components of the creative activity of students:

- emotional - development of an emotional response to a socially-creative product, motivation for creativity - development of the desire to do it yourself.

- cognitive - understanding the ways and means of creation (learning the technology of creating a creative product).

- activity - active participation in the project, on the basis of interaction with the teacher and (or) a group of like-minded people, and the presentation of the product of the creative project at the department or creative and research student competitions.

The pedagogical conditions for the formation of creative activity of bachelor students on the basis of studying the national costume design are highlighted by us and included in the program-informative unit of the model.

The model provides for the principles of training and technology activities of the teacher, in the process of interaction with students and the implementation of project activities, based on a system-activity and student-centered approach.

The expected result of the developed model is the formation of the necessary competencies of bachelor students (design and research, communication, motivational, organizational, creative, reflective) and teachers of educational organizations: (innovative, design, technological, creative) in the process of implementing the content of research work on the introduction of a theoretical model.

Thus, in the proposed model, directions are clearly defined, it has a systematic, logical substantiation, theoretical and methodological substantiation and content of the activities of a teacher of an educational organization, has practical-oriented significance for the formation of professional competencies in bachelor students.

References

1. Andreeva, E.V. Historical - theoretical aspects in the study of the place and role of extracurricular activities in the system of secondary vocational - pedagogical education [Text] / E. V. Andreeva. // Proceedings of the Russian State Pedagogical University. A.I. Herzen. - 2009. - № 112. 79 p.

2. Gurov, V. N. Forming a Tolerant Personality in a Multi-Ethnic Educational Environment [Text]: Proc. allowance / V.N. Gurov, B.Z. Vulfov, V.N. Galyapina, etc. - M., 2004. 841p.

3. Lector, V.A. Scientific and extra-scientific thinking: a sliding border / Lektorsky, V.A. [Text]. M., 1996. 92 p.

4. Mednik S.A. Formation of creative abilities [Text] / S.A. Tinker // Psychology of creativity. - M .: MGSU, 1982. - P. 55–61.

5. Morozov A.V. The creativity of a higher education teacher [Text]: monograph / A.V. Morozov. - M .: MGSU, 2002.

6. Orlova I. B. Culture is spiritual. M. [Text]: monograph, M. Thought, 2003. - 426 p.

7. Plaksina, E. B. The history of the suit [Text]: styles and trends / E. B. Plaksina, L. A. Mikhailovskaya, V. P. Popov; by ed. E. B. Plaksinoy. - 3rd ed., Sr. - M .: Academy, 2008. 224 p.

8. Barron F. The disposition toward originality / F. Barron // [P.E. Vernon (ed.)] // Creativity. L. - 1972. - P. 273–288

9. Renzulli J.S.The three-ring conception of giftedness: A developmental model for creative productivity // SternbergR.J. , DavidsonJ.E. (Eds.). Conceptions of Giftedness. New York: Cambridge University Press. 1986. P.53–92.

10. Taylor C.W. Scientiific creativity. Recognition and development / C.W. Taylor. - N. Y., 1963.

可视化作为在外国学生教授医科大学专业语言时激活主要感官方式的一种方式
VISUALIZATION AS A WAY OF ACTIVATING THE LEADING SENSORY MODALITIES WHEN TEACHING FOREIGN STUDENTS THE SPECIALTY LANGUAGE AT A MEDICAL UNIVERSITY

Kim Zinaida Mikhailovna
Candidate of Pedagogic Sciences, Associate Professor
Korneva Galina Victorovna
Candidate of Pedagogic Sciences, Associate Professor
Ryazan Medical State University named after academician I.P.Pavlov

注解。 在本文中，作者正在研究一种可视化技术，该技术旨在通过考虑这些特征的培训材料的可用性，更加完整和主动地披露学生的个体特征。 视觉图像，文本，教师的口头解释的组合，允许学生最广泛地实现他们在学习过程中的能力，同时最佳地感知被学习的材料。 在教育过程中使用可视化需要在向外国学生介绍之前对教育材料进行必要的特殊准备。
关键词：可视化，外国学生，领导感官形态，记忆类型，练习类型。

Annotation. In this article authors are examining one of visualisation technique, that is destined to more complete and active disclosure of individual characteristics of the students due to the availability of training materials that take into account these characteristics. The combination of a visual image, text, an verbal explanation of the teacher, allows students to most widely realize their abilities in the learning process and at the same time optimally perceive the material being studied. The use of visualization in the educational process requires the necessary special preparation of educational material before its presentation to foreign students.

Keywords: visualization, foreign students, leading sensory modalities, types of memory, types of exercises.

In today's rapidly changing information world, the prevalence of visual information over verbal information is noted. Both in education and in professional activity, the "visual" component is becoming more and more widespread and important. This requires the availability of specially prepared teaching materials before presenting it to foreign students. By visualization in the educational process, we understand the visual transformation of educational material in order to visualize

it [2]. Visualization can be represented by the widest range: tables, charts, pictures, videos, movie clips, matrixes, etc.

As noted by M. Kholodnaya, such a form of organization of the educational process is necessary, which allows for the individualization of the intellectual development of all students within the framework of a common educational space for all - varied and diverse in terms of its content and types of educational activities (including using modern pedagogical and information technologies).

Individual methods of learning activity are developed under the influence of the cognitive styles inherent in the student (styles of coding and processing information, posing and solving problems, cognitive attitude to the world) [3, p. 261].

This means that the teacher needs to come up with such activities in the classroom using visualization, which would suit all students, to find the necessary means for this.

The process of studying a new material is presented as the perception and processing of new information by relating it to the previous experience of learning a student. According to psychologists, new information is assimilated and remembered better when knowledge and skills are "impressed" in the system of visual-spatial memory. In our opinion, the presentation of educational material with the use of visualization allows you to more quickly and efficiently assimilate the material proposed by the students, new systems of concepts, methods of action.

In the psychological and pedagogical literature, researchers have allocated a different number of sensory preferences (types of memory) when retaining and reproducing information.

Researchers distinguish between 3 main types of memory and, accordingly, student types: auditory (best perceive hearing information), visual (better perceive information visually), kinesthetic (this type requires movement, touch, sensation).

Lynn O. Brian in his study informs that 40% of students adhere to visual ways of studying, 15% perceive information by ear and 45% are tactile.

According to the studies of Swassing and Bart, only 22% of students prefer to receive information on the auditory sensory channel. In the world of adults - a minority audial people.

According to other psychological and pedagogical studies, 82% of students learn the information visually, 11% have auditory preferences and only 2% are tactile.

It should be noted that many students have mixed types of memory.

Working in a group of 15 people, we found that 10 students turned out to have visual memory (visuals), 3 - from visual-auditory (visuals-audials), 1 - from visual-somatosensory (visual-kinestet), 1 - from auditory - somatosensory (audial-kinestet).

Any information going through the nervous system must be previously translated into the leading single modality of memory, understanding. When the information coincides with the leading modality of students, they do a good job with the task and memorize this part of the lesson. When the teacher switches from the leading modality of the "translator" to another, the student is forced to transmit information back to his modality. Such a broadcast requires a temporary disconnection from reality (the student at this time may not hear the teacher). As a result, the student has a series of gaps in the information, which is revealed most often during repetition and in tests.

Task types for students with different types of memory

Sensory preferences	Types of tasks
Student - visual	Work with a visual row: pictures, unfinished drawings or diagrams; detection of inaccuracies and missing details in the presented material; written assignments; work with the board.
Student - audial	Work with phonetic material: recording words, texts, stories. Watch educational videos; reading, repeating aloud; choral pronouncing.
Student - kinesthetic	Work with cards; role playing, playing scenes, competitions. The maximum entry in the notebooks that the teacher writes on the blackboard.

The table gives the preferred types of exercises for students with different types of memory, but the teacher must remember that when teaching, a multi-sensory presentation of information is necessary. Such an approach will affect the majority of students and allow them to receive information by selecting their "input" channel. In addition, multi-sensory learning reinforces memorization, since the more information channels are involved, the more effective memorization. Naturally, multi-sensory learning enhances students' additional sensory channels, which has a positive effect on the assimilation of the presented information [1].

We offer the following types of exercises using visualization (drawings, charts) on the topic: "The human digestive system."

1. Read the names of the organs that make up the digestive system, and find them in the figure.
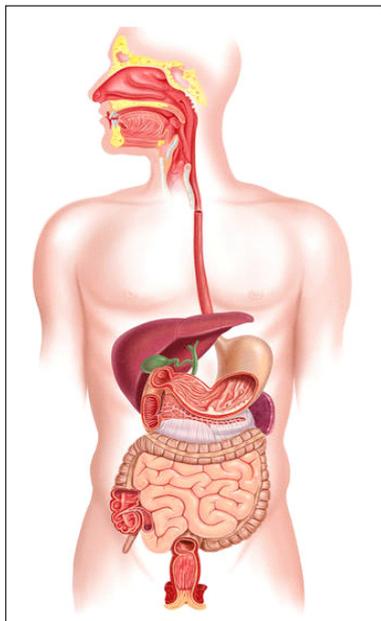
Organs:
1. Tongue,
2. Oral cavity,
3. Pharynx,
4. Esophagus,
5. Stomach,
6. Liver,
7. Bile ducts,
8. Gallbladder,
9. Duodenum,
10. Duodenal papilla,
11. Pancreas,
12. Small intestine,
13. large intestine,
14. Vermiform appendix

Figure 1. *The structure of the digestive system*

2. Number your drawing according to the list of organs. (Students receive a drawing with an image of the abdominal cavity and a list of names of organs. They need to correlate numbers and names).

Figure 2.
The digestive system of the body

3. Assemble the puzzle drawing. (Students are invited to cut into pieces the picture "The structure of the digestive system", they need to collect it)

4. Consider the "Structure of the Digestive System" picture. Show the bodies in the picture. (One student is invited to the board and shows randomly named organs by the other students of the group)

5. Consider the drawing "Scheme of the human stomach in the abdominal cavity." Prepare a story about the location of the stomach, using the design: *is for what? above what? under what? between what? ahead / behind of what?*
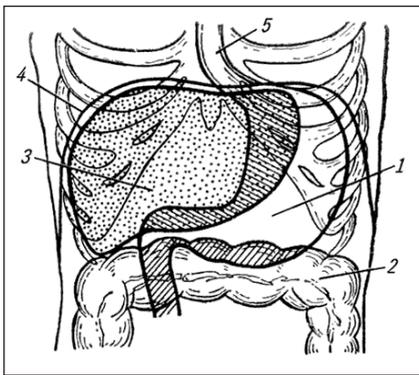
1. stomach
2. transverse colon
3. liver
4. aperture
5. esophagus.

Figure 3. *Layout of the human stomach in the abdominal cavity*

6. Consider the "Structure of the small and large intestine". Tell: a) of which departments the small intestine consists; b) of what departments is the large intestine. Show these sections in the picture.
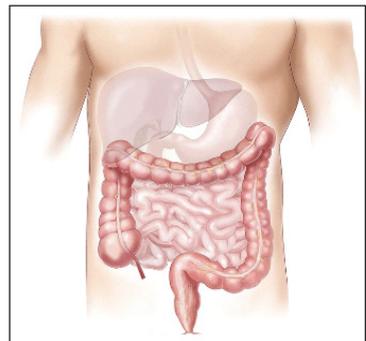
Figure 4.
Structure of the small and large intestine

7. Looking at the scheme, tell us about the structure and functions of the oral cavity.

Oral cavity

Bottom   teeth   gums   solid sky   soft sky   uvula   tongue   glands

8. Consider the picture "The structure of the liver." Tell us about the structure and function of the liver.
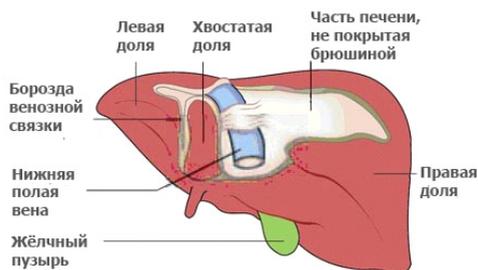
Figure 5. The structure of the liver

9. Consider the pyramid of healthy eating. Write a report about the prevention of diseases of the gastrointestinal tract.

Homework. *To perform an assignment, students are arbitrarily divided into subgroups.*

The task. Choose one of the topics:
1. Stomach
2. Liver
3. Pancreas
4. Appendix.

Write a report on the chosen topic, which you will present to your groupmates. When preparing, use additional advanced material, visibility (pictures, reference schemes, video), vocabulary.

So, the visualization technology (drawings, diagrams), in our opinion, is aimed at a more complete and active disclosure of individual characteristics of students due to the availability of training materials that take into account these characteristics. The combination of a visual image, text, an oral explanation of the teacher, allows students to most widely realize their abilities in the learning process and at the same time optimally perceive the material being studied.

1 СЛАДОСТИ И ЖИРЫ
При умеренном потреблении могут стать частью здоровой, сбалансированной диеты.

2.1 МОЛОЧНЫЕ ПРОДУКТЫ
содержат кальций, необходимый для зубов и костей, а также белки и витамины.

2.2 МЯСО, ПТИЦА, РЫБА
Богаты железом, цинком и витаминами группы В.

3 ХЛЕБ, КРУПЫ И КАРТОФЕЛЬ
Богаты железом, цинком и витаминами группы В.

4.1 ОВОЩИ
Они очень полезны. Их необходимо съедать как минимум 5 порций в день.

4.2 ФРУКТЫ
Они богаты витаминами, минеральными и биологически активными веществами.

5 НАПИТКИ
Взрослому человеку требуется не меньше 1,5 л жидкости в день.

References

1. Akishina A.A., Kagan O.E. Learning to teach: for the teacher of Russian as a foreign language. - Moscow: Russian language. Courses, 2004. 256 p.

2. Ryabtseva N.K. The trend towards visualization in the modern information space, the problem of education and innovative technologies in the teaching of foreign languages [Electronic resource] // Linguistics and methods of teaching foreign languages: a periodic collection of scientific article. Electronic scientific publication. -Moscow: FL RAN, 2015. Release 7. URL: http://www.iling-ran.ru/ library/sborniki/for_lang/2015_07/13.pdf (date of the application: 25.11.2018).

3. Kholodnaya M.A. Cognitive styles: the nature of the individual mind. - Moscow: PERSE, 2002.

家庭民族教育学与教育学的互动是现代条件下个体精神和道德教育的必要条件
INTERACTION OF ETHNIC PEDAGOGY OF THE FAMILY AND PEDAGOGY AS A NECESSARY CONDITION IN THE SPIRITUAL AND MORAL EDUCATION OF THE INDIVIDUAL IN MODERN CONDITIONS

Alikhanova Rovzat Arbievna
Candidate of Pedagogical Sciences, Associate Professor,
Chechen State Pedagogical University
Grozny, Russia

注解。 本文通过民间教育学的方式论述了家庭和学校教育民族化的问题，这是教育过程与年轻一代教育相互作用的主要因素。 它涉及将传统（民族，国家，民族）文化与现代教育系统，思想和技术相结合的过程，创造一种特殊的教育环境（ethnopedagogic空间）。
关键词。 空间民族主义，家庭民族教育学，年轻一代，民族文化，家庭价值观

Annotation. The article deals with the problem of ethnopedagogization of education in the family and school as the main factor of interaction of the process of education and upbringing of the younger generation by means of folk pedagogy. It involves the process of integration of traditional (national, national, ethnic) cultures with modern educational systems, ideas, technologies that create a special educational environment (ethnopedagogic space).

Keyword. Space ethnopedagogical, ethno pedagogy of the family, the younger generation, ethnic culture, family values

In any life situation, a person measures his actions and actions with those life attitudes and values that are formed in him, starting with the family. In the current situation, being in a state of constant change, acquired a General civilizational status, people should focus on their awareness, education, social and professional competence. The situation has become somewhat unusual: a number of traditional values have become perceived as irrelevant, secondary, pushed, respectively, to the second or even third plan of life priorities. Among them were spiritual and moral values. Thus, describing the peculiarities of the Russian mentality, M. I. Volovikova notes that the issues of morality are the most important in the life of society and in the life of each individual. Only one or the other degree of preserva-

tion of the moral foundations in the ability to save the country, a family, to give education to the younger generation. (1, p. 1). From the standpoint of Russian philosophy, the rejection of traditional moral positions is tantamount to the refusal of man from his essential nature, because spirituality is the deepest essence of man as a generic being.

Taking into account the evidence of the positive impact of the national experience of spiritual and moral education on the younger generation, this experience is again being updated today, although for a long time it has been pushed into the background, as something that does not enjoy the attention and necessity. Today, the situation is slowly changing in a positive direction, rethinking the understanding of spirituality and morality since the Ancient world

The contents of family education was investigated by Y. A. Komensky, I. G. Pestalozzi, W-J. Rousseau, L. N. Fat, N.And.Pirogov, A. S. Makarenko, N. To. Krupskaya, V. A. Suhomlinskiy etc. they All agree that family education is the base for the formation of the personality of the growing child. In the research of philosophers, sociologists , demographers, psychologists I. V. Bestuzhev-Lada, I. S. Kon, V. I. Perevedentsev, V. J. Reasonable, NL. Solovyov, V. A. Sysenko, A. G. Kharcheva and others.education of the future family man is interpreted as one of the most important aspects of social formation of the person. Methodological basis of the problems of family education is based on the scientific work of V. G. Afanasyev, V. A. Borisova, A. G. Vishnevsky, Yu. V. Vasilyeva, V. B. Golofast, P. A. Gurko, S. V. Damagehide, G. A. Kharcheva, M. S. Matskovskogo, V. A. Ryasentseva, Y. I. Semenov.

Problems of interaction of various institutions of education with the family and family members among themselves investigated Yul. Azarov, T. V. Volikova, P. P. Pivnenko, L. S. Salnikova, E. N. Sorochinskaya, O. N. Urban and others. Ethnocultural problems of upbringing of the younger generation has successfully solved I. A. Arabs, GN Volkov, A. M. Magomedov, sh. Mirzayev, O. D. mukaeva, T. G. Saidov, S. B. Uzdenova, Z. B. Tsallagova, V. N. Tsaturov, Z. Y. Yakubov, etc. Ethnopedagogical aspects of family education was developed in researches .M.-H. Arsaliev., R. A. Alikhanov.A.,Aselderov M. A., S. B. Aliyeva, G. O. Babaeva, Z. I. Khasbulatov, R. I. Yusupova R. Yai. Today, when society is in search of the ideal of education, new means and forms of influence on the younger generation, ethnopedagogics of the family of any nation and can play a positive role in the process of preparing young people for life. It is necessary to form the personality focused on preservation and reproduction of values of national culture in creative activity capable to cultural self-development, cultural and moral regulation of behavior.

At the new stage of development of problems of ethnopedagogics, researcher Sokolnikova E. I. put forward the task of promoting the spiritual rise of the native people through consistent, scientifically based ethnopedagogization of all aspects of life.

Of course, ethnopedagogical alone can not develop the problems of traditional family education requires close collaboration with its school in rural and urban settings, in mono – and multicultural teams.

For the development of the problems of ethno-pedagogy-need pilot schools, widely uses in the Commonwealth with family ideas of ethnopedagogics, validating and enriching them.

In order to strengthen the ethnopedagogization of education in the family and school, it is necessary to prepare teachers for this complex process. This should be facilitated by the creation of ethnopedagogics laboratories in the pedagogical University with the involvement of the Institute for the improvement of teachers of the Republic to disseminate the ethnopedagogic potential of the Chechen family in the practice of schools. This is the beginning of the work.

In the future, it will be possible to coordinate in a single research and teaching center all the issues and problems of ethnopedagogization of education. The centre should probably be responsible for coordinating the training required for such work. It is too early to talk about this now, of course, but it should be in the future.

Ethnopedagogization is considered by us as the main factor of interaction of process of training and education of young generation by means of national pedagogics, it assumes process of integration of traditional (national, ethnic) cultures with modern educational systems, ideas, the technologies creating the special educational environment (ethnopedagogical space). Undoubtedly, this is not a panacea, not a universal condition for the radical improvement of the educational process, but it provides ample opportunities for parents and teachers in the transformation of ethnopedagogic potential in the modern practice of education of the younger generation.

Emphasizing the weight and importance of folk pedagogy, we state that it alone is not able to solve the problems of education of the younger generation. Ethnic pedagogy, according to many researchers, is designed to reflect an important, but not the only facet of pedagogical reality, it is multifaceted, has a common essential characteristic: the General structure, the General laws of its functioning.

No science, including pedagogical science, will develop successfully without the development of its branches. Ethnic pedagogy is one of the most important branches of pedagogy. Its importance and influence increases in modern conditions, when there is the formation of equal interethnic relations. In turn, ethnopedagogics will not successfully develop and influence the educational process as a whole without the development of the General pedagogical theory, which serves as a methodology in relation to the first.

Close unity in the overall development of pedagogical theory and ethnopedagogics is a necessary condition today.

Work in the field of ethnopedagogics of Chechens and Chechen family, in particular, has many promising areas:

- General and ethnic pedagogy of the family of Chechens;
- the role and place of ethnic and pedagogical heritage of Chechens in the educational process of the younger generation;
- education of the child as an object and subject of education in the ethnocultural space of the Chechen family;
- ethnopedagogical problems of family education in the context of modern trends (on the example of the Chechen family);
- theory and practice of family ethnopedagogics of Chechens;
- problems of interaction of ethnopedagogical ethnopedagogical science , etc.

The movement of society along the path of progress is inexorable. The problems that arise along the way, put humanity in front of the increasingly complex tasks of education and human education.

One of the goals of the education system is to create conditions for the development of the individual as a representative of the ethnic group and a citizen of Russia, which requires an active manifestation of the subjectivity of each of the subjects of the educational space of the Russian Federation: the individual, ethnic group, society.

Modern trends of education-democratization, humanization and humanitarization – is not a tribute to fashion, but an urgent need of time in the conditions of cataclysms not only of natural character, but also cataclysms arising in the souls and nature of the relationship of people and even entire Nations.

In this regard, there is a real problem of intensive development along with the General pedagogy of ethnopedagogics of the family as its component, and the use of ethnic experience of education of the Chechen family in the practice of education in close cooperation with pedagogical science.

Harmonious correspondence between General education and General education can be ensured only by national attention to the formation of the younger generation and the revival of all truly national pedagogical traditions. The thousand - year "pedagogical memory of the people" - a storehouse of inexhaustible experience and ideas of education.

Given these statements, it is obvious the need to search for new educational approaches and pedagogical technologies aimed at the development of spiritual and moral sphere of students. Perspective, in our opinion, in this regard can be considered the development of pedagogical technologies to expand the role of the family in the spiritual and moral education of the child using ethnopedagogic culture.

References

1.   Abulkhanova K. A., Volovikova M. I., Eliseev V. A. *Problems of research of individual consciousness / Psychol. journal. Vol. 12, Ms4, 1991. P. 27-40.*

2.   *Koltsova V. A., Socio-psychological and spiritual-moral aspects of family and family education in the modern world [Electronic resource] / Resp. ed. V. A. Koltsov - Moscow: Institute of psychology, RAS, 2013. - 956 p. - ISBN 978-5-9270-0259-7-access Mode: http://www.studentlibrary.ru/book/ ISBN9785927002597.html*

3.   *Sokolnikova E. I. Ethnopedagogics of the Chuvash family. – Moscow: publishing house of the Moscow state pedagogical University, 1997.*

在关于公主和七个小矮人（英雄，丈夫）的古代阴谋中代表北斗七星
REPRESENTATION OF THE BIG DIPPER IN THE ANCIENT PLOT ABOUT THE PRINCESS AND THE SEVEN DWARFS (HEROES, HUSBANDS)

Cherkashina Svetlana Pavlovna
Candidate of Philological Sciences, Associate Professor
Stavropol State Pedagogical Institute

注解。 本文从遗传学的角度分析了三个作品在其想象系统中由一个共同元素联合起来的作品。 对文本的这种看法提供了一个机会，不仅可以阐明一个更古老的情节基础，可能与印欧社区时代的熊崇拜有关，也可以解释这个邪教的起源上升到对崇敬的崇拜。 北斗星座。
关键词：印欧时代，童话，比喻系统，熊崇拜，北斗七星。

Annotation. *The article analyzes three works united by a common element in their imaginative system from the point of view of the genetic approach. Such a view on the text provides an opportunity not only to explicate a more archaic plot basis, possibly related to the bear cult in the era of the Indo-European community, but also to explain the origins of this cult rising to the reverence of the Big Dipper constellation.*

Key words: *Indo-European epoch, fairy tale, figurative system, bear cult, Big Dipper.*

For each person understanding of oneself in the world is connected, first of all, with the search of one's roots and sources. And the main place in this search is taken by the definition of cultural foundations, which are the platform that makes it possible to establish itself in the world. The development of folk culture leads to the realization of their ethnic identification, above all, representing the image-archetype that accumulates the spiritual ideals of the people, their aspirations and achievements.

Today, the classification that describes three types of artistic integrity is generally recognized in historical poetics: the era of syncretism (the mythical and poetic era - Antiquity), the era of eidetic poetics (VII century BC - XVIII century), the era of artistic modality (XVIII - present time) [6, 13].

Within the framework of the undertaken research, the epoch of syncretism, or the mythopoetic stage, encompassing the "incalculable temporal boundaries" [6,

13], which gave rise to mythological images, later reflected in folklore and literary works, is interesting.

The object of the research in this article are the German fairy tale of the Grimm brothers "Snow White and the Seven Dwarfs", Russian "Tale of the Dead Princess and the Seven Heroes" by A.S. Pushkin and the Indian epic "Mahabharata". Researchers, in particular N.R. Guseva, V.N. Demin, S.V. Zharnikova, claim that the East Slavic traditions are well preserved in the northern regions of Russia and modern Russia. Moreover, in their opinion, it was the North-Russian folk tradition that preserved such elements of the archaic, which were more ancient then Greek and Vedic (the Vedas began to take shape from about the 16th century BC) both. In this article, we do not seek to support or disprove the hypothesis put forward, since the problem touched by the mentioned scientists is more in the field of history, ethnology, rather than literary criticism. The reasons of choosing of sources are: firstly, belonging to the Indo-European family of languages, secondly, the degree of correspondence of archaic plots to each other, and thirdly, the quality of preservation of mythological elements.

The subject of the research is a figurative system in the works mentioned above.

The purpose of the article is to identify the prototype, which became the basis of the figurative structure in three works of different ethnic groups.

The fable is interesting because it is a fragment of a myth, along with religion and history, with which the ancient mythmaker explained the world. As the Russian scientist F.I. Buslaev in his speech "On Folk Poetry in Old Russian Literature" (1858), "... the tale contains ancient myths common to all Indo-European languages, but these myths have lost their meaning in later generations, updated by various historical influences, therefore the tale is relatively later mindsets become absurd, crease, not true. But with regard to the comparative study of the Indo-European nations, she offers material for the study of how each of the kindred peoples assimilated the common mythological heritage."

The thinking of the ancient man personified nature, animating it. "The first character is plural-single; it is impersonal, nameless (one name of a totem is for everyone), zoomorphic, cosmic"[7, 202].

We assume that the constellation Big Dipper could be such a zoomorphic and cosmic character. According to the Soviet historian B.A. Rybakov, this image leads away in that historical period of deep archaics, which in literary criticism is called the era of syncretism. Rybakov speaks of the cult of the bear as "the very first in the history of mankind," especially, for Indo-Europeans [5]. The need for orientation on the terrain necessitated their study of the starry sky. And it was certainly noted that in their area, in the north, the largest and most permanent stellar object is the Big Dipper, which resembles a polar bear in its outlines. It was also noted that the constellation is not passing, and therefore has become navigational. The significance of the Big Dipper is hard to overestimate.

The folk tale of Snow White was processed by Grimm brothers, the German scientists and linguists and later it was published in the collection of The Tales of Grimm Brothers. In the German fairy tale there are two interesting elements: images of Snow White and the Seven Dwarfs. The name Snow White contains two values noted by researchers: an indication of color and snow. According to one version of Schneewitchen or Schneeweischen - dieWeeisst is light, which can be considered an indication of the sun [1, 75], on the other - Snee - snow, and witt - white, which can be interpreted as an indication of where the plot was created; and these will not be warmer areas. Images of gnomes can also be indicative of mountainous terrain, as the gnomes mined treasures in the mountains. As a hypothesis, we propose a version that Snow White and the seven dwarfs are an archaic metaphor, in which was the ancient important knowledge about the Big Dipper, which required secrecy and therefore encoded.

The presence of the heroine and seven warriors, five men who will be present in the other two sources is notable. In particular, Jacob Grimm found parallels in the myths of different nations and argued that "all separate deities appear as creatures and dismemberment of one and only one" [2, 59].

After reading the tale of Snow White, Russian poets A.S. Pushkin and V.A. Zhukovsky staged a creative competition and wrote a fairy tale based on the specified plot. However, in the records of Pushkin there was a retelling of the fairy tale "The Magic Mirror", a plot similar to the fairy tale about Snow White. Interest in folk art undoubtedly arose under the influence of Arina Rodionovna, the poet's nanny. It is noteworthy that, embodying the folk story, Pushkin preserved elements of the mystery very carefully. Soviet folklorist V.Y. Propp explains the figurative system of a fairy tale by the presence of a girl and men in the so-called "men house", a forest school in which young men were trained and later initiated. However, it can be assumed that the tale reflects some more ancient protossy about the Bear.

The heroes of the Mahabharata, the Pandavas, live with the common wife Draupadi in the forest, although there are only five husbands. The reduced figurative system can be explained in this case as follows. Part of the Indo-Europeans left the place where the story about the Bear was born and, therefore, relevant. The bear has ceased to be in sight, religious priorities have changed, and navigation knowledge has lost its importance over time. Therefore, over time, the memory of the prototype remains in the past and only five brothers-husbands appear and become fixed in the work.

Soviet researcher O.M. Freudenberg wrote: "The basic law of the mythological <...> plot is that the significance expressed in the name of the character and, consequently, in its metaphorical essence, unfolds into action <...>; the hero does only what semantically means. The deity of a tree dies and rises in a tree, the deity of water sinks and is saved from water ... "[7, 223]. The tales of Snow White,

the Pushkin princess and Draupadi did not preserve the bearish precedence of the heroes. However, it should be noted that almost all female heroes are of the royal family, and one of the functions of a bear is "the representation of royal grandeur" [4, 129]. According to S.V. Zharnikova, the seven stars of the Great Bear were especially honored by the Indo-Europeans, who considered them their forefathers [3]. Here are the ideas of S.V. Zharnikova overlap with the concept of Academician B.A. Rybakova.

Analyzing the figurative system of the three works, we came to the assumption that the constellation of the Big Dipper could become a metaphor for the prototype. There are several reasons: firstly, well viewed in the northern hemisphere, it was probably a universal navigation device for the ancient Indo-Europeans, and secondly, in an attempt to preserve their knowledge, northerners encrypted information about the constellation. Actual for those left to live in the north, it has been preserved in a fairy tale: both Germans and Russians live in the Northern Hemisphere, therefore, their versions of the fairy tale have been preserved better, more precisely, than the Indian one.

References

1. Badestova A.V., Popova N.O. Culturological analysis of the characters of the German fairy tale "Snow White" and "Tales of the Dead Princess and the Seven Heroes" A.S. Pushkin // Bulletin of the North-Eastern Federal University named after M.K. Ammosov. - Vol. 4. - 2007, No. 3. - P. 72-76.

2. Grimm J. German mythology // Foreign aesthetics and the theory of literature of the XIX-XX centuries. Treatises, articles, essays. - M.: Publishing House of Moscow State University, 1987. - P. 54-71.

3. Zharnikova S.V. Golden thread. - Vologda, 2003. - Electronic resource: http // www.booksite.ru (access date 01/10/2019)

4. Ivanov V.V., Toporov V.N. Bear. - Myths of the peoples of the world. Encyclopedia in 2 tons. - M .: Rus. Encyclopedia, 1994. - Vol.1. - p. 128-130.

5. Rybakov B.A. Paganism of the ancient Slavs. - M.: Nauka, 1994. - 608 p. - Electronic resource: https://royallib.com/book/ribakov_boris/yazichestvo_drevnih_slavyan. (access date 01/10/2019)

6. Broytman S.N. Historical poetics. - 5th ed., Rev. - M.: Publishing Center "Academy", 2014. - 368 s.

7. Freudenberg O.M. The poetics of the plot and genre. - M.: Labyrinth, 1997. - 448 p.

俄罗斯医学术语科学: 历史和发展的地标
RUSSIAN MEDICAL TERMINOLOGY SCIENCE:
HISTORY AND DEVELOPMENTAL LANDMARKS

Bekisheva Elena Vladimirovna
Doctor of Philology, Professor
Head of the Foreign Languages and Latin Department
Samara State Medical University
Rozhkova Tamara Valentinovna
Candidate of Philology, Associate Professor,
Foreign Languages and Latin Department
Samara State Medical University

抽象。 本文致力于俄罗斯医学术语的发展历史及其研究。 作者区分并描述了五个时期。
关键词: 医学, 医学术语, 俄罗斯医学史; 医学词典, 认知语言学。

Abstract. The article is devoted the history of the development of Russian medical terminology and its investigation. Authors distinguish and describe five periods.

Keywords*: medicine, medical terminology, history of Russian medicine; medical dictionaries, cognitive linguistics.*

At the modern stage of the development of general terminology we are sure to say that medical terminology has been distinguished out as a separate complex linguistic science with its own aims, tasks and methods. The necessity in the deep theoretical investigations is caused by specific conditions of medical terminology functioning and developing which differ it from other fields of special vocabulary.

The peculiarities characteristic of these conditions include the following:

• international character of medical terminology;

• active use of Latin and Ancient Greek words and term-elements;

• the creation of neologisms according to Latin and Greek models of word-building;

• active introduction of eponyms into medical vocabulary;

• overlapping of two scientific lexical systems (national terms and their equivalents of Latin and Greek origin);

• some strict limitations imposed to the professional communication by the deontological demands;

• the use of terminology in the official medical documentation which is directly connected both with life, health and death of people and with the questions of financing their treatment;

• rapid development of medical science and practice has caused the appearance of a great number of new medical terms;

• a complicated structure of scientific concept reflected by a term .

Medical terminology science is the creation of no one man, and of no one age; it is a growth that has slowly developed itself down the ages. We can divide the history of medical terminology science into some periods.

The first period (XVIII century) was marked by active formation of the Russian language in which scientific terms of Greek and Latin origin began to be used. They were borrowed from the Western European Languages as well as from the works of ancient writers.

The first medical dictionaries in Latin, Russian and French were composed by the first Russian professor of Obstetrics N.M. Ambodik-Maximovich (1744-1790). His "Anatomical and Physiological Dictionary" [6] published in 1783 contained about 4000 names of organs and functions. The words designating diseases, symptoms, operations, manipulations and dressings were collected in his "Medico-pathologo-surgical dictionary" published in 1785. Efforts to standardize the language of the Russian researchers were initiated at the end the 18th century. In 1789-1794 the first scientific dictionary in the vernacular language "The Dictionary of the Russian Academy" appeared. It contained 600 medical terms.

The second period (XIX century). By the beginning of the XIX century more extensive use of the medical language emphasized the timeline of specification and systematization of medical terms. This period was marked by the new approach to the lexicographic processing of medical terms. In 1835 «Dictionary for Doctors» [8] composed by A.N. Nikitin (the founder of the St Petersburg physician society) was published. It was the first Russian medical dictionary which provided the definitions of the terms. The medical community of the first part of the XIX century appraised highly this dictionary having called it "a pattern of Russian medical terminology".

The development of Russian medicine and a medical terminology is attributed to the names of the outstanding Russian physicians E.O. Muchin (1766 – 1850), N.I. Pirogov (1810 – 1881), I.M. Sechenov (1829 – 1905), S.P. Botkin (1832 – 1889). In his work «The Course of Internal Diseases» S.P. Botkin described the clinical picture of some diseases and introduced new terms. For example:

In 1885 while Botkin and his family were living in a small village in Finland all his relatives fell ill with an unknown contagious disease. Having described

the clinical picture Botkin named it *Finnish angina* because all the members of his family suffered from sore throat. His followers H.K. Plout, J.H. Vensan and N.P. Simanovsky discovered a pathogene of the disease *"a fusiform bacillus"* and coined this disease *fusospirochitosis*. In modern nomenclatures the disease is called Plout-Vensan-Simanovsky disease. The eponym was created as the minimum tribute of gratitude for their contribution to medical science. This example also illustrates the rapid development of a medical scientific concept and simultaneously the appearance of new terms.

In 1892-1893 "The First Encyclopedic Medical Dictionary" by A. Vilare was translated from German into Russian. It was said in the preface of the dictionary that Russian medical terminology had considerably developed and become common among Russian physicians but it was still impossible to exclude Latin terms.

In the XIX century there was still a tradition to write scientific papers in Latin. For example, N.I. Pirogov [11] wrote his doctoral thesis on the ligation of ventral aorta and his classical work «Anatomia Topographica» was also written in Latin. All pharmacopoeas had been published in Latin up to the end of the 19th century. Medical histories were also written in Latin.

The XIX centrury is characterized by active term creation in the field of medicine. It's remarkable that the authors' names of the majority of the medical terms are known. Not long ago a very interesting dictionary "Dictionary of the Authors' Terms" [3] has appeared in Russia. A lot of terms (so called neoclassicisms) were created from Greek and Latin term-elements in the XIX century, e.g. phagocytosis (I.I. Mechnikov), leukemia (R. Virchov), parabiosis (N.E. Vvedencky) и others.

The third period (the first part of the XX century). The first part of the XX century was marked by the formation of the terminology science theoretical basis. Some outstanding scientists who worked in the field of engineering are considered to be its founders. They are E. Woster, A.K. Dresen and D.S. Grek in Europe and later linguists G.O. Vinokur and A.A. Reformatsky in Russia. Those were just the works which determined trends of practical activity on standartization and internalization of terminology. However in the first part of the XX century, medical terminology science wasn't distinguished as separate theoretical terminological subject. Terminological activity was carried out by medical scientists who composed textbooks and medical dictionaries for didactic purposes.

In 1924 classical gymnasias were closed in Russia and Latin was excluded from the curricula of the secondary schools. This fact caused difficulties in teaching Anatomy and clinical subjects at the medical departments because students couldn't understand Greek and Latin medical terminology. In the 1920s – 1950s the first textbooks of medical Latin by P.I. Karuzin, V.M. Bogolepov, N.M. Lempel were published but they failed to provide any information on term-building.

The forth period (1960-1980). This period is characterized by separating and

formation of medical terminology science as an independent interdisciplinary terminological subject. This is a period of an active methodic work in the field of medical terminology. A lot of textbooks for medical high schools were published during that period (the textbooks by U.F. Shoolts, V.F. Novodranova, U.I. Gorodkova and others). The necessary information on phonetics, Latin grammar and medical terminology was selected and systematized in these textbooks.

That was just the beginning of methodic work which had become a stimulus for comprehension of the nature of a medical term and its linguistic description. The appearance of multilingual dictionaries by G. Arnaudov (in 5 languages, 1966) [1], B. Zlotnitsky (in 6 languages, 1971), K. Rudzitis (in 3 languages, 1973) were of great importance for descriptive study of a medical terms.

Major preconditions for realization of the necessity of theoretical comprehension of the nature and functional peculiarities of a medical term were the following:

- completion of formation, collection, primary handling and arrangement of medical terms and their definitions;

- understanding of unsatisfactory condition of medical terminology. Throughout the history of medical terminology many terms have been coined without scientific criteria, and without considering grammatical rules. Improvement of this situation required common efforts from both medical community and linguists.

- acknowledgement of medical terminology as a specific terminological layer of vocabulary which is characterized by interesting etymology connecting with ancient civilization and culture, classical literature and the history of world medicine.

During this period the first descriptive theses devoted to the problems of the medical language were defended. They studied etymology of the medical terms (Petrishina, 1973), names of medicines (Bereznikova, 1975), lexical and grammatical peculiarities of N. Pirogov's works, problems of nomination and style in the medical treatises of the 15th -16th centuries (Katerinich, 1979), metaphor as a means of medical term creation (Krakovetskaya, 1974) etc.

Medical terminology began to be studied on the material of different European languages. The language of ancient physicians, anatomists of Middle Ages and Renaissance was also thoroughly analyzed during this period. The first methodic conferences devoted to the problems of teaching Latin in medical high schools (held in Perm in 1974 and in Gorky in 1079) contributed to the development of medical terminology science in Russia.

The fifth period, modern period (from the 1980-s till to date). This is the period of further development of medical terminology science in the limits of modern trends of linguistics and general terminology theory.

In 1982 the first "Encyclopedic Dictionary of Medical Terms" [12] in vernacu-

lar edited by academician B. Petrovsky was published in Russia. The dictionary contained 60000 terms with scientific definitions, etymological and grammatical information. This dictionary was of great value for the researchers of the medical language.

The third volume of the dictionary contains an essay written by professor M. Chernyavsky which is devoted to the main problems of medical terminology, in particular its history, etymology of terms, term-building, terminological synonymy and polysemy, conformity of the term to its scientific concept. Professor Chernyavsky was the first who employed principles of terminology teaching in his textbooks in a form easily understood for students.

Outstanding researchers of classical medical literature were professors U.F. Shoolts and U.V. Shanin. Their translations of the works of ancient and medieval authors enriched a historical and terminological depository of medicine.

During the period from 1970 to 1995 the works of Russian terminologists had a descriptive nature and were devoted to the structural and semantic peculiarities of different medical term systems.

The last decades of the XX century were characterized by the process of divergence of the vocabulary of medical disciplines caused by the differentiation of medical and biological sciences and appearance of various new fields of knowledge and branches of investigation in medicine. This process was also accompanied by the process of interfering of the vocabulary of adjacent medical disciplines. Such specific conditions of the development and functioning of medical terminology had caused the necessity of its thorough theoretical study. At that period the research activity in the field of medical terminology was under the influence of outstanding Russian terminologist V.M. Leichik [4, 5] who had developed a lot of questions of general terminology. By 1995 extensive use of medical terminology emphasized the timelines of its study and led to the appearance of many systemic investigations of the linguistic phenomena on the material of medical terminological subsystems, for instance, ophthalmology (L. Tatarinova), cardiology (L. Dines), surgery (E. Bekisheva), officional herbs (L. Lazareva) etc.

A doctoral thesis written by a founder of scientific trend in the investigation of medical terminology Valentina F. Novodranova [7] was devoted to the comparative study of word-building in the Latin language and Latin medical terminology. She is an author of 180 scientific works. The subject matter of her research is very vast (classical philology, cognitive linguistics, general terminology and language of medicine, methods of teaching medical Latin). Some years ago professor Novodranova was awarded Wuster Prize for her contribution to terminology science. Theoretical theses developed in Novodranova's works were assumed as a basis in the works of her followers (Rudinskaya, Poluhina, Duhanina, Kurkina, Alafy, Bekisheva etc.).

The beginning of the XXI century is characterized by the complex study of a medical term. Since a term is one of the main means of obtaining knowledge, it has become a subject of interest not only for linguists but also for physicians and medical scientists. However scientific interests of these two groups are considerably different. Representatives of medical world are interested in the aspects connected with lexicographic representation of a term and its definition in the dictionaries and different classifications, excessive use of acronyms, the problems of correspondence of a term to its concept, standartization and unification of medical terminology which often touch upon financial questions and some aspects of medical statistics. Scientific interests of the linguists mainly extend to the analysis of the term structure, its semantics, relations in the term system and scientific discourse, but a philologist can't often reconstruct a scientific concept without having special knowledge of medicine.

It's no wonder that when translating special texts an interpreter meets all kinds of conceptual difficulties. A typical example is as follows:

Composing a terminological handbook in children heart diseases and rheumatology for senior students of pediatric department, we met with a concept "narrowing" which can be translated into Latin as *stenosis, coarctatio, strictura, constrictio*. We needed the help of a cardiologist to explain the conceptual difference between these terms. Thus the problem of adequacy of the term to the scientific concept can be solved only in collaboration with medical professionals.

However terminologists rarely cooperate with medical professionals. Medical scientists don't read linguistic articles and philologists fail to look through medical journals. To overcome these barriers it is necessary to cooperate with the professionals of various medical disciplines. It would be the most important step in the development of medical terminology science. Otherwise "terminological achievements" of linguists would be far from pragmatic demands.

Since the end of the 1990-s there has been a cognitive turn in general terminology and the language for specific purposes (LSP) research in particular. The extensive analysis of human information processing, especially the correlation between the form of knowledge representations and the access of knowledge structures, is in the main focus of cognitive interests. In Russia cognitive LSP research is presented mostly by representatives of Novodranva's school of cognitive terminology.

The current LSP research in the field of cognitive science has caused a broadening and deepening of its subject-matter. Different types of cognitive structures represented in medical terms, communicative mechanisms, production and perception of oral or written medical texts, conceptual metaphor, reflection of ontological categories and national picture of the world in medical terminology were analyzed in the works of V.F. Novodranova, T.V. Kurkina, T.V. Rozhkova, V.V. Zhura, S.G. Dudetskaya and others.

At the beginning of XXI century there appeared some monographs devoted to the different problems of the language of medicine, among them "Medical Discourse" by L. Alexeeva and S. Mishlanova; "Typological Peculiarities of Medical Terminological Subsystems" by S. Kazarina, "The Reflection of Gnoseological Categories in Clinical Terminology" by E. Bekisheva [2] and others. A diachronic view of medical terminology have been taken by Z. Palyutina in her monograph "Civilisation Linguistics" [9]. Interdisciplinary approach to the LSP in the field of medicine is based upon descriptive, functional, structural, comparative, statistical methods and methods of cognitive linguistics.

Much work has been done in the field of didactics. It is widely accepted that incorporating special etymological, cultural and historical information (in addition to scientific one) on every term in medical textbooks and manuals is an important factor of humanization of medical education. Recent years a lot of textbooks of Latin, glossaries, handbooks and special dictionaries for educational purposes were compiled on terminology of different medical disciplines (Surgery, Orthopedics and Traumatology, Gynecology and Obstetrics, Pharmacy).

A great number of narrowly-specialized dictionaries, such as dictionaries of metaphorical medical terms, abbreviations, eponyms, authors' terms, mythological medical terms have been compiled nowadays. They present both the knowledge about medical scientific concepts and sociolinguistic and deep historical information. They also show the way the author of the term represents his creative intensions and his vision of the scientific object.

Historical information about outstanding scientists contributed to the development of medicine can be obtained from encyclopedic, defining and special dictionaries of eponyms (e.g. "English-Russian Medical Dictionary of Eponyms" [10] by V.I.Petrov, A.I. Perepelkin, 2005). A medical eponym is of some educational value since certain types of medical students will not rest until they have discovered who was the specialist whose name is presented by the eponym.

Much has been written about metaphors in terminology. The necessity to compile dictionaries of medical metaphors and mythological terms was caused by vague meaning of the associative term allowing specialists to apply the term to a very broad range of supposed scientific objects. Cultural value of metaphorical dictionaries is in their possibility to uncover author's cognitive intentions during the process of term creation.

The necessity of compiling special medical dictionaries containing both scientific and cultural information is very important since they contribute to broadening of students' knowledge of Humanities. It will be very useful for LSP researchers in the field of medical terminology to try to reach higher agreement on the identity especially with the respect to methods and theory.

References

1. Arnaudov G.D. Medical terminology in five languages. - Sofia: "Medicine and Physical Education", 1964. 1029 p.

2. Bekisheva E.V. Categorical bases of the nomination of diseases and problems related to health: monograph / ed. prof. V.F. Novodranovoy. - Samara: OOO IPK "Commonwealth"; SamSMU, 2007. - 250 p.

3. Dyachenko A.P. Dictionary of copyright terms, concepts and names in medicine. - Moscow: Triad-X Publishing House, 2002. - 364 p.

4. Leychik V.M. Domestic terminology at the turn of the century and medical terminology // Language of Medicine: Vseros. mezhvuz. Sat scientific tr. - Vol. 1. - Samara: LLC "Commonwealth Plus"; State educational institution of higher professional education "Samara State Medical University", 2004. - p. 14-30.

5. Leychik V.M. Terminology: the subject, methods, structure. Ed. 3rd - Moscow: Publishing house LKIB 2007. - 256 p.

6. Maksimovich-Ambodik N.M. Anatomical and physiological dictionary: In any way all the names of parts of the human body, prior to the anatomy and physiology belonging to, from different medical essays collected in Russian, Latin and French, are clearly and briefly suggested, with a brief description this science / For the benefit of the Russian youth in the first printed works and dependencies of Nestor Maksimovich-Ambodik of medical science, doctor and professor of the secondary school of art. - SPb: Type. Mor the gentry. cadet. Corps, 1783. - 160 p.

7. Novodranova V.F. Latin basics of medical terminology (nominal word formation). - Diss. ... Dr. filol. sciences. - Moscow, 1989. - 501 p.

8. Nikitin A. N. Medical Dictionary, expounding Greek and Latin terms accepted in medicine, with the addition of brief biographical essays by famous ancient physicians, compiled by Doctor of Medicine, court counselor and cavalier Alexander Nikitin, Medical-Surgical Academy Corresponding Member and the Society of Russian Doctors in St. Petersburg, a member and secretary. - SPb .: type. Imp. Acad. Sciences, 1835. - 620 p.

9. Palyutina Z.R. Civilization linguistics: Ufa: Publishing house "Healthcare of Bashkortostan", 2005. - 279 p.

10. Petrov V.I., Perepyolkin A.I. English-Russian medical dictionary of eponymic terms. Under total the leadership of the academician of RAMS V.I. Petrova. - Moscow: "Medicine", 2005 - 384 p.

11. Pirogov N.I. Topographic anatomy of cuts through frozen corpses. Vol 1-4. - SPb., 1851-1854.

12. Encyclopedic dictionary of medical terms: in 3 volumes. Ed. Academician B.V. Petrovsky. - Moscow: Soviet encyclopedia, 1982-1984.

叙事话语中的参与者和动名词
PARTICIPLES AND GERUND FUNCTIONING
IN THE NARRATIVE DISCOURSE

Eschenko Irina Olegovna
Candidate of Philological Sciences, Associate Professor
of Department of Foreign Languages and Professional Communication
Belgorod State National Research University, Belgorod
Boichuk Igor Vasilievich
Candidate of Philological Sciences, Associate Professor
of Department of Foreign Languages and Professional Communication
Belgorod State National Research University,
Belgorod, Russia

抽象。 本文论述了叙事话语中英语某些语法形式（即动名词和分词）的功能特点。 动词的这些非限定形式的特征正在根据它们在句子中执行的功能进行分析。 使用不同形式的动名词和分词的频率是在分析示例的统计方法的帮助下定义的。 该分析是在Ray Bradbury的书"蒲公英酒"的基础上进行的。

关键词: 动词的参与, 非限定形式, 叙事话语, 统计方法

Abstract. *The present article deals with the peculiarities of functioning of the certain grammar forms of the English language, namely, the gerund and participles, in the narrative discourse. The features of these non-finite forms of the verb are being analyzed depending on the function they perform in the sentence. The frequency of using different forms of the gerund and participles is defined with the help of the statistic method of analyzing the examples. The analysis is performed on the basis of the book "Dandelion wine" by Ray Bradbury.*

Key words: *Participle, non-finite forms of the verb, narrative discourse, statistic method*

Introduction

During his lifetime Ray Bradbury wrote more than eight hundred various literary works, including several novels and hundreds of stories, plays, articles, and poems. He is traditionally considered the classical author of science-fiction, though considerable part of his works is drawn towards genres of fantasy, parable, or fairy-tale. "American science-fiction is one of the spiritual tops of the mankind,

and philosophically-oriented Ray Bradbury, …, - is the expresser of the best in it" [5]. First published in 1957, "Dandelion wine" by Ray Bradbury remains one of the most touching stories of the writer, bearing the pronounced emotional experience and reflecting some autobiographical memories. The present paper analyses the role of the gerund and participles in creating the explicit atmosphere of the narrative discourse of the book.

According to D. Bolinger, "to perform the most important and frequent illocutive objectives in the language there are special grammar markers – morphological-syntactical and intonation ones" [2]. In the field of grammar, there is the "transfer of the concepts of the indicator (marker). Syntactic indicators are an improvement of the categories of traditional grammar - noun, adjective, adverb, etc." [4]. Our research is aimed at studying the peculiarities of functioning of the English gerund and participles as representatives of the categories of traditional grammar.

Method

Methodology of descriptive research is based on structural and functional approach, and general philology. In analyzing the peculiarities of the English non-finite forms of the verb, using methods of traditional grammar, we set as our goal the functional analysis of the certain grammar structures.

Discussion

Following the rules of general linguistics, this article focuses on the use of the gerund, participles and participial constructions as attributive adjunct, adverbial modifier, Complex object, and analyzes the frequency of their occurrence in the sentence.

Results

The present paper provides the examples illustrating the differences in the use of the certain grammar forms. The present participle and the gerund, being formed from the verb by adding "-ing", can be easily mixed, but their functions in the sentences help to distinguish between these two non-finite forms of the verb.

It is known that the English participle is most often used as attributive adjunct [3]. Consider the following example:

(1) The male voices invaded the old house timbers; if you closed your eyes and put your head down against the floor boards you could hear the men's voices *rumbling* like a distant, political earthquake, constant, *unceasing, rising or falling* a pitch [1].

In Example 1, the English present participles active *unceasing, rising or falling*, are in the postposition to the noun *earthquake*, and they fulfill the attributive adjunct function. One more case of using the participle in this sentence is the Objective participial construction that performs the function of the complex object in the English sentence *you could hear the men's voices rumbling*. The use of the

parallel construction produces the effect of continuous action, creating the necessary atmosphere of the ordinary spring evening that remained in the memory of the susceptible child.

Let us analyze one more example of using the English present participle active in the attributive function:

(2) ***Opening*** the screen door, he found Mom still ***ironing*** [1].

Example 2 demonstrates the use of both non-finite forms of the verb: the gerund at the beginning of the sentence (***Opening*** the screen door) in the function of the adverbial modifier and the present participle active in the Objective participial construction (*found Mom still **ironing**).* The given example highlights the simple routine action that was ordinary in the life of the boy.

In the following example (3), the syntactic indicators of the past participle (the third form of the irregular verb or the ending -*ed* of the regular verb and the usual position in the sentence after the determined word) find a different position in the sentence, preceding the defined noun (a ***corked*** ketchup bottle). The present participle active also precedes the defined noun (the ***crackling*** dry clothes). Both participles are used in the attributive adjunct function describing the household chores and bringing into the discourse the details that popped out of the boy's memory; those were details that tied up small episodes of everyday life with the feeling of safety:

(3) Mother was ironing and sprinkling water from a ***corked*** ketchup bottle over the ***crackling*** dry clothes behind Tom [1].

Let us consider the example of the participial construction with the conjunction *with*:

(4) And now that Douglas knew, he really knew he was alive, and moved turning through the world to touch and see it all, it was only right and proper that some of his new knowledge, some of this special vintage day would be ***sealed*** away for opening on a January day ***with*** snow ***falling*** fast and the sun ***unseen*** for weeks or months and perhaps some of the miracle by then ***forgotten*** and in need of renewal [1].

In example 4, participles in the attributive adjunct function to the noun ***day*** are used as an independent participial construction with the conjunction ***with***. The English present participle active ***falling*** (Participle I) creates the peaceful atmosphere of the quiet winter day, whereas the English past participles ***unseen***, ***forgotten*** (Participle II) correspond to the situation of the long-gone past that is remembered no more. This is the case when the English conjunction ***with*** acts as one of the syntactical indicators of the participle (the conjunction ***with*** and the attributive adjunct function in the postposition to the defined noun) used in the sentences.

(5) Oh, the luxury of ***lying*** in the fern night and the grass night and the night of susurrant, slumbrous voices ***weaving*** the dark together [1].

In this example, (5), the gerund ***lying*** is used in the prepositional phrase in the

function of the object, and the present participle *weaving* has the attributive function in the postposition to the noun *voices*, both of these non-finite forms of the verb substituting the predicates that are absent in this elliptical sentence, creating the narrative of dreamy childhood memories.

In the function of adverbial modifier, the present participle active often stands at the beginning of the sentence, setting the scene:

(6) Then, *rising* from the cellar like a June goddess, Grandma would come, something *hidden* but obvious under her *knitted* shawl [1].

In example 6 the present participle active *rising* is used in the function of the adverbial modifier of the verb in the second part (would come), though it is the third part of the sentence that contains the imprint of the mysterious image of Grandma in the child's memory, and that is a case of using an independent participial construction in a postpositive position: something *hidden* but obvious under her *knitted* shawl.

Participle II is often used in the objective participial construction and replaces the subordinate clause, which simplifies the construction of the sentence [3].

(7) Since this was going to be a summer of *unguessed* wonders, he wanted it all *salvaged and labeled* so that any time he wished, he might tiptoe down in this dank twilight and reach up his fingertips [1].

In example 7 there are three participles used in different functions *(unguessed, salvaged and labeled)*; the first is the attributive adjunct in the preposition to the noun *wonders,* and the next two are the objective participial construction used in the function of Complex Object (he wanted it all *salvaged and labeled*). This sentence creates the image of an inquisitive child having a delicate perception of the surrounding world.

The following sentence demonstrates the use of the same grammar form in various functions:

(8) The courthouse clock struck nine and it was getting late and it was really night on this small street in a small town in a big state on a large continent on a planet earth *hurtling* down the pit of space toward nowhere or somewhere and Tom *feeling* every mile of the long drop [1].

In Example 8 there are two present participles active: '*hurtling* and *feeling'*, consequently, one could suppose the preservation of the concurrency of constructions. However, the participle *hurtling* is used in the function of the attribute in the postposition to the noun: " *a planet earth **hurtling** down*" whereas *feeling* performs the function of the adverbial modifier in the absolute participial construction "*and Tom **feeling** every mile of the long drop*". The use of parallel prepositional phrases "*on this small street in a small town in a big state on a large continent on a planet earth*" which precedes the participles produces the effect of simultaneous, synchronous actions and as if draws the reader to follow the boy falling into the

funnel together with the planet "*down the pit of space*".

Let us consider one more example, demonstrating the variety of the functions of the English participles:

(9) He gave the money, received the chill, icy pack, and ***rubbing*** it across his brow and cheek, ***laughing***, thumped barefootedly homeward [1].

In Example 9 the English participles ***rubbing, laughing*** are used in the function of the adverbial modifier. In the case of the succession of past actions we see the use of homogeneous parts of the sentence, namely, predicates: *gave, received, and thumped homeward*, with the help of which the translator preserves the concurrency of construction. The present participles ***rubbing****, **laughing*** add the elements of the childish behavior to the narration and animate it.

Conclusion

The statistic method of analyzing the examples allows defining the frequency of using the English non-finite forms of the verb in various functions and demonstrates that gerund and participles in the function of the adverbial modifier are used in about 70% of the cases. Sentences with the participles in the attributive function are found in 30% of the analyzed examples.

Thus, the given study confirmed the use of the English participles in the attributive and adverbial functions in the narrative discourse of the modern literature. The peculiarity of the present study, combining theory and practice, splendidly illustrates the statement of D.Bolinger that "the value of tradition is determined by the centuries-old processes of careful selection, sifting, selection and culling occurring on a huge test site, where practical use is a decisive factor for survival and where experiments are conducted by many hands, the latter being the one that determines the achievement of scientific truth" [2]. And that is splendidly true for the so widely-known sci-fi author Ray Bradbury, who managed to create such a moving story recollecting the vanished past through the pictures so vividly drawn in the mind of the reader.

References

1. *Bradbury. Dandelion Wine [Electronic resource] / Bradbury // – URL: http://www.e-reading.club/bookreader.php/71170/Bradbury_-_Dandelion_Wine.html (accessed 20.03.2019)*

2. *Dwight Bolinger. The Atomization of Meaning [Electronic resource] / D.Bolinger //– "Language", Vol.41, 1965, p.555-573. – URL: www.classes.ru/grammar/155.new-in-linguistics-10/source/worddocuments/_4.htm (accessed 20.03.2019). [In Russian]*

3. *Dmitriyeva L.F., Kuntsevich S.E. The English language. The course of translation / L.F.Dmitriyeva, S.E.Kuntsevich // – M.: Rostov n/D. Izdatelsky tsentr «MarT», 2005. – 304p [In Russian]*

4. *Eshchenko I.O. Modality of a polypredicative sentence with parataxis and hypotaxis in commission speech acts /I.O.Eshchenko // Prospects for the development of science and education. Collection of proceedings on the materials of the International Scientific and Practical Conference – 31 January 2014. Part 8. Tambov 2014. P.41-44 [In Russian]*

5. *https://skurlatov.livejournal.com/997157.html (accessed 20.03.2019)*

反对国家世界的全球社会: 社会变迁导致的移情文化
GLOBAL SOCIETIES AGAINST NATIONAL WORLD:
EMPATHIC CULTURE AS A RESULT OF SOCIAL SHIFTS

Bykhovtsov Alexander Pavlovich
Head of Educational center "Quality engineering thinking" (QET)

"I create things, therefore I exist"
(Lee Bocun)

注解。　 本文讨论了与国家社会中全球社区文化形成相关的理论问题。在中国外籍人士社区的例子中，特别关注发展移情文化的理由。

关键词：全球化，第三文化，外派，移情，职业文化，现代化

Annotation. The paper discusses the theoretical problems associated with the formation of the culture of global communities in the national world. Particular attention is paid to the grounds of the development of an empathy culture on the example of expat communities in China.

Keywords: globalization, third culture, expat, empathy, professional culture, modernization.

Globalization as the main, determining tendency of the development of the world community of the last century is one of the most difficult to define phenomena in sociological and political research. The repertoire of research in the field of globalization is associated with the study of the basic factors of the development of globalization processes, the content of the main stages of globalization, the role of globalization processes in the development of individual regions of the world. Such research topics are associated both with the formation of the phenomenon of globalization itself and with the development of ideas in science about globalization as an object of scientific research. However, lately, the effects of globalization have emerged, which are primarily associated with the impact of the content of globalization on a person, his values, spiritual life, everyday and professional culture. The most typical example of such influence is representatives of a third culture or expats, that is, people who voluntarily left the country of birth for an interesting and well-paid job abroad.

Already since the 90s of the last century, international companies interested in optimizing their production costs have been forced to bring their technology and

other intellectual property to China. The competent policy of the Chinese government has created a comfortable environment for industrial production, which, in turn, has led to the development and provides with constant demand another important business sector - the infrastructure of supporting processes. Countless companies, ranging from small trading companies manufacturing tools to large metallurgical plants, constantly work to meet the needs of Chinese manufacturers. In other words, by creating an environment for the production of goods, the Chinese government in parallel created an even more powerful industry, which grows with the consumer of its product, while further stimulating the growth of production of goods.

It is this liaison of production and infrastructure capabilities that brings foreign business to China, since none of the oldest economies in the world can offer this kind of prompt response of the production environment to market demands. And the Chinese business itself greedily absorbs imported technologies and business solutions by attracting foreign companies and foreign specialists to the market in Chinese companies. Naturally, the most passionate representatives of their cultures become the producers of these technologies and business decisions, as long living in the context of the Chinese household culture and working in the context of the business culture of the Middle Kingdom urgently require people to leave the comfort zone, take a long time to adapt to new realities. Thus, communities of professionals are formed in large Chinese business centers such as Shanghai, Guangzhou, and Shenzhen. Their distinguishing features are constructivism, pragmatism, empathy and positivity. Business motivation, the pursuit of business / professional implementation are its main pivot, holding together the idea, the very spirit, worldview and ideology of this group.

An expat ("expatria" "outside the homeland") is usually a first-class specialist. It differs from a regular migrant in that, on the basis of his high qualifications, which give him the opportunity to work in another region of the world, and wages, he is a producer of a new culture of everyday life, communication, and professional activity. The reasons for emigration are also different: emigrants seek to solve their material problems at any cost, while expats go to countries where there is a warm climate, favorable social integration into the professional community, and comfortable conditions for communication in a professional environment. Another difference between emigrants and expats is that emigrants tend to stay in the host country; they want to transport their family there. Expats return home, live in another country without a family, and perceive their move as a temporary inconvenience.

Communication plays a huge role in the life of business colonists. It is not so much about interaction with representatives of the host culture, as, to a much greater extent, with representatives of other cultures from the number of expats.

Contrary to the expected competition among foreign specialists of similar competence and qualifications, one can more often see examples of mutual assistance and solidarity, the primacy of impatience values over personal success. On the one hand, this is due to the solidarity of foreigners in a foreign culture. On the other hand, the main reasons lie in the basic spiritual needs of the organization of society on the basis of truth and justice. And the content of the Chinese cultural environment, distinctive and unlike European traditions in the matter of the relationship between the individual and society makes this vector of the organization of the life of expatriates relevant.

In the international districts, national communities continue to play a significant role only at the household level. In addition, the largest local ethnic enclaves in China are formed by Asians: the Japanese and Koreans. The areas of compact residence of representatives of one or several cultural and related nationalities create an initial basic minimum, designed to meet household needs, free temporary migrants from the need to integrate into local household specifics and spend their forces on unnecessary integration for themselves in the local community. Expats create, maintain and use only extremely significant local social structures. They are not satisfied with the local infrastructure, if we are talking about educational and educational institutions, catering and environment for communication. And, it should be noted, the Chinese, in turn, are very enthusiastic about the opportunity to gain access to such structures. Absorption of foreign culture and lifestyle, along with strong traditional habits, is for the Chinese a way of permanent safe and progressive development of their rich and distinctive culture without the risk of losing meaningful content and, most importantly, without shocks.

Among expats, assistance in solving professional tasks is actively practiced. This can be assistance in a useful business acquaintance, professional advice, and exchange of experience, sharing of business and logistics infrastructure, and even assistance in solving domestic issues. At the same time, communication expats professional environment is not limited. Joint leisure for them is the same significant field of interaction, where not only business ties are strengthened, but also a new common value is produced - a single spiritual environment, a single spiritual community. The need for such an environment is keenly felt by expats, since they do not have the ability to quickly project the events of their life into the cultural and living environment that remains far in their homeland. At the same time, an expat is constantly under pressure from alien cultural installations that are dissolved in the cultural context and social communication of the host country. Thus, the impossibility of operational psycho-emotional connection with the national tradition, on the one hand, and the possibility of elevation over the local tradition, involvement in the universal cultural tradition, which refers to belonging to Euro-

pean culture, contributes to the formation of the phenomenon of the third culture. The impossibility of direct interaction with the national cultural community, multiplied by the orientation towards the society of representatives of the Japanese and Korean diaspora, contributes to the development of cultural values of expats in their communities and the integration of Chinese professionals in them.

According to the State Administration for Foreign Experts, in 2016, over 900 thousand citizens of foreign countries officially worked in mainland China[1]. First of all, they are representatives of the Asia-Pacific region, among the immigrants most of all are Koreans, including North Koreans, and Japanese[2]. In 2000, 10 million foreigners entered China (excluding compatriots from Hong Kong and Taiwan), in 2009 - 21 million and in 2011 - 27 million, with 10% of them working in China, and another 30% for business purposes[3]. In addition, the number of foreign communities in China is increasing due to foreigners of non-Chinese nationality, ethnic Chinese, citizens of other countries living in Hong Kong and Macao, which are administrative units of the PRC. As a result, China has formed a stable group of foreigners and immigrant communities in Chinese cities (the Japanese enclave in Shanghai, the African region in Guangzhou).

We will try to present an interview with some of the most representative representatives of the European expat community in China.

Dmitry B. Head of Computer Design Department, 25 years old. "My move to China is very spontaneous. I wanted to work abroad and gain experience from foreign professionals. He began to look for offers and came across a great option - an internship in a design studio in China. I sent a request, went through several online interviews, and after only a few weeks, without even realizing it myself, flew in a Moscow-Guangzhou plane. The internship term was 6 months. Then it seemed that I would soon be home, go back to my business, but later I was offered a place in the company, and I stayed, got a promotion and now I lead the design team. Almost three years have passed since then"[4].

Catherine S. Dancer in the project, 27 years old. "In China, I am already the ninth time: before that I was on contracts from a couple of weeks to two and a half months as a dancer, and this time I have stayed for four months: I work with girls, teach them, put on choreography and participate in productions myself. Every time I come home, everything is already familiar here, well. The club sphere

[1] More than 900 thousand foreign specialists and foreign personnel worked in the mainland of China in 2016. Site CRL, the international radio of China in Russian [Electronic resource] /http://ekd.me/2017/04/1-mln-inostrancev-naxodilsya-v-kitae-po-rabochej-vize-v-2016-godu/

[2] 外国游客的目的JAN-DEC2014 [Electronic resource] /https://www.sohu.com/ (appeal date: 03/07/2019)

[3] Anokhina E.A. Foreigners in China: New Challenges to Migration Policy [Electronic resource] / http://ashpi.asu.ru/ic/?p=2677

[4] Borovets V. Go-Go East. Belarusian expats in China [Electronic resource] / https://bolshoi.by/world/go-east/

in China is very developed and every year it is developing more and more: on Monday evening there are not less people in clubs than on Friday or Saturday. I won't say that I go here for the money, although the salaries are good here ... The purpose of my trip is to gain more experience, and according to internal sensations, China is my country. For example, I like to watch the elderly who are quite liberated here. Grandmothers take out a column every night, turn on music and dance, grandfathers play chess, sing or play sports. Professionally, all the Chinese are very dedicated to their work; they live from morning till late evening. It is a very hardworking nation, and that would be worth it for us to learn from them, if, of course, you are in the right place, and the work brings pleasure" [5].

Andrei M. Designer in his own event-agency. Andrew went from an expat to an immigrant, moved his family to China. "Once, a manager from China wrote me on social networks: he became interested in our show programs and costumes that we sew for them. When I received an offer from him to work in China as a designer, I agreed, although I believed that the Chinese could not be completely trusted. In 2015, he moved with his wife: the company, which they settled in, owned a large network of clubs and sold them in franchise as a whole package - from napkins before the show program. Developing a business, they decided to open a direction on the design and tailoring of stage costumes for Chinese stars and show ballets. Since this department was not originally there, we started from scratch: we purchased equipment, established business processes. Now I have my own event-agency. China has several reasons. First, in the southern part of the country, where I live, there are good climatic conditions: there are close to other Asian countries, there is a good opportunity to travel cheap. Secondly, for people who want to come to China to earn money, here is a good foundation for starting a business. If you are a good specialist, you can come and work for the Chinese, or open your own business and export goods / import goods: the Chinese absorb everything from the outside, and, as you know, willingly share their own products. The same Guangzhou is a large industrial city, which is famous for its large market of fabrics, fakes of footwear and clothing brands. Most of the clothes that we see on the shelves of our stores are more than 90% likely to come from Guangzhou" [6].

Interviewers, describing the factors that prompted them to move to China, noted some spontaneity and even ease of moving, which is a result of not only personal attitudes, but also reflects the professional capabilities of the expat, the significance of his profession for Chinese employers, his involvement in professional networks, and also the desire to move up the professional ladder.

On the other hand, the expat experience gained is an important incentive for future trips. He is interested to return to the country where he has accumulated so-

[5] Borovets V. Go-Go East. Belarusian expats in China [Electronic resource] / https://bolshoi.by/world/go-east/

[6] Decree. cit.

cial experience of interaction, where he can continue to develop it. The third party, of course, is the improvement of the quality of life, and this is also associated with the relocation, with the opportunity to be in another region of the world and visit new countries in which he would hardly find himself on a tour.

It should be noted that in China in the last decade great attention has been paid to the development of system planning in the framework of industrial development. Development of the project is an integral part of Chinese culture. The highest achievements of Chinese civilization, the Great Wall of China, the longest anthropogenic object on earth or the forbidden city of Gongun, the largest and most famous palace complex in the world, which served as the residence of twenty-four powerful rulers of the two Ming and Zinn dynasties, are the results of Chinese engineers' project thinking. The State Planning Commission, now the State Commission for Development and Reform, the State Commission on Economics and Trade, which has now merged with the Ministry of Commerce and the Ministry of Construction, established educational institutions or training centers in which 321,983 project managers were trained, 297,774 of them were certified. In total, more than 500 thousand project managers were certified only in the construction industry[7]. Project management implies an area of activity whose input determines and achieves clear project objectives while balancing between work, resources, time, quality and risk in accordance with the ANSI Project Management Book of Knowledge (PMBoK) standard.

The theory of empathy culture is still undergoing a period of formation. Of course, empathy plays a huge role in the formation of collective implicit knowledge among expat communities. Humanities research develops approaches to the study of empathy in ethnic cultures, but practically does not address the issue of empathy in the emerging global culture of expatriates, who are absolutely not by chance called "children of the third culture." Meanwhile, P. Sztompka also noted that modernization is a powerful factor that forms a sociocultural trauma in society and in the individual. Accordingly, the culture of empathy is in turn the result of modernization; the answer is a culture of empathy, which can be reflected in the professional culture of expats. A similar term applies today not only to children, but also to adults. In their environment, a new culture is being formed as a combination of traditions and an old and new large culture, and a concentration of professional skills. The third culture, after the first, national, and second, host country, is the emerging expat culture. It is important to understand that empathy as perception pervades both the inner and outer world of the actor, on this basis the concept of personality and the core of knowledge and culture of the professional group are formed.

Being in a foreign environment, far from the Homeland, awakens a feeling of

[7]From the history of project management in China [electronic resource] / https://professionali.ru/ Soobschestva/moscow_business_school/iz_istorii_proektnogo_menedzhmenta_v_kitae/

empathy, empathy and empathy, a desire to understand the inner world, consciousness and culture of another person, which in a professional community located within the framework of a foreign culture environment is a factor for the development of global communities modernization processes. We can assume that from the middle of the XX century. In the world, after the collapse of empires, business acquired a new meaning and from its activities for profit, turned into a means of achieving political goals and satisfying ambitions of global superiority. Nowadays, the most energetic national forces that for many centuries have been actively involved in military expansion and various unfriendly colonization are involved in the confrontation of countries through the implementation of the most effective macroeconomic solutions. As before, determination, optimism, activity and readiness to overcome difficulties are in demand, but now the ability to interact and empathy are replacing cynical aggressiveness. Modern passionaries form post national communities.

In such voluntary new forms of human interaction, a society of the future is born, active and constructive. But at the same time, this new community incorporates the problems of modern humanity, with its secularism and consumer attitude to life. In Shanghai, Guangzhou, Hong Kong, a prototype of humanity of the 21st century is being formed, in which there will be no place for the rural way of life, and urbanization will have to reach its limit of 99.9%. Productive labor will be as robotic as possible, and the question of employment of a huge number of people not involved in creative professions will arise.

References

1. Anokhina E.A. Foreigners in China: New Challenges to Migration Policy [Electronic resource] / http://ashpi.asu.ru/ic/?p=2677

2. Bao O. Formation of the philosophy of engineering in China // Problems of the Far East, 2013, No. 4. P.137, 138.

3. Bzhanokov M.Kh. Culture of Empathy // Ethnographic Review, 2003, № 2.

4. Borovets V. Go-Go East. Belarusian expats in China [Electronic resource] / https://bolshoi.by/world/go-east/

5. More than 900 thousand foreign specialists and foreign personnel worked in the mainland of China in 2016. Site CRL, the international radio of China in Russian [Electronic resource] / http://ekd.me/2017/04/1-mln-inostrancev-naxodilsya-v-kitae-po-rabochej-vize-v-2016-godu/

6. From the history of project management in China [Electronic resource] / https://professionali.ru/Soobschestva/moscow_business_school/iz_istorii_proektnogo_menedzhmenta_v_kitae/

7. Lee Botsun. In Ziao Wu Guo Zai - Jian lun Gunchenshitsylun [I create things, therefore, I exist - on the theory of engineering realism] // Tszyanbyanzhenzhenfayantszyu. 1993. № 12. p. 10.

一例先天性乳糜胸患儿，有Noonan综合征表型
A CASE OF CONGENITAL CHYLOTHORAX THE CHILD
WITH PHENOTYPE OF NOONAN-SYNDROME

Kislyuk Galina Ivanovna
Candidate of Medical Sciences, Associate Professor
Lukashov Michael Mikhailovich,
Urus Anastasia Alexandrovna
3rd year students of pediatric faculty,
Kursk State Medical University

抽象。　　Noonan综合征是一种罕见的遗传性疾病。　　这种综合征与胎儿（hydropsfetalis）先天性乳糜胸的非免疫性水肿相结合，对淋巴系统的背景畸形，肺部和心脏的畸形，恶化了疾病的预后。　介绍了一项文献综述和先天性乳糜胸的临床病例，这是一种患有Noonan综合征的新生儿，他们在Kursk区域围产中心的复苏科接受治疗。
关键词：Noonan综合征，遗传病理学，新生儿，hilotorax。

Abstract. Noonan syndrome is a rare genetic disorder. The combination of this syndrome with non-immune hydrops of the fetus (hydropsfetalis) congenital chylothorax on the background malformations of the lymphatic system, with malformations of the lungs and heart, worsen the prognosis of the disease. Presents a literature review and a clinical case of congenital chylothorax a newborn child with Noonan syndrome who were treated in the resuscitation Department of the regional perinatal center, Kursk.

Key words*: Noonan syndrome, genetic pathology, newborn children, hilotorax.*

Syndrome Noonan (s.N) - a rare congenital disorder caused by mutation of the gene. PTPN11. s.N. inherited by autosomal dominant type in cases of family nature of the disease, or occurs sporadically in autosomal recessive type of inheritance. In the neonatal period, the syndrome occurs at a rate of 1:8 000 girls and 1:16 000 boys. Sexual chromatin and karyotype in sick children have not been changed [5].

Diagnosis of Noonan syndrome is based on the identification of a characteristic phenotype and laboratory methods. The minimum diagnostic signs include a short neck with pterygoid folds, congenital anomalies of the musculoskeletal

system (deformation of the chest, elbow joint (cubitus valgus), flat feet, changes in the shape and structure of the vertebrae, short fingers), congenital heart defects (55% of patients): stenosis of the pulmonary artery, ventricular septal defect, open arterial duct, tetralogy of Fallot) or cardiomyopathy. Possible accumulation of fluid in the cavities surrounding the lungs and heart [5,6].

The main clinical manifestations of Noonan syndrome: stunting, lymphostasis of the lower extremities, low growth of hair on the back of the head, anti-Mongoloid incision of the eyes, ptosis, Hypertelorism, deformity or low location of the auricles, asymmetry or triangular shape of the face, wide bridge of the nose, underdevelopment of the upper jaw (micrognatia) and a high arched palate. Sexual development in patients varies from normal to complete gonadal dysgenesis. The boys often recorded and microphone cryptorchidism, oligospermia, with normal or reduced levels of sex hormones (testosterone, estrogen) in the blood. In some cases, patients with children recorded congenital anomalies of the genitourinary system (hydronephrosis, aplasia or hypoplasia of the kidneys). In most patients, there is a pronounced mental retardation.

Among laboratory markers of Noonan syndrome main are: XII factor of blood clotting, testosterone level in blood serum in men is important. With the help of instrumental methods (ECG, echocardiography, chest x-ray), the presence of malformations of internal organs is established. Medical genetics is also consulted [6].

As the cause of NS is a genetic defect, the treatment is symptomatic: replacement therapy with sex hormone drugs, surgical correction of congenital malformations, treatment of mental disorders associated with mental retardation. The prognosis for life is often favorable.

According to the literature, congenital genetic diseases (Noonan syndrome, down syndrome, Shereshevsky–Turner syndrome) may be associated with nonimmune fetal dropsy (hydropsfetalis), with congenital hilotorax against the background of abnormalities of the lymphatic system (lymphangioma, atresia or hypoplasia of the chest duct), with malformations of the lungs and heart, which significantly worsens the prognosis of the disease (mortality up to 50%) [1,2,3,4,5].

Materials and methods

Presents a clinical case of congenital chylothorax in a child with Noonan syndrome who were treated in the resuscitation Department of the regional perinatal center, Kursk.

Own research and discussion of the results. The boy G. was borned from 2nd pregnancies, 2nd childbirth in the 27-year-old woman, with chronic secondary pyelonephritis against the background of congenital malformation (CPR) of the right kidney (partial doubling) and the CDF of the uterus (two-horned uterus). When ultrasoundexamination in the period of 12-13 weeks of gestation was discovered cystic hygroma of the neck of the fetus, previa chorion, subcutaneous edema of

the fetus. The cytogenetic study of chorion villi revealed no abnormalities. At 17 weeks of pregnancy against the background of bronchitis in a woman found markers of VUI, a course of antibiotic therapy in a day hospital. In 20 weeks of gestation re-hospital treatment for amnionitis, the threat of miscarriage ultrasound signs of choroid plexus cyst. In the period 32-33 weeks - ultrasound - signs of non-immune hydrops (right-sided hydrothorax, ascites), polyhydramnios, HVUG, HFPN in decompensation stage.

Childbirth operational for emergency indications in the 33rd week of gestation. The boy was born with the clinic non-immune hydrops of the fetus, with a weight of 2040 g, height 38 cm, head circumference 33 cm, breast circumference-32 cm, with a clinic of severe intranatal asphyxia (Apgar score 2/4). Immediately after birth, the child is connected to the ventilator and for further treatment transferred to the intensive care unit. The condition of the boy from birth and dynamics is extremely difficult due to severe respiratory failure, cerebral disorders on the background of anasarca, bilateral hydrothorax, asphyxia, the risk of intrauterine infection. Expressed syndrome, depression, muscular hypotonia and hyporeflexia. Against the background of mechanical ventilation (ventilator) with parameters (SIMV, PIP20, PEEP5, FiO2-1,0, R50) the child had low saturation parameters during the first hour of life(SO2-80%), sharply weakened breathing in the lower parts of the lungs the abundance of wheezing krepitiruyuschie, increasing the size of the abdomen due to swelling of soft tissues, hepatomegaly (liver +3 cm). Radiographically-signs of bilateral hydrothorac-CA, 1 hour after birth, a puncture of the pleural cavity was performed-120 ml on the right, 20 ml of light yellow liquid on the left. After 2 hours, a repeated decrease in saturation to 85%, x-ray right-hand pneumothorax, drainage with active discharge was established, 350 ml of chylous fluid was isolated per day (table 1).

Table 1

Results of the study of pleural exudates

Date	protein	erythrocytes	leukocytes	lymph: neutral	R. Rivolta
29.08	6,6	3	2560	90%:10%	-
1.09	6,6	10-20	30		-
2.09	19,8	until 50	2155		+
20.09	16,8	20-25	25		+

A course of conservative treatment of chylothorax was initiated, which included drainage of the pleural cavity, a hungry pause, full parenteral nutrition, the appointment of octreotide (5-8 mkg/kg/hour), IVL and anesthesia.

The condition of the child within 1-2 days deteriorated to extremely severe due to the development of severe anemia (HB 125 g/l, HT 35%) and hypotension

(BP 30 mm Hg.St). The treatment involved titration of dopamine, transfusion of erythrocyte mass, continued antibiotic therapy and dehydration. On the 4th day of life the child's condition deteriorated by the clinic of internal combustion engines (skin-hemorrhagic syndrome, renal, gastric KRO-vtechenie, ivh 1-2 tbsp, bleeding from injection sites) on the background of severe bilateral polysegmental pneumonia, complicated with total atelectasis of the upper lobe on the right. In the treatment connected haemostatic therapy (traneksam), plasma transfusion, increased antibiotic therapy by zyvox. The child was transferred to HF-ventilator, drug sedation with fentanyl.

After a comprehensive examination of the child, the phenotype of Noonan syndrome was revealed: multiple congenital malformations - CHD (defect of the inter-mediated heart septum, open arterial duct), fistula of the lymphatic duct with congenital pneumothorax; abnormalities of the genitourinary system (dystopia of renal pelvis, bilateral cryptorchism), kleido-cranial dysplasia, pterygoid fold of the neck, low growth of hair on the back of the head.

In the dynamics of the severity of the condition was due to respiratory failure, resistant to intensive care - expressed oxygen dependence on the background of HF ventilator, Fi02-100%, the development of multi-organ failure due to the development of pulmonary hypertension, and then the formation of the classical form of bronchopulmonary dysplasia against the background of recurrent course of pleuropneumonia in a child with congenital heart disease.

It should be noted that on the background of conservative therapy for 23 days managed to stop chylothorax (picture 1.)

From 24 to 27 days of life on the background of the abolition of octreotide exudation drainage was not. The resumption of exudate drainage is associated with the development of secondary pleurisy, which was confirmed by pathomorphological study.

Thus, in the illustrated case, in a child with Noonan syndrome have had multiple malformations: the heart, the lymphatic duct, thymus gland, urogenital system, were identified as the characteristic external signs of the syndrome: wing warehouse-neck, low hair growth, clinic, cleido-cranial dysplasia. The severity of the disease and the poor prognosis associated with treatment-resistant respiratory failure polietiologichesky Genesis (massive bilateral, then the right-hand utero chylothorax, long-term pleuropneumonia, pulmonary hypertension, the formation of BPD). On the background of conservative therapy, we were able to stop the chylothorax on the 23 day of life. However, the presence of multiple congenital anomalies in the child, the development of secondary pleurisy, multiple organ failure, immaturity of organs and systems were the cause of an unfavorable prognosis in a child with Noonan Syndrome.
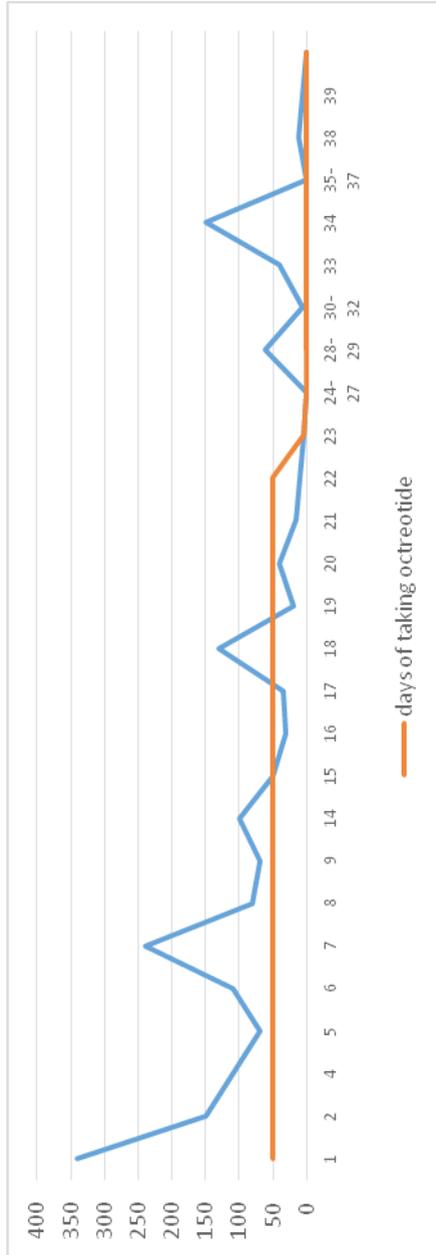
Picture 1.
The volume of pleural exudate (ml/day) in a child with chylothorax within 39 days of life

References

1. Andreev D. A., Verbin O. I. Chylothorax // Volgograd scientific medical journal. 2009. Vol. 4. No. 24. P. 55-58.

2. Downie L., Sasi A., Malhotra A. Congenital chylothorax: associations and neonatal outcomes // Paediatr. Child Health. 2014. Vol. 50. No 3. P. 234–238.

3. Kislyuk G. I., Pakhomov D. A., Agarkova T. A. Spontaneous neonatal chylothorax. In the collection: Modern scientific potential and promising areas of theoretical and practical aspects of the collection of scientific articles on the results of the international scientific and practical conference. 2017. P. 17-20.

4. Kislyuk G. I., Kononenko N. And... Vorotyntsev S. G., Sluggish E. K. Prevalence of hereditary pathology in the Kursk region in the collection: Age-associated and gender features of health and disease-no collection of materials of the International scientific and practical conference. 2016. P. 387-391.

5. Kozlova S. I. Demikova N. So. Hereditary syndromes and medical genetic counseling, St. Petersburg.- 2007.- 448 p.

6. Kucherov Y. I., Yashina E. V., Zhirkov, Y. V., Chebotareva, L. I., Moskvitina, L. N. Treatment of newborn chylothorax, chylopericardium, hemoperitoneum //the Russian Bulletin of pediatric surgery, anesthesiology and critical care medicine. 2016. Vol.6. No. 1. P. 95-99.

儿童和青少年甲状腺疾病的发展障碍谱
THE SPECTRUM OF DEVELOPMENT'S DISORDERS
IN CHILDREN AND ADOLESCENTS WITH THYROID DISEASES

Urmanova Yulduz Makhkamovna
Mavlonov Utkir Khamidovich
Department of endocrinology with pediatric Endocrinology
Bukhara Endocrinology Dispansery
Tashkent Pediatric Medical Institute,
Tashkent

抽象。在儿童内分泌科的员工的监督下，2012年至2016年，RUz的内分泌中心住院治疗了213名患有各种甲状腺疾病的儿童和青少年，其中男孩为-67（31,4 ％），女孩-146（68,5%）。 20名健全的孩子和适当年龄的青少年组成了控制组。

大多数患者处于青少年时期，即11至17岁--147名患者（69.1%），同时多为患病女孩--100名患者为147名（68,0%）。

大部分患者转为先天性甲状腺功能减退症患者 – 94例（44%），第二位 – 混合性甲状腺肿35例（16.4%），第三例 – 弥漫性毒性甲状腺肿30例（占140%），也有1-2度弥漫性甲状腺肿 – 19例（8,9%），自身免疫性甲状腺炎 – 14例（6.5%），多结节性甲状腺肿 – 15例（7,0%） ，尖锐的溃疡性牙龈炎 – 2例（0.9%），乳头状腺癌 – 2例（1.0%）。

对患者进行了不同程度的手术治疗，甲状腺全切除术 – 14例（34%）监测，半切除术最常在此处执行 – 10例（24%），大切除小叶 – 6例（14.5%），等等

关键词：儿童，青少年，甲状腺功能

Abstract. Under supervision of the employees of the department of children's endocrinology the Center of Endocrinology of PH of RUz during from 2012 on 2016 years was hospitalized 213 children and teenagers with various diseases of thyroid gland, from them of the boys was - 67 (31,4%), girls -146 (68,5%). 20 sound children and the teenagers of the appropriate age made the group of the control.

The most of patients were in teenage age, namely from 11 to 17 years - 147 patients (69,1%), were at the same time mostly sick girl - 100 from 147 (68,0%).

Greater part of patients on turned was made by patients with congenital hypothyroidism- are 94 cases (44,1%), on the second place - the mixed goiter is 35 supervisions (16,4%), on the third - a diffusely-toxic goiter is 30 patients (14,0%), and also diffuse goiter of 1-2 degree - 19 (8,9%), autoimmune thyroiditis - 14

(6,5%), multinodular goiter - 15 (7,0%), sharp festering strumitis - 2 (0,9 %), papilliferous adenocarcinoma - 2 (1,0%).

To the patients the different spectrum of surgical help was executed, a total thyroidectomy - 14 (34%) supervisions, hemistrumectomy was most often executed here - 10 (24%) cases, large resection of lobuli - 6 (14,5%), etc.

Key words: *Children, teenagers, thyroidology*

Relevance. Diseases of the thyroid gland (CHD) in children and adolescents are a pressing problem of endocrinology. This is due, on the one hand, to the fact that WHO considers iodine deficiency diseases to be the most common non-communicable diseases. [1, 2, 3].

In terms of iodine deficiency, in addition to increasing the volume of the thyroid gland, the physical, intellectual and sexual development of children is impaired (Ismailov S.I, et al., 2010). According to Ismailov S.I., a direct correlative relationship was found between the degree of pubertal delay and growth in boys and the thyroid status of the subjects (degree of thyroid enlargement, degree of hypothyroidism, TSH level, free thyroxine) [7,8-11].

The constantly changing ecological and radiological environment contributes to an increase in the frequency of thyroid diseases and changes the structure of thyroid pathology. [16-18]. According to WHO experts, iodine deficiency is the most common cause of mental retardation in children, which is easy to prevent [20-22].

Thus, the spectrum of thyroid diseases is wide and besides the most widespread manifestation of iodine deficiency - non-toxic goiter, iodine deficiency can lead to impaired reproductive function and puberty, delayed physical development, as well as delayed intelligence until the formation of severe forms of cretinism and can serve background to increase somatic pathology [8,9,10].

Prevention of iodine deficiency and endemic goiter makes it possible, without great expense in a short time, to significantly improve the population and practically eliminate iodine-deficient diseases and their complications [13-15]. However, in the literature not enough attention is paid to the study of biomedical and socio-hygienic factors that influence the formation of iodine deficiency disorders in children and adolescents. We met a small number of studies on other thyroid diseases in children and adolescents, their characteristics, frequency, epidemiology, and other issues.

However, the practice shows a wider range of thyroid diseases in children and adolescents, the incidence of autoimmune thyroiditis, nodular and multinodular goiter, and cancer [7, 8–12]. At the same time, little work has been devoted to this issue. This was the reason for conducting this study.

The purpose of the study is to study the frequency, characteristics of develop-

ment disorders in children and adolescents with thyroid diseases according to the data of negotiability for the period 2012-2016.

Material and research methods. During the period from 2012 to 2016, 213 children and adolescents with various thyroid diseases were hospitalized, among them 67 (31.4%) boys, and 146 girls (68.5%), under the supervision of the staff of the Department of Pediatric Endocrinology of the RSSPMC Endocrinology named acad. Ya.Kh. Turakulov of PHM RUz.). 20 healthy children and adolescents of the corresponding age constituted the control group.

A complex of studies was performed for all patients, including general clinical (complete blood and urine), biochemical (blood glucose, blood electrolytes, ALT, AST), hormonal (thyroid stimulating hormone (TSH), parathyroid hormone (PTH), free thyroxine (T4), antibodies to thyroperoxidase (A-TPO), prolactin, etc.), ECG, ultrasound of the thyroid gland, internal, genital organs, chest radiography. In addition, patients performed a study of the function of the parathyroid gland - radioisotope scintigraphy. All patients underwent anthropometric studies (target height, centile, growth rate, SDS height and weight, etc.) based on the Tanner-Whitehouse international height-weight map, assessment of the stage of sexual development according to Tanner.

The obtained data were processed using computer programs Microsoft Excel and STATISTICA_6. The mean values (M), standard deviations of the mean (m) were calculated. The significance of differences in the level between the groups was estimated by the magnitude of the confidence interval and Student's criterion (p). Differences were considered statistically significant at $p < 0.05$.

The results of the study and their discussion. Table 1 presents the distribution of patients by sex and age.

Table 1. The distribution of patients by age and in groups (by WHO)

Age, years	Boys	Girls
Until 1 years old	-	-
from 1 to 4 years	2	4
5-10 years	14	35
11-14 years	28	56
15-17 years	19	44
18 – 21 years	4	7
Total	**67**	**146**

As can be seen from table 1, the majority of patients were in adolescence, namely, from 11 to 14 years old - 84 patients (39.4%), while most often girls were ill - 56 out of 84 (66.6%). In the second place were patients of adolescence - from 15 to 21 years: 74 observations (34.7%), among which girls also prevailed - 51

cases (68.9%). Next, we studied the characteristics of thyroid disease in patients (Table 2).

Table 2. Characteristics of thyroid diseases in patients

№	Diseases	Number of patients		Total
		boys	girls	
1	Congenital hypothyroidism	36	58	94 (44,1%)
2	Mixed goiter	8	27	35 (16,4%)
3	Diffuse toxic goiter	4	26	30 (14,0%)
4	Diffuse goiter 1-2 st	8	11	19 (8,9%)
5	Autoimmune thyroiditis	4	10	14 (6,5%)
6	Multinodular goiter	4	11	15 (7,0%)
7	Acute purulent strumitis	1	1	2 (0,9 %)
8	Nodular goiter	1	-	1 (0,5%)
9	Cystic neck	1	-	1 (0,5%)
10	Papillary adenocarcinoma of the thyroid gland	-	2	2 (1,0%)
	total	67	146	213

As can be seen from table 2, the majority of patients were with congenital hypothyroidism - 94 cases (44.1%), in the second place - mixed goiter - 35 observations (16.4%), on the third - diffuse toxic goiter - 30 patients (14 , 0%), as well as diffuse goiter 1-2 St - 19 (8.9%), autoimmune thyroiditis - 14 (6.5%), multinodular goiter - 15 (7.0%), etc. At the same time, in 2 cases (13.3%) out of 15 multinodular goiter was toxic. It should be noted that among the patients there were such diseases as acute purulent strumitis - 2 cases (0.9%), papillary adenocarcinoma - 2 cases (0.9%) , neck cyst - 1 case (0.5%), knots new goiter 1 case (0.5%).

Patients underwent surgical treatment in 41 (19.2%) cases (prof. Ismailov S.I.). As can be seen from the data in Table 3, patients underwent a different range of surgical care, with total thyroidectomy being most often performed - 14 (34%) observations, hemistrumectomy - 10 (24%) cases and extended resection of the proportion - 6 (14.5 %).

Next, we studied the complications of the underlying disease in children and adolescents (Figure 1).
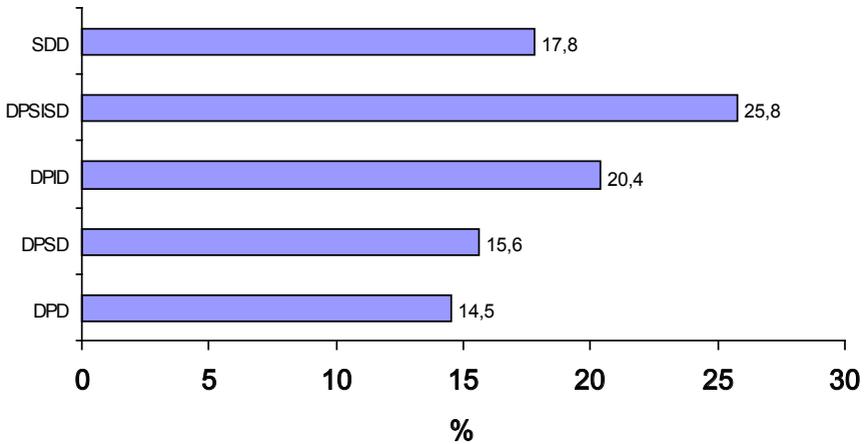
Fig.1. *The development of endocrine complications*
in various diseases of the thyroid gland in children and adolescents (%)

Note: SDD - skeletal development delay, DPSISD-delay of physical, sexual, intellectual, speech development, DPID - delay of physical, intellectual development, DPSD - delay of physical, sexual development, DPD - delay of physical development.

The relationship between thyroid disease and the delayed overall development in children and adolescents is indicated by studies by many authors [2-6]. According to V. Krasnov, children and adolescents living in iodine-deficient regions have significant deviations in their physical development, especially in the presence of EZ. At the same time, a decrease in weight-growth ratios, an increase in the proportion of children with body mass deficiency, reduced values of body surface area, etc. are noted. [eight].

According to our data, the frequency of complications of the main diseases in children and adolescents was as follows: skeletal development delay - 17.8%, physical, sexual, mental, speech development delay - 25.8%, physical and mental development delay - 20.4%, the delay of physical, sexual development - 15.6%, the delay of physical development - 14.5%.

Table 4 gives the average values of the thyroid hormones in patients.

As can be seen from the data in Table 3, our patients had manifest hypothyroidism, that is, a significant increase in TSH was observed against the background of a significant decrease in free thyroxin in the blood compared to the control group.

Table 3. The average values of thyroid hormones in patients

Hormones	Norm	Boys n=67	Girls n=146
TSH	0,17-4,2 ME/ L	3, 42 *± 0,06	3,17* ± 0,08
		Control boys	Control girls
		1, 41 ± 0,03	1,13 ± 0,05
		P < 0,5	P < 0,5
Free thyroxine	11,5 – 23 nmol/l	9,4 *± 0,7	10,5 *± 0,4
		Control boys	Control girls
		17,9 ± 0,4	16,5 ± 0,6
		P < 0,5	P < 0,5

Note * - significant difference compared with the control group.

Discussion of the results. Adolescence is critical from a medical and social point of view (A.A. Baranov, 2001; V.R. Kuchma, J1.M. Sukhareva, 2002; A.G. Ilyin, 2005), including for the formation of the pathology of the thyroid gland. . Timely examination and carrying out a complex of treatment-and-prophylactic measures and correction of functional disorders in the prepubertal period would prevent the formation of goiter, hypothyroxinemia and a number of goiter-associated conditions (delayed sexual and physical development, menstrual disorders, mental disorders) in puberty.

Earlier studies have allowed to assess the severity of goitre endemia and the severity of manifestations of violations of the sexual and physical development of girls of school and adolescence living in iodine deficient regions [10].

Our research also confirms the literature data. Thus, our results require further long-term observation and treatment of patients.

Conclusions.

1) The majority of patients with negotiability were patients with congenital hypothyroidism - 94 cases (44.1%), in the second place - mixed goiter - 35 observations (16.4%), on the third - diffuse toxic goiter - 30 patients (14 , 0%), as well as diffuse goiter 1-2 St -19 (8.9%), autoimmune thyroiditis - 14 (6.5%), multinodular goiter - 15 (7.0%), acute purulent strumitis - 2 (0.9%), papillary adenocarcinoma - 2 (1.0%).

2) The frequency of complications of major diseases in children and adolescents was as follows: skeletal developmental delay — 17.8%, physical, sexual, mental, speech developmental delay — 25.8%, physical and mental retardation — 20.4%, physical retardation , sexual development - 15.6%, physical retardation - 14.5%.

3) Patients underwent a different range of surgical care, with total thyroidectomy being most often performed - 14 (34%) observations, hemistrumectomy - 10 (24%) cases, extended resection of the lobe - 6 (14.5%), etc.

References

1. *Ismailov S.I., Urmanova Yu.M., Mavlyanov U.Kh. / The role of iodine deficiency states in the development of puberty delay in boys "// Methodical recommendations, Tashkent, 2010, 31 p.*

2. *Ismailov S.I., L.B. Nugmanova, M.M. Rashitov, et al. / Dynamics of iodine deficiency disorders in Uzbekistan // International Endocrinological Journal [Electronic resource]. - 2008. - Access mode: http://endocrinology.mif-ua.com/archive/issue-7057/article-7084.html. - Access date: 03/09/2011.*

3. *Ismailov S.I., Karimov M.M., Rashitov M.M. et al. / Results of epidemiological studies, prevalence. Iodine deficiency disorders in the Fergana region of the Republic of Uzbekistan // International Endocrinological Journal, Ukraine, Kiev, 1 (41) 2012, pp. 10-14*

4. *Ismailov S.I., L.B. Nugmanova, M.M. Rashitov, et al. / Situational analysis of the salt market according to enterprises producing iodized salt in Uzbekistan // Journal of Theoretical and Clinical Medicine, Tashkent, 2012, No. 6, p. 16-24*

5. *Ismailov S.I., L.B. Nugmanova, M.M. Rashitov, et al. / Results of monitoring on the implementation of the law of the Republic of Uzbekistan "On the prevention of iodine deficiency diseases" in the regions in 2008 // Journal of Problems of Biology and Medicine, Tashkent, 2010, 1 (60), pp. 109-113*

6. *Krasnov V.M. / Health and development of children living in iodine-deficient region with different anthropogenic load. // Author. dis. ... Dr. med sciences. M., 2001.*

7. *Oleynik, V.A. / Hyperplasia of the thyroid gland norm or pathology? / V.A. Oleinik, E.A. Benikova // Problems of endocrinology. - 1992. - T38. - №4. -WITH. 13-14.*

8. *Metreveli, D.S., K.R. Mikadze, M.O. Gvakharia / Thyroid gland condition in children and adolescents in various regions of the Republic of Georgia // Problems of endocrinology. 1992. - №4. - pp. 25-26.*

9. *Burgi, H., T. Schaffner, J. P. Seiler /The toxicology of iodate: a review of the literature. // Thyroid. 2001. - N 11. - P. 449-456*

10. *K.A. Hansen, S.P. Tho, M. Hanly et al. /Massive ovarian enlargement in primary hypothyroidism // Fertility and sterility. 1997. - Vol. 67, N 1. - P. 169171.*

11. *Delange F. /Iodine deficiency as a cause of brain damage. //Postgrad Med J 2001; 77: 217–20.*

12. *Salarkia N, Mirmiran P, Azizi F. /Timing of the effect of iodine supplementation on intelligence quotients of schoolchildren// Int J Endocrinol Metab 2004; 2: 95–102.*

13. *Delange F. / Iodine deficiency as a cause of brain damage. //Postgrad Med J 2001; 77: 217–20.*

14. *WHO, UNICEF and ICCIDD. Indicators for assessing Iodine Deficiency Disorders and their control through salt iodization. Geneva: WHO, WHO/ Euro/ NUT/ 1994.*

15. *WHO, UNICEF and ICCIDD. Progress towards the elimination if Iodine Deficiency Disorders (IDD). WHO/Euro/NUT/ 1999.*

16. *WHO, UNICEF and ICCIDD. Assessment of Iodine Deficiency Disorders and Monitoring their Elimination. Second edition 2001:1-103.*

幼儿维生素D缺乏的迹象
SIGNS OF VITAMIN D DEFICIENCY IN YOUNG CHILDREN

Zakirova Alfiia Midchatovna
Candidate of Medical Sciences, Associate Professor
Department of Propaedeutics of Children's Diseases and Faculty
of Pediatrics
Kadriev Albert Gamilyevich
Candidate of Medical Sciences
Associate Professor, Department of Pediatric Surgery
Rashitova Elina Lenarovna
Preparator, Department of Propaedeutics of Children's Diseases and
Faculty of Pediatrics
Kazan State Medical University
Ministry of Healthcare of the Russian Federation

抽象。维生素D（VD）的可用性具有很大的相关性，取决于许多因素，其中日晒，营养，地理位置，种族等是最重要的。该研究的目的是根据儿童的社会地位来检查幼儿VD缺乏症的临床症状。

对292名1个月至3岁的儿童进行了检查，形成了两组：主要组别包括来自医疗社会风险组和对照组的儿童，这些儿童来自富裕家庭。入院时，患者的父母和监护人签署了知情同意书。

从入院前3天入院的那一刻起，所有患者都接受了临床和工具性研究方法，专家咨询。使用"Statgrafics"软件进行统计处理。对数据的分析揭示了各种临床诊断和伴随的病症，并且产科病史揭示了妊娠之前和影响怀孕的因素。

超过15%的儿童VD率正常。在生命最初几个月的儿童中，记录了较低的骨化二醇，而在主要组中，缺乏明显显着。饲喂分析表明，每五个孩子中检测到人工喂养长达三个月，七个患者混合喂养。每日剂量500ME的VD在第一年每五个孩子接受一次。

在两组儿童中，在给药期间骨化二醇的水平增加，但在主要组的患者中，记录该指标的较慢增加。因此，作者表明存在负担的前眶背景，对VD覆盖的不充分的摄食负面影响以及第一年没有预防性给药，以及儿童患有医学社会风险的缓慢的钙二醇恢复水平组。有必要为社会健康风险群体的儿童开发单独的VD剂量，以使血清中代谢物的指标正常化。

关键词：儿童，维生素D，不足，医疗和社会风险

Abstract. Vitamin D (VD) availability is of great relevance and depends on many factors, among which insolation, nutrition, geographic location, race, and so on are most important. The purpose of the study is to examine the clinical signs of VD deficiency in young children, depending on their social status.

292 children aged 1 month to 3 years were examined and two groups were formed: the main group, which included children from the medical-social risk group and the comparison group, which were children from wealthy families. Upon admission, parents and guardians of patients made out informed consent.

From the moment of admitting to hospital during the first 3 days, all patients underwent clinical and instrumental methods of research, expert consultations. Statistical processing was carried out using the "Statgrafics" software. Analysis of the data revealed a variety of clinical diagnoses and concominant conditions, and obstetric history revealed factors that preceded and influenced pregnancy.

Over 15% of children had normal VD rates. In children of the first months of life, lower rates of calcidiol were recorded, and in the main group the deficiency was significantly pronounced. Feeding analysis showed that artificial feeding for up to three months was detected in every fifth child, seven patients were mixed feeding. VD in a daily dose of 500ME received every fifth child in the first year.

In children of both groups, there was an increase in the level of calcidiol during the administration of the drug, but in patients of the main group a slower increase in this indicator was recorded. Thus, the authors showed the presence of a burdened premorbit background, a inadequate feeding negative effect on the VD coverage and the absence of its prophylactic administration in the first year, as well as a slow calcidiol recovery level in children from the medical-social risk group. It is necessary to develop individual VD doses for children from groups of social health risks in order to normalize the indicators of its metabolites in blood serum

***Key words:** children, vitamin D, insufficiency, medical and social risk*

RELEVANCE

According to international studies, the provision of vitamin D (VD) is of extreme relevance [1, 2, 3]. Its level depends on nutrition, geographical location, race, existing pathological conditions that prevent the normal synthesis of VD and others [4]. To assess the balance of VD in the body, it is advisable to study the content of its metabolic products 25-hydroxycholecalciferol (25 (OH) D) and 1,25-dehydroxycholecalciferol (1.25 (OH) 2D) [5, 6]. It is noteworthy that the Negroid race with a lower level of 25 (OH) D, compared with Caucasoid, does not have clinical signs of VD deficiency [8, 9].

According to modern data, 1,25 (OH) 2D is a hormone that significantly exceeds the activity of 25 (OH) D [11]. The formation rate of 1.25 (OH) 2D depends on the concentration of phosphate, calcium, parathyroid hormone (PTH), and, by

the feedback mechanism, the concentration of PTH is influenced by the levels of ionized calcium and the metabolite 1.25 (OH) 2D in plasma [13]. Indicator of the security VD is the content in serum 25 (OH) D. At the present stage, regulatory indicators and permissible deviations of the VD level in the human body are revised. Thus, it is considered adequate to have a VD content of 30-70 ng / ml, hypovitaminosis - a level less than 10 ng / ml, VD deficiency - below 20 ng / ml, borderline insufficiency - 21-29 ng / ml, avitaminosis - less than 5 ng / ml [5, 6]. The key to the full development of the child is an adequate level of VD in the mother's body during pregnancy and feeding, since 25 (OH) D is freely transported through the placenta [7, 8].

With a VD deficiency in the mother's body, the risk of diabetes, autoimmune pathology, delayed fetal brain formation, and so on increases [9]. Children with intrauterine deficiency have a low vitamin status at birth. In infancy, especially who are breastfed babies taking prophylactic doses of VD, also have a low level of provision [10, 11]. Infants represent a risk group for the development of VD deficiency due to the physiologically high skeletal growth rate.

In the northern latitudes, among children born in the autumn months, there is a high risk of VD deficiency due to the inability to stay for a long time for a walk, which inhibits its synthesis in the skin. However, the development of hypovitaminosis is possible in the southern regions due to smog, cloudiness, application of sunscreen on the skin, shading during walks, et cet. [12]. Thus, for young children, prophylactic doses of the drug 500 IU per day are insufficient to realize the fullfill functions of VD [13]. The mechanism of development of its deficiency in the body is important to consider when prescribing drugs VD.

Objective of work.

To examine the signs of vitamin D deficiency in young children depending on their social status

PATIENTS AND METHODS

Under medical supervision there were 292 children aged from 1 month to 3 years in the period 2013-2018 who are in the children's hospital of the State Autonomous Healthcare Institution "Central State Clinical Hospital №18". Two groups were formed: the main group included children from the medical-social risk group, the comparison group included children from well-off families who are in hospital for examination for acute respiratory diseases and functional disorders of the gastrointestinal tract. Upon admission, parents of patients signed out informed consent.

From the moment of hospitalization during the first 3 days, all patients underwent clinical and instrumental methods of research, expert consultations. The

results of the examination of children by a pediatrician in the history of the disease and an individual registration card specially designed for the study were recorded daily. The determination of serum calcidiol was carried out by the laboratory service of the company "Ephis" in Moscow. Calcidiol level was interpreted according to American Academy of Pediatrics, 2010. Calcidiol level from 30 to 70 ng / ml was taken as standard values, reserve deficiency - 20-30 ng / ml, low security - 10-20 ng / ml, hypovitaminosis - less than 10 ng / ml and vitamin deficiency - less than 5 ng / ml. Statistical processing was carried out using the "Statgrafics" software. Reliable considered the results at p <0.05. Characterization of the obtained data was performed using standard deviation.

RESEARCH RESULTS

Analysis of the data revealed a variety of clinical diagnoses and related conditions, and obstetric history revealed factors that precede and influence pregnancy. Thus, among antenatal factors, the age over thirty years at the time of conception, the interval between previous pregnancies of less than three years, the presence of chronic diseases of internal organs were recorded. In $32.47 \pm 4.7\%$ of cases, the pathological course of pregnancy was noted (toxicosis, threatened abortion, hypertension, gestational pyelonephritis and anemia).

In $27.48 \pm 5.3\%$ of women the chronic alcoholism, psychoactive substances administering, venereal diseases were diagnosed. In 41.3% of cases, multivitamin preparations were taken during pregnancy at a daily dose of VD and calcium of no more than 500 IU and 125–200 mg, respectively.

Analysis of the VD sufficiency in children at admission showed that 16.17% had its normative content. More than 1/3 children of the first year of life, every fifth child of the second year of life and half of children of the third year of life had reduced rates

Figure 1 shows the dynamics of VD provision (ng / ml) of patients depending on age. As can be seen from the presented data, calcidiol values below 15 ng / ml were observed in children of the third year of life.
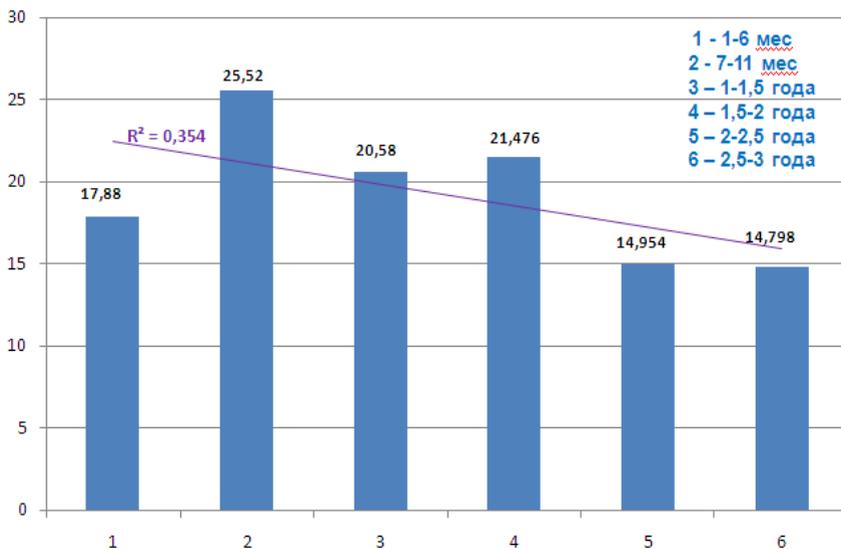
Figure 1. *Dynamics of vitamin D provision (ng / ml)*
of the examined patients depending on age
(мес. month., год(а) years)

Figure 2 shows the dynamics of VD provision in children in the first year of life. Thus, in children of the first months of life, lower rates of calcidiol were recorded, and in the main group the deficiency was significantly pronounced.

Feeding exclusively or predominantly with breast milk was detected in children of the first half of the year of life. Artificial feeding up to three months was found in every fifth child, seven patients were mixed feeding.

$42.33 \pm 3.2\%$ of children in adapted milk formulas turned out to be unadapted or partially adapted baby food (шт socially disadvantaged families). Lures were introduced by age. VD in a daily dose of 500ME received every fifth child in the first year.

Feeding exclusively or predominantly with breast milk was detected in children of the first half of the year of life. Artificial feeding up to three months was found in every fifth child, seven patients were mixed feeding. $42.33 \pm 3.2\%$ of children in adapted milk formulas turned out to be unadapted or partially adapted baby food (socially disadvantaged families). Lures were introduced by age. VD in a daily dose of 500ME received every fifth child in the first year.
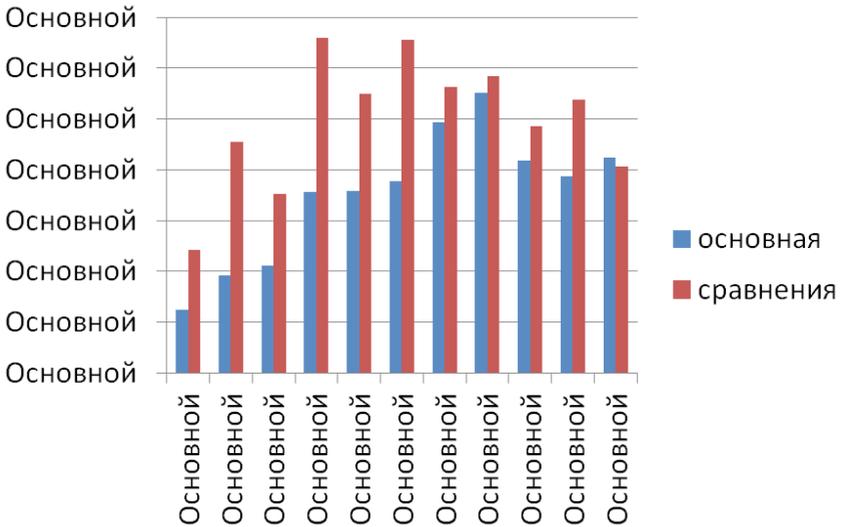
Figure 2. Dynamics of vitamin D provision in the first year of life
of the children examined
(основная - main group, сравнения - comparison group)
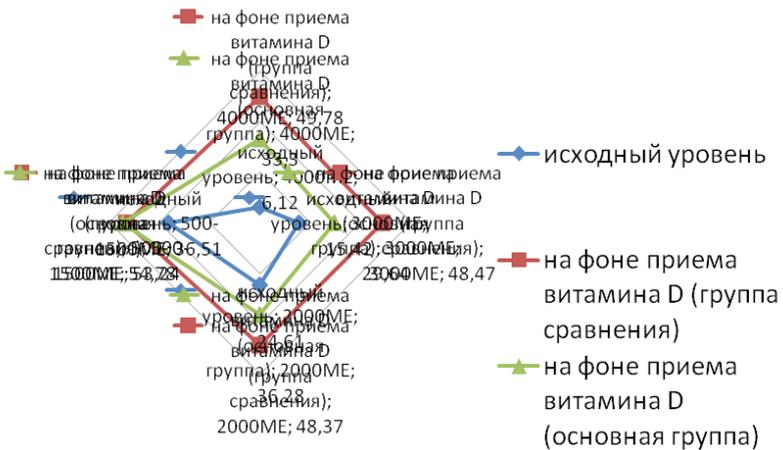
Figure 3. Dynamics of increase in the level of calcidiol (ng / ml) of serum in children
who received an aqueous solution of vitamin D in the therapeutic dose, depending
on the initial level (blue - initial level; red - on the background of vitamin D intake
(comparison group); green - on the background of taking vitamin D (main group))

Conclusion

1. Our studies have shown a negative effect on the provision of vitamin D inadequate feeding and the lack of its prophylactic administration in the first year of children from the medical-social risk group.

2. Slow recovery of serum calcidiol level on the background of a therapeutic dose of an aqueous solution of vitamin D in children of the main group compared with children of the comparison group was regarded by us as burdened with premorbitic background.

3. It is necessary to develop individual doses of vitamin D for administering by children from groups of medico-social risk in order to normalize the indicators of its metabolites in serum.

References

1. Federal clinical guidelines. Vitamin D deficiency in adults - diagnosis, treatment and prevention. 2015.

2. I.N. Zakharova, S.V. Maltsev, T.E. Borovik, G.V. Yatsyk, S.I. Malyavskaya, I.V. Vakhlova, T.A. Shumatova, E. B. Romantsova, F.P. Romanyuk, L.Ya. Klimov, N.I. Pirozhkova, S.M. Kolesnikova, V.A. Kuryaninova, T.M. Tvorogova, S.V. Vasilyeva, M.V. Mozzhukhina, E.A. Yevseyev. Vitamin D deficiency in young children in Russia: results of a multicenter cohort study of FAMILY (2013–2014). Questions of modern pediatrics. - 2014. - vol. 13, №6. - P.30-34.

3. Chen TC, Chimech F, Lu Z., Mathieu J. Holick MF. Factiors that influence the cutaneous synthesis and dietary sources of vitamin D. Arch. Biochem Biophys. 2007 Apr 15;460(2):213-217.

4. The national program "Vitamin D deficiency in children and adolescents in the Russian Federation: modern approaches to correction." - M.: 2015. - 112 p.

5. Cashman KD, Hayes A, Galvin K, Merkel J, Jones G, Kaufmann M, et al. Significance of serum 24,25- dihydroxyvitamin D inthe assessment of vitamin D status: a double-edged sword? Clin Chem 2015;61:636 –45.

6. Zakharova I.N. What you need to know a pediatrician about vitamin D: New data on the diagnosis and correction of its deficiency in the body. / I.N. Zakharova, O.A. Gromov // Pediatrics. - 2015. - volume 94, №6. - p. 1-7.

7. Johnsen MS, Grimnes G, Figenschau Y, Torjesen PA, Almas B, Jorde R. Serum free and bio-available 25- hydroxyvitamin D correlate better with bone density than serum total 25-hydroxyvitamin D. Scand J Clin Lab Invest 2014;74:177– 83.

8. Carter G.D., Phinney K.W. Assessing Vitamin D Status: Time for a Rethink? Clinical Chemistry, June 2014, vol. 60, no. 6, pp. 809-811.

9. Powe CE, Evans MK, Wenger J, Zonderman AB, Berg AH, Nalls M, et al. Vitamin D-binding protein and vitamin D status of black Americans and white Americans. N Engl J Med 2013;369:1991–2000.

10. Jones G, Prosser DE, Kaufmann M. Cytochrome P450- mediated metabolism of vitamin D. J Lipid Res 2013; 55:13–31.

11. Bikle D. Vitamin D and Immune Function: Understanding Common Pathways. Curr. Osteoporos. Rep. — 2009;7:58-63.

12. Holick M.F. Vitamin D and Healht: Evolution, Biologic, Functions, and Recommended Dietary Intakes for Vitamin D // Clinic Rev. Bone. Miner. Metab. — 2009. — 7. — P. 2-19.

13. Gutierrez OM, Farwell WR, Kermah D, Taylor EN. Racial differences in the relationship between vitamin D, bone mineral density, and parathyroid hormone in the National Health and Nutrition Examination Survey. Osteopor Int 2010;22:1745–53

分析后牙接触面比例
ANALYSIS OF THE POSTERIOR TEETH CONTACT SURFACE PROPORTIONS

Prokhorova Olga Victorovna
Candidate of Medical Sciences
Associate Professor of the therapy dentistry and periodontology department of the Pavlov University
Shefov Vladimir Yurevich
4th year student of the dentistry faculty of the Pavlov University

抽象。 获得了臼齿和前磨牙的接触表面的比例。 进行了后牙冠颊韧带直径的体内测量。 开发了齿冠宽度与接触点的高度和尺寸之比的公式。
关键词 接触点，比例，近似表面，2级龋齿，后牙
Abstract. The proportions of the contact surfaces of molars and premolars were obtained. The in vivo measurements of the buccolingual diameter of posterior teeth crowns were made. The formula for the ratio of the tooth crown width to the height and size of the contact point was developed.

Key words. Contact point, proportions, approximal surfaces, class 2 caries, posterior teeth

Introduction. Caries class 2 treatment involves teeth contact point restoration. Successful reproduction allows preserving contact physiological functions: ensuring proper chewing function, preventing food from getting stuck in the interdental gap, protecting the gingival papilla and periodontal attachment [1]. It should be borne in mind that for the proper formation of the teeth contact point it is necessary to know well its anatomy, so it is still a subject for study. There are many indications of general patterns in the structure of interdental contacts of molars and premolars. A number of studies indicate that the contact point is located in the middle third, has an oval shape, as well as a tendency to decrease in height from premolars to molars [2]. However, we noticed the absence of exact numerical proportions of the contact surface of posterior teeth.

Aim. To make the measurements of the posterior teeth approximal surface and to make up the numerical proportions of their crowns.

Materials and methods. Computerized tomograms of patients, which were used for the study, were selected according to the following criteria:

1). The absence in patient anamnesis of accelerated tooth wear

2). The patients don't have periodontal diseases

3). The teeth, which were studied, were sound and didn't have a caries in anamnesis

4). The patients were from 18 to 30 years old
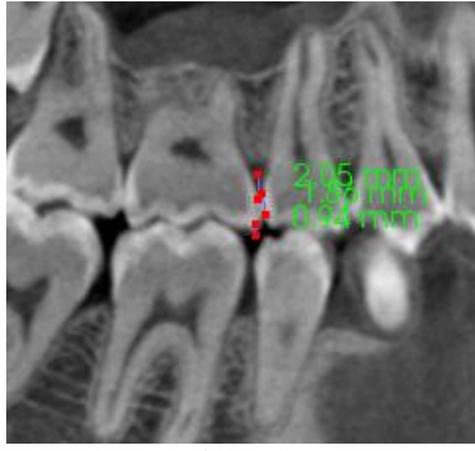
Fig. 1 The study of the molars and premolars crowns proportions

Thus, 50 images were selected. During the analysis in the InVivoDental program (Fig. 1), by measuring the teeth by a ruler (part of the software) with an error of 0.001 mm, the main parameters (213 indicators) were entered in the table: the crown height from the cervical part of the tooth to the cusps, the distance from the cervix to the contact point, the size of the contact point itself, the distance from it to the cusp, the position of the contact and its shape. Later in Excel, a correlation between these parameters was determined and a final analysis of the data was performed.

In addition to tomogram analysis, we made the in vivo measurements of the buccolingual diameter of the posterior teeth with orthodontic calipers. The study involved 10 people aged 18 to 30 years old living in Saint-Petersburg.

Fig. 2 In vivo crown width measurements

Results and discussion. After processing all the data obtained, the relative proportions of the crowns of posterior teeth were calculated. They are listed in table 1.

We noticed the following features of the anatomy of the contact point. Firstly, the upper teeth contact point has a 9% (Δ1.1) decrease in height of the crown from premolars to molars, thus, using the example of the first upper molar, we see that if the contact is on the mesial side at a height of 47% (Δ4, 3) from the height of the tooth crown, then with the distal it is already at the level of 38% (Δ3.5). It was also noticed that the contact between the teeth of the upper jaw is shifted vestibularly relative to the center of the tooth crown. The size of the contact point has a slight tendency to increase in the maxillary molars.

The situation is different in the Mandibula; the height of the contact point is almost the same between the medial and distal sides of the tooth; its size, like in the Maxilla, increases towards the molars, but not significantly. It is important to notice the peculiarity of the position of the contact point. Between the premolars, contact is in vestibular position, and between the molars it is in the middle of the tooth. The form of the contact point in the studied patients was round (oval), however, according to statistics [1], this indicator has an individual character.

Measuring the width of the posterior teeth crowns made it possible to draw up a proportion of the ratio of the crown buccolingual diameter to its height. These proportions are shown in table 2.

Thus, we observed the following pattern: each next tooth has both a wider and a lower crown.

Table- 1 Posterior teeth crowns proportions

Maxilla

Parameter	Values
The form of the contact point	oval
Contact position	Vestibular
The difference in contact point height between the medial and distal side of the tooth (%)	9(Δ1,1)
Contact point size (%)	33(Δ5,1) 30(Δ5,3) 30 (Δ5,1)
Contact point height (%)	41(Δ3,3) 50(Δ4,3) 38(Δ3,5) 47(Δ4,3) 40(Δ3,7) 36(Δ3,8) 49(Δ4,0) 36(Δ3,9) 68(Δ4,3)

Mandibula

Parameter	Values
Contact point height (%)	33(Δ2,9) 33(Δ3,1) 33(Δ3,8) 33(Δ4,7) 33(Δ3,2) 39(Δ4,3)
Contact point size (%)	32(Δ4,8) 3(Δ0,5)
The difference in contact point height between the medial and distal side of the tooth (%)	0 —
Contact position	In the center of the crown Vestibular
The form of the contact point	Oval Circular

Table- 2 The ration of the crown diameter to its height

	Tooth number	4	5	6	7
Maxilla	The ration of the crown buccolingual diameter to its height	1:1,05	1:1,05	1:1,46	1:1,57
Mandibula	The ration of the crown buccolingual diameter to its height	1:0,88	1:1	1:1,40	1:1,42

The data in the tables allowed us to create a formula that allows the clinician to obtain the physiological height or size of the contact point (Y).

Y=A*B*C, where

A - buccolingual diameter of the crown of the tooth (can be measured with an orthodontic caliper)

B - the ratio of the width of the crown to its height (table 2)

C- percentage data on the height or size of the contact point (table 1)

This formula allows the doctor to predict the required size and height of contact between the posterior teeth knowing only the buccolingual diameter of the tooth crown.

Conclusion. The obtained data of the contact point proportions and position can be used by the dentist for the anatomically and physiologically correct restorations of the contacts between the posterior teeth.

References

1. Shu- Fen Chuang, Kuo- Chih Su, Chung- Hsiang Wand, Chih- Han Chang Morphological analysis of proximal contacts in class II direct restorations with 3D image reconstruction //Journal of dentistry — 2011 — №39 — p. 448- 456

2. Stanley J. Nelson WHEELER'S Dental Anatomy, Physiology, and Occlusion — Las Vegas: Elsevier, 2015. — 350 p.

非药剂技术的发展前景，以增加俄罗斯的就业潜力
DEVELOPMENT PROSPECTS OF NON-MEDICAMENT TECHNOLOGY TO INCREASE EMPLOYMENT POTENTIAL OF RUSSIA

Kulikova Natalya Gennadyevna
Head of physiotherapy PFUR, Doctor of Medical Sciences
Professor Lecturer in physiotherapy PFUR
Volkova Inna Vladimirovna
Candidate for a degree of the Candidate of Medical Sciences
Laboratory of the Department of physiotherapy PFUR
Bezrukova Olyga Vycheslavovna
candidate for a degree candidate of medical sciences
Peoples' Friendship University of Russia (RUDN University)
Moscow, Russia,

注解。　在文章中，由于加强非医疗方法的应用和制定康复方案，设计了改善俄罗斯人口的新方法的权宜之计，这将消除儿童不利的趋势增长和共同死亡率，改善生活质量　并减少对残疾人，儿童/青少年，年龄较大的患者的药理压力。　标签：非药物治疗，公共卫生，物理治疗，康复，理疗：非药物治疗，公共卫生，物理治疗，康复，物理治疗

Annotation. In the article the expediency of devising new ways of improvement of the Russian population due to intensifying the application of non-medical methods and the development of rehabilitation programmes, that would eliminate the unfavourable trend growth of child and common mortality, improve the quality of life and reduce the pharmacological stress on persons with disabilities, children/ adolescents, patients older age groups. Tags: non-medication treatment, public health, physiotherapy, rehabilitation, physiotherapy: non-medication treatment, public health, physiotherapy, rehabilitation, physiotherapy

Introduction. Projects aimed at prophylaxis of chronic pathology and oncological diseases cannot be based only on diagnostic technology. Important events to change the mentality of the patients towards their health, nutrition, physical activity, widespread use of wellness not medical methods of treatment, including physiotherapy and active sports-terrenkurnyh. In this regard, the development orientation of the population informed units of different age groups with regard to risk factors, on-

copathology, degenerative and vascular disease plays a pivotal role [2]. Understandably increased percentage of adolescent smokers 15 years and older, increasing the number of women smokers, including among pregnant women (from 2015 to 2018 g.g. increase from 32.4% to 38.5%), which according to 2018 years higher than in the EU in 20-22 times, due to the weak development socially-oriented information technology [3]. Low motivation of health among the population, low health literacy on critical risks leading pathologies, not the high level of beneficial (hardening, UV-recreation, sports games, industrial discharge, a diet program) program, form an army of working-age patients, including viral and infectious diseases, the incidence of which is increasing every year, among both children and adult population) [1; 4].

All of the above translates into high levels of infant mortality (almost the last place in the EU), high risks of complicated pregnancy and continued high levels of maternal mortality [1; 4]. On indicators of maternal mortality and life expectancy, projected Russia (72.7 years) continues to be one of the last places in Europe (after Mexico) [3].

Modern reproductive technology cannot solve the complex questions of increasing the birth rate remains high, while dominant negative risk factors (smoking, low physical activity, eating healthy foods, not party drinks type of Coca-Cola carbonated products, heavily salt and structurally altered products, including GMOs) among the younger generation, pregnant and lactating mothers. On the other hand, rehabilitation and recovery technology based on high-tech is not medical treatment practices, provide increased balance sheet health level (cell therapy, combined methods comprehensive rehabilitation, physiotherapy and physical culture terrenkurnaja, chiroplastic massage, ozone therapy, laser and bioresonance therapy) and provide preventive fizioprofilakticheskoe [2; 4].

Socio-economic situation is directly linked to the somatic and mental health, as well as mortality. Consider the relationship of mortality in Russia GDP and compare the data with the neighboring former republics of the CIS COUNTRIES (Moldova, Georgia and Azerbaijan). In terms of GDP per capita in the world and in Russia, it can be stated that the revenues in Russia is noticeably higher than the income of many former Soviet republics, where maternal, infant mortality and much lower [1; 4; 6].

It is clear that Russia has not taken adequate measures to improve the situation on these indicators. Because a higher level of GDP was in Russia for over ten years, we can say that during this time there have been no adequate material and institutional measures to improve health and social conditions in the country. Anyway, the decline in mortality is extremely slow: to achieve the current level of the EU, starting in 2010, for the maternal mortality need to be 7 years infant mortality must be 6 years, for 10 years is pure mortality [6].

Note, as above, that assessment made here cannot be seen as predictions of

possible development. It can be argued that the speed of reaching the level of the EU, even if the site selection faster change is very small now. Estimates show the ineffectiveness of the rate of development of today's health level, and efforts in the country measures are not effective and adequate in the current exceptional situation.

Currently, you can only assume that the country is taking measures to remedy an early stunting of social conditions and the quality of life of citizens, which generally focused on improving the DAW (currently 72.7 years), the greatest growth which had been only according to 2005-2009, when there were analyzed the direct linear regression for Russia and the EU [6]. In recent years, surveillance (2016-2018) the increase in Russia is extremely slow with an apparent prospect of equalizing to 2031-2035, which makes the problem increasing life expectancy to level 78 years, anyway, the coming years [3; 5-6].

Significant increase of the labor potential of the country is impossible without also healing the young generation, which should apply not only high-tech treatments, but legislatively imposed health technology, to improving the cultural, psychological and physical health, as it has been proven that one of the factors of reducing gender difference of DAW is to improve the social, physical and psychological well-being of the population and level of medical awareness [2]. It follows that now in Russia there is an opportunity to escape from the situation of instability only by developing radical measures aimed at: reducing financial polarity in population Wednesday, intensifying the health, Prevention and rehabilitation programmers, improving cultural, mental and physical health of the nation, preservation of family values, improving social security in the country, raising the level of social security in the country, not medical methods and health-preserving technologies available not only for privileged categories of citizens.

References

1. Rams A.A., Albickij V.Y. *Under-five mortality rates of the population of Russia. - M.: 2007, Literra, 328 p.*

2.   Kulikova N.G., Derygina L.E., Bezrukova O.V. *Jekogennye risks diskogennoj regeneration and modern ways of gomestaziologicheskoj physiotherapy/correction/human ecology, 2018; No. 2; c. 124-129.*

3. Prohorenko N.F. *towards advances in life expectancy is 78 years in Russia// medical education week: Science and practice-2018: proceedings of the international scientifically-practical Conference, m.: PFUR, 2018. c. 22-29.*

4. Sukhanova L.P., Sklyar M.S. *Infant and perinatal mortality in Russia: trends, structure, risk factors. - Ekaterinburg, public health development of countries and Russia//Civilization of knowledge: modernizing Russia: proceedings of the eleventh international scientific conference, Moscow, 23-24 April, 2010 г.-m.: Rosnou, 2010. c. 52-58.*

5.   A. Sokurov. *Meeting at intersections. Economic strategies, no. 5/2011 c. 52-57.*

6. Tarko A.M. *Best alternative Idea of a high-tech country-a leader in global dynamics. Analysis and simulation of development of countries and Russia. Civilization of knowledge: modernizing Russia: proceedings of the eleventh international scientific conference, m.: Rosnou, 2014. c. 52-58*

7. World Development Indicators. *World Bank, 2017, http://databank.worldbank.org/ddp/home.do., 20017.*

昼夜节律作为红外热成像在北极地区应用的影响因素（综述）
CIRCADIAN RHYTHM AS INFLUENCE FACTOR OF INFRARED THERMOGRAPHY APPLICATION IN ARCTIC ZONES (REVIEW)

Nasution Abdillah Imron
Syiah Kuala University
Banda Aceh, Indonesia;
Pankov Mikhail Nikolaevich
Northern (Arctic) Federal University named after M.V. Lomonosov,
Arkhangelsk, Russia;

抽象。工作原理之一是通过确定热图案特征的方法之一是红外热成像。这种技术可能受外部因素特别是昼夜节律的影响。为了通过红外热成像进行研究，解释有关北极地区的永久居民和临时居民之间的昼夜节律的研究仍然有限。本文的目的是回顾可能影响北极地区红外热成像应用的分析和解释的昼夜节律。在PubMed，Medline，Web of Science数据库和Google Scholar上进行了电子搜索，目的是对昼夜节律中可能影响红外在北极地区应用的三个因素进行文献分析。研究发现，这些变化受生物钟控制，生物钟在人体内位于称为视交叉上核的两个脑区。昼夜周期也同步取决于足够强度的光和褪黑激素的分泌。基于此，昼夜节律有三个因素会影响北极地区红外线的应用。这三个因素如下：足够强度的光，视交叉上核和神经递质。
关键词：北极地区，昼夜节律，红外热成像

Abstract. One of method which working principle is by determining the thermal pattern characteristics is Infrared Thermography. This technique may influenced by external factor particularly circadian rhythm. Study which explained concerning circadian rhythm between permanent and temporary resident in Arctic Zones in order to conduct research through infrared thermography is still limited. The aim of this article is to review circadian rhythm that may influence both analysis and interpretation of infrared thermography application in Arctic Zones. An electronic search was conducted across PubMed, Medline, Web of Science databases, and Google Scholar for the purpose of literature analysis of three factors in circadian rhythm that can affect the application of infrared in the Arctic Zones. Studies have found these changes are governed by a biological clock, which in human is located in two brain areas called the suprachiasmatic nuclei. The circadian cycle also synchronized depend on light of sufficient intensity and secretion

of melatonin. Based on this, there are three factors in circadian rhythm that can affect the application of infrared in the Arctic Zones. The three factors are as follows: Light of sufficient intensity, suprachiasmatic nuclei, and neurotransmitter.
Keywords: *Arctic Zones, Circadian Rhythm, Infrared Thermography*

Introduction

The indication of using thermal imaging has established for tens of centuries. Presently, thermal body pattern is one of the best indicators of health status in humans. Thermal configuration of body can define the alterations in the human body. The change of body thermal patterns are a potential indication of a pathological process [1]. Thermal pattern examinations are thought of an advancement in common medical strategies. One of method which working principle is by determining the thermal pattern characteristics is Infrared Thermography.

Since infrared thermography capability was recognized to detect many groups of diseases at once, the use of infrared thermography in humans was more intensive on its applications as a diagnostic tool. This approach enable either medical or veterinary practitioners to specify the localization of purposeful changes and able to discover signs of diseases in a pre-clinical stage. Data result and reliability of thermal imaging close to 100% and for primary examinations concerning 80% [2]. Besides, as a non-invasive and lowcost technique, infrared thermography does not cause discomfort in patients. This method is totally safe and easy to execute. Even for additional frequent use, the amount of security is incredibly safe. This technique permits to be used in pregnant women and kids [3].

One of disadvantage of infrared thermography is this technique may influenced by external factor. The external factor particularly circadian rhythm may influence by natural characteristics of the environment where the infrared thermography method is performed. Unlike individual factors that more controllable, circadian rhythm factors are very difficult to control in Arctic Zones.

Study which explained concerning circadian rhythm between permanent and temporary resident in Arctic Zones in order to conduct research through infrared thermography is still limited. The aim of this article is to review circadian rhythm that may influence both analysis and interpretation of infrared thermography application in Arctic Zones.

Discussion

Geographical areas of Arctic Zones included were Canada, Greenland, Denmark, Iceland, Norway, Sweden, Finland, Alaska, and the northern parts of Russia were areas had an Arctic climate [4]. The population of the Arctic regions is 4 million people, spread over a large geographical area, in an ecosystem highly adapted to a harsh and sensitive climate. Many of the permanent residences live and work with limited access to daylight and cold temperature. Meanwhile, environment

factor in the Arctic cause diverse health risks not only for permanent residents. The Centers for Disease Control (CDC) of U.S. confirmed that temperature-related deaths between 2006 and 2010 showed that 63% were attributable to cold exposure, while only 31% were attributable to heat exposure [5].

One of the contributors to the increasing number of temporary residents in the Arctic Zones is international students. Mostly, the international students enter Russian Universities came from tropical countries. In 2016 range of foreign students' enrolments in Russian Federation are 244.597 students. During the year, the amount of students from tropical countries in Russian universities increased by 17%. The number of students from India enhanced by 20% and from China enhanced 10%. Ministry of Education of country conjointly explicit students from Vietnam concerning 3.1 thousand and from African countries were 11 thousand people already received in Russian universities in 2015-2016 [6].

Cold temperatures, adverse weather conditions, and prevailing darkness in winter are among the many challenges of making research in the Arctic Zones. People living in Arctic Zones may experience more seasonal variations in sleep patterns and problems than people living in tropical country. In many situations during the winter, temporary residents are restricted in movement and causing internal desynchronize of sleep. These conditions may influence a biological process for the rhythmicity which is known as circadian rhythm. As known, the daily light-dark cycle governs rhythmic changes in the behavior and/or physiology of people. Studies have found that these changes are governed by a biological clock, which in human is located in two brain areas called the suprachiasmatic nuclei. Moreover, the circadian cycle can be synchronized depend on light of sufficient intensity and secretion of melatonin [7]. Based on this, there are three factors in circadian rhythm that can affect the application of infrared in the Arctic Zones. The three factors are as follows: Light of sufficient intensity, suprachiasmatic nuclei (SCN), and neurotransmitter.

1. Light of sufficient intensity

The change of circadian rhythm in Arctic Zones related to light of sufficient intensity. Light of sufficient intensity is the main factor that maintains the 24-h period of human circadian rhythms [8]. In the Arctic Zones, people are deprived of natural sunlight in winter and have continuous daylight in summer. The typical impact during the winter months is increased sleeplessness and sleep problems have been reported more often during winter than during summer. The sun in Arctic Zones is absent between mid-November and mid-January. Although the sun is absent, it does not become pitch black even at winter solstice. The sky is still deep blue at midday, but the intensity is dim and of short duration [9]. Consequently, living in continual daytime or nighttime can causing sleep, mood and productivity problems for people living in Arctic Zones.

Moreover, the circadian rhythm and its influence on body temperature demonstrated higher skin temperature were during the evening and more stable before 12 pm [10]. It is confirmed that daily activity directly influences skin temperature variations. Human more active in area with sufficient light. This has been proven by interesting findings that effect of circadian rhythm's described depending on the area of the body being examined [11].

2. Suprachiasmatic Nuclei

The suprachiasmatic nuclei (SCN), acting as circadian pacemakers, have the function of orchestrating the timing in physiology and behavior. The SCN control circadian rhythms in other parts of the brain, such as the cerebral cortex, in the pineal gland, and in peripheral tissues such as liver, kidney and heart [12]. The SCN as a circadian rhythm can not only produce its own rhythm, but can also be affected by the dark-light cycle of the environment. It is further known that SCN, rearranged photoreceptive and as well as phototransductive [13].

It has identified that The SCN responds to light entering the eye, and so is sensitive to cycles of day and night. In the evening the core body temperature and proximal skin temperature rise in contrast to distal skin temperature, the opposite effect seems to take place in the morning [14]. During this time when light relayed from the retina hits SCN in the hypothalamus, the production of neurotransmitter in the pineal gland is suppressed. During the evening, neurotransmitter secretion again increases and induces drowsiness [15]. Light as a trigger and the SCN transforms this information into neural signals that set the body's temperature. Small changes in body temperature can send a powerful signal to the clocks in our bodies. Consequently, a small change in internal body temperature synchronize cellular time of the body automatically and heat emitted by the body converted into electrical signals and infrared thermography detector's response that into thermogram result. This is may influence the interpretation of the thermal pictures of infrared thermography.

3. Neurotransmitter

Studies have indicated the presence of a large number of neurotransmitters in the SCN. Lack of light intensity of the human body in Arctic Zones associated to secretion of melatonin [12]. Neurotransmitters like melatonin has been implicated in the functioning of the SCN. Melatonin known as an important factor for sleep–wake cycles is influenced by light should influence circadian rhythms and sleep timing. [16] The SCN is the most important target of melatonin, because of the high melatonin receptors density are placed in SCN. In melatonin, SCN has a dual effect, direct effects and long-term effects. As a direct effect, melatonin is found to suppress neuronal SCN activity at night [17] Therefor, in the circadian phase, acceleration of sleep initiation with stimulation of waking time by SCN is played by melatonin. Meanwhile, in terms of long-term effects, melatonin can strengthen the circadian rhythm of SCN. [18] This implies that melatonin levels can affect the body's ability to adapt to extreme cold and day-lenght in Arctic Zones

This clearly suggested that three factors of circadian rhythm are as follows: Light of sufficient intensity, suprachiasmatic nuclei (SCN), and neurotransmitter may influence both analysis and interpretation of infrared thermography application in Arctic Zones.

References

1. *Romanovsky, A. A. Review-Skin temperature: its role in thermoregulation. Acta Physiol, 2014; 210: 498–507.*

2. *Durnovo, E. A., Potekhina, YU. P., Marochkina, M. S., Khomutinnikova, N. E., Yanova, N. A. Features of Infrared Thermography in The Diagnosis of Complex Diseases of Maxillofacial Region. Modern problems of science and education, 2012; 4.*

3. *Sheiko, E. A., Kozel, Yu. Yu., Triandafilidi, E. I., Shikhlyarova, A. I. Remote infrared thermography as an auxiliary method in the diagnosis and treatment of hemangiomas in children up to a year. International j. applied and fundamental. Researches, 2015; (9-2): 302–304.*

4. *Hedlund, C., Blomstedt, Y. and Schumann, B. Association of climatic factors with infectious diseases. In the Arctic and subArctic Zones: a systematic review Glob Health Action, 2014; 7: 241–61, http://dx.doi.org/10.3402/gha.v7.24161.*

5. *Berko, J. et al. Deaths attributed to heat, cold, and other weather events in the United States, 2006–2010. National Health Statistics Reports, No. 76. Hyattsville, MD: National Center for Health Statistics, U.S. Centers for Disease Control and Prevention (30 July 2014). Available: http://www.cdc.gov/ nchs/data/nhsr/ nhsr076.pdf [accessed 30 September 2015].*

6. *Federal State Statistics Service (Rosstat). Russia In Figures 2017, Statistical Handbook- Moscow, 2017.*

7. *Johnsen, M. T., Wynn, R., Bratlid, T. Is there a negative impact of winter on mental distress and sleeping problems in the subarctic: the Tromsø study. BMC Psychiatr, 2012; 12: 1–6.*

8. *Vitaterna, M. H., Takahashi, J. S., Turek, F. W. Overview of circadian rhythms. Alcohol Res Health, 2001; 25(2): 85–93.*

9. *Friborg, O., Bjorvatn, B., Amponsah, B., Pallesen, S. Associations between seasonal variations in day length (photoperiod), sleep timing, sleep quality and mood: a comparison between Ghana (5) and Norway (69). J Sleep Res, 2012; 21: 176–84.*

10. *Miyakoshi, N., Itoi, E., Sato, K., Suzuki, K., Matsuura, H. Skin temperature of the shoulder: circadian rhythms in normal and pathologic shoulders. J. Shoulder Elbow Surg. /Am. Shoulder Elbow Surg, 1998; 7: 625–628.*

11. Dawson, D., van den Heuvel, C. J. Integrating the actions of melatonin on human physiology. Ann Med, 1998; 30: 95–102.

12. Reppert, S. M., Weaver, D. R. Coordination of circadian timing in mammals. Review Nature, 2002 Aug 29; 418(6901): 935–41.

13. Lucas, R. J., Peirson, S. N., Berson, D.M., Brown, T. M., Cooper, H. M., Czeisler, C. A., Figueiro, M. G., Gamlin, P. D., Lockley, S. W., O'Hagan, J. B., Price, L. L., Provencio, I., Skene, D. J., Brainard, G. C. Measuring and using light in the melanopsin age. Review. Trends Neurosci, 2014 Jan; 37(1): 1–9.

14. Zisapel, N. Circadian rhythm sleep disorders: pathophysiology and potential approaches to management. CNS Drugs, 2001; 15: 311–28.

15. Zhdanova, I. V., Lynch, H. J., Wurtman, R. J. Melatonin: a sleep-promoting hormone. Sleep 1997; 20: 899–907.

16. Macchi, M., Bruce, J. Human pineal physiology and functional significance of melatonin. Front Neuroendocrinol, 2004; 25: 177–95.

17. Van den Top, M., Buijs, R. M., Ruijter, J. M., Delagrange, P., Spanswick, D., Hermes, M. L. Melatonin generates an outward potassium current in rat suprachiasmatic nucleus neurones in vitro independent of their circadian rhythm. Neuroscience, 2001; 107: 99-108.

18. Lockley, S. W., Skene, D. J., James, K., Thapan, K., Wright, J., Arendt, J. Melatonin administration can entrain the free-running circadian system of blind subjects. J Endocrinol, 2000; 164: 1–6.

METABOLOMICS - THE BASIS FOR THE DEVELOPMENT OF A NEW PHARMACEUTICAL SUBSTANCE OF PLANT ORIGIN

Sorokina Alla Anatolievna
Doctor of Pharmaceutical Sciences
Professor at the Department of Pharmaceutical Science
"First Moscow State Medical University named after I.M. Sechenov"
of the Ministry of Healthcare of the Russian Federation
Institute of Pharmacy
Tikhomirova Ekaterina Alekseevna
Postgraduate at the Department of Pharmaceutical Science
"First Moscow State Medical University named after I.M. Sechenov"
of the Ministry of Healthcare of the Russian Federation
Institute of Pharmacy
Gudkova Alevtina Alekseevna
Candidate of Pharmaceutical Sciences
Associate Professor
Voronezh State University

注解。 使用许多药用植物的例子，已经表明，植物代谢组合物的详细研究允许开发用于创新药物制剂的新的草药药物。

关键词：药用植物，代谢产物，药用植物药材Dioscorea nipponica L.，Dioscorea opposita Thunb。，Iris pseudacorus L.，Melilotus officinalis Mill.。，Urtica dioica L.，Polygonum persicaria L.，Polemoniun coeruleum L.

Annotation. *Using the example of a number of medicinal plants, it has been shown that a detailed study of the plant metabolome composition allows to develop new herbal pharmaceutical substances for the innovative medicinal preparations.*

Key words*: medicinal plants, metabolom, pharmaceutical substance of plant origin Dioscorea nipponica L., , Dioscorea opposita Thunb., Iris pseudacorus L., Melilotus officinalis Mill., Urtica dioica L., Polygonum persicaria L., Polemoniun coeruleum L.*

The history of use in medicine of medicinal plants goes back thousands of years. But even now, herbal remedies are widely used for therapeutic and prophylactic purposes. This is explained by the combination of a wide range of biological activity and relative safety in phytopreparations.

Plant low concentrated extracts due to the large number of various biologically active compounds (BAS) have multidirectional effects and can be used for the simultaneous treatment of several functional diseases. This makes them ideal drugs of the bioregulatory model of medicine, the main purpose of which is to restore the autoregulation in the disturbed biological networks that cause the disease by supporting the autoregulatory system with complex drugs.

The final goal of bioregulatory medicine is always to maximize the optimization of the patient's autoregulatory reserve, including natural mechanisms of self-regulation support. Joint disorders in several diseases are a potential problem from the point of view of the bioregulatory approach to treatment. Favorable is the ability to regulate several disrupted biological networks at once through a targeted impact on their common molecular chains.

Bioregulatory drugs can be prescribed either independently of each other or in various combinations, especially in the presence of chronic diseases with multiple concomitant cascade disorders of the body functions. Bioregulatory medicine is indicated for the treatment of the majority of patients seeking medical help today [1].

Metabolomics, representing a set of bioinformatics and modern instrumental methods for determining the medicinal plant metabolome, makes it possible to find out the main BAS of the low molecular weight metabolome fragment. Based on the obtained data, to check by specific markers the authenticity of the used medicinal plant materials (MPM), to monitor the composition of BAS in its all organs, and to search for new medicinal plants.

Knowledge of the nomenclature of secondary low-molecular metabolites in a medicinal plant successfully allows us to more address the issues of "through" standardization in the sequence: medicinal plant → pharmaceutical substance of plant origin → medicinal plant preparation [2,3]. Perennial studies of medicinal plants conducted at Sechenovsky University confirm these points in practice.

In the 70s of the twentieth century dioscorea nipponian raw material (*Dioscorea nipponica L.*) was used in the USSR as a source for "Polisponin" obtaining, which is the sum of water-soluble steroid saponins and recommended as a hypocholesterinemic agent, due to the low diosgenin content. Dioscorea opposita (*Dioscorea opposita Thunb.*), known by the name "Chinese yam", is the most ancient cultivated plant of China and Japan, used both as a medicinal and as a food.

An in-depth study of the metabolome of dioscorea nipponian rhizomes with roots and dioscorea opposita rhizomes revealed the presence in the raw material of both species, polysaccharides, flavonoids, tannins, organic acids, amino acids in addition to steroid saponins. In rhizomes with roots of dioscorea nipponian, ascorbic acid is absent (unlike rhizomes of the dioscorea opposita).

In experiments on animals (mice) on the model of alloxan diabetes, the presence of a hypoglycemic effect of polysaccharides isolated from the rhizomes of the dioscorea opposita was shown. It is statistically significant ($p < 0.05$) that polysaccharides reduce the glucose blood level in the of animals and contribute to an increase in their weight. The immunomodulatory effect of rhizome extract with dioscorea nipponian roots on the immune system of adjuvant arthritis was found out. The introduction of the extract led to an increase in rat weight and thymus index, and also reduced the spleen index. In animals treated with dioscorea extract, the levels of all studied cytokines (IL-1, IL-6, IL-8, TNF-α) in the serum and in the synovial fluid were statistically lower ($p < 0.05$) than in not treated animals [4,5,6].

Marsh iris (iris yellow) *Iris pseudacorus* L. has an extensive resource base in the European part of Russia, in Western Siberia, in the Caucasus. It is well cultivated, unpretentious to the growth conditions. Rhizomes of marsh iris are widely used in traditional medicine as an antimicrobial, expectorant, diuretic, hemostatic agent. In 1972, this raw material was allowed for medical use in the USSR as a component of the M.N. Zdrenko Species. Conducted in-depth study of marsh iris rhizomes showed that the potential of this plant raw material is not fully disclosed. Polysaccharides, pectic substances, tannins, flavonoids, mainly isoflavones, saponins, organic acids, essential oils are present in objectes studied.

On standard strains of microorganisms and fungi by the method of agar diffusion, the antimicrobial activity of rhizomes of marsh and iris was experimentally confirmed. It has been established that aqueous extracts are active against yeast-like fungi. Alcohol extracts are more effective against gram-positive and gram-negative bacteria. A detailed study of marsh iris rhizomes metabolome and the study of its pharmacological properties in the concept of development of domestic drugs and phytonering showed a great potential of raw materials [7, 8, 9].

Melilotus herb (*Melilotus officinalis Mill.*) is currently have limited medical use in Russia. It is part of the sedative Species No. 3, which is applied internally in the form of an infusion, and "Melilotus" granules are used in homeopathy. of The metabolome analysis of melilotus herb revealed the presence of flavonoids, tannins, saponins, polysaccharides, ascorbic acid, free organic acids and amino acids besides coumarins in the raw materials.

Flavonoids of melilotus herb are represented by 12 compounds: rutin, hyperoside, luteolin-7-glucoside, 5 kaempferol glycosides and 4 quercetin glycosides. On the basis of the data above, the possibility of a soft dosage form (ointment) obtaining as a venotonic agent from melilotus herb was considered [10,11].

A comprehensive study of hydrophilic BAS and the mineral composition of nettle folia (*Urtica dioica L.*) metabolome, proved the presence of tannins, saponins, polysaccharides, flavonoids (rutin, luteolin, quercetin), coumarin scopoletin, ascorbic acid, caffeic and chlorogenic acids. The results obtained allow us to consider the nettle leaves not only as a source of vitamin K (a lipophilic compound) with a hemostatic effect [12,13,14].

Together with the Voronezh State University, a study of metabolomes of *Polemoniun coeruleum L.* and *Polygonum persicaria L.* was carried out. In the 60s of the 20th century, the USSR pharmaceutical industry produced a liquid extract of Polygonum persicaria, which was used as a hemostatic agent.

The use of modern physico-chemical analytic methods allowed us to obtain new information on the BAS composition of Polygonum persicaria and to give them a quantitative assessment. Mass spectra of 62 of organic substances were obtained; 17 compounds were identified: 3 substances of alcoholic nature (erythritol, glycerin, xylitol), 4 sugars (D-fructose, D-fructopyronose, galactopyronose, sucrose), 2 substances of anthocyanin nature, gallic acid, isoflavone , 2 fatty acids (palmitinic, stearic), ribothymidine and phytosterol, various organic acids (pyroslicic acid, etc.).

The composition of the plant metabolome includes minerals. The content of the main macro- and microelements (phosphorus, potassium, calcium, magnesium, manganese, copper, molybdenum, zinc, chromium, etc.) was studied in Polygonum persicaria herb.

Data on antioxidant activity and membrane-stabilizing action, which is not inferior to the adaptogenous activity of leading plants can be used in further pharmacological studies to expand the field of use of its raw materials and preparations [15,16,17].

The composition of the plant metabolom includes minerals. The content of the main macro- and microelements (phosphorus, potassium, calcium, magnesium, manganese, copper, molybdenum, zinc, chromium, etc.) was studied in the grass of the mountaineer of the kidney stone. Data on antioxidant activity and membrane-stabilizing action, which is not inferior to the activity of the leading plant adaptogens, can be used in further pharmacological studies to expand the field of use of raw materials and preparations based on moth pickles [15,16,17].

Rhizomes and roots of *Polemónium caerúleum* are traditionally used in the form of a decoction as an expectorant. Triterpene saponins are officially recognized active ingredients of this plant. The study of the whole complex of its BAS and its distribution throughout the plant's organs showed that Polemónium caerúleum contains a significant amount of flavonoids. The herb, which is currently a waste when harvesting raw materials, is especially rich in them. In experiments on healthy animals in glucose-tolerant test, the hypoglycemic effect of polemónium caerúleum liquid extract was shown.

The hypoglycemic activity of the extract was less pronounced than glibenclamide, but it was characterized by a more favorable pharmacological profile : unlike glibenclamide, the liquid extract of polemonium herb did not reduce fasting glucose and the blood glucose concentration was below normal values, which avoided the risk of hypoglycemia. Thus, the liquid extract of polemonium

herb can be considered as a plant-related regulator of prandial glycemia. In addition, membrane-stabilizing and high antioxidant activities were detected for plant flavonoids [18, 19, 20].

Thus, the results of an in-depth study of the metabolome and pharmacological properties of medicinal plants currently falling into the "forgotten" category show the promise of this raw material for obtaining innovative ready-made medicines. The conversion of medicinal plant materials, which is based on the implementation of a metabolic approach to its study, allows to obtain new types of pharmaceutical substances of plant origin.

References

1. Smith A. Bioregulatory medicine: practical aspects. Farmatsiya, 2017; 1: P. 42-47

2. Sorokina A.A. Rudakova I.P., Samylina I.A. A systematic approach to the analysis of medicinal plant materials used for the manufacturing of aqueous extracts. Materials of the II scientific-practical conference "Modern requirements for medicinal plant materials and medicinal plant preparations." Sechenovsky Bulletin, 2014; 1 (15): 105

3Marakhova A.I., Sorokina A.A. Zhilkina V.Yu. Physico-chemical methods in the analysis of medicinal plants and herbal preparations. - Moscow: "Your format", 2017; 307.

4. Sorokina AA, Bu Wei. Study of the immunomodulating effect of saponins of dioscorea in arthritis. Farmatsiya, 2014; 3: 45–48.

5. Bu Wei, Sorokina AA, Study of the composition of hydrophilic biologically active substances of Nippon dioscorea. XXIV Moscow International Homeopathic Conference "The Development of the Homeopathic Method in Modern Medicine": conference materials. M., 2014; 149–150.

6. Bu Wei, Sorokina AA, Study of the composition of biologically active substances of the dioscorea opposita. Scientific-practical conference with international participation, dedicated to the 30th anniversary of the Department of Pharmacognosy and Pharmaceutical Technology of the Yaroslavl State Medical Academy: conference materials. Yaroslavl, 2014; 61–63.

7. Tikhomirova E.A. Sorokina A.A. The study of the hydrophilic fraction of biologically active substances of the marsh iris rhizomes (Iris pseudacorus L.) V scientific-practical conference "Modern aspects of the use of plant materials and raw materials of natural origin in medicine." - Moscow: Ed. Ist MSMU, 2017; 214-217.

8. Tikhomirova E.A. Sorokina A.A. Marakhova A.I. Rhizomes of marsh iris: antimicrobial activity. Farmatsiya, 2017; 66 (7): 42-45.

9. Tikhomirova E.A., Sorokina A.A. Marsh iris: chemical composition and pharmacological effects. Farmatsiya, 2018; 67 (2): 13-15. DOI 10.29296 / 25419218-2018-02-02.

10. Schemelinina T.V., Sorokina A.A. The study of the hydrophilic fraction of biologically active substances of Melilotus officinalis. "Ways and forms of improving pharmaceutical education. Creation of new physiologically active substances. Proceedings of the VI International Scientific and Methodological Conference "Pharmaceutical Education - 2016". Voronezh: edit. House VSU, 2016; 612–615.

11. Schemelinina T.V., Sorokina A.A., Vedenina M.V., Kozlova Zh.M. Getting a soft dosage form with Melilotus officinalis herb extract. Materials of the II scientific-practical conference "Modern requirements for medicinal plant materials and medicinal plant preparations." Sechenovsky Bulletin, 2015; 1 (19): 138-140.

12. Skalozubova T.A., Marakhova A.I., Fedorovsky N.N., Sorokina A.A. Polysaccharides in the leaves and infusion of Urtica dioica. Farmatsiya, 2012; 2: 5–7.

13. Skalozubova T.A., Marakhova A.I., Sorokina A.A. Determination of the sum of free organic acids and vitamin C in raw materials and infusion of Urtica dioica. Collection of scientific papers of the II Russian Phytotherapeutic Congress. - Moscow: 2010; 223-225.

14. Skalozubova T.A., Marakhova A.I., Sorokina A.A. The amount of flavonoids in the leaves and infusion of Urtica dioica. XXI Moscow International Homeopathic Conference "The development of the homeopathic method in modern medicine." Theses of reports. - Moscow: 2011; 196-198.

15. Chistyakova A.S., Slivkin A.I., Sorokina A.A., Maltseva A.A. et al. Evaluation of the membrane-stabilizing effect of drugs of Polygonum persicaria. Bulletin of the Voronezh State University. Ser. Chemistry. Biology. Pharmacy., 2014; 4: 140 - 143.

16. Chistyakova A.S., Sorokina A.A., Maltseva A.A. and others. Phytochemical analysis of the herb of the Polygonum persicaria. Sechenovsky Bulletin, 2014; 1 (15): 113-114.

17. Chistyakova A.S., Slivkin A.I., Maltseva A.A., Sorokina A.A. and others. The study of the antioxidant activity of the Polygonum persicaria herb. "Ways and forms of improving pharmaceutical education. Creation of new physiologically active substances. Proceedings of the V International Scientific Methodical Conference "Pharmaceutical Education 2013". Voronezh, 2013; 590-592.

18. Maltseva A.A., Sorokina A.A. Polemonium coeruleum: chemical composition, pharmacological properties. Pharmacy, 2010; 5: 54-56.

19. Maltseva A.A., Sorokina A.A. Polemonium coeruleum herb is a promising source of triterpenic saponins. Farmatsiya, 2011; 7: 13–16.

20. Maltseva A.A., Sorokina A.A., Brezhneva T.A., Slivkin A.I. Evaluation of the hypoglycemic effect of the Polemonium coeruleum preparation. Farmatsiya, 2010; 2: 18-20.

来自废水残渣和啤酒糟的基质中"Staratel"杂交种的堆肥蠕虫的蚯蚓
VERMICULTIVATION OF COMPOST WORMS OF THE "STARATEL" HYBRID IN SUBSTRATES FROM WASTEWATER RESIDUES AND BREWER'S GRAINS

Moiseev Alexey Alekcsandrovich,
master student
Nakonechny Nikolay Vladimirovich,
Candidate of Biological Sciences, Leading Researcher
Surgut State University,
Institute of Natural and Technical Sciences,
Surgut, Russia

注解。 介绍了城市供水和啤酒厂废谷物废水的实验性蚯蚓栽培结果。 研究了蚯蚓Eisenia foetida杂交种"Staratel"的最佳底物，即在有机废物的各种基质样品中的存活，生长和繁殖。
关键词：废谷物，废水残留物，赤子爱胜蚓（Eisenia foetida）。
Annotation. The results of experimental vermicultivation from the waste water of the city watersupply and the brewery spent grain are presented. The optimal substrates for earthworms Eisenia foetida hybrid "Staratel" the survival, growth and reproduction of in various samples of the substrate with organic waste have been estimated.
Keywords: spent grain, residuals from wastewater, Eisenia foetida.

Today, the problem of waste growth is increasingly being discussed. The current situation in the handling of waste has a negative impact on the environment and human health. Currently, there are four basic methods for the disposal of household waste: burial, incineration, composting, recycling.

The most beneficial for production, safe for human health, nature and the environment is the method of recycling household and industrial waste. But this method requires a high ecological culture, modern technologies, material costs, the separate waste collection organization. Our city is just beginning to learn the proper use of waste, and, as one of the practical methods, is the processing of organic waste using earthworms (Nakonechniy, Turbina, 2016).

The problem of recycling organic waste is one of the urgent topics in the urban ecology. The rational resource use allows to reduce the burden environment. Organizations of the city, which carry out activities for of organic waste disposal, using recycling technologies, bring a positive effect, saving natural resources, and even renew them (Illarionov, Kalashnikova, 2002; Igonin, 2002).

The use of earthworms for the organic fertilizers production is now gaining wide popularity. Vermicomposting allows to use various safe wastes as fertilizer, which have a positive effect on the growth, rooting and stress resistance of plants, as well as improve soil properties.

In temperate countries, the muckworm *Eisenia foetida* and its subspecies *E.f.foetida*, *E.f.andrei*, are widely used; the common earthworm *Lumbricus terrestris*, the epigeic earthworm *Lumbricus rubellus* and the earthworm *Dendrobaena veneta*. Of the many types of earthworms, the most productive and suitable for organic waste processing technologies was the muckworm *Eisenia fetida* (Gilyarov, Striganova, 1978; Gilyarov, Krivolutsky, 1985; Igonin, 2002).

The aim of the work is to identify the survival of *Eisenia foetida* earthworms hybrid "Staratel" in various soil samples with different composition of solid household waste containing toxic substances.

Tasks are set: to find out in which substrate the survival and reproduction of earthworms will be observed; at what stage will the greatest number of earthworms be grown.

During the experiment, the following substrates were used: depleted greenhouse soil (hereinafter referred to as "sand") with a total humus content of 2.7%, liquid residues of the urban sewage (LRSew), waste grain from brewery, sawdust of softwood and small-leaved species, a microbiological additive preparation "Tamir", and of 10 worms *Eisenia foetida* hybrid "Prospeaker" (480 immature individuals were involved). The experiment was divided into 3 stages: stage 1 - 30 days, stage 2 - 90 days, stage 3 - 150 days. For each variant of the mixed substrate there were of three replications of their ratios, presented in the table.

The calculation of chalk volume introducing for the low acidity soil before laying the worms performed by the formula:

$$D=0{,}05*Hr*h*d;$$

D – norms of lime,
Hr – hydrolytic acidity per 100 g.,
h – the thickness of the arable layer cm^3,
d - bulk soil mass.

Table. Variants of substrates and their ratio

Smpl.№	Substrate (gr, ml) with earthworms of 10 young individuals	Smpl.№	Substrate (gr, ml) with earthworms of 10 young individuals
A 2	sand 500 : LRSew 120	B 2	sand 500 : LRSew 120 : Tamir 100
A 3	spent grain 300 : LRSew 120	B 3	spent grain 300 : LRSew 120 : Tamir 100
A 4	sawdust 100 : LRSew 120	B 4	sawdust 100 : LRSew 120 : Tamir 100
A 5	sand 200 : sawdust 50 : spent grain 100 : LRSew 120	B 5	sand 200 : sawdust 50 p: spent grain 100 : LRSew 120 : Tamir 100
Б 2	Sand 500 : LRSew 120	Г 2	Sand 500 : LRSew 120 : Тамир 100
Б 3	spent grain 300 : LRSew 120	Г 3	spent grain 300 : LRSew 120 : Tamir 100
Б 4	sawdust 100 : LRSew 120	Г 4	sawdust 100 : LRSew 120 : Tamir 100
Б 5	sand 200 : sawdust 50 : spent grain 100 : LRSew 120	Г 5	Sand 200 : sawdust 50 : spent grain 100 : LRSew 120 : Tamir 100

After weighing and laying the worms into the sample, tanks A3, B3, B3 and G3 were excluded from further analysis, as the worms died in the period from 15 minutes (in samples A3 and B3) to one week (in samples B3 and G3). The pH ranged from 7.4 to 8.1 units. We believe that the rapid worms death caused with release of cadaveric venom - kadaverin, and the cause of death only after a week is associated with the addition of the "Tamir" additive.

At the end of the first month, the pH values in the samples began to grow and reached 8 units or more (Figure 1). After the end of the second stage, the indicators were 1 or 1.5 units higher than the original data, with the exception of sample B2.2. At the end of the third stage, in all samples, the pH was not observed above 7.5 units, and in samples A2.3 and B2.3 it reached the initial value.

The quantitative growth of worms in the first stage was observed in samples B5.1, B5.1, and G5.1, maturation of the young and the appearance of cocoons occurred (Fig. 2). In several samples, quantitative growth was not observed, remained immature or partially died. After the end of the second stage, the high increase, also remained in the samples - A5.2, B5.2 and B5.2, it should be noted the increase in samples A2.2, B.2.2 and D5.2.

 In a number of tests, quantitative growth was not observed, so in A4.2, B2.2 and B.4.2, maturation of surviving individuals occurred, and in samples G2.2 and G4.2 the worms were immature. At the end of the third stage, a significant increase was observed in samples B5.3 and G5.3, also insignificant in A5.3. In a number of samples from group B and C, the worms did not ripen, there were no cocoons and in sample B 5.3 all worms died.

The weight characteristics of the mass of young and mature individuals among the above samples were noticeably different from the initial indicators (Fig. 3). From the first stage, the total number of worms in the samples A5.1, B5.1, B.2.1, B5.1 and D5.1 has doubled. At the second stage, A2.2, A5.2 and B5.2. At the end of the third stage, A5.3 and G5.3 doubled the increase, and in the B5.3 sample it increased three times.

Thus, experiments have shown that the most productive in the quantitative and mass increase of the compost worm are suitable substrates of the mixed soil group with or without a microbiological additive. The use of clean brewer's spent grain with residues of wastewater, and on sawdust is not productive. A substrate is required which will have good absorbing ability to isolate from cadaverine excretion and retain beneficial substances.

References

1. Gilyarov M.S., Striganova B.R. The role of soil invertebrates in the decomposition of plant residues and the cycle of substances // Zoology of invertebrates. Soil zoology. - 1978. V. 5. - p. 8–69.

2. Gilyarov M.S., Krivolutsky D.A. Life in the soil. - Moscow: Young Guard, 1985. - 191 p.

3. Ilarionov S.A., Kalashnikova I.G. Bioconversion of organic waste using vermicultivation // Earthworms and soil fertility: materials of the I International Conference. Vladimir, November 21–23, 2002 - Vladimir, 2002. - p. 34–36. (

4. Igonin A.M. How to improve soil fertility tenfold with the help of earthworms. - Moscow: Marketing, 2002. - 30 p.

5. Nakonechny N.V., Turbina I.N. Survival of earthworms of a hybrid "Prospector" in soil containing solid household waste // Scientific Tobolsk - 2016: Materials of the XIII All-Russian Scientific and Practical Conference (with international participation) (Tobolsk, November 10-11, 2016). - Tobolsk: Print Express LLC, 2016. - p. 71-74.
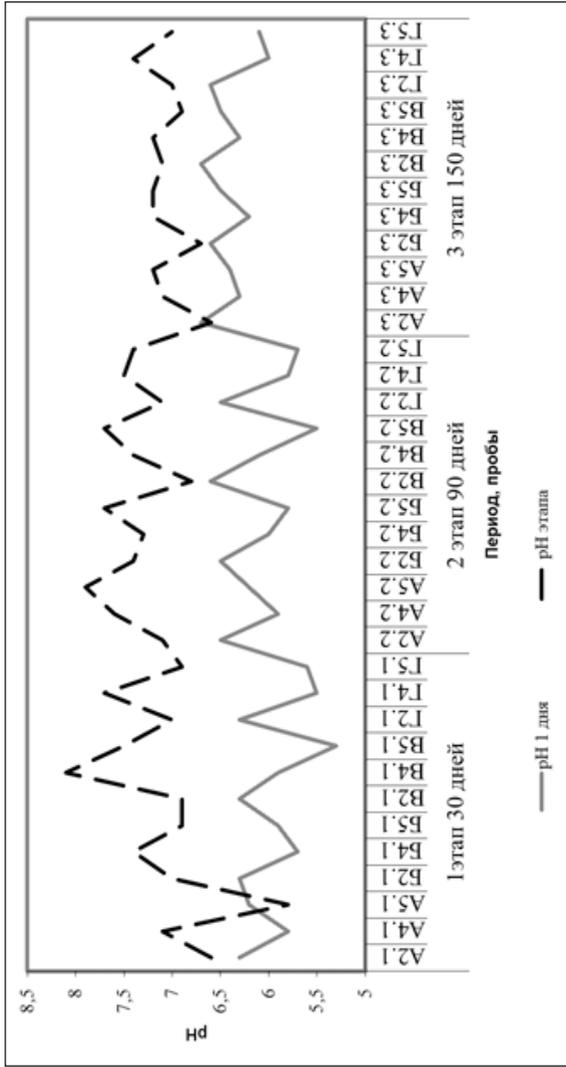
***Figure 1.** pH values in substrates sampling frequency (период пробы) : stage 1 30 days – (1 этап 30 дней); 2 stage 60 days – (2 этап 60 дней); stage 3 150 days - (3 этап 150 дней).*
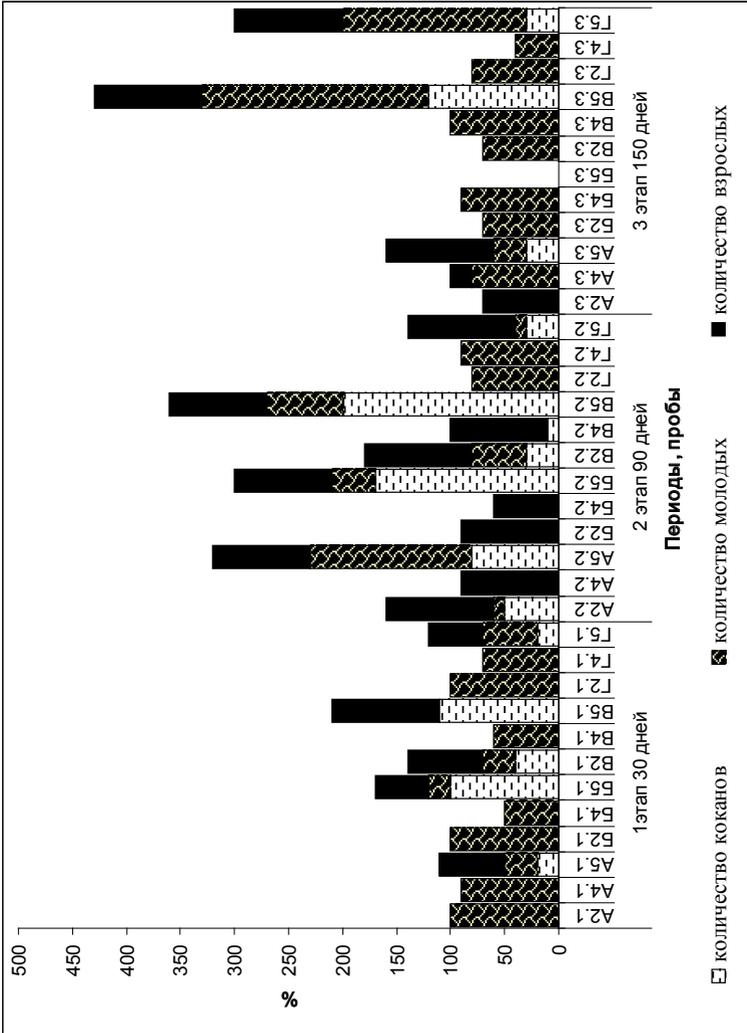
Figure 2. *Quantitative increase in earthworms amount of cocoons (количество коконов);*
number of young (количество молодых), number of adults (количество взрослых); sampling frequency (периоды пробы) :
stage 1 30 days – (1 этап 30 дней); 2 stage 60 days – (2 этап 60 дней); stage 3 150 days - (3 этап 150 дней).
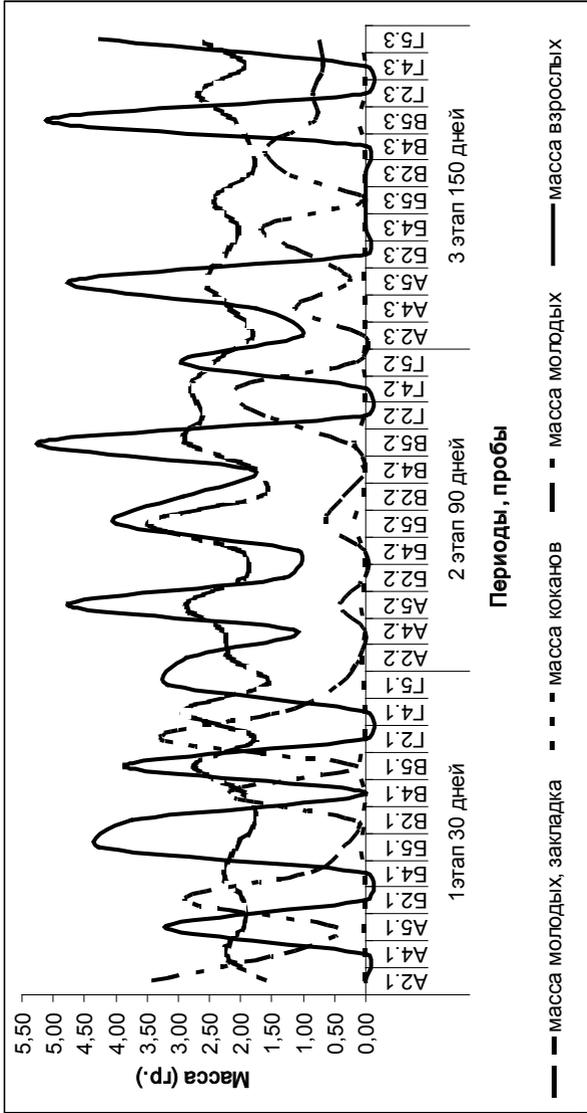
Figure 3. Earthworm biomass increment sampling frequency (период пробы): 1 stage 30 days – (1 этап 30 дней);
2 stage 60 days - (2 этап 60 дней); 3 stage 150 days - (3 этап 150 дней);
mass of young laying in the ground (масса молодых закладка в грунт); cocoon mass (масса коконов);
the mass of young (масса молодых); mass of adults (масса взрослых).

乌兹别克斯坦共和国安集延地区小学生的体育训练水平
THE LEVEL OF PHYSICAL TRAINING OF SCHOOLCHILDREN OF PRIMARY CLASSES OF ANDIJAN REGION OF THE REPUBLIC OF UZBEKISTAN

Kholmirzaeva A. Madinaxon
PhD Student
Ministry of Higher and Secondary Special Education of Republic of Uzbekistan
Andijan State University, Republic of Uzbekistan
Zaynabiddinov E. Anvar
Doktor of Biological Science
Ministry of Higher and Secondary Special Education
of Republic of Uzbekistan
Andijan State University, Republic of Uzbekistan
Shunkor S. Khushmatov
Institute of Biophysics and Biochemistry at the National University
of Uzbekistan named after Mirzo Ulugbek, Republic of Uzbekistan

抽象。在这项研究中，位于沙漠，丘陵，山麓和山地气候带的学校#17，#26，#30，#4，#5的小学（7–11岁）学生的体能水平根据长跳（cm）的运动结果分析了乌兹别克斯坦共和国的安集延地区。在研究中指出的学校序列中，发现7–11岁年龄组男孩的跳跃值约为125.7；133.5；141.5；139.4和148厘米，分别为女孩 – 123.3；134.8；132.9；分别为141.2和154.6厘米。结果发现，位于山麓地带的学校#5中年龄范围为7–11岁的男孩和女孩的跳远指标值比同龄儿童高1.18和1.25倍# 17，位于沙漠气候 – 地理区域。此外，7–9岁男孩跳远指标的增长率具有相对较高的价值，而对于男女代表而言，位于沙漠地带的17号学校儿童的增长率，增长率该指标显着降低。

关键词：小学生，气候 – 地理区域，跳远运动。

Abstract. *In this research, level of physical fitness of pupils of primary schools (7–11 years old) in schools #17, #26, #30, #4, #5, located in the desert, hills, foothill and mountain climatic zones of Andijan region of the Republic of Uzbekistan was analyzed, based on the results of the exercise with a long jump (cm). In the sequence of schools indicated in the studies, it was found that the jump value in boys in the age group 7–11 is about 125.7; 133.5; 141.5; 139.4 and 148 cm, respectively, and also for girls – 123.3; 134.8; 132.9; 141.2 and 154.6 cm respectively. It was found that the value of indicators in the long jump in boys and girls with an age range of 7–11 years in school #5, located in the foothill zone was 1.18*

and 1.25 times higher than children of the same age of school #17, located in the desert climatic–geographical zone. In addition, the growth rate of the indicators of the long jump from a place for boys 7–9 years old has a relatively high value, and for children of school #17 located in the desert zone for representatives of both genders, the growth rate of this indicator was significantly lower.

Keywords: primary school pupils, climatic–geographical zones, long jump exercise.

World Health Organization (*WHO*) stresses the importance of creating conditions for the physical, psycho–emotional development of children as a priority for the future of each society.

Especially physiometric/anthropometric researches for the continuous monitoring of the level of physical development and health of school–age children in the process of education have scientific practical importance in the context of the development of a set of health promotion measures.

Moreover, analysing on the basis of camparing anthropometric indicators of organism of children living in different geographical areas is considered to be very important from the poit of view of learning the process of adjustment to climate geographical conditions of human organism. The optimal level of physical fitness of the body of children/adolescents is a criterion for the expression of the spectrum of physical activity during exercise. The level of physical training of children/teenagers in school is characterized by high growth rates and, in turn, is an important period in terms of ensuring optimal physical development [Safronov and Arislanov, 2013].

Based on the above information, the purpose of this study was the analysis of the level of physical fitness of pupils of primary schools (7–11 years old) in schools #17, #26, #30, #4, #5, located in the desert, hills, foothill and mountain climatic zones of Andijan region of the Republic of Uzbekistan was analyzed, based on the results of the exercise with a long jump (cm).

Material and methods. Experiments are conducted in 2017 at school of #17 (desert zone) in the Ulugnor district of Andijan region, at school of #26 in Pakhtaabad district (foothill zone), at school #4 in Markhamat district (foothill zone), at school #30 (foothill zone), located in Andijan city (promountain zone) and at school #5, located in Khanabad city (mountain zone). Experiments in our studies were carried out in full compliance with principles of the Declaration of the Helsinki International Medical Association (World Medical Association, WMA) for determining the functional parameters of primary school pupils. The experiments were conducted with the written consent of the parents of schoolchildren and school administrations and the oral agreement of the schoolchildren themselves. In the experiments, an exercise of long jump was used (cm) to assess the level of physical training of primary school children (7–11 years old) [Landa, 2006; Muratova, 2009; Efimova et al., 2015]. The results were statistically processed by a special software package OriginPro v. 8.5 SR1 (EULA, USA).

Result and discussion. In this research, level of physical fitness of pupils of primary schools (7–11 years old) in schools #17, #26, #30, #4, #5, located in the desert, hills, foothill and mountain climatic zones of Andijan region of the Republic of Uzbekistan was analyzed, based on the results of the exercise with a long jump (cm). In particular, schools #17, #26, #30, #4, #5, located in the desert, hills, foothill and mountain climatic zones with an age range of 7–11 years for both sexes, based on the results of a test exercise of jumping in the length of the space (cm) level of physical fitness in a statistically significant increase. At the same time, in schools #17, #26, #30, #4, #5 in the range of 7–11 years for boys, the test–exercise of the long jump from a place (cm) was 125.7; 133.5; 141.5; 139.4 and 148 cm, respectively, and for girls – 123.3; 134.8; 132.9; 141.2 and 154.6 cm, respectively.

Conclusion. Thus, in the experiments it was revealed that with the age range of 7–11 years for boys, the test results of a long jump from a place (cm) in schools #17, #26, #30, #4, #5, located in the desert, hills, foothill and mountain climatic zones were – 125.7; 133.5; 141.5; 139.4 and 148 cm, respectively. In addition, the value of this indicator for girls was 123.3; 134.8; 132.9; 141.2 and 154.6 cm, respectively. Indicators of boys and girls of the age range of 7–11 years of secondary school #5 located in the foothill zone were 1.18 and 1.25 times higher in long jump from space (cm) than schoolchildren of the same age range of school #17 located in desert climatic–geographical zone. Also for boys, the indicator of the test of the long jump from the spot (cm) has a high value at the age of 7–9 years as compared with the range of 7–11 years; also for representatives of both sexes of school #17 located in the desert zone the growth rate of this indicator was significantly lower. The results will be used in the preparation of regional standards/norms of anthropometric indicators of primary school children (7–11 years old), taking into account climatic and geographical factors.

References

1. *Safronov et al., (2013). Dinamika fizicheskogo razvitiya i fizicheskoy podgotovlennosti uchashchikhsya 5–6 klassov // Molodoy uchenyy. (Russian). 7: 455–458.*

2. *Landa, (2006). Metodika kompleksnoy otsenki fizicheskogo razvitiya i fizicheskoy podgotovlennosti: ucheb. Posobiye. (Russian). 208: 20–42.*

3. *Muratova (2009). Otsenka fizicheskogo razvitiya i fizicheskoy podgotovlennosti uchashchikhsya mladshikh klassov obshcheobrazovatel'nykh shkol Respubliki Mordoviya // Vestnik sportivnoy nauki. (Russian). 1: 59–61.*

4. *Efimova et al., (2015). Otsenka fizicheskoy podgotovlennosti uchashchikhsya Irkutskoy oblasti (po dannym monitoringa) // Fundamental'nyye issledovaniya (Russian): 7(4): 675–678.*

冷杉木绿色储存对精油成分的影响
THE EFFECT OF STORAGE OF WOOD GREEN OF FIR TO THE COMPOSITION OF THE ESSENTIAL OIL

Ryazanova Tatyana Vasilevna
Doctor of Engineering Sciences, Professor
Reshetnev Siberian State University of Science and Technology
Loskutov Sergy Reginaldovich
Doctor of Chemical Sciences, Department Head
Aniskina Antonina Alexandrovna
Research Assistant
Sukachev Institute of Forest SB RAS, Federal Research Center
"Krasnoyarsk Science Center SB RAS"

注解。 应用紧凑型设备从不同储存时间的冷杉木材中获取精油的实验研究。
利用色谱 – 质谱法，建立了油蒸馏过程中分数组成的变异性。 结果表明，在连续蒸馏馏分油的过程中，油类obitnytsya富含单萜和含氧组分和倍半萜烯。
关键词：杉树绿，小型植物，精油，分数组成

Annotation. *Experimental studies with the application of compact equipment for obtaining essential oils from wood green of Abies with different storage time.*

Using the method of chromatography-mass spectrometry, the variability of fractional composition in the process of oil distillation is established. It is shown that in the process of successive distillation fractions oil obitnytsya monoterpenoid enriched and oxygen-containing components and sesquiterpenes.

Keywords: *fir tree greens, small-sized plant, essential oil, fractional composition*

Introduction

Green trees - part of the tree is the richest in biologically active substances (BAS). The greatest practical interest among the green wood is the Siberian fir green wood, as the richest in essential oils. Essential oils, in particular fir, are among the most effective natural biologically active products, widely used in many areas [1 - 4]. A significant amount of research is devoted to the isolation of essential oil from the wood green of Siberian fir. The yield and quality of the essential oil is affected by a number of biocenotic and technological factors. The in-

fluence of the former was taken into account and minimized in the development of technical conditions for green wood. To preserve the quality of harvested Siberian fir wood for long-term storage, certain conditions must be observed [2]. In accordance with the requirements of State Standard 21769-84, wood greenery consists of needles, leaves, buds and non-lignified shoots, which are in a certain ratio [5]. Preparation is recommended to be carried out better from October to February. Storage should be carried out under conditions where the quality of wood greens should be close to fresh-harvested, otherwise, in the process of further processing, there will be significant losses in both the yield and the quality of the products obtained. In this regard, the shelf life of raw materials is determined. At positive temperatures, it is limited from 3 to 7 days, and at low temperatures - from 15 to 30. It has been established that biologically active substances are better preserved when storing green wood without separating needles. Storage of crushed wood greens (particle size from 2 to 10 mm) is allowed no more than a day, since longer storage has a strong influence on the alteration of the content of key components in fir oil.

Under production conditions, essential oil is produced in plants, mainly of periodic operation, where the distillation of oil is carried out for 17–20 hours. Long-term residence of its components in the high-temperature zone reduces output and impairs the quality of the product.

Small-sized fir installation is mobile, which allows its use without reference to the terrain and the room and at the same time, due to the short duration of the distillation process, to obtain high-quality oil.

Purpose of the study. Determining the effect of storing green wood on the yield and changing the composition of the essential oil.

Research methods. The object of the study was the Siberian fir green wood collected in the vicinity of the city of Krasnoyarsk in March 2018. The experiments were carried out in a 37-liter small-sized plant designed to accommodate up to 6 kg of fir wood, ground to a particle size of 3-5 mm. To obtain the oil, fresh wood greens and wood greens stored for 7 days indoors at a temperature of minus 20-25 o C were used. The duration of the oil distillation was 3 hours; the oil was sampled at intervals of 30 minutes. Small-scale installation for obtaining essential air is shown in Figure 1.
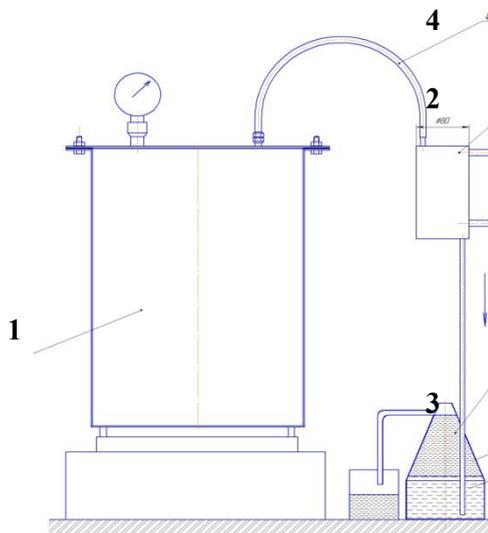
Figure 1
Small-scale set-up for receiving essential substances

1-distillation tank,
2 –fridge,
3- receiving capacity -florentin,
4 - waste.

The installation includes a vat (1) with a heating element at the bottom, and a set of perforated cassettes placed in it. From above, the vat is closed with a lid, to which a discharge pipe (4) is connected, connecting the tank with a refrigerator (2), which, in turn, is connected to a receiving tank, florentine (3), by means of another branch pipe, where the condensed vapors are collected and separated essential oil and water. Cassettes that are installed in the distillation tank 1 are loaded with up to 6 kg of chopped wood green (particle size from 2 to 10 mm). At the bottom of the tank, water is poured in a quantity of 5 liters, then it is loaded into the cassettes, one on the other, the tank is closed with a lid and the heater is turned on.

The analysis of the essential oil was performed by standard methods [5-6]. Its yield was determined volumetrically in terms of absolutely dry mass, density - pycnometrically. The qualitative determination of the component composition of the samples was performed on an Agilent 5975C-7890A chromatographic mass spectrometer (Agilent, USA) using an automatic sampler for Agilent 7683 liquid samples. A 30-meter HP-5 quartz column was used (5% diphenyl-copolymer 95% dimethylsiloxane) with an inner diameter of 0.25 mm. The carrier gas is helium with a constant flow of 1.1 ml / min. Column temperature: initial isothermal section 50 ° C, temperature rise at a rate of 4 ° C / min from 50 to 200 ° C (0 min.), 10 ° C / min to 220 ° C (0 min.). The volume of the injected sample 0.2 μl.

The temperature of the evaporator is 280 ° C, the temperature of the ionization chamber is 170 ° C, the ionization energy is 70 eV. Components were identified by comparison, by the presence and ratio of characteristic fragment ions using a database of standard samples from the NIST05-L mass spectral library and linear retention index values using the AMDIS data processing program (The Automated Mass Spectral Deconvolution and Identification System).

Chromatographic measurements were carried out at the Federal Research Center "Krasnoyarsk Science Center of the Siberian Branch of the Russian Academy of Sciences".

The results of the study.

Fir oil derived from fir greens is a complex mixture of terpenes. Organoleptic and physico-chemical characteristics of coniferous oils are their important characteristics. They define the scope, serve as identification criteria and are used, for example, in conducting certification tests.

As the results showed, the yield of essential oil was 19.7 and 16.5 g / kg of wood greens of natural moisture from fresh raw materials and raw materials stored during the week, respectively. That is, storage of raw materials even at low temperatures led to a decrease in the yield of essential oil, although, according to physico-chemical parameters, the obtained samples of fir oil did not differ from each other and corresponded to the requirements of State Standard [5]. Density at 20 ° C, g / cm3 - 0.960; refractive index at 20 ° C - 1.466; acid number, mg KOH / 1 g - 0.64.

The physicochemical processes taking place in the wood green during its storage led both to a decrease in the total yield of the essential oil, as noted above, and to an increase in the rate of oil distillation. This is confirmed by the results of quantitative evaluation of the selected fractions, so if, when distilling off oil from fresh wood greens, about 70% falls on the first and second fractions, then when using green wood stored for 7 days, up to 70% of oil falls on one first fraction. With an increase in the fraction number, the oil content gradually decreases, in the latter fractions its amount is less than 1%. Therefore, to determine the component composition of the latter fractions were combined.

The composition of the oil obtained and its changes in the process of distillation can be judged by the results of chromate-mass-spectrometry given in Table 1.

As can be seen from the above values, the content of the main components in the distillation process was changed in accordance with their volatility. Among monoterpenes in the first fraction, camphene (36.7 and 34.4%), α-pinene (14.6 and 12.1) are predominant. Butter from fresh wood greens and stored for a week, respectively. During storage, due to the volatility of these monoterpenes, their share in the essential oil decreased, which cannot be said of other monoterpenic hydrocarbons, such as Δ^3-Karen, limonene and β-pinene, in whose content no significant difference is observed. The fractions differ significantly in content of oxygen-containing compounds. The share of oxygen-containing compounds in the first fraction of fresh wood greens accounts for about 17%, of which 95% is borny lacetate. All subsequent fractions are gradually depleted of monoterpenes and enriched with oxygen-containing compounds, so in the last two fractions their content is 60 - 65%, while the share of borny lacetate accounts for about 94 - 95% of oxygen-containing compounds of the fraction. A different character of the change in the composition of oxygen-containing compounds is observed in fractions of oil distilled from wood greens after storage for 7 days. In this case, even in the first fraction, where the share of oxygen-containing accounts for about 24% of the sum of al components of the fraction, borneol is more than 50%.

Table 1- *The effect of the freshness of the green fir wood on the change in the chemical composition of fir oil in the process of its distillation*

Retention time, min.	Content from total quantities,%								Chemical formula	
	60 min.		90 min.		120 min.		180 min.**			
6,101	1,588	1,742*	1,745	2,819*	2,388	3,698*	3,330	3,345*	C_9H_{14}	Santen
7,157	4,16	3,38	2,431	1,873	1,436	1,336	1,104	1,117	$C_{10}H_{16}$	Tricyclene
7,321	0,082	0	0	0	0	0	0	0	$C_{10}H_{16}$	a-Thujiene
7,523	14,575	12,112	9,266	7,232	5,535	5,399	4,292	4,567	$C_{10}H_{16}$	a-Pinene
7,985	36,653	34,421	26,145	18,3	13,887	12,138	9,669	10,394	$C_{10}H_{16}$	Camphene
8,798	0,076	0	0	0	0	0	0	0	$C_{10}H_{16}$	Sabinen
8,890	2,180	2,009	1,696	1,168	0,899	0,792	0,661	0,653	$C_{10}H_{16}$	b-Pinene
9,393	0,666	0,597	0,531	0,331	0,262	0,23	0,251	0,183	$C_{10}H_{16}$	b- Myrcene
10,020	9,648	9,977	8.853	6,979	5,379	5,189	4,047	3,973	$C_{10}H_{16}$	3-Carene
10,520	0,062	0,102	0	0,072	0	0	0	0	$C_{10}H_{14}$	p-Cimene
10,666	8,793	9,055	8,525	6,128	5,015	4,242	3,539	3,270	$C_{10}H_{16}$	Limonene
11,731	0,075	0,073	0,105	0,07	0,074	0,069	0,690	0	$C_{10}H_{16}$	tau-Terpinen
12,783	0,834	0,859	1,036	0,794	0,813	0,577	0,630	0,446	$C_{10}H_{16}$	Terpinolen
14,771	0	0	0	0,106	0	0,072	0,070	0	$C_{10}H_{16}O$	Camphor
15,536	0,987	13,369	2,083	22,310	3,401	26,421	3,787	3,418	$C_{10}H_{18}$	Borneol
19,722	18,789	10,699	35,619	26,534	56,658	31,224	61,298	31,212	$C_{12}H_{20}O_2$	Bornylacetate
22,920	0	0	0	0,16	0,087	0,178	0,195	0		***
23,524	0	0	0	0,276	0	0,511	0,087	0,156	$C_{15}H_{24}$	a-Gurjunene
23,620	0	0,998	0.065	2,669	0,115	3,684	0,162	0	$C_{15}H_{24}$	Longifolene
23,703	0	0	0.061	0	0,189	0,097	0,396	0	$C_{12}H_{24}O$	Dodecanal
24,070	0,608	0,389	1,208	1,225	2,243	1,918	2,790	0,073	$C_{15}H_{24}$	Caryophyllene
25,133	0,212	0	0,459	0,096	0,975	0,178	1,576	0,120	$C_{15}H_{24}$	a-Caryophyllene
26,444	0	0	0	0,097	0	0,201	0,126	0,12	$C_{15}H_{24}$	a-Chamigrene
26,802	0,057	0	0.167	0,144	0,38	0,348	0,557	0,147	$C_{15}H_{24}$	b-Bisabolene
ml	47	67,5	30	18,5	20	5	18	5,5		

Note: * DZ stored for 7 days at minus 20 °C; 2 fractions are combined.

In the second and third fractions, the content of oxygen-containing components increases from 48.8% to 67.6%, and the share of borneol in them is more than 45%. And only in the last fraction, where the total amount of oxygen-containing compounds is 34.6%, the borny lacetate is the predominant oxygen-containing terpenoid; its share is about 90% of the sum of these compounds. Less significant is the storage of green wood affecting sesquiterpenes, with the exception of longifolen and karyofillen, the content of which increases during storage.

Thus, the obtained results give grounds to assert that during storage of Siberian fir tree greenery, even at subzero temperatures, significant changes occur in the chemical composition of the essential oil, first of all, the content of borny lacetate decreases and the content of borneol increases due to oxidative processes. In addition, the use of a small-sized plant has increased productivity, shortened the process time and reduced production costs, as well as improved oil quality. The observed fractionation offers the prospect for its practical use and real cost-free separation of the marketable product into the monoterpene and oxygen-containing fractions. This indicates the correctness of the chosen and adopted technical decisions and the advisability of installing the installation.

References

1. Heyfit LA, Dashunin V.M. Perfumes and other perfumery products. - M .: Chemistry, 1994. - 256 p.

2. Degree, R. A. Organization and technology of fir production [Text]: monograph. / R.A. Degree, V.N. Nevzorov, S.M. Repyakh. - Krasnoyarsk: SibGTU, 2000. - 45 p.

3. Levin, E.D. Processing of green wood [Text] / E.D. Levin, S.M. Repyakh. - Moscow: Forest industry, 1984. - 116 p.

4. Processing plant raw materials and waste disposal [Text]: Sat. tr. / ed. S.M. Repyakh. - Krasnoyarsk, KGTA, 1994. - Vol. 1. - 256 p.

5. Ivanov A. B., Petrov V. G., 2017 769–84 Woody greens. Technical conditions [Electronic resource] - Access mode: http://docs.cntd.ru/document/1200014995 (access date: 03/15/2018)

6. State Standard ISO 10869–2015 Essential Siberian fir oil (Abies sibirica Lebed). Technical conditions [Electronic resource] - Access mode: http://docs.cntd.ru/document/1200122227 (access date: 03/15/2018)

用不同性质的添加剂评价沥青改性效果
EVALUATION OF THE BITUMEN MODIFICATION EFFECTIVENESS BY ADDITIVES OF DIFFERENT NATURE

Evdokimova Natalya Georgiyevna
Doctor of Technical Sciences
Professor at the Department of Chemical – Engineering Processes
Ufa State Petroleum Technical University
Branch of the University in the City of Salavat
Russian Federation
Luneva Natalya Nikolaevna
Candidate of Economic Sciences
Director of Ufa State Petroleum Technical University
Branch of the University in the City of Salavat
Russian Federation

注解。 在不同性质的添加剂改性对油沥青操作性能的影响规律的研究中，给出了它们的最佳浓度，以确保针织所需质量的空间分散结构，并从技术和经济的角度评价改性效率。 添加剂改性的使用方法研究了道路沥青的性能。 显示了在接收改性沥青的同时生产可销售产品的复合技术的经济可行性。

关键词：沥青；修改;添加剂；粘合成形性；低温性能；热稳定性；修改的效果；经济效率

Annotation. In the work of the regularities of influence of modifying additives of different nature on operational properties of oil bitumen and found their optimal concentration to ensure spatial dispersion structures of knitting required quality and the evaluation of modification efficiency from technological and economic points of view is given. The directions of use for the modification of additives studied properties of road bitumen. The economic feasibility of compounding technology in production of marketable products while receiving modified bitumen is shown.

Keywords: *bitumen; modification; additives; adhesion formability; low-temperature properties; thermal stability; effect of the modification; economic efficiency*

The most important tasks facing the Russian oil refining today are increasing the efficiency of oil refining and the quality of oil products produced. In the technological scheme of the modern oil refinery one of the most common is the process of compounding. The process of compounding ensures the formation of qualitative, meeting all regulatory requirements and quantitative indicators, commercial products of oil refining, including oil bitumen, 80% of which is used as a binder for asphalt concrete pavement.

Currently, many Russian roads require repair due to premature destruction of the roadway, associated with an increase in traffic loads, cell formation, external natural factors, etc. Under these conditions, research aimed at improving the production technologies of bitumen and materials based on them is highly relevant durability. Modern and quite effective ways to improve the quality of bitumen are recognized as compounding or modifying technologies with additives, which allow adjusting the properties of bitumen, and obtaining products of improved quality, and provide the necessary structural and mechanical properties to bituminous materials.

In practice and in the scientific literature, sufficient material has been accumulated on the effect of various substances on the properties of petroleum bitumen. However, the question of an integrated approach to the effective use of these substances remains open. Therefore, the purpose of the research was to determine the main selection criteria and study the influence of the nature of modifying additives on the performance properties of petroleum bitumen, as well as determining the directions of their use for regulating the properties of bitumen.

For modifying with additives, bitumen obtained from oils of various natures and using various technologies were used: oxidized various grades from bituminous plants of LLC Bitum (Salavat, Russia) and the oil refinery TPP Urayneftegaz (Russia) and compounded using the "oxidation- compounding"from the bitumen plant Gazprom Neftekhim Salavat LLC (Russia).

Surface-active compounds, which increase the polarity of pyrobitumen, contribute to intermolecular hydrogen bonds, stabilize the heterogeneous structure of the binder, and also sharply increase the density of intermolecular hydrogen (associative) bonds, which in this case are responsible for adhesion to the mineral material and polymer compounds to create polymer-modified bitumen materials, at certain concentrations which, being distributed in oil dispersed with tem, form an independent or linked disperse phase polymer dispersion medium frame, thereby plasticize or cross linked bitumen, bitumen are able to translate the class of thermoplastic elastomers, i.e. polymer-bitumen binder (PBB), in which the elastic structural network of the polymer, in addition to high elasticity, gives it the ability to orient at negative temperatures.

Surface-active compounds, which increase the polarity of asphaltenes, con-

tribute to intermolecular hydrogen bonds, stabilize the heterogeneous structure of the binder, and also sharply increase the density of intermolecular hydrogen (associative) bonds, which in this case are responsible for adhesion to the mineral material and polymer compounds to create polymer-modified bitumen materials, at certain concentrations which, being distributed in oil dispersed with tem, form an independent or linked disperse phase polymer dispersion medium frame, thereby plasticize or cross linked bitumen, bitumens are able to translate the class of thermoplastic elastomers, i.e. polymer-bitumen binder (PBB), in which the elastic structural network of the polymer, in addition to high elasticity, gives it the ability to orient at negative temperatures.

The main criterion for choosing the direction of use of additives was determined by the maximum effect of modifying the properties of bitumen, which shows the change in properties under the influence of external influences, in particular with the introduction of modifying additives. The method of determining the effect of modifying was based on the analysis of dependencies "property - external influence" and was to determine the ratio of the difference of indicators of physicochemical properties after and before modification to the value of external influence, resulting in bitumen as a typical oil disperse system in an extreme state [5]. Table 1 shows the modifying additives used in the work.

Table 1 - Modifying Additives

Type of additives	The name of the used additives
Surface-active compounds:	**МЭА** - monoethanolamine by МРТУ 6-09-3909-67, **ДЭА** - diethanolamineТУ 6-09-68-70; **ДЭГ** - diethylene glycol by МРТУ 6-09-6131-69, **ТЭГ** – triethylene glycol by МРТУ 6-09-4965-68; **ОРСК** (waste of sulfuric acid regeneration) from a sulfuric acid alkylation unit of isobutane with olefins; **БП-3М** (adhesive additive cationic type) by ТУ 02570001-00151822-93; **БГУ** – oligomers based on solid waste from the production of terephthalic acid; **ПД** (plasticizing additives) - obtained on the basis of the heavy product of the distillation of 2-ethylhexanol and the distillation residue of phthalic anhydride of the alcohol plant of P.C. "Gazprom Neftekhim Salavat" [1];
Polymer compounds:	**ПВБ** (polyvinyl butyral) - waste production of polyvinyl butyral P. C. "Salavatsteklo"; **ПМ** (polymer modifier) - based on BSC rubber and low molecular weight polyethylene in a 50/50 percentage ratio; **НМПЭ** (low molecular weight polyethylene) by ТУ 6-05-1837-82 waste production of high-density polyethylene; **ПВ** (polyethylene wax) - waste production of low-density polyethylene; **ДСТ** (ДСТ-30-01 (DST-30-01) 1 group) thermoplastic elastomer by ТУ 38.103267-99; **БСК** (plasticizing composition) - based on styrene-butadiene rubber (BSC) and diesel fuel by ТУ 2455-064-16810126-99; **(Р+ТСП)** – an additive based on spent rubber and heavy pyrolysis resin [2]; **НПС** (petroleum resin) - obtained from the VAT residue styrene distillation (KORS), a by-product of styrene production [3]; **ДНП-S** - sulfided, oxidized low molecular weight polyethylene [4]; **ДНП-А** - aminated oxidized low molecular weight polyethylene [4].

Analysis of the results of studies of the properties of modified bitumen, presented in the wokrs [1-16], made it possible to evaluate the effectiveness of modifying additives. Figures 1 - 3 show the effect of modifying additives, taken in the optimal amount corresponding to the maximum effect of the modification, on the ductile, low-temperature and thermal-oxidative stability of road bitumen. Table 2 presents the proposed areas of application of the investigated additives for the production of road bitumen binders with improved properties.

Figure 1 - Plasticizing effectiveness of additives in the preparation of modified road bitumen

Figure 2 - The change in the temperature of the fragility of road bitumen, modified by various additives

***Figure 3** - The effectiveness of additives to improve the thermal and oxidative stability of road bitumen*

Table 2 - Directions of use of additives modifying the properties of bitumens

Type of additives		Functional purpose				
		Plasticizing	Structuring	Adhesive	Thermo-oxidation inhibitor	Improving temperature properties
Polymeric compounds	ПМ	+		+		
	ПВ		+			+
	НМПЭ	+			+	+
	Rubber БСК		+	+	+	+
	ДСТ	+		+		
	ПВБ		+	+	+	+
	НПС	+		+	+	
	Р+ТСП	+		+	+	+
	ДНП-А		+	+	+	+
	ДНП-S		+	+	+	+
Surface - active compounds	ДЭГ	+		+	+	+
	ТЭГ	+		+	+	+
	МЭА	+		+	+	
	ДЭА	+		+	+	+
	БГУ	+		+	+	
	БП-3М	+		+		
	ОРСК		+			
	ПД	+		+		+

Comparative economic calculations were carried out of the expediency of modifying in the production of BND 90/130 bitumen for the existing bitumen unit of P. C. «Gazprom Neftekhim Salavat» with a feed capacity of 300 thousand tons / year. Table 3 shows the increase in productivity and profit increase of the bitumen plant from the implementation of the modified bitumen.

Table 3 - *Increased productivity and profit growth of the bitumen installation of P. C. "Gazprom Neftekhim Salavat" upon receipt of modified BND 90/130 grade bitumen using various modifying additives*

Name of additives	Increased productivity of a bitumen plant, %	Increase in profits from the sale of modified bitumen grade BND 90/130, mln rub.	Name of additives	Increased productivity of bitumen installation, %	Increase in profits from the sale of modified bitumen grade BND 90/130, mln rub.
ПМ	1,5	145	ТЭГ	2,0	350
ПВ	1,5	140	МЭА	4,0	1240
НМПЭ	0,8	30	ДЭА	3,0	814
ДНП-А	2,0	255	БГУ	1,8	106
ДНП-S	2,0	255	БП-3М	2,5	586
Каучук	2,0	350	ОРСК	2,0	70
ДСТ	1,0	260	ПД	3,0	407
ПВБ	2,0	1540	НПС	4,0	130
ДЭГ	3,5	725	Р+ТСП	10,0	169

Thus, the regularities of the effect of modifying additives of various nature on the performance properties of petroleum bitumen to ensure the spatial dispersion structure of the required quality are shown; taking into account the mechanism of action of various additives to bitumen materials, directions for the use of additives of various natures have been proposed, allowing for the effective selection of additives to control the quality of bitumen production; The economic feasibility of a scientific approach to the implementation of compounding processes in bitumen production during the creation of modified bitumen is shown.

References

1. *Likhachev N.A., Evdokimova N.G., Khalikova D.V., Murtazina G.N. Plasticizing additives on the basis of the bottoms of the alcohols plant of JSC Gazprom neftekhim Salavat as modifiers of bitumen properties // Oil and Gas Business. Scientific and technical journal. - 2012. – Vol.10. - №2. - p. 107-111.*

2. *Evdokimova N.G., Kortianovich K.V., Halimov A.A., Zhirnov B.S. The use of combined additives for the modification of road bitumen // In sb. "Oil Refining and Petrochemistry - 2005": materials of the international scientific-practical conference. - Ufa: 2005. pp. 96-97.*

3. *Evdokimova N.G., Abdrakhmanova G.A. On the choice of technology for the production of petroleum resins for the modification of petroleum bitumen. "Oil and Gas Processing 2013": materials of the International Scientific and Practical Conference. - Ufa: 2013. p. 137-138.*

4. *Gaynanova R.F., Evdokimova N.G., Kolysheva E.O., Budnik V.A., Fatkullin M.R. Modification of road bitumen of P. C. "Gazprom Neftekhim Salavat" with polymer additives based on high-pressure polyethylene waste // Petrochemistry and oil refining. - 2012. - №8. - p. 19-24.*

5. *Evdokimova N.G. Development of scientific and technological bases for the production of modern bitumen materials as oil disperse systems. Thesis for the degree of doctor of technical sciences. - Moscow: Gubkin RSU of oil and gas, 2015*

6. *Abdrakhmanova G.A., Evdokimova N.G. The effect of petroleum resins on the operational properties of road bitumen. "The Science. Technology. Production 2013": abstracts of reports of the International Scientific and Technical Conference of Students, Postgraduates and Young Scientists. Ufa: 2013. p. 6-7.*

7. *Evdokimova N.G., Kortianovich K.V., Zhirnov B.S., Akshentsev S.B. The use of waste petrochemistry and road transport in the production of petroleum bitumen // In coll. "Ecological technologies in oil refining and petrochemistry": materials of the scientific-practical conference. Ufa: 2003. P.46-48.*

8. *Kolysheva E.O., Evdokimova N.G., Gaynanova R.N., Nigmatullin V.F. On the receipt of modifying additives to oil road bitumen // In sb. "Oil and Gas Processing - 2011": materials of the International Scientific and Practical Conference. Ufa: 2012. p. 106-107.*

9. *Kolysheva E.O., Evdokimova N.G., Gaynanova R.N., Nigmatullin V.F. Oil bitumens with surface-active additives, obtained on the basis of low molecular weight polyethylene // In coll. "The science. Technology. Production": abstracts of the inter-university scientific and technical conference of students, graduate students and young scientists. Ufa: 2012. p. 24-25.*

10. Evdokimova NG, Mustafin AG, Sharipov T.V. On the possibility of using the waste of regeneration of sulfuric acid of the alkylation process as a modifier in the production of petroleum bitumen // Bulletin of the Bashkir University. - 2012. - Vol.17. - №1. - p. 42-47.

11. Sharipov T.V., Mustafin A.G., Evdokimova N.G., Galinov A.Kh. Method for producing bitumen // Patent RF №2405807,2010.

12. Evdokimova N.G., Anikolchuk N.V. Polyethylene production waste as modifiers of oil road bitumen. "Oil disperse systems. VAT-2008 ": materials of the International Symposium. - Moscow: 2008. p. 79-80.

13. Evdokimova N.G., Egorova E.V., Ibragimova R.F. Influence of adhesive additive "BSU" on thermo-oxidative and adhesive properties of road bitumen // In coll. "Neftegazopererabotka - 2010" Materials of the International Scientific and Practical Conference ". Ufa: 2010. p. 118-120.

14. Evdokimova N.G., Kortianovich K.V., Zhirnov B.S. Study of the influence of amines and glycols on the properties of road bitumen // Proceedings of the Sterlitamak branch of the Academy of Sciences of the Republic of Bashkortostan. Series "Physico-mathematical and technical sciences." Issue number 5. - Ufa: Gilem, 2007. - P.135-140.

15. Evdokimova N.G., Batyrova I.I., Gorina O.A. Investigation of the effect of modifying additives on the properties of petroleum bitumen // V sb. "Oil and Gas Processing - 2009": materials of the International Scientific and Practical Conference. Ufa: 2009. p. 185-186.

16. Evdokimova N.G. On the modification of oil bitumen // Proceedings of the Sterlitamak branch of the Academy of the Republic of Bashkortostan. Series "Chemistry and Chemical Technology". Issue 2. - Ufa: Gilem, 2001.

协同处理冷杉和云杉的木质绿化
CO-PROCESSING OF WOODY GREENERY
OF THE ABIES AND PICEA

Parshikova Valentina Nikitichna
Doctor of Technical Science, Professor
Institute of Economics and Trade, Siberian Federal University
Petrenko Elena Valerievna
Institute of Economics and Trade, Siberian Federal University
Schitnikov Alexsandr Savelyevich
Doctor of Pedagogical Science, Associate Professor
Institute of Economics and Trade, Siberian Federal University

注解。 本文涉及木质绿化蒸汽冷杉和云杉的共处理，以生产精油和松树提取物，后者可用作有毒粘合剂的改性剂。 完成了工作单元的设计，通过形成的水Florentino对原料进行补充灌溉，从而实现水溶性物质的快速释放15-20%，并将可销售产品的蒸馏收率从2-3降低到15%-17%。

关键词：木质绿化，机械化，工作单位，改性剂，松凝

Annotation. *This article deals with co-processing of the woody greenery steam fir and spruce to produce essential oils and pine extract, the latter of which can serve as a modifier of toxic adhesive agents. Worked out the design of the working unit, which provided supplemental irrigation of raw by formed water Florentino thereby achieving rapid release of water-soluble substances by 15-20% and reduces the duration of the distillation yield of marketable products increased from 2-3 to 15-17%.*

Keywords: woody greenery, mechanization, work unit, modifiers, pine condensate

Introduction

In the felling area in Siberia during logging nearly half of the biomass of trees, a quarter of which is the woody greenery - rich in energy and in biologically active substances raw materials are left at the cutting area. Moreover, because of the poor quality of the wood of Picea and Abies arrays remain intact. However, it is shown that the value in the same area of stem wood significantly inferior to the cost of processing products of the woody greenery [1]. First of all, it refers to the

dark coniferous wood. When disposing the woody greenery profitability of wood processing industries is slightly increases, as the cost of cleaning the cutting area are transferred to the wood chemical companies. Harvesting of green Abies is difficult due to the complexity of the process of mechanization of its separation from the total volume of raw materials.

The objective of these studies is to develop a technology of co-processing of woody greenery of Picea and Abies, able to ensure the profitability of wood chemical industry.

Materials and Methods

In conducting research we used the November woody greenery of Picea and Abies saplings of Krasnoyarsk forest. Samples were taken from 10-12 normally developed trees in a mixed stand. In preparation for analysis of separated branches of coniferous shoots with a diameter of 10 mm bran was crushed to a particle size of 3-5 mm and mixed for homogenization. The samples were determined by standard methods conventional moisture content of mineral substances extracted with hot water, essential oils and pigments. [2] Moisture, ash content and content of water-soluble compounds found gravimetrically, pigments - spectrophotometry. Essential oil steam distilled in Clevenger apparatus, its output is evaluated volumetrical composition - by method of gas-liquid chromatography (packed column, SE-30).

Results and discussion

Processing of Abies woody greenery with distillation of essential oil by steam is known since the 18th century. Picea woody greenery was not processed by this technology due to the low content of essential oil [3]. For the same reason joint utilization of Abies and Picea shoots, was not done as the latter will be ballast here. However, Abies and Picea belong to the same tribe, and therefore, presumably, the component structure of woody greenery will be close. Due to this only technology ensuring economic efficiency will be realized.

The only commercial product of processing Abies woody greenery, until recently, was the Abies oil [4]. The resulting recently Abies extract, which although has possibility of its practical use practically isn't consumped [4, 5]. The inclusion in feedstock Picea woody greenery significantly reduces the yield of oil and therefore is not used in the traditional technology. The economically justified scheme is supposed to produces demanded products with relatively high added value.

An example of such products can be a Pinus extract - the result of concentrating the bottoms of condensate formed during the steam distillation of essential oil from woody greenery of Abies and Picea. It was shown experimentally that it is an effective modifier of phenol-formaldehyde resin and polyvinyl acetate dispersion when gluing wood and leather products [6, 7]. This property of extract allows you to replace them partially in the composition of the content of adhesive agents

and makes promising their use in the furniture industry and production of wood-materials. It is important to note that the high demand for this commodity product can be regarded as a real incentive for the development of this wood-chemical direction.

To ensure the rapid release of water-soluble substances from woody greenery that form the basis of Pinus extract, a working device with internal and external cooling vapor diffusion flow was designed and built (Figure 1) [8]. In the proposed designs the acceleration is achieved by the leaching of water-soluble substances from the raw materials is carried out both by falling Florentino water and condensate, formed by passing steam through the raw material, [9]. If the raw materials dominated poor in essential oil Picea woody greenery, then after a brief work in external contour sufficient to extract the main quantity of essential oil, operation of the plant is switched to a less power-consuming internal contour, where Florentino water circulates within the chamber. During the processing of raw materials with a high content of essential oil, the plant most of the time works on the external contour and a less on the internal

The reason for such a regime were the results of research the dynamics of selection of essential oils and water-soluble substances from woody greenery in the temperature range 100-130 ° C [10]. These laboratory experiments indicate close nature of the selection of both substances with their high yields at an early stage and very low - in the final stages. Especially clearly this difference appears for the essential oil, when during the first 5-10 min. it is distilled more than during last 1.0-1.5 hours. It should be noted that the decline in separation of water soluble substances from the raw materials is much slower in comparison with oil. In order to synchronize the output of both products it was necessary to achieve rapid leaching of water-soluble components, what is achieved in device through irrigation the feedstock by Florentino water. It also provides the return, of enriched with bornylacetate, essential oil from the water and shortens the duration of release.

In connection with the joint processing of Abies and Picea woody greenery, it is important to compare the content and composition of essential oil and water-soluble substances. Analysis of oil showed that there is almost complete identity of their component composition, Abies oil yield on average is four times bigger than Picea oil [9]. The results suggest that the co-processing of woody greenery of Abies and Picea will significantly reduce the amount of marketable product while maintaining quality. Water-soluble substances and pigments of woody greenery of Abies and Picea are similar in qualitative and quantitative terms, and due to their content and composition remain unchanged when co-processing of woody greenery.

Along with the mechanization of harvesting of raw materials and supposed high demand for pine extract yield assessment and study of the composition of the

test raw material components are an argument in favor of the proposed technology of co-processing wood greens of Abies and Picea.

Indicators obtained by processing the mixed raw materials, essential oil meet standards of Abies oil (OST 13-221-86), due almost identical composition of Abies and Picea essential oils [3]. Its main components are monoterpene hydrocarbons (55-65%), among which prevails camphene. Oxygen fraction in it is very significant and contains bornylacetate (65-75% rel.). Content sesquiterpenoids in Abies and Picea oils is not so significant (3-4%).

Unlike the essential oil yield and composition of water-soluble substances is not dependent on the ratio of the feedstock of wood greens of Abies and Picea. The volume and quality of the pine extract are determined by technological conditions. The main ones are mixing masses during the cooking process to prevent sticking and bringing the finished product to a dry solids content of 50% (density of 1.225 g / cm3).

It is assumed that most of the produced extracts will be used as modifiers of toxic adhesive agents. However, comparison of Abies - Picea, Abies [4, 11] and therapeutic Pinus-Picea (TU 81-05-97-70) extracts points to their similar composition. They content in almost identical concentrations the same biologically active, energy and mineral substances. Compliance with the composition and consumer properties of different products, suggests the possibility of equal use to feed the animals. A pleasant fragrance in the composition and the presence of chlorophyll (mg 37.3%), carotenoids (19.4 mg%) and vitamin C (9.4 mg%) demonstrates the possibility of using the extract as a preventive measure [11].

Conclusion

The research results indicate the possibility of an effective co-processing of wood greens of Abies and Picea, the latter of which is currently not utilized. Implementation of the proposed technology makes it possible to mechanize the harvesting of raw materials and increase the yield of salable product from 2-3 up to 15-17%. Developed device allows with a sufficiently comprehensive distillation of essential oil to reduce the duration of allocation of water-soluble substances by 15-20%. Obtaining by the concentration pine extract is successful modifier adhesive agents for bonding wood and leather.

The study was performed under the guidance of Stephen R.A. and the article is dedicated to his anniversary of retirement.

References

1.Yagodin V.I. The basic technology of non-waste technology of woody greenery //Problems of chemical processing of wood raw material. - SPb.: SPbLTA, 2000 - P. 50-58.

2.Ushanova V.M., Lebedev O.I., Devyatlovskaya A.N. Basic scientific research. V. 3. Study of chemical composition of vegetable raw materials. - Krasnoyarsk: SibGTU, 2004. - 396 p.

3.Chernyaeva G.N. Dolgodvorova S.Y., Stepen R.A. Disposal of woody biomass. - Krasnoyarsk: IF&T SB RAS, 1987. - 166 p.

4.Stepen R.A., Nevzorov V.N., Nevzorov T.V. Organization of production of pine oil. - Krasnoyarsk: KrasGAU. 2010. 104 p.

5.Chernyaeva G.N., Manakov V.A., Lyandres G.V. Integrated waste-free processing of green wood and bark of Siberian fir // Biotechnology in forestry and forest industries. - Varna, 1986. - P. 39-40.

6. Petrenko E.V., Parshikova V.N., Stepen R.A. Use of an extract of green wood as an adhesive agent // Actual problems of modern science and technology and their solutions. - Krasnoyarsk: KGTEI, 2010. - P. 157-160.

7. Petrenko E.V., Parshikova V.N., Stepen R.A. Effect of modifying adhesives pine extract the smell of furniture in the room environment // Forest and chemical complex - problems and solutions. - Krasnoyarsk: SibGTU, 2012. - P. 122-124.

8. Petrenko E.V., Parshikova V.N., Stepen R.A. The laboratory setup for studying the dynamics of temperature extraction of vegetable raw materials. Patent № 123334. Claim № 2,012,131,013.

9. Petrenko E.V., Parshikova V.N., Stepen R.A. Modification of technology of complex processing of wood greens of fir and spruce // Vestnik KrasGAU. - 2012. - № 12.-P. 184-186.

10.Petrenko E.V., Parshikova V.N., Stepen R.A. Hydro-temperature treating of spruce-fir woody greenery // Advances in chemistry and chemical technology of vegetable raw materials. - Barnaul Alqui, 2012. - P. 520-521.

11.Chernyaeva G.N. Study the possibility of disposal the condensate of fir-boiled production // Hydro and wooden chemical industry. - 1982. - № 4. - P. 14.

生物制剂作为除草剂抗抑郁药及其在粮食作物中的应用
BIOLOGICAL AGENTS AS ANTIDEPRESSANTS WITH HERBICIDES AND THEIR APPLICATION TO THE GRAIN CROPS

Apaeva Nina Nikolaevna

Candidate of Agricultural Sciences, Associate Professor
Mari State University, Russian Federation

注解。农业生态系统缺乏植物检疫稳定性和整个生态状况的恶化需要开发和使用新的替代植物保护方法。除草剂对作物具有压力。这种压力影响表现为植物生长的延迟，叶子的腐烂和变黄以及对产生疾病的因子的易感性。尽管一周杀灭有益的后果，但使用除草剂会导致产量降低。将生物制剂用作除草剂的抗抑郁药已成为农业中的普遍做法。

关于Planriz和Psevdobakterin-2生物制剂（荧光假单胞菌，菌株ＡＰ-33和金黄色假单胞菌，菌株BS1393）与Grench, SP和Lintur, VDG除草剂混合时活性剂活力的研究表明，除草剂几乎具有对这些细菌的活力没有负面影响。在与除草剂混合后的第二天，细菌活力达到96.5-94.0%，这说明了上述试剂的良好相容性。

生物制剂促进了株高，穗长，穗粒数和千粒重的增加。所有这些因素导致春小麦和大麦的产量增加。

关键词：除草剂，Planriz和Psevdobakterin-2生物制剂，抗抑郁药，杂草，春小麦，大麦。

Annotation. The lacking phytosanitary stability of agrocenosises and the deterioration of the ecological situation at large require new alternative methods of plant protection to be developed and used. Herbicides have a stressful impact on crop plants. Such stressful impact manifests itself in retardation of growth of the plants, decay and yellowing of leaves and susceptibility to disease-producing factors. Despite the beneficial consequences of week killing, the use of herbicides leads to reduction in yields. Applying biological agents as antidepressants with herbicides has become a widespread practice in agricultural industry.

The study concerning the viability of active agents of Planriz and Psevdobakterin-2 biological agents (Pseudomonas fluorescens, strain AP-33 and Pseudomonas aureofaciens, strain BS 1393) when mixed with Grench, SP and Lintur, VDG herbicides has shown that the herbicide had almost no negative effect on the viability of these bacteria. On the second day after mixing with the herbicide, bacteria viability has amounted to 96.5–94.0%, which is illustrative of the good compatibility of the above-mentioned agents.

Biological agents have promoted the increase of plant height, spike length, number of grains per spike and weight of 1000 grains. All these factors have resulted in the increase in yields of spring wheat and barley.

Key words: *Herbicides, Planriz and Psevdobakterin-2 biological agents, Antidepressant, Weeds, Spring wheat, barley.*

INTRODUCTION

Over recent years, much attention has been given to the development of environment-friendly methods of farming and the rational use of environmental assets, including the extension of applying biological agents produced with the use of beneficial soil microorganisms.

The lacking phytosanitary stability of agrocenosises and the deterioration of the ecological situation at large require new alternative methods of plant protection to be developed and used. It is against this background that the biological method of fighting undesirable organisms is essential in the set of protective measures. Furthermore, biological agents increase soil fertility [7].

Protection of grains from weeds is at the forefront of the general system of plant protection. Prompt taking of protective weed-fighting measures allows reducing the weed infestation of crops. Most chemical pesticides are quite toxic. Due to this fact, besides their main function (to protect plants from diseases, weeds and pests), they often have a stressful impact on the main crop itself, which they are intended to protect. Such stressful impact may manifests itself in retardation of growth and various metabolic processes, reduction of germinating ability, appearance of spots and burns, leaf roll, increase of susceptibility to diseases and other symptoms, and eventually results in significant shortfall in yields [3].

The chemical method of weed protection is still the most widespread. The contribution of herbicides to yields of these crops in the Nonchernozem Belt ranges from 100 to 1000 kg/ha [6].

Herbicides have a stressful impact on crop plants. Despite the beneficial consequences of week killing, the use of herbicides leads to reduction in yields. After the crops are treated with herbicides, retardation or cessation of growth of the main crop is observed, decay and yellowing of leaves may appear, the crop's susceptibility to disease-producing factors increases. In certain cases, application of highly active herbicides or tank mixtures of herbicides may lead to nearly complete inhibition of plant growth. In this case, only a timely rain or treatment with a powerful antidepressant can save the yield. That's why there is a growing trend of applying biological agents as antidepressants (antidotes) together with herbicides.

The active components of biological agents are bacteria and microscopic fungi contained in soil. By means of long-term observation, researchers select microorganisms, which can survive well in rhizosphere or on roots of plants and have

positive impact on growth and development of crop plants. Such microorganisms are completely harmless for humans and animals, and they can significantly increase the fertility of soil when there are applied [4].

Certain strains of *Pseudomonas* bacteria promoting the growth of plants and protecting them from phytopathogens are commonly designated as PGPRP (plant growth-promotion rhizosphere *Pseudomonas*). The mechanisms of the stimulating effect of pseudomonas have been studied. Some strains of PGPRP are able to synthesize such plant growth regulators as auxins, cytokinins and gibberellin-like substances, which have direct influence on the growth and development of plants. PGPRP can improve the phosphorous nutrition of plants [1]. Many strains of PGPRP produce antibiotics – phloroglucinols, phenazines, pioluteroine, oomycin A and others, which inhibit the growth and development of plant phytopathogens [11].

One of the properties of fluorescent pseudomonas is their ability of producing secondary metabolites only when their culture achieves high density of cells [12]. Furthermore, these bacteria are able to induce systemic resistance of plants to phytopathogens [10; 13]

V.R. Gabdullin and N.N. Apaeva (2010) note that biological agents produced with the use of nitrogen fixers and mobilizers of insoluble phosphorus compounds in the soil becomes of special interest in terms of fighting organisms harmful for plants. It is necessary to study their effectiveness on various crops. Selected strains of needed microorganisms are able not only to fertilize the soil with plant nutrients, which are necessary for growth and development of crop plants, but also to emit a set of biologically active substances (such as plant growth stimulators, antibiotics and soil microflora activators) into the environment [2].

MATERIALS AND METHODS

The studies concerning the research of biological agents as antidepressants in mixture with herbicides had been conducted during 2011-2014 on the trial field of the Mari State University. Field trials were held on spring wheat crops with the use of Grench herbicide and Planriz and Psevdobakterin-2 (PS-2) biological agents.

Trial arrangement:

1. Control (without treatment);
2. Grench – 10 g/ha
3. Grench + Planriz– 10 g/ha + 375 mL/ha;
4. Grench + PS-2– 10 g/ha + 1 L/ha.

The trial was held in four replications. The soil of the trial area was sod-podzolic, middle-loamy. Agrochemical attributes of the soil: humus content 2-2.2%, pH (salt) 5.7; P_2O_5 – 24-26 mg per 100g of soil; K_2O – 11-14 mg per 100g of soil. The seeds of spring wheat (Lada sort) were used for sowing. Treatment of spring wheat crops with the agents was made during the tillering stage in fine windless weather.

A similar trial was held on spring barley crops. In this trial, Lintur, VDG was applied. The arrangement of this trial was almost similar to the one of the previous trial:

1. Control (without treatment).
2. Lintur (0.15 kg/ha).
3. Lintur (0.15 kg/ha) + Planriz (375 mL/ha).
4. Lintur (0.15 kg/ha) + Psevdobakterin-2 (1 L/ha).

The trial was held in six replications. The soil of the trial area was sod-podzolic, middle-loamy. Agrochemical properties of the soil: humus content 2-2.1%, pH (salt) 5.7-6.0; P_2O_5 – 23-26 mg per 100g of soil; K_2O – 11-13 mg per 100g of soil. The seeds of spring wheat (Elf sort) were used for sowing. Treatment of spring wheat crops with the agents was made during the tillering stage in fine windless weather in evening time.

Weed estimation of crops was made before the application of herbicides and one month after it (in each replication). Quantitative method was used for weed estimation. While moving along the diagonal line of the field, 50x50cm frames (0.25m^2) were put in even increments of distance. Weeds inside each frame were counted by species (using the route survey method) [8]. The number of fields for weed estimation is 5. The results were recorded in the field book and then used for calculating the number of weeds by species per 1 hectare of the surveyed area and the weed infestation score.

Planriz agent consists of *Pseudomonas fluorescens* bacterial cells (strain AP-33), and Psevdobakterin-2 consists of *Pseudomonas aureofaciens* (strain BS 1393). Bacteria in the biological agent are living, and when it is used in combination with a chemical herbicide, there is a danger that the living bacteria cells may die. If the bacteria lose their viability, it may have influence on the protective and growth-stimulating effect of the biological agents. In light of this, we have carried out the analysis of compatibility between biological agents based on living bacteria and chemical agents.

The studies concerning the research of influence of chemical agents on viability of bacterial cells were conducted in laboratory conditions by method of adding them into the nutrient media using the same concentrations as those used during field trials. As a nutrient medium, MIA (meat-infusion agar) was used. In one of the two separate vessels, Grench herbicide was mixed with Planriz biological agent, and in the other vessel, Grench was mixed with Psevdobakterin-2. The same procedure took place with Lintur with the same biological agents. These mixtures were placed in Petri dishes on a solid nutrient medium. Biological agents without herbicides were cultured as well for control purposes. The result was total 6 variants in three replications. After inoculation, the Petri dishes were placed into a thermostat at the temperature of 37°C. On the second day after inoculation,

the numbers of viable bacteria were counted for each of the Petri dishes. Bacteria viability was determined by their growth leading to the emergence of visible colonies in the nutrient medium.

The most simple and available methods for separating living and dead cells are represented by various ways of staining them with subsequent microscopic examination. This method is described in the books of R. Mitchell [5] and J. L. Alonso [9].

RESULTS AND DISCUSSION

The laboratory analysis for the research of the viability of active components of Planriz and Psevdobakterin-2 in mixture with Grench and Lintur was carried out on the second day after the inoculation in Petri dishes (Table 1).

Table 1: Impact of herbicides on the viability of bacteria cells

Variants	Number of viable cells in the solution, pcs/mL			Viability, %
	Control	Lintur	Grench	
Pseudomonas fluorescens, strain AP-33	2.8×10^9	2.7×10^9	2.6×10^9	96.5-94.0
Pseudomonas aureofaciens, strain BS 1393	2.9×10^9	2.8×10^9	2.7×10^9	96.5-94.5

The research showed that the herbicide had virtually no negative impact on viability of *Pseudomonas aureofaciens* (strain BS 1393) and *Pseudomonas fluorescens* (strain AP-33) bacteria. When Planriz and Psevdobakterin-2 are mixed with Grench herbicide, viability of *Ps. fluorescens* and *Ps. aureofaciens* amounts to 96.5–94.0%, which is an evidence of good compatibility of those agents.

In the course of determining bacteria viability after 7 days, it was established that the number of viable bacteria has steeply reduced; the chemical agent has killed almost all the bacteria.

Therefore, it is recommended to use tank mixtures of biological and chemical agents immediately after mixing.

The results of weed estimation of crops during the field trial have shown that perennial weeds predominated in the agrocenosis of spring wheat, including: creeping thistle (*Cirisium arvense* L.), field milk thistle (*Sonchus arvensis*), broad-leaf plantain (*Plantago major*); among annual weeds – fat hen (*Chenopodium album*), catchweed (*Galium aparine* L.), wild buckwheat (*Polygonum convolvulus* L.), field pansy (*Viola arvensis* M.), cornflower (*Centaujea speciosa* M.), capsella (*Capsella bujsa* P.), Edmonton hemp-nettle (*Galeopsis speciosa* M.), common hemp-nettle (*Galeopsis tetrahit* L). We have observed reduction of weed infestation of spring wheat crops as the result of applying Grench herbicide in its pure form and in mixture with Planriz and PS-2 biological agents.

At the moment of sprinkling, annual weeds were generally at the stage of 3-5 leaves or more, perennial offset weeds (rosettes) have entered its booting stage. The protected crop (spring barley) was at the stage of full tillering (stage 26 by Zadoks scale). Sprinkling of crops with herbicides significantly reduces the number of weeds (table 2).

We have observed reduction of weed infestation of spring wheat crops as the result of applying Grench herbicide in its pure form and in mixture with Planriz and Psevdobakterin-2 biological agents.

Table 2: Impact of herbicides on weed infestation of spring wheat crops

Trial variants	Number of weeds, pcs/m^2		Biological effectiveness, %	Yield, metric ton/ha
	Before treatment	After treatment		
1. Control	91	93	-	2.5
2. Grench	102	7	93	2.7
3. Grench + Planriz	94	8	92	2.9
4. Grench + PS-2	94	9	90	3.5

After treatment of crops with Grench herbicide, the number of weeds decreased by 14.6 times. Their total number amounted to 7 pcs/m^2. This herbicide was highly effective against annual weeds. Among annual weeds, we only observed fat hen (2 pcs/m^2), common fumitory (2 pcs/m^2) and chickweed (2 pcs/m^2). Other weed species were killed. Biological effectiveness of Grench against annual weeds amounted to 93%.

Effectiveness of tank mixtures of biological agents and herbicides against weeds amounted to 90-93%. All plants of field horsetail, pale persicaria and hoary alyssum were killed.

After treatment with the herbicide and the tank mixtures, the number of weeds has reduced by 95 pcs/m^2 in the second variant, by 90 pcs/m^2 in the third variant and by 85 pcs/m^2 in the fourth variant. Biological effectiveness from the use of the herbicide in pure form amounted to 93%, and from the use of the tank mixtures – 92 and 90.5 % correspondingly. As compared with the control variant, the number of weeds reduced by 13, 12 and 10 times correspondingly.

Under the trial conditions, deviations in the start of stages of growth, development and morphological changes were observed at the moment of spring wheat harvest for those weeds, which had remained in the bottom circle in single quantities.

After treatment of spring wheat crops with Grench herbicide, its yield increased by 0.25 metric ton/ha as compared to the variant without treatment. Psevdobakterin-2 in mixture with herbicides had material impact on the spring wheat yield increase. Yield gain amounted to 1.0 metric ton/ha.

Difference in yields between the variants can be explained by differences in the number of productive stems, spike length, number of grains in a spike and weight of 1000 grains (Table 3).

Table 3: Impact of applying a tank mixture of herbicides with biological agents on the elements of spring wheat yield structure

Variants	Density of planting, pcs/m²	Productive tillering capacity	Height of plants, cm	Spike length, cm	Number of grains in a spike, pcs	Weight of 1000 grains, g
Control	284	0.96	60.8	8.0	12.7	38.5
Grench	291	0.80	60.1	8.0	11.25	39.0
Grench + Planriz	275	0.87	63.5	9.2	15.25	42.6
Grench + PS-2	298	0.90	65.1	9.5	19.25	43.3

These tables are showing that sprinkling of spring wheat crops with the herbicide or with the tank mixture of Psevdobakterin-2 and the herbicide increases all yield structure indices.

Spike length and the number of grains in a spike were higher in the variants with the use of the herbicide and the tank mixture. The biggest increase is seen in the fourth variant. As compared to the control variant, spike length increased by 0.6cm, and by 1.5cm as compared to the second variant. The number of grains in a spike increased by 4.55 pcs as compared to the control variant, and by 8 pcs as compared to the use of the herbicide in pure form.

The results of weed estimation of spring barley crops have shown that perennial weeds predominated in the agrocenosis, including: field horsetail (*Equisetum arvensis*), common dandelion (*Taraxacum officialis*), field bindweed (*Convolvulus arvensis)*; among annual weeds – fat hen (*Chenopodium album*), common fumitory (*Fumaria officinalis*), cleaver (*Galium aparine* L.), chickweed (*Stellaria media*), wild buckwheat (*Polygonum convolvulus* L.).

The most of weeds in spring barley crops were annual – 83.5% from the total number of weeds in the first variant and 88.7% in the second. Percentage of annual weeds amounted to 90.3% in the third variant and to 89% in the fourth. The perennial weeds were represented mostly by field horsetail.

After treatment of crops with Lintur herbicide, the number of weeds reduced by 9.5 times (Table 4). Their total amount amounted to 13 pcs/m². This herbicide was highly effective against annual weeds. Among annual weeds, we only observed fat hen (1 pcs/m²), cleaver (4 pcs/m²), common fumitory (4 pcs/m²) and chickweed (1 pcs/m²). Other weed species were killed. Biological effectiveness of Grench against annual weeds amounted to 93%. The number of perennial weeds

has reduced by 4.7 times as compared to the same variant before treatment. As compared to the control variant, the number of weeds was 11.7 times less. Biological effectiveness of Lintur herbicide against annual weeds amounted to 91.4%. Effectiveness of tank mixtures of biological agents and herbicides against weeds amounted to 85.5% and 87.5% correspondingly. Almost all plants of hoary alyssum and wild radish were killed.

Table 4: Impact of herbicides on weed infestation of spring barley crops

Trial variants	Number of weeds, pcs/m²		Biological effectiveness, %	Yield, metric ton/ha
	Before treatment	After treatment		
1. Control	114	152	-	1.94
2. Lintur	124	13	91.4	2.28
3. Lintur + Planriz	124	22	85.5	2.66
4. Lintur + PS-2	128	19	87.5	2.92

As contrasted with the use of the chemical in pure form, such weeds as field horsetail, common dandelion and chickweed were better preserved in the variants with biological agents. Lintur in pure form has dealt better with perennial weeds as contrasted with its tank mixtures with biological agents.

Tank mixtures of Planriz and Psevdobakterin-2 with the herbicide have also shown high effectiveness on spring barley crops, although it was a little less than the biological effectiveness of the chemical in pure form.

The number of weeds has increased by the time of second measurement by 38 pcs/m² in control variant. After treatment with the herbicide and tank mixtures, the number of weeds has reduced by 111 pcs/m² in the second variant, by 102 pcs/m² in the third variant and by 109 pcs/m² in the fourth. Biological effectiveness from the use of the herbicide in pure form amounted to 91.4%, and from the use of tank mixtures – 85.5% and 87.5% correspondingly. As compared to the control variant, the number of weeds reduced by 11, 7 and 8 times correspondingly (by variants).

Percentage of perennial weeds before sprinkling the crops with the herbicide was almost equal in all variants, within the range of 10-15% of the total number of weeds. After treatment in the control variant, the percentage of perennial weeds remained at almost the same level (15-16%). As for other variants, an increase of the percentage perennial weeds in the total number of weeds is observed (Figure 1). This demonstrates that Lintur herbicide kills annual weeds better.
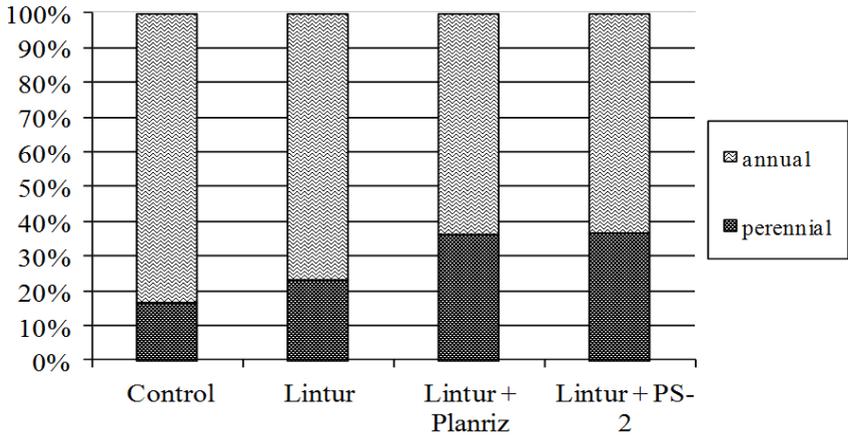
Figure 1: *Percentage of perennial and annual weeds in the total amount of weeds after treatment, %*

After treatment of spring barley crops with Lintur herbicide, the yields increased by 0.34 metric ton/ha as compared to the variant without treatment. After treatment with Lintur + Planriz tank mixture, the yield of barley increased by 0.72 metric ton/ha. As contrasted with the variant with the herbicide in pure form, the yield of barley increased by 0.38 metric ton/ha. Psevdobakterin-2 in mixture with the herbicide had a material impact on the spring barley yield increase. Yield gain amounted to 0.98 metric ton/ha as compared to the control variant, and to 0.64 metric tons/ha as compared to the Lintur variant. When comparing two biological agents, we can see that Psevdobakterin-2 has shown the best results. The yield of spring barley as compared to Planriz is 0.26 metric ton/ha higher.

Application of Lintur herbicide on spring barley crops increases grain production profitability by 32% as compared to the control level. The use of biological agents as antidepressants contributes to the increase of net income and profitability as compared to the use of herbicides in pure form. Planriz application increases net income by 6.75 thousand rubles per hectare as compared to the control level, and by 3.7 thousand rubles per hectare as compared to Lintur. The biggest income was earned from the use of Psevdobakterin-2. Net income increased by 1.8 times as compared to the control level, and profitability increased by 1.7 times.

CONCLUSIONS

1. *Pseudomonas fluorescens* (strain AP-33) and *Pseudomonas aureofaciens* (strain BS 1393) cells in mixture with recommended doses of herbicides do not lose their viability in case they are used immediately after mixing.

2. Treatment of spring barley crops and spring wheat crops with herbicides (both pure and mixed with Planriz or Psevdobakterin-2 biological agent) results in a significant reduction in the number of weeds.

3. Planriz and Psevdobakterin-2 biologic agents had favorable effect on the growth of plants and promoted the increase in yields of spring barley and wheat. Psevdobakterin-2 has shown the highest effectiveness in terms of yield increase. Yields of spring wheat and barley have increased by 40 and 50% correspondingly. Profitability of grain production with the use of this biological agent has increased by 70%.

References

1. *Voronin AY, Kochetkot VV, Belousov et.al. (2000). Biological agents based on pseudomonas / Agro XXI Vek. 3: 3-5.*

2. *Gabdullin VR, Apaeva NN (2010). Effectiveness of biological agents in mixture with herbicides. Polytopical online scientific journal of the Kuban State Agrarian University (KSAU science jounal) [electronic source] – Krasnodar: KubSAU, 56(56): 56-63.*

3. *Korobova LN, Gavrilets TV (2006). Application of bactofit: both yield gain and restoration of soil [Text]. Protection and quarantine of plants. 4: 47-48.*

4. *Labutova NM. An alternative to mineral fertilizers and pesticides. Electronic source: URL: http://cbio.ru/page/43/id/711*

5. *Mitchell R, Stamm V, Stamm-Zollinger E et.al (1976). Water Pollution Microbiology [Text]. Edited by R. Mitchell, translated to Russian by G.G. Kalin. Moscow: Medicine. Page 320.*

6. *Safonov AF, Gataulin AM, Platonov IG et.al. (2006) Farming systems. Moscow: KolosS. Page 447.*

7. *Titov IN. Locally produced biological agents: regulators of growth and development of plants and humic agents for modern farming. [Electronic source] URL: http://pandia.ru/text/78/009/76980.php*

8. *Edited by Chenkin AF (1994). Phytosanitary diagnostics. Moscow: KolosS. Page 323.*

9. *Alonso JL et.al. (2002). Double-staining method for differentiation of morphological changes and membrane integrity of Campylobactercoli cells. Appl. Environ. Microbiol. 2002. 68: 5151–5154.*

10. *Johansen JE, Binnerup SJ, Lejbolle KB et.al. (2000). Impact of biocontrol strain Pseudomonas fluoresecens CHAO on rhizosphere bacteria isolated from barley (Hordeum vulgare L.) with special reference to Cytophaga-like bacteria. Journal of Applied Microbiology. 93: 1065-1074.*

11. *Kerry BR (2000). Rhizosphere interactions and the exploitation of microbial agents for the biological control of plant-pathogenic fungi. Ann. Rev. Phytopathol. 38: 423-441.*

12. *Ligon JM, Hill DS, Hammer PE et.al. (2000). Natural products with antifungal activity from Pseudomonas biocontrol bacteria. Pest Man. Sci. 56: 688-695.*

13. *Van Loon LC, Bakker PA, Pietrse CMJ (1998). Systemic resistance induced by rhizosphere bacteria. Ann. Rev. Phytopathol. 36: 453-483.*