



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

Proceedings of the
International Conference

Date:
February 12

Beijing, China 2025

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 2

2025 年 2 月 12 日，中国北京
February 12, 2025. Beijing, PRC

Proceedings of the International Conference
**“Scientific research of the SCO countries: synergy
and integration”** - Reports in English

(February 12, 2025. Beijing, PRC)

DOI 10.34660/conf.2025.50.97.018

这些会议文结合了会议的材料 – 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。

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

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可持续城市能源规划和绿色建筑发展
**SUSTAINABLE URBAN ENERGY PLANNING AND GREEN
BUILDING DEVELOPMENT**

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摘要: 随着全球经济的快速发展和城镇化进程的加快,城市已成为能源消耗和环境污染的主要来源。城市能源消耗不仅关系到能源安全,而且对生态环境和气候变化有着深远的影响。在此背景下,如何实现城市能源的可持续发展成为各国政府和学术界关注的焦点。城市可持续能源规划与绿色建筑发展作为推动城市可持续发展的重要途径,具有重要的理论和现实意义。本文旨在探讨城市可持续能源规划的理论体系、方法策略及其与绿色建筑发展的相互关系。通过本文的研究,期望为城市可持续能源规划、推动绿色建筑发展提供理论支撑和实践指导,从而实现城市能源消耗的减量化、清洁化和高效化,为建设资源节约型、环境友好型社会做出贡献。

关键词: 城镇化、可持续性、能源、绿色发展、规划。

Abstract. *With the rapid development of the global economy and the acceleration of urbanization, cities have become a major source of energy consumption and environmental pollution. Urban energy consumption is not only related to energy security, but also has a far-reaching impact on the ecological environment and climate change. In this context, how to realize the sustainable development of urban energy has become the focus of attention of governments and academics. Urban sustainable energy planning and green building development, as a key way to promote sustainable urban development, have great theoretical and practical significance. The purpose of this paper is to explore the theoretical system, methodological strategies of urban sustainable energy planning and its interrelationship with green building development. Through the research of this paper, we expect to provide theoretical support and practical guidance for urban sustainable energy planning and promote green building development, so as to realize the reduction, cleanliness and high efficiency of urban energy consumption, and to contribute to the construction of a resource-saving and environment-friendly society.*

Keywords: *Urbanization, Sustainability, Energy, Green Development, Planning.*

Theoretical system of urban sustainable energy planning

Overview of sustainable energy

Sustainable energy is energy that can meet current needs without compromising the ability of future generations to meet their own needs. This type of energy is usually derived from resources that are constantly renewed in nature or forms of energy that have minimal environmental impact. Sustainable energy sources include solar, wind, hydro (hydropower), biomass, geothermal and ocean energy. The development of sustainable energy is an important way to realize global climate change goals, promote a green and low-carbon transition and ensure energy security. With technological advances and policy support, sustainable energy is expected to become the dominant form of energy in the coming decades.

Status and trends of urban energy consumption

1. Status of Energy Consumption in Chinese Cities

With the continuous expansion of China's urban scale, the contradiction between urban development and energy consumption has become increasingly prominent. Urban energy consumption continues to grow, especially in the context of the era of mass production, consumption and waste, and the problems of industrial and domestic pollution are prominent. In recent years, Chinese cities have achieved remarkable results in dealing with pollutant emissions. For example, chemical oxygen demand (COD) emissions peaked from 2011 to 2015, but emissions have decreased significantly since 2016. The daily sewage treatment capacity of cities is also increasing. With the development and application of energy-saving technologies, the city's energy consumption has shown a downward trend. This indicates that technology plays an important role in promoting energy efficiency. Increased awareness of environmental protection has promoted the increase of urban greening area. Meanwhile, the urban industrial structure is shifting from labor-intensive industries to knowledge-intensive industries, which not only promotes industrial upgrading, but also brings higher growth rates.

2. Status of global energy consumption

Total global primary energy consumption in 2023 is 21,142 million tons of standard coal, an increase of 2.02% from 2022 and 5.37% from 2019. This indicates that global energy consumption is gradually recovering and maintaining the growth trend after the epidemic.

Asia-Pacific takes the top spot in total primary energy consumption, with its share increasing from 44.11% in 2019 to 47.09% in 2023. On the contrary, North America and Europe show a decreasing trend in their share.

The share of fossil energy sources (oil, coal and natural gas) in total primary energy consumption is on a decreasing trend, while the share of renewable energy consumption is increasing every year, from 4.96% in 2019 to 8.16% in 2023.

Overview of green building development

Definition and Characteristics of Green Building

Definition

A green building is a building that maximizes the conservation of resources (energy, land, water and materials), protects the environment and reduces pollution during the whole life cycle of the building, and provides people with a healthy, suitable and efficient use of space, in harmony with nature. The whole life cycle of a building includes the whole process of material production, planning, design, construction, operation and maintenance, demolition, reuse and disposal of the building. Green building is not only about the greening of buildings, but a broader concept covering the impact of buildings on the environment, the efficient use of resources and harmonious coexistence with the natural environment.

Characteristics

Conservation and environmental protection: In the whole process of the construction and use of buildings, maximize the conservation of resources, protect the environment, care for the ecology and reduce pollution. This includes energy-saving, land-saving, water-saving, material-saving and other aspects, in order to reduce the load and impact on the earth's resources and environment.

Healthy and Comfortable: To provide a healthy, suitable and efficient space for people to move around. This includes good indoor air quality, lighting, temperature and humidity control, etc. to create a healthy and comfortable living and working environment.

Natural Harmony: In the process of building construction and use, the natural ecological environment is approached, cared for and taken care of, so as to realize the harmonious coexistence of human beings, buildings and nature. This involves the integration of natural ventilation, natural lighting and green landscape in building design.

International experience in green building development

1. Policy standards and incentives

Many countries have promoted the development of green buildings by formulating policy standards and encouraging technological innovation. For example, the French government has actively promoted the standardization of green building evaluation systems and introduced a number of energy consumption regulations. In addition, the UAE has enacted a law requiring all new buildings to comply with environmentally friendly green building standards and introduced a series of green building policies and regulations.

2. Green Building Certification System

HQE (High Quality Environmental Evaluation System) launched in France evaluates the environmental performance of buildings, including the harmony between the building and the environment, building materials, water use and other outdoor environments, as well as indoor environments such as hot water, noise and air quality.

3. Innovative design and building materials

For example, green buildings in Denmark can reduce a building's energy consumption by 50 per cent through innovative design. The landmark Group Headquarters building in the United Arab Emirates employs a range of green technologies, such as automated lighting control systems with daylight harvesting capabilities and water recycling units with temperature sensors, to improve energy efficiency and reduce carbon footprints.

4. Green and Harmonious Communities

Dubai's Sustainable City is a prime example, in which photovoltaic panels have been installed on the roofs of all buildings to meet the community's electricity needs. The community also encourages low-carbon lifestyles, such as limiting the entry of cars into the community and promoting walking and cycling.

5. Market Opportunity

According to a report by the World Economic Forum, the global green building revolution is expected to unlock a \$1.8 trillion market opportunity by 2030. According to the report, decarbonizing the building sector brings significant economic benefits to industry pioneers, while creating positive environmental benefits for all.

Status and Trends of Green Building Development in China

Green building in China originated in the 1980s, initially promoting the concept of building energy efficiency, and by around 2005, the concept of green building was introduced and widely spread. The promotion of green buildings in China has achieved remarkable results. According to news reports, data from the China Building Energy Efficiency Association showed that in 2018, the total carbon emissions from the whole process of the country's buildings were 4.93 billion tons of carbon dioxide, accounting for 51.3% of the country's carbon emissions, and the total energy consumption of the whole process of the country's buildings was 2.147 billion tons of standard coal equivalent, accounting for 46.5% of the country's total energy consumption. The "14th Five-Year Plan" for Building Energy Efficiency and Green Building Development proposes that by 2025, all new buildings in cities and towns will be built as green buildings, the efficiency of building energy use will be steadily improved, the structure of building energy use will be gradually optimized, and the trend of growth in building energy consumption and carbon emissions will be effectively controlled. The plan also specifies nine

key tasks for the “14th Five-Year Plan” period, including improving the quality of green building development, raising the level of energy efficiency in new buildings, strengthening the energy-saving and green transformation of existing buildings, and promoting the application of renewable energy.

In the future, China will continue to promote the high-quality development of green buildings. This includes raising green building standards, promoting ultra-low-energy buildings, enhancing energy-saving retrofitting of existing buildings and promoting the application of renewable energy in buildings. The government and industry organizations will increase policy support and market guidance for green buildings to promote their application and development on a wider scale.

Interaction between urban sustainable energy planning and green building development

The relevance of energy planning to green building development

1. Energy Consumption and Efficiency

One of the core objectives of green building is to improve the efficiency of energy use and reduce energy consumption in the building sector. Energy planning directly supports the development of green buildings by optimizing the energy structure and improving the efficiency of energy use. In energy planning, the promotion of building energy-saving technologies and green building standards helps to reduce the total energy consumption in the building sector, which is of great significance in realizing the goal of controlling the country’s total energy consumption.

2. Renewable energy utilization

Energy planning usually includes the development and utilization of renewable energy sources. Green buildings reduce dependence on fossil energy by integrating renewable energy technologies such as solar and wind. Renewable energy promotion policies in energy planning, such as subsidies and tax incentives, can incentivize the greater use of these clean energy sources in green buildings.

3. Carbon Emission Reduction Targets

Green buildings and energy planning together serve the national carbon emission reduction targets. Through energy planning, specific energy consumption and carbon emission reduction targets can be set, and green buildings are an important way to realize these targets. Market mechanisms such as carbon trading and carbon tax in energy planning can promote the development of green buildings because it reduces the long-term operating costs of green buildings.

4. Policies and regulations

Energy planning usually involves a series of policies and regulations that provide the necessary legal support and policy environment for the development of green buildings. For example, through energy planning, governments can develop green building evaluation standards, mandatory codes and incentives to promote a green transition in the construction industry.

5. Economic incentives and market mechanisms

Economic incentives in energy planning, such as financial subsidies, preferential loans and green bonds, can reduce the cost of green buildings and improve their market competitiveness. Energy planning can also promote the development of green buildings by establishing market mechanisms, such as green power trading and energy efficiency certificates.

6. Regional development and urban planning

Energy planning and urban planning are closely linked, and the development of green buildings, as an important part of urban planning, needs to be coordinated with regional energy planning. Comprehensive regional planning and energy planning can ensure the harmonious coexistence of green buildings with urban infrastructure, transportation networks and energy supply.

7. Technology innovation and transfer

The development of green buildings drives innovation in energy efficiency and renewable energy technologies, and these technological advances are, in turn, key to energy efficiency and sustainability in energy planning. Energy planning can support the development and diffusion of green building technologies and facilitate technology transfer and deployment.

Green Building Development Strategies and Policy Recommendations

Policies and regulations

Formulate and improve laws and regulations related to green buildings, and clarify the definition, standards, evaluation system and incentive policies for green buildings. Incentivize developers and consumers to adopt green buildings through financial subsidies, tax incentives and financial support. Introduce national and industry standards for green building design and construction, and promote the green building labeling system.

Technology R&D and application

Encourage research institutions and enterprises to research and develop new green building technologies, materials and processes. Integrate existing green building technologies to form systematic and modularized solutions. Utilize information technologies such as BIM (Building Information Modeling) and Internet of Things to improve the management level of green buildings.

Education, training and publicity

Train building industry practitioners in green building knowledge and technology. Increase public awareness and acceptance of green building through the media, community activities and other forms.

Market promotion

Guiding consumers to choose green buildings through measures such as green building certification and energy efficiency labeling. Establish a market for green building products and services and promote the development of the green building industry.

Social Responsibility and Supervision

Encourage enterprises to assume social responsibility and integrate green building concepts into their corporate culture and business strategies. Establish a social supervision mechanism for green building evaluation to ensure the authenticity and effectiveness of green buildings.

International cooperation

Conduct exchanges and cooperation on green building technologies with countries and regions at advanced international levels. Promote mutual recognition of green building standards at home and abroad and internationalization of green building.

Conclude

Urban sustainable energy planning and green building development are complementary. As an important part of urban sustainable energy planning, green building is of great significance for optimizing urban energy structure, reducing energy consumption and reducing environmental pollution. At the same time, urban sustainable energy planning provides policy support, technical guarantee and market guidance for green building development. Urban sustainable energy planning should be based on green building development, formulate and improve green building related policies and regulations, and clarify green building development goals, standards and policy measures. Increase the research and development and promotion of green building technology, and promote technological innovation in the green building industry. Optimize the urban energy structure and increase the application ratio of renewable energy in the construction field. Strengthen green building publicity and education, and improve public awareness and acceptance of green building. Although China's urban sustainable energy planning and green building development has achieved certain results, it still faces many challenges. In order to realize sustainable urban development, the policy system should be further improved, policy support should be increased, and the scale of green building development should be promoted. Innovate the market mechanism, stimulate the market demand for green buildings, and promote the upgrading of green building industry. Expand international cooperation, introduce foreign advanced technology and management experience, and improve the overall level of green building in China. Strengthen the integration of urban energy planning and green building development to realize the coordinated development of urban energy utilization and environmental protection.

In conclusion, sustainable urban energy planning and green building development are important ways to promote the sustainable development of China's cities. Only by closely combining the two can we achieve the optimization of urban energy use, the enhancement of environmental protection and the improvement of people's quality of life, and contribute to the construction of a better living environment.

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中亚水资源和能源问题的某些方面
**SOME ASPECTS OF THE WATER AND ENERGY PROBLEM OF
CENTRAL ASIA**

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注释。在人类面临的紧迫问题中，必须注意与水资源利用有关的问题。考虑到使用跨界河流水的中亚国家的水资源储量有限，有必要就跨界河流水的联合使用达成共识。需要强调的是，在中亚国家，水和能源问题在当今的议程上占有特殊地位。结论是，该地区所有国家的政府之间需要采取协调行动，无论是在建设新的水力发电厂方面，还是在用水灌溉地区和恢复咸海方面。

关键词：中亚、水资源、河流、能源。

Annotation. *Among the urgent problems that humanity faces, it is necessary to note the issue related to the use of water resources. Considering the limited water reserves in the Central Asian countries that use the waters of transboundary rivers, it is necessary to come to a common denominator on the joint use of the waters of transboundary rivers. It is emphasized that in the Central Asian countries the water and energy problem occupy a special place on the agenda today. A conclusion is made about the need for coordinated actions between the governments of all countries in the region both in the construction of new hydroelectric power plants, as well as in the use of water for irrigation of areas and the restoration of the Aral Sea.*

Keywords: *Central Asia, water resources, rivers, energy.*

The Central Asian region (CA) is located in the very center of Eurasia, covering vast areas and includes Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, Turkmenistan with a population of more than 82 million people (as of 2024).¹By 2050 it will reach 100 million people.²

In this regard, the “problem of carrying out comprehensive modernization and cooperation in order to increase the competitiveness of national economies” is acute.³As is known, water resources and energy are fundamental components of any economy.

The water and energy complex of the five Central Asian countries that gained independence in 1991, including large hydroelectric power plants with reservoirs, canals and an irrigation system, was created under the conditions of the existence of a single country - the USSR, in accordance with the approved schemes for the integrated use of water resources of river basins. Today, referring to this, the downstream countries, where irrigated agriculture is most developed - Kazakhstan, Turkmenistan and Uzbekistan, insist on preserving the then existing principles and schemes of water allocation and flow regulation regimes, and the countries of the flow formation zone - Kyrgyzstan and Tajikistan, constantly refer to the fact that under the USSR they received appropriate compensation from the downstream countries in the form of energy supplies for the operation of their hydroelectric power plants in the irrigation mode.⁴ During the Soviet period, all the republics were part of a single national economic complex that covered all production links. The Soviet Union carried out large-scale projects to build irrigation canals in the republics of Central Asia, starting in the 1930s, based on the intensive extraction of water from the two leading waterways of the region - the Amu Darya and Syr Darya rivers, which brought their waters to the Aral Sea. The Soviets were characterized by extensive agricultural economics, the desire to develop more and more new areas to increase productivity and all indicators of the agricultural sector.⁵

In total, there are 10.1 million hectares of irrigated land in Central Asia. The largest amount is in Uzbekistan - 4.3 million, where this type of agriculture absolutely dominates. In second place in terms of total area is Kazakhstan, where 2.2 million hectares of agricultural land are irrigated. True, in the total share of Kazakhstan’s arable land this is only 7.6%, which is literally a pittance in comparison

¹ Population of Central Asia 1950-2024 & Future Projections <https://database.earth/population/central-asia>

² News Central Asia (nCa) <https://www.newscentralasia.net/2024/04/09/naseleniye-tsentralnoy-azii-sostavlyayet-pochti-81-million-chelovek-k-2050-godu-ono-dostignet-100-millionov-chelovek/>

³ Zhumabekov M.U., Syzdykova Zh.S. International corridor “North-South”: ways of forming Eurasian logistics// Issues of national and federal relations. Issue 8(113).2024. Vol.14.P.2632.

⁴ Petrov G.N. Problems of using water and energy resources of transboundary rivers of Central Asia and ways of their solution. Dushanbe. 2009. P. 5.

⁵ Agrarian policy of N. S. Khrushchev: main directions and results <https://cyberleninka.ru/article/n/agrarnaya-politika-ns-hrusheva-osnovnye-napravleniya-i-rezultaty>.

with other Central Asian countries. But if we take the southern regions separately, then here irrigation is actually the only option for farming. In general, irrigated agriculture accounts for 65.5% of gross agricultural output in Central Asia.⁶

In the Central Asian countries, the process of desertification is growing, which is “accompanied by a change in the qualitative and quantitative composition of the population, which can have the most negative impact on the productive forces of states and lead to serious political, socio-economic and environmental consequences”⁷.

After the collapse of the USSR, one of the main problems for the Central Asian countries was the coordinated management of water resources. Attempts were made to jointly manage water resources, meetings were held during which bilateral and multilateral agreements were signed, which marked the beginning of strengthening cooperation between the Central Asian countries. At the same time, it is worth emphasizing that each of the countries relied on the fact that “a sovereign state has all the rights to unconditionally establish any regimes for regulating river flow that correspond to its national interests on reservoirs belonging to it and located on its territory.”⁸

The first significant step was taken in October 1991 in Tashkent, when the heads of the water committees of the Central Asian countries gathered to discuss issues related to the use and conservation of water resources. On February 18, 1992, the ministers gathered in Almaty and signed an agreement and decided to establish the Interstate Commission for Water Coordination (ICWC). The main issues were: management of the Aral Sea basin, the Amu Darya and Syr Darya river basins, as well as return waters with the joint use of water sources and their conservation. During 2003-2008, 11 projects worth a total of 6.62 million US dollars were implemented to regulate water resources in the region. These projects cover stable water management in the Aral Sea basin, the introduction of integrated water resources management, and other issues.⁹

The international conference on the topic: “Transboundary environmental problems of Central Asia: application of international legal mechanisms for their solution” was held on November 17, 2010, in which experts, scientists, environmentalists from more than 30 countries, as well as representatives of more than

⁶ We have five years: what problems canal in northern Afghanistan create for southern Kazakhstan <https://orda.kz/u-nas-est-pjat-let-kakie-problemy-kanal-na-severe-afganistana-mozhet-sozdat-jugu-kazahstana-379213/>.

⁷ Sidorova L. Central Asian States: Problems of Joint Use of Transboundary Water Resources. // Central Asia and the Caucasus. 2008. No. 1 (55). P. 92-104.

⁸ Petrov G. N. Legal regime of reservoirs of complex purpose on transboundary rivers. Economy of Tajikistan: development strategy. Dushanbe, 1999. No. 3.

⁹ Materials of the IFAS. Action report of the International Fund for saving the Aral Sea for the period of 2002-2008. Dushanbe, 2008. R. 25.

60 international organizations and financial institutions, including the UN, OSCE, WHO, World Bank, World Wildlife Fund, etc. took part.¹⁰ Following the Conference, the Tashkent Environmental Declaration was adopted, which defined the basic principles for the use of transboundary rivers and emphasized the need to comply with international legal acts on transboundary cooperation.¹¹

The largest rivers of Central Asia are the Amu Darya and the Syr Darya. The confluence of the Panj and Vakhsh rivers gives rise to the waters of the Amu Darya, into which in the middle reaches flow the Kafirnigan, Surkhandarya, Sherabad on the right, and the left-hand tributary Kunduz. The Amu Darya takes its sources in the territory of Tajikistan and partly in northern Afghanistan, then flows along the border of Afghanistan and Uzbekistan, then through Turkmenistan and returns to Uzbekistan. Further along the 1257 km there are no more tributaries.

The confluence of the Naryn and Karadarya rivers forms the Syr Darya, which carries its waters through the territory of Kyrgyzstan, Uzbekistan, Tajikistan and flows through the Kazakh lands into Lake Aral. In the middle reaches, the Syr Darya receives the waters of the Akhangaran, Chirchik, Keles, and Arys rivers.

The Central Asian states are divided into two groups due to their geographical features. The first group is represented by Kyrgyzstan and Tajikistan, which are located in the upper reaches of the Amu Darya and Syr Darya rivers. Due to the fact that the overwhelming majority of their territory is mountains (about 96%) and due to the high-mountain rivers, it is possible to build hydroelectric power plants.

Kazakhstan, Uzbekistan and Turkmenistan represent the second group, which have large areas of irrigated land. This group of countries prefers to collect water in winter so that it can be used in summer. While the first group of countries, on the contrary, collects in summer and uses in winter.¹²

In 2017, during the official visit of the President of Uzbekistan Sh. Mirziyoyev to Kyrgyzstan, important statements were made regarding cooperation in the field of hydropower. President Sh. Mirziyoyev announced the intention of both countries to jointly build the Kamarata HPP-1 and emphasized that this cooperation should be beneficial for both parties. He expressed his conviction in the need for a reasonable and coordinated approach to this project so that it contributes to

¹⁰ Press service of Ecological movement of Uzbekistan: International conference “Transboundary ecological problems of Middle Asia: Application of international legislative mechanisms for their solution” (17 November 2010).

¹¹ Tashkent Environmental Declaration of the participants of the International Conference “Transboundary Environmental Problems of Central Asia: Application of International Legal Mechanisms for Their Solution” // URL: www.eco.uz.

¹² Problems of using transboundary water resources in the Central Asian region // <https://cyberleninka.ru/article/n/problemy-ispolzovaniya-transgranichnyh-vodnyh-resursov-v-tsentralnoaziatskom-regione?ysclid=m6shufo6dn863024019>

the development of both countries and satisfies their interests.¹³ These statements were confirmed by subsequent events. In March 2021, Shavkat Mirziyoyev made another visit to Bishkek, where the agreements reached were discussed and approved. On November 30, 2021, the

laws on the Treaty between the Republic of Uzbekistan and the Kyrgyz Republic on certain sections of the state border and on the Agreement on joint management of water resources of the Andijan (Kempir-Abad) reservoir¹⁴.

Every time we constantly encounter the fact that under the call to find mutual interests, to coordinate positions, cries for justice, people understand maximum attention to their own problems, and nothing more.”¹⁵.

Japanese expert Tetsuji Tanaka notes that the problems associated with the use of water resources cover 5 important factors, among which 2 issues relate directly to ensuring environmental safety: joint use of water and energy resources and the formation of a unified system of management and environmental protection¹⁶.

EDB analysts are confident that Central Asian countries, acting in a coordinated manner, will have greater opportunities to overcome structural development problems.

The increasing load on the energy system in the context of active growth of economic activity and the connectivity of the countries of the region by common river basins make their cooperation in the water and energy sector uncontested. No less important are concerted efforts to develop transport infrastructure and combat climate risks. Removing bottlenecks in the development of infrastructure sectors will increase productivity in the economy, expand trade and economic partnerships with neighboring countries, and improve commodity diversification of production and exports.¹⁷.

The main volume of hydropower potential is concentrated in Kyrgyzstan (12.8%) and Tajikistan (76.8%). Uzbekistan and Turkmenistan directly depend on water supplies from Kyrgyzstan and Tajikistan, since the economies of these republics depend on the cultivation of agricultural products on irrigated lands. In turn, the water energy of Kyrgyzstan and Tajikistan is the main source in the energy balance - 77% and 96%, respectively.¹⁸.

¹³ Elkeeva K. How will Bishkek and Tashkent build hydroelectric power stations? // Azattyk Ynalgyssy. 2017 URL: <https://rus.azattyk.org/a/28721985.html>.

¹⁴ The President of Uzbekistan signed laws on the border with Kyrgyzstan and the Andijan reservoir // President of the Republic of Uzbekistan. <https://president.uz/ru/lists/view/5745>

¹⁵ V. V. Kozlov, A. A. Kozlova. Conflict Management. Moscow, Eksmo, 2006.

¹⁶ Security issues in Central Asia. // Materials of the international scientific-practical conference. Tashkent: Turon-Iqbol, 2006. - P. 95.

¹⁷ QazaqGreen | Kazakhstan News | Renewable energy potential in Central Asia is concentrated in the solar and wind energy segments – EDB report <https://qazaqgreen.com/news/kazakhstan/757/>.

¹⁸ Donbaeva G.Ch. Features of transboundary rivers of Central Asia (on the example of Kyrgyzstan) // Bulletin of the Saratov University.

Currently, the construction of the Rogun hydroelectric power station in Tajikistan and the Kambarata hydroelectric power station in Kyrgyzstan is at the top of the agenda. Hydroelectric power stations (HPPs) are the basic sources of electricity generation in Tajikistan. Undeveloped potential 91.7% Developed -8.3%¹⁹.

The construction of the Rogun hydroelectric power station began in the Soviet Union in 1976. After 1991, construction was mothballed. The powerful floods of 1993 washed away the upper construction dam, and the tunnels and machine room were partially flooded. In the early 2000s, they returned to the issue. The plans include using Rogun not only for energy purposes, but also for irrigation purposes with an area of more than 300 thousand hectares.

As all leading publications of the CIS countries note: "... the main concern has nevertheless become the search for financing for the Rogun hydroelectric power station... changing the purpose of the Rogun hydroelectric power station: if in the 2014 feasibility study it was noted that 70% of Rogun's electricity would go to the development of Tajikistan, now 70% will have to be exported and developed mainly not in Tajikistan, but in unnamed countries. "Only in this case will the project be economically feasible – self-sustaining and profitable," Sirozhidinov referred to the World Bank's expertise. This fundamentally changes the matter: money is not energy, and factories will not earn money from bundles of currency, so it is necessary to prepare the population for the new purpose of the hydroelectric power station now. The government of the republic will be able to explain to people that their money, given in 2009 for Rogun shares, will be used to build a hydroelectric power station for their neighbors.²⁰

The costs of completing the hydroelectric power station have also been announced and amount to \$6.7 billion, but as of early October 2024, it is unclear whether the World Bank will provide \$650 million or just promise. It is also unclear in what tranches and for how many years the bank will continue financing, especially in the context of a weakening national currency.²¹ Uzbekistan will benefit from the construction of the Rogun hydroelectric power station. The presence of two large reservoirs will allow Tajikistan to more wisely manage the cascade of hydroelectric power stations on the Vakhsh, adjusting the water supply to the needs of Uzbekistan's agriculture. Well, Tashkent will also be able to earn money

Series: Earth Sciences. 2020, No. 4. <https://cyberleninka.ru/article/n/osobennosti-transgranichnyh-rek-tsentralnoy-azii-na-primere-kyrgyzstana>

¹⁹ How many hydroelectric power plants are there in Tajikistan - 04.08.2018, Sputnik Tajikistan <https://tj.sputniknews.ru/20180804/tajikistan-ges-gidroelektrostaciya-1026367719.htm>.

²⁰ Rogun hydroelectric power station in Tajikistan will cease to be a national project // Nezavisimaya Gazeta. https://www.ng.ru/dipkurer/2024-10-13/11_9113_tajikistan.html

²¹ Rogun hydroelectric power station in Tajikistan will cease to be a national project // Nezavisimaya Gazeta. https://www.ng.ru/dipkurer/2024-10-13/11_9113_tajikistan.html

on the transit of electricity from Tajikistan to Kazakhstan and to the south of Russian Siberia.²²

The condition of the Nurek hydroelectric power station is of great concern. According to various estimates, over more than 40 years, 2–2.2 billion m² of sediment has been deposited on the bottom of the Nurek hydroelectric power station, which has led to a decrease in the volume of the reservoir by a third and a decrease in electricity generation by approximately 11%.²³and over time, there will be a gradual reduction in generating capacity by half. Expert Y. Lobanovsky from the Russian Scientific Center for Internet Technologies “INTERTECH” notes that “after replacing the units of the Nurek HPP without measures aimed at eliminating hydroacoustic effects, a serious accident may occur.” Experts noted the limited water resources in the Nurek HPP, which generates more than 70% of electricity in Tajikistan, as a number of reasons.

Construction of the Kambarata HPP-1 will begin in Kyrgyzstan in 2025. Preparatory work is planned to be completed before the onset of cold weather.²⁴The hydroelectric power station is planned to be built on the Naryn River. The capacity of the future station will be 1860 MW, the average annual output will be 5.6 billion kW/h. The height of the dam will be 256 m, the volume of the reservoir will be more than 5.4 billion cubic meters.²⁵In June 2024, Kyrgyzstan, Uzbekistan and Kazakhstan signed an agreement on joint participation in the construction of the Kambarata HPP-1. The parties agreed to create a tripartite joint-stock company to manage the project: Bishkek will own 34% of the shares, Tashkent and Astana - 33% each.²⁶In May 2024, the International Investment Energy Forum in Vienna ended with the creation of a donor coordination committee for the construction of the Kambarata HPP-1, which included the World Bank, the OPEC Fund, the Asian Development Bank, the Asian Infrastructure Investment Bank, the Islamic Development Bank, and the European Bank for Reconstruction and Development. Today, 16,350 people work in the country’s energy sector. There are 16 large small hydroelectric power plants, 2 thermal power plants in Bishkek

²² VZGLYAD / A giant Soviet construction project removes the threat of war in Central Asia :: Economy<https://vz.ru/economy/2018/11/16/950964.html>.

²³ Nurek hydroelectric power station: so that reality does not become a fairy tale - Rhythm of Eurasia <https://www.ritm Eurasia.ru/news--2018-01-12--nurekskaja-ges-chtoby-byl-ne-stala-skazkoj-34424>.

²⁴ When will they start building Kambaratinskaya HPP-1 <https://kz.kursiv.media/2024-06-11/zhnb-kambarata1geskz/>.

²⁵ Construction of Kambarata HPP-1 in Kyrgyzstan will begin in 2025. <https://neftegaz.ru/news/energy/850992-stroitelstvo-kambaratinskoy-ges-1-v-kirgizii-nachnetsya-v-2025-g/>.

²⁶ What is known about the construction of the Kambaratinskaya hydroelectric power station <https://iz.ru/1712568/igor-karmazin/vod-novyj-povorot-strany-tcentralnoi-azii-soglasovali-stroitelstvo-gigantskoi-ges>

and Osh operating in Kyrgyzstan.²⁷ Zhanay Sagin, a professor at the University of Michigan in the United States, a water resources specialist and hydraulic engineer, is confident that “it is not Kazakhstan or even Kyrgyzstan itself that will benefit from the construction of the Kambarata HPP-1, but neighboring Uzbekistan. In recent years, it is Uzbekistan that has been actively developing water resources, solving its own problems related to the construction of the Kosh-Tepa Canal in Afghanistan. When this canal is completed, Afghanistan will take about a third of the water volume from the Amu Darya. As a result, Uzbekistan will be forced to take the necessary water from the Syr Darya basin.”²⁸ The Kosh-Tepa Canal will worsen the situation with water resources in Central Asian countries. The project is to be completed by 2028. The canal will stretch for 285 kilometers and will take about 20% of the water from the Amu Darya, which serves as the border between Afghanistan, Uzbekistan and Tajikistan.²⁹

Each country has its own approach to water consumption regime, as well as to issues of energy and irrigation.

Neighboring Afghanistan remains on the sidelines of all agreements, but despite this, it has begun construction of Kush-Tepa. Of course, the Afghan government has the right to use the water of the Amu Darya, but it is still necessary to comply with the standards adopted in the region. The idea of construction itself arose under President Daoud, the plans were thwarted by the 1979 revolution. Under the presidency of Ashraf Ghani and with the participation of USAID, work was resumed in 2018. Active construction began in 2022 and should be completed in 2028. The goal is to irrigate 500 thousand hectares. The first section is to the city of Balkh (108 km), the second - to the province of Jowzjan and Faryab (177 km). At the meeting of the Council of Heads of State-Founders of the International Fund for Saving the Aral Sea, which took place in September 2023 in the capital of Tajikistan, Dushanbe, the President of Uzbekistan Sh. Mirziyoyev emphasized: “It is necessary to form a joint working group to study all aspects related to the construction of the Kush-Tepa canal... We propose considering the issue of involving representatives of Afghanistan in a regional dialogue on the joint use of water resources.”³⁰

²⁷ Fact: There are 16 large and small hydroelectric power plants operating in Kyrgyzstan https://www.tuz.kg/news/2361_fakt_na_territorii_kyrgyzstana_deystvuyet_16_bolshih_i_malyh_ges.html.

²⁸ Will it save us from drought or leave us without water? Does Kazakhstan need a new hydroelectric power station in Kyrgyzstan <https://orda.kz/spaset-ot-zasuhi-ili-ostavit-bez-vody-nuzhna-li-kazahstanu-novaja-gies-v-kyrgyzstane-388303/>.

²⁹ Will it save us from drought or leave us without water? Does Kazakhstan need a new hydroelectric power station in Kyrgyzstan <https://orda.kz/spaset-ot-zasuhi-ili-ostavit-bez-vody-nuzhna-li-kazahstanu-novaja-gies-v-kyrgyzstane-388303/>.

³⁰ Mirziyoyev proposed to include Afghanistan in the dialogue on water resources in the region – News of Uzbekistan – Gazeta.uz <https://www.gazeta.uz/ru/2023/09/15/kushtepa/>

It is worth noting that there are many countries that are paying close attention to promising projects in the water and energy sector of Central Asia, including the Russian Federation, the United States, China, India, Pakistan, Iran, and Afghanistan. Interest in the region is not only related to commercial activity, but is also a manifestation of geopolitical strategy to no lesser extent.

International organizations and institutions assist in the development of cooperation in the Central Asian region, often acting as an international arbitrator in resolving complex problems arising between the Central Asian countries. Among them are the World Bank, the Asian Development Bank, the Islamic Development Bank, the European Bank for Reconstruction and Development, the Islamic Development Bank, and the Global Environment Facility. Anna Lobanova, an expert on energy connectivity at the Economic and Social Commission for Asia and the Pacific, notes: "... together with the UN Economic Commission for Europe, we have developed a program to develop energy connectivity in the countries of Central Asia and the Caucasus. The main idea is to develop specific plans for the further development of connectivity and assistance in achieving these plans. In addition to partnership with the Economic Commission, we also cooperate with other international organizations, such as the World Bank and the Asian Development Bank, since joining efforts is one of the important mechanisms for achieving goals³¹.

Thus, The Central Asian countries made their first attempts in the area of transboundary river water management in 1991 in Tashkent, where statements were made, and in 1992 an agreement was signed in Almaty (Alma-Ata Agreement). A year later, the International Fund for Saving the Aral Sea (IFAS) and the International Water Commission (ICWC) were created, and two basin water management associations were included in this commission: "Amu Darya" and "Syr Darya".

Later meetings were more productive with the coming to power of new leaders of the countries, but there are still many complex issues that are of a complex nature and for their solution it is necessary to use new technologies and achievements of artificial intelligence. It is worth noting that the fact is that in the multilateral and bilateral documents of the Central Asian countries the term "transboundary rivers" itself is absent, and such formulations as "water or water-energy resources" are used.

³¹ Why Central Asian countries need a single energy market | | UN News <https://news.un.org/ru/interview/2024/07/1454791>

DOI 10.34660/INF.2025.91.97.031

上合组织与其他区域组织开展合作的理论基础
**THEORETICAL BASIS FOR THE DEVELOPMENT OF
COOPERATION BETWEEN THE SCO AND OTHER REGIONAL
ORGANIZATIONS**

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摘要。本文探讨了上海合作组织（SCO）与其他区域组织互动的具体情况。分析了上合组织与国际伙伴合作的主要领域、互动机制和发展前景。特别关注上合组织在加强区域安全和经济合作方面的作用。

关键词：上合组织、区域合作、国际组织、一体化、安全、经济伙伴关系。

Abstract. *The article examines the specifics of the interaction of the Shanghai Cooperation Organization (SCO) with other regional organizations. The main areas of cooperation, mechanisms of interaction and prospects for the development of SCO relations with international partners are analyzed. Special attention is paid to the SCO's role in strengthening regional security and economic cooperation.*

Keywords: *SCO, regional cooperation, international organizations, integration, security, economic partnership.*

In the modern world, characterized by growing interdependence of states and regions, the Shanghai Cooperation Organization (SCO) has established itself as an influential international structure that promotes stability and development of multilateral cooperation in Eurasia. Established in 2001, the organization has come a long way, transforming itself from a mechanism for strengthening confidence-building measures in border areas into a multidisciplinary structure for regional cooperation.

Speaking at the SCO summit in Samarkand, the President of the Republic of Uzbekistan Shavkat Mirziyoyev noted that: “The SCO has become an effective platform for multilateral cooperation, promoting the strengthening of mutual trust and good neighborliness, maintaining stability and sustainable development in the organization’s space” [1]. In the context of the formation of a polycentric world order, the study of the interaction of the SCO with other regional organizations is particularly relevant, which allows us to assess the potential and prospects for the development of multilateral cooperation in the Eurasian region.

The methodological basis for studying the SCO's relations with other regional organizations is based on a comprehensive analysis of official documents, scientific publications, and analytical materials. The work uses a systematic approach that allows us to consider the SCO as an integral structure in the system of international relations, as well as a comparative analysis that makes it possible to identify the specifics of the organization's interaction with various international partners. The use of content analysis of documents made it possible to determine the main areas and priorities of SCO cooperation with regional organizations.

The theoretical basis of the study was formed by the works of leading Russian researchers, in particular the works of S.G. Luzyanin [2] and V.Y. Vorobyov [3], which examine in detail the issues of the SCO development and its role in the modern system of international relations. A significant contribution to the study of the problem was made by Uzbek scientists - M.A. Rakhimov [4] and R.K. Alimov [5], whose research is devoted to the analysis of the role of the SCO in ensuring regional security and developing multilateral cooperation. Of particular value are the works of foreign authors - A. Small [6] and A. Cooley [7], who offer an alternative view of the development of the SCO and its interaction with other international structures. The analysis of official documents of the SCO, cooperation agreements with other organizations and final documents of summits made it possible to form a holistic idea of the mechanisms and prospects for the development of interorganizational interaction in the region.

An analysis of the SCO's interaction with other regional organizations revealed the formation of a sustainable system of multilateral cooperation covering various areas of international relations. Of particular importance is the development of partnership relations with ASEAN, which was secured by the signing of a Memorandum of Understanding in 2005 [8]¹. This document laid the foundation for the development of dialogue in the areas of security, economic cooperation and cultural exchange between the organizations. The practical implementation of the provisions of the Memorandum contributed to the intensification of contacts between the SCO and ASEAN at various levels, including regular consultations on regional security issues and countering new challenges and threats.

Of significant importance is the development of interaction between the SCO and the Eurasian Economic Union (EAEU). Cooperation between the organizations is aimed at forming a common economic space and developing trade and economic ties [3]. The practical implementation of this area includes the coordination of transport and logistics projects, the harmonization of technical standards and the development of industrial cooperation.

¹ Statement by the official representative of the Russian MFA A.V. Yakovenko in connection with the signing of the Memorandum of Understanding between the SCO Secretariat and the ASEAN Secretariat - Ministry of Foreign Affairs of the Russian Federation

An important aspect of the SCO's international activities is interaction with the UN, in whose General Assembly the organization has observer status.²[9]. Cooperation covers a wide range of issues, including countering terrorism and extremism, combating drug trafficking, promoting sustainable development and protecting the environment. Of particular importance is the coordination of efforts in the area of ensuring regional security and stability.

Within the framework of interaction with regional organizations, the SCO develops the following main areas of cooperation: joint counteraction to terrorism, extremism and separatism; development of trade and economic ties and investment cooperation; expansion of cultural and humanitarian interaction; coordination of efforts in the sphere of environmental safety and environmental protection. The practical implementation of these areas is carried out through mechanisms of regular consultations, joint events and projects, exchange of experience and information.

The analysis shows that the development of interaction between the SCO and other regional organizations contributes to strengthening the system of international cooperation in the Eurasian region and the formation of effective mechanisms to counter modern challenges and threats. At the same time, the improvement of the regulatory framework for cooperation and the development of practical mechanisms for interaction are of particular importance.

The transformation of the global system of international relations has a significant impact on the development of relations between the SCO and regional organizations. In the context of the formation of a polycentric world order, the role of regional integration associations as instruments for ensuring stability and sustainable development is increasing. Analysis shows that the SCO is actively developing cooperation with the Collective Security Treaty Organization (CSTO), which helps strengthen the regional security system. The interaction of the organizations is carried out on the basis of the Memorandum of Understanding signed in 2007.

Particular attention is paid to the development of cooperation in the area of countering new challenges and threats. The SCO has established partnership relations with the United Nations Office on Drugs and Crime (UNODC), which allows for the coordination of efforts in the fight against drug trafficking and transnational organized crime. The practical implementation of this area includes joint anti-drug operations, exchange of information and experience, and personnel training.

In the economic sphere, the Eurasian Development Bank (EDB) is an important partner of the SCO. Cooperation is aimed at financing infrastructure projects, developing transport corridors and promoting regional economic integration. Of

² ON GRANTING THE COLLECTIVE SECURITY TREATY ORGANIZATION (CSTO) AND THE SHANGHAI COOPERATION ORGANIZATION (SCO) OBSERVER STATUS IN THE UN GENERAL ASSEMBLY - Ministry of Foreign Affairs of the Russian Federation

particular importance is the coordination of efforts in implementing the “One Belt, One Road” initiative and developing the region’s transport and logistics potential.

The SCO’s interaction with the International Monetary Fund (IMF) and the World Bank promotes the development of financial and economic cooperation and the implementation of joint projects in the field of sustainable development. Particular attention is paid to issues of digital transformation of the economy, development of “green” technologies and support for small and medium-sized businesses.

In the humanitarian sphere, the SCO is developing cooperation with UNESCO, which promotes the expansion of cultural exchanges, the development of educational programs and the preservation of cultural heritage. The practical implementation of this area includes holding joint cultural events, developing scientific and educational cooperation and supporting youth exchanges.

The analysis shows that an important aspect of the SCO’s activities is the development of cooperation with regional forums and dialogue platforms, including the Asia-Pacific Economic Cooperation (APEC) and the Conference on Interaction and Confidence-Building Measures in Asia (CICA). This helps expand the geography of the organization’s international relations and strengthen its role in the regional integration system.

Of particular importance is the development of cooperation between the SCO and the International Organization for Migration (IOM), which allows for the coordination of efforts in the area of regulating migration processes and protecting the rights of labor migrants. The practical implementation of this area includes the exchange of information, conducting joint research, and developing recommendations for improving migration policy.

In the area of environmental security, the SCO is developing cooperation with the United Nations Environment Programme (UNEP), which facilitates the coordination of efforts to combat climate change and protect the environment. Particular attention is paid to the development of a “green” economy, the introduction of environmentally friendly technologies and the preservation of biodiversity.

An analysis of the SCO’s interaction with regional organizations allows us to identify the following promising areas for the development of cooperation:

1. Strengthening coordination mechanisms in the area of countering new challenges and threats, including cybersecurity and information security.
2. Development of cooperation in the field of digital economy and innovative technologies, including the creation of joint technology platforms and the development of e-commerce.
3. Expanding cooperation in the field of transport and logistics, including the development of multimodal transport corridors and the creation of modern logistics infrastructure.

4. Strengthening cooperation in the field of health and combating pandemics, including the development of an early warning and emergency response system.
5. Development of cooperation in the field of education and science, including the creation of joint research centers and the implementation of educational programs.

The practical implementation of these areas requires the improvement of institutional mechanisms of interaction, the development of the regulatory framework for cooperation and the strengthening of the financial basis for joint activities. Of particular importance is the development of public-private partnership mechanisms and the involvement of the business community in the implementation of joint projects.

The analysis shows that an important factor in the successful development of the SCO's interaction with regional organizations is taking into account the national interests and characteristics of the member states. In this case, the development of mechanisms for coordinating positions and finding mutually acceptable solutions on key issues of cooperation is of particular importance.

In general, the development of interaction between the SCO and regional organizations contributes to strengthening the system of international cooperation in the Eurasian region and the formation of effective mechanisms for ensuring security and sustainable development. Practical implementation of promising areas of cooperation will increase the effectiveness of joint activities and strengthen the role of the SCO as an important factor in regional integration.

Of considerable interest is the analysis of the effectiveness of the mechanisms of interaction between the SCO and regional organizations. The study assessed the main areas of cooperation and their effectiveness (see Table 1).

Table 1.
Compiled by the author
Analysis of the effectiveness of SCO interaction with regional organizations
(2020-2024)³

Direction of cooperation	Main partners	Mechanisms of interaction	Efficiency*	Development Prospects
Safety	CSTO, ASEAN, UN	Joint exercises, exchange of information	High (8/10)	Development of cyber security system
Economy	EAEU, EADB, APEC	Investment projects, trade agreements	Average (6/10)	Digital transformation

³ Speech by President Shavkat Mirziyoyev at the meeting of the Council of Heads of State of the SCO Member States (full text) | Archive | Shanghai Cooperation Organization

Transport and logistics	EAEU, ASEAN	Development of transport corridors	Average (7/10)	Creation of a unified logistics network
Humanitarian sphere	UNESCO, IOM	Cultural exchanges, educational programs	High (9/10)	Expanding scientific cooperation
Ecology	UNEP	Joint environmental projects	Low (4/10)	Development of «green» technologies

*Assessment on a 10-point scale based on expert assessments

Of particular importance in the development of international cooperation of the SCO is the formation of an effective system of financial interaction. The organization is actively working on the creation of mechanisms for mutual settlements in national currencies and the development of financial infrastructure. An important area is cooperation with international financial institutions in the field of combating money laundering and terrorist financing.

The analysis shows that the successful development of the SCO’s interaction with regional organizations largely depends on the effectiveness of the coordination of efforts at various levels. An important role is played by the activities of permanent working groups and expert councils, which ensure regular dialogue on key issues of cooperation.

In the area of energy security, the SCO is developing cooperation with the International Energy Agency (IEA) and regional energy organizations. Particular attention is paid to the development of renewable energy sources and increasing energy efficiency. The practical implementation of this area includes the implementation of joint projects in the area of “green” energy and the development of energy infrastructure.

An important aspect of the SCO’s activities is the development of cooperation in the field of food security. The organization interacts with the Food and Agriculture Organization of the United Nations (FAO) on issues of agricultural development and food security. Particular attention is paid to the introduction of modern agricultural technologies and the development of sustainable agriculture.

In the area of healthcare, the SCO is actively developing cooperation with the World Health Organization (WHO), which has become especially relevant in the context of global epidemiological challenges. The practical implementation of this area includes the exchange of information, coordination of measures to counter the spread of infectious diseases and the development of a medical care system.

The analysis shows that an important factor in the successful development of international cooperation of the SCO is the formation of an effective system for

monitoring and evaluating the results of interaction. This allows for the timely identification of problematic aspects and the adoption of measures to improve the effectiveness of joint activities.

A promising area is the development of cooperation between the SCO and regional organizations in the field of innovative development and technological modernization. Of particular importance is interaction in such areas as artificial intelligence, big data, the Internet of things and robotics.

The conducted analysis of the SCO interaction with other regional organizations shows significant potential for the development of multilateral cooperation in the Eurasian region. The organization demonstrates its effectiveness as a platform for dialogue and development of partnership relations, contributing to the strengthening of international cooperation and stability. The established mechanisms of interaction with ASEAN, the EAEU, the UN and other international structures create the basis for further expansion of cooperation areas and increasing the effectiveness of joint activities.

The role of the SCO in the formation of a regional security system and the development of economic cooperation is of particular importance. In the context of modern global challenges and the transformation of international relations, the potential of the SCO as a platform for multilateral cooperation will only increase, which opens up new prospects for strengthening regional integration and cooperation.

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北极作为未来冲突和军事联盟的地区：特朗普上台后其发展的起源和问题

**THE ARCTIC AS A REGION OF FUTURE CONFLICTS AND
MILITARY ALLIANCES: THE ORIGINS AND PROBLEMS OF ITS
DEVELOPMENT WITH THE ADVENT OF D. TRUMP**

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摘要。作者考虑了北极及其在特朗普上台后面临的挑战，从国际法和新美国政府不断变化的地缘政治利益的角度讨论了使用各种制度和协议的可能性。

关键词：北极、特朗普、SMO、俄罗斯、乌克兰、无主地概念、新保守主义者、工业 4.0。

Abstract. *The authors consider the Arctic and the challenges in it with the arrival of D. Trump, discussing the possibility of using various regimes and agreements from the standpoint of international law and the changing geopolitical interests of the new American administration.*

Keywords: *Arctic, D. Trump, SMO, Russia, Ukraine, terra nullius concept, neocons, Industry 4.0.*

With the arrival of Donald Trump in the Oval Office as the 47th President of the United States, the concept of dividing the planet into 12 zones of influence, previously voiced by globalists in anticipation of the formation of the neocon world, began to be increasingly subject to various clarifications, but the goals for Greenland and the annexation of Canada as the 51st state of the United States came to the forefront of the emerging geopolitics of Trumponomics. Here is the battle for Panama with China and the cancellation of fees for American ships for using the canal, achieved in February 2025. At the same time, it is the battle for the poles, which primarily includes the Arctic, which is a unique region covering the Arctic Ocean and the adjacent areas of the Pacific and Atlantic Oceans, as well as

the coastal territories of Eurasia and North America, that is becoming a matter of time before conflicts and battles for its resources and the ability to control the security and logistics zones of Industry 4.0. Eight Arctic countries are located in this zone of national priorities at the strategic level: Russia, Canada, the USA, Norway, Denmark, Iceland, Sweden and Finland, and each of them shares its history with the Arctic, the natural potential of existing accumulations and responsibility for the future of these territories. Five of them have direct access to the seas of the Arctic Ocean and control part of the Arctic shelf: Russia, Canada, the USA (via Alaska), Norway and Denmark (via Greenland). Sweden, Finland, and Iceland, although they do not have access to the Arctic Ocean, are partially located in the Arctic region and participate in its management.

More than 530 million people live in the countries of the Arctic region, but less than 5 million live in the territories adjacent to the Arctic Ocean.¹ The central part of the ocean is occupied by the Arctic deep-water basin surrounding the North Pole. There are 10 seas in the region: Greenland, Norwegian, Barents, White, Kara, Laptev, East Siberian, Chukchi, Beaufort, Baffin, as well as Foxe Basin and numerous straits and bays of the Canadian Arctic Archipelago. The Arctic includes the northern sections of the Pacific and Atlantic Oceans. Among the Arctic islands and archipelagos, the following stand out: Vaigach, Wrangel, Greenland, Dikson, Franz Josef Land, Canadian Arctic Archipelago, Queen Elizabeth Archipelago, Novaya Zemlya, New Siberian Islands, Nordenskjold Islands, Severnaya Zemlya, Spitsbergen and others. Initially, the term “Arctic” was used for a part of the territory that included only the deep-water Arctic basin, that is, the central part of the Arctic Ocean, covering its deepest areas and located around the North Pole; as well as the seas and islands of the Arctic Ocean, limited from the south by the July isotherm of 5°C, that is, a line on the map showing areas where the average temperature of the warmest month (July) does not exceed +5°C.² By the end of the 20th century, the concept of the “Arctic” had expanded significantly. It is now considered to be the northern polar region, including the outskirts of Eurasia and North America, almost the entire Arctic Ocean with its islands (except for the coastal islands of Norway), as well as the adjacent parts of the Atlantic and Pacific Oceans. The southern boundary of the Arctic can be defined in different ways: either along the southern boundary of the tundra zone, or along the conventional line of the Arctic Circle (66°33' north latitude). In the first case, the area of the Arctic is about 27 million km², which is three times larger than the area of Europe. If we limit it only to the Arctic Circle, the area will decrease to 21 million km².

¹ Lukin Yu.F. Multidimensionality of the Arctic space. Arkhangelsk: NArFU named after M.V. Lomonosov, 2017. 250 p.

² Lukin Yu.F. Multifaceted Arctic in the flow of time and meanings. Arkhangelsk, 2019. 241 p.

Thus, the southern boundary of the Arctic remains conventional and depends on the approach used to define it³.

With its significant reserves of oil, gas and other minerals, the Arctic is of interest not only to the Arctic states, but also to countries such as China, South Korea, Japan and the European Union, which have expressed an active interest in the economic potential of the region. In addition, as the author mentioned in the previous chapter, the melting of Arctic ice as a result of global warming opens up prospects for the use of new transport routes that reduce the time and distance of transportation between Europe and Asia. Such a situation makes this territory very attractive to most participants in the world community, which entails the emergence of certain claims and disputes in the area of delimitation of influence over it.

In this context, it is important to turn to the origins of legal regulation of issues of sovereignty over the territory, in particular, to the concept of *terra nullius* - the so-called “no man’s land”, which the Arctic was considered in the past. The authors believe that an analysis of this concept will allow a deeper understanding of the evolution of the legal status of the region and the modern nature of territorial disputes. The authors have already touched upon this concept in other works on this topic, dedicated to Hugo Grotius. In international law, this issue was one of the key aspects of the formation of state territories. This term was used to denote lands that were not under the sovereignty of any state and were not inhabited or cultivated by the indigenous population. It was precisely such territories that states could consider “free” for occupation. The concept of *terra nullius* is often associated with Roman law. However, there is a nuance: when studying this issue, the author discovered that in ancient Roman law, the term *terra nullius* was not used as such, but its analogies are found in the Roman legal system, where there was a concept of land that did not belong to anyone and could be acquired through occupation or use. A similar analogous concept in ancient Roman law was *res nullius*. This term meant “nobody’s object” or “nobody’s thing”. It was applied to everything that did not yet belong to an individual or the state. *Res nullius* included such objects as wild animals, fish in rivers and, in fact, lands that no one had yet occupied. The process of appropriating **res nullius** was determined by the **principle of occupatio (occupation)** - if someone seized an object that was not owned by anyone and began to use it, this object became his property. This principle could also be applied to “no man’s” lands, that is, territories that did not belong to any person, city, or state could be considered available for appropriation, especially if they were then used for agriculture, pastures or the needs of the Roman Empire.⁴ However, such lands could not simply be left empty and undeveloped,

³ Lukin Yu.F. Multidimensionality of the Arctic space. Arkhangelsk: NArFU named after M.V. Lomonosov, 2017. 250 p.

⁴ Kuzishchin V.I. *History of Ancient Rome*. — M.: Higher School, 2000. — 512 p.

as the later colonial concept of terra nullius implied. The process of acquiring sovereignty over them was legitimized precisely by the fact that these territories were cultivated or developed. In practice, the Romans did not always apply the concept of res nullius to literally no-man's land. Sometimes such lands were inhabited by local populations, but the Romans generally took into account the existing socioeconomic and legal relationships of the inhabitants with these territories. Rather than completely disregarding the rights of the population, Rome sought to legitimize its possessions by establishing new legal and political frameworks. Such agreements could take the form of treaties known as foedera (singular foedus) and deditio. Foedus were concluded between Rome and conquered or allied peoples, and established the legal status of these peoples. The Romans often allowed allies to retain control over their land and property in exchange for military commitments and loyalty. For example, the Romans made such treaties with the Latin tribes and other peoples of Italy, which allowed them to retain local forms of government and land rights. Such treaties set out the rights and obligations of the parties, which provided local residents with some autonomy and protection of their lands. *Deditio in fidem* was a process of voluntary surrender in which a city or people surrendered to Rome and placed themselves under the protection of the Roman people. However, the population was not expelled, and the land was not completely confiscated. Instead, agreements were made under which the land also remained in the use of the locals, and the Romans provided protection and established their control. For example, during the Roman campaigns of conquest in Cisalpine Gaul, after the victory at Telamon, the Romans began to actively advance deeper into Gallic territory. In 222 BC, they reached Mediolanum (modern Milan), the capital of the local Celtic tribe, the Insubres. Roman troops under the command of consuls Gaius Flaminius and Marcus Claudius Marcellus besieged the city. Seeing the obvious advantage of the Romans, the Insubres decided to capitulate and voluntarily surrendered to Rome in order to avoid destruction and losses. That is, in order to preserve the population and the city, the Insubres chose deditio and were considered *dediticii* - "surrendered". They could not bear arms and were subordinated to the empire of the Roman magistrates and promagistrates, who had military command in Italy⁵, but in exchange for surrender, the city received military protection from Rome, and the local population retained some of its rights. After that, the Insubres gradually assimilated into Roman society, and over time, they were fully integrated into the Roman Empire. In a number of cases, Rome founded colonies in which the local population retained their lands and received special rights. For example, after conquering Sicily, the Romans did not take the land from local landowners, but introduced a tax system that allowed the Romans to earn income without infringing on the interests of local residents.

⁵ Kovalev S.I. History of Rome. — L.: Leningrad University Publishing House, 1986. — 752 p.

In conquered lands, Rome often appointed *praefectus* (governors) or allowed local elders to continue to govern the territories, provided that they observed Roman laws.⁶ This practice of concluding agreements with conquered peoples served as an important tool for maintaining stability in the captured territories and integrating them into the Roman system. The Romans sought to avoid direct confiscations of land. While respecting the rights and customs of local residents to some extent, they simultaneously ensured their control and economic benefit. Thus, although *res nullius* was clearly defined in Roman law, *terra nullius* arose as an analogy and acquired an independent meaning in late modern international law. This shows that the connection between Roman law and *terra nullius* was not direct, but was formed through the adaptation and reinterpretation of Roman concepts in the context of colonial expansion.⁷

In the Middle Ages, the concept of *terra nullius* continued to develop, becoming key for European powers seeking to colonize new lands. The term began to denote not actually no-man's lands, but territories that European powers considered "empty" in the civilizational sense, since they lacked Christian rule. This allowed European monarchs to ignore the rights of the indigenous population, which was often declared insufficiently "developed" to own the territory. It was on this principle that when Europeans discovered new lands, they declared them *terra nullius* and colonized them with complete disregard for the rights of the indigenous peoples. The author concludes that if the ancient Romans approached the issues of conquest from a pragmatic point of view, without a religious justification for seizing lands, but based only on military force, political treaties and the need to expand the Roman state, then in the Middle Ages *terra nullius* received an explicit religious justification. For example, the already mentioned papal bull *Inter Caetera* of 1493, issued by Pope Alexander VI, granted Spain and Portugal the right to own new lands if they were non-Christian.

Today, there is no set of laws in international law that would directly define the establishment of control and authority of any state over *terra nullius*. However, the study of this issue allows the author to formulate a number of requirements that have historically been established to justify control over unoccupied territories:

1. Occupation.

This is the primary means of acquiring sovereignty over *terra nullius*, which means the actual establishment of control and authority of the state over a no

⁶ Kovalev S.I. History of Rome. — L.: Leningrad University Publishing House, 1986. — 752 p.

⁷ Benton L., Straumann B. Acquiring Empire by Law: From Roman Doctrine to Early Modern European Practice [Электронный ресурс] // Law and History Review. 2010. Vol. 28, No. 1. P. 1–38. Access mode: <https://www.cambridge.org/core/journals/law-and-history-review/article/abs/acquiring-empire-by-law-from-roman-doctrine-to-early-modern-european-practice/82C36269E6A3820EF939BB6F42FC8B0E>

man's land under certain conditions. It requires not only a formal declaration, but also real control and management, and must be:

- Effective, i.e. the state must establish actual control over the territory, not just claim it. This includes the establishment of administrative structures, provision of security, maintenance of order and functioning of administrative bodies, protection of the interests of the local population, if any.
- Public, i.e. the state must declare its intention to take possession of the territory openly, so that other states know about it. This also implies that the seizure must be conscious, not accidental.
- Stable, i.e. the state must demonstrate a long-term and sustainable presence in the territory. If the state does not maintain permanent control, its claim to terra nullius may be challenged.

2. The principle of Discovery.

In the early periods of international law (especially during the Age of Discovery), sovereignty over newly discovered lands could be acquired by discovery. However, by the 19th century, discovery alone was no longer sufficient to establish sovereignty and had to be accompanied by effective occupation.

An important element in the process of acquiring sovereignty is international recognition by other states. If other states recognize claims to occupy terra nullius, this strengthens the new state's sovereignty over the territory.

During the Age of Discovery, European explorers such as James Cook claimed the islands in the Pacific Ocean that they discovered as their own. That is, the principle of discovery was at work here. New Zealand was also claimed as British territory after its discovery by the same Captain James Cook in 1769. Initially, the British applied the principle of discovery, but despite initial claims, Britain could not fully apply the principle of terra nullius in relation to New Zealand, the islands were inhabited by the Maori, who already had their own traditions, social structure and land rights. This became one of the factors that forced the British to seek a formal treaty with the Maori. In 1840, they finally concluded the so-called Treaty of Waitangi with the Maori chiefs. According to the treaty, the Maori granted Britain the right to govern and sovereignty in exchange for the protection of their rights to land and traditions. It was this treaty that became the main document on which British sovereignty over New Zealand is based. A more "successful" British attempt to apply the principle of terra nullius was the actions in relation to Australia. But it was successful only for the British Crown, and not for the indigenous population of Australia. Indigenous peoples had lived there for thousands of years, had complex social structures and traditions around the land, but under the concept of terra nullius, Aboriginal people were excluded from any legal protections for their lands and were not considered owners of their territories. Lands that had belonged to Aboriginal people for centuries were alienated en

masse and distributed to British colonists for agriculture. Indigenous people, who had continued to move freely through the territory, hunting and gathering, were perceived as trespassers on private property. Without access to their food sources and cultural landscapes, they were forced to migrate inland to deserts and remote areas, where they were later placed on reserves, or to work on foreign lands, leading to extreme poverty, marginalization, forced displacement, and the destruction of their cultural and social structures. These policies had disastrous consequences for the Indigenous people. Many tribes disappeared, and those who survived found themselves in dire conditions or were assimilated. The number of Aborigines, which was about 300 thousand people in 1788, decreased to about 60 thousand by the end of the 19th century⁸, and today Aboriginal people make up less than 2.2% of Australia's population⁹. British law automatically applied to Australian territory without recognizing the Aboriginal legal system¹⁰. In 1837, the British Colonial Office ordered the Governor of New South Wales to extend the formal rights of the colony to the Aborigines, that is, on paper, the indigenous population was equated with British subjects¹¹. However, in practice, despite the proclaimed strict principle of equality of all British subjects before the law and the courts, special colonial legislation began to take shape, regulating the criminal liability of Australian Aborigines.¹² Thus, local courts had the right to consider less serious crimes (felonies and misdemeanors), such as theft or disorderly conduct, committed by Aborigines, in a simplified, accelerated procedure, without the need for a full trial, and to issue sentences of punishment in the form of lashes or imprisonment for up to 6 months. This allowed for quick decisions, but, of course, reduced the quality and fairness of the proceedings. And in 1886, the authorities of Western Australia, on completely legal grounds, received the right to expel from the city Aborigines who, in their opinion, had a slovenly or dirty appearance.¹³ Another act that high-

⁸ Ananidze F.R. Legal status of indigenous peoples of Australia and New Zealand. // Bulletin of RUDN. Series: legal sciences. Moscow, 2002. No. 1.

⁹ Andreev K.Yu. Legal status of indigenous peoples in foreign countries. Handbook. M. 2006.

¹⁰ Trikoz E. N. The policy of the British colonial authorities in relation to the customary law of Australian aborigines in the 19th century // Bulletin of RUDN. Series: Legal sciences. 2005. No. 1. URL: <https://cyberleninka.ru/article/n/politika-britanskih-kolonialnyh-vlastey-po-otnosheniyu-k-obychnomu-pravu-avstraliyskih-aborigenov-v-hih-v>.

¹¹ Report by Grey on the Method for Promoting the Civilization of Aborigines. Correspondence, Lord John Russell to Sir George Gipps, 8 October 1840 // In: Aboriginal Customary Law. The Criminal Law, Evidence and Procedure / The Law Reform Commission. Discussion Paper No. 20, March 1984. - Sydney, 1984.

¹² Trikoz E. N. The policy of the British colonial authorities in relation to the customary law of Australian aborigines in the 19th century // Bulletin of RUDN. Series: Legal sciences. 2005. No. 1. URL: <https://cyberleninka.ru/article/n/politika-britanskih-kolonialnyh-vlastey-po-otnosheniyu-k-obychnomu-pravu-avstraliyskih-aborigenov-v-hih-v>.

¹³ Aborigines Protection Act, 1886 (W.A.). 50 Vic., No. 25.

lighted the differences in approaches to justice for Aboriginals and Europeans was the **Capital Punishment Amendment Act 1875 (39 Vict. No. 1)**. It amended a previous law of 1871 that had abolished public executions. The 1875 amendment restored the practice of public executions exclusively for Aboriginal people, requiring them to be carried out outside prison walls, as opposed to private executions for other convicts. This decision was explained by the desire of the colonial authorities to use such events as a way to demonstrate power and intimidate.¹⁴

The economic oppression of the indigenous population continued for centuries, during which very limited space was created for the Aboriginal people for economic activity or entrepreneurship. In addition, the loss of land led to the loss of a significant part of the Aboriginal cultural traditions, as the land played a central role in their mythology and spiritual practices. Indigenous peoples could no longer maintain their sacred sites, which contributed to the destruction of their identity.¹⁵

Today, *terra nullius* is considered an outdated and discriminatory term. Modern norms of international law, such as the right to self-determination of peoples and respect for territorial integrity, reject the possibility of legitimizing the seizure of lands that are already inhabited by ethnic and cultural groups, even if these groups are not organized into a state. That is, the authors conclude that modern international law clearly limits the doctrine of *terra nullius* in its pure form.

Therefore, the future clash with the Anglo-Saxons for the riches of this region will rest on the tasks of constructing military bases and scientific research of mineral raw materials and bioresources, allowing to solve the problems of sovereign existence and food security, including the entire spectrum of biodiversity of existing representatives of flora and fauna. The Arctic implementation of weapons and other mechanisms for protecting the logistical routes of these transitions and future hubs will push towards a more serious line of possibilities and tasks of increasing and technological sovereignty. Therefore, the planned peace in Ukraine after our victory in the North-Eastern Military District will become a prelude to a new battle for the Arctic and will give impetus to the development of the already existing NATO groups and Russian troops in their peaceful exercises to retain control of the North Pole of the Earth. And the task of Russia, as well as the BRICS countries, especially China, in the decisions of their OBOR project will be to build multi-level security zones for trade caravans across the waters of the Arctic Ocean, as insurance for the land-based OBOR, which the Americans have already opposed in Africa and the Middle East.

¹⁴ Elkin A. Indigenous population of Australia / Translated from English. — M., 1952.

¹⁵ ⁵ Abashidze A.Kh., Ananidze F.R., Solntsev A.M. International legal foundations for the protection of minorities and indigenous peoples. Textbook. M. RUDN. 2015.

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DOI 10.34660/INF.2025.66.78.013

从澄清无主地和原住民所有权的角度反思现代地缘政治世界转型趋势
**REFLECTION OF MODERN TRENDS IN GEOPOLITICAL
WORLD TRANSFORMATION FROM THE STANDPOINT OF
CLARIFICATION OF TERMS *TERRA NULLIUS* AND *NATIVE
TITLE***

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摘要。作者考虑了特朗普回归后对和平和国际法的挑战，从国际法和新美国政府不断变化的地缘政治利益的角度讨论了使用各种制度和协议的可能性，并结合国际水域海洋制度各种地位的变化和人民自决权建立了历史类比。

关键词：危机、地缘政治、特朗普、特朗普经济学、SMO、俄罗斯、乌克兰、无主地概念、新保守主义者、知情同意、工业 4.0、原住民所有权。

Abstract. *The authors consider the challenges to peace and international law with the return of D. Trump, discussing the possibility of using various regimes and agreements from the standpoint of international law and the changing geopolitical interests of the new American administration, and build historical analogies in connection with the change in various statuses of maritime regimes of international waters and the rights of peoples to self-determination.*

Keywords: *crisis, geopolitics, D. Trump, trumpoonomics, SMO, Russia, Ukraine, terra nullius concept, neocons, informed consent, Industry 4.0., native title.*

With the arrival of Donald Trump in the Oval Office as the 47th President of the United States, the concept of dividing the planet into 12 zones of influence, previously voiced by globalists in anticipation of the formation of a neocon world, has become increasingly subject to various clarifications, but the goals of Greenland and the annexation of Canada as the 51st state of the United States have come to the forefront of the emerging geopolitics of trumpoonomics. Here is

the battle for Panama with China and the cancellation of fees for American ships to use the canal, reached in February 2025. Duties on a whole group of goods from China and other EU countries show that this is serious and for a long time, voluntarism will increase, chaos will again be concentrated in the hands of the New World, which rules the mistakes of its past administrations and calls Joseph Biden the worst of all US presidents. Accordingly, all regimes can be revised and international law will again be subject to attempts at radical changes, which can lead to the devaluation of established concepts in the understanding of previously established criteria and to the denial of the previously adopted uniform glossary of international terms for all. One of such options, possible evolution may be a rethinking of the previously established statuses of *terra nullius* and *native title*. Definitions are always historical in nature and based on internationally accepted data, subject to appropriate codification or adoption through their implementation by the UN International Law Commission. Something similar has happened before, notably in the case of Western Sahara. It was there that Spain considered the territory to be a *native title*, despite the fact that it was already inhabited by local nomadic Sahrawi tribes with their own traditions and ties to the land. The Berlin Conference of 1884-85, also known as the Berlin Conference on the Partition of Africa, enshrined the idea that effective governance and presence were required to justify ownership of a territory, which Spain attempted to do in Western Sahara. It established trading posts along the coast, including in the areas known today as El Aaiun and Dakhla. At the same time, Spain ignored the rights of the Sahrawis, believing that their nomadic way of life did not meet the requirements that Europeans made of “civilized” peoples capable of owning territory. In December 1960, the UN adopted Resolution No. 1514, which approved the Declaration of Independence for colonial countries and peoples¹. This document called on UN member states to immediately and completely eradicate all forms of colonialism. As a result, most European colonies in Africa gained sovereignty, but Western Sahara remained dependent on Spain. In September 1963, the Decolonization Committee was created within the UN, which began to systematically consider the issue of the status of Western Sahara². On 16 October 1964, the Committee adopted its first resolution demanding that Spain respect the right of the people of Western Sahara to self-determination. The following year, at the twentieth session of the General Assembly, Resolution No. 2072 was approved, recommending that the

¹ UN Resolution No. 1514 on the Granting of Independence to Colonial Countries and Peoples) // Official UN website [Electronic resource] URL: <http://www.un.org/ar/decolonization/declaration.shtml>

² Makutchev A.V. UN Participation in Resolving the Problem of the Status of Western Sahara (1964-1975) // JSRP. 2016. No. 4 (36). [Electronic resource] URL: <https://cyberleninka.m/artide/n/uchastie-oon-v-reshenn-problemy-statusa-zapadnov-sahary-1964-1975-gg>

Spanish government grant the region independence and end colonial rule³. When the status of Western Sahara was referred to the International Court of Justice in 1975, the Court ruled that Western Sahara was not *terra nullius* at the time of its occupation by Spain. The Court recognized the historical ties that the Sahrawis had with these territories. During this same period, attempts were made by the local population to create their own political organizations that could defend the interests of the Sahrawis. The most successful was the activity of Western Saharawi students, who in May 1973 founded POLISARIO - the Popular Front for the Liberation of Saguia el-Hamra and Rio de Oro, their motto being: "Let's achieve freedom with arms in our hands."⁴ By uniting various groups of the Sahrawi population seeking self-determination and liberation from foreign domination, they began a guerrilla war for the independence of Western Sahara. The leaders of the Polisario declared that they were the "only and legitimate representatives of the Sahrawi people in the struggle for self-determination and independence."⁵ They were supported by Algeria, providing military and diplomatic assistance, which strengthened the position of the Polisario in the international arena. However, Morocco and Mauritania suddenly put forward their rights to the territory of Western Sahara, which complicated the process of decolonization. The governments of these countries also believed that they had historical rights to these lands. Under pressure from the international community and in the context of an internal crisis, Spain agreed to hold a referendum on self-determination in Western Sahara in 1975. However, instead of a referendum, Spain signed the Madrid Agreements with Morocco and Mauritania, transferring control of the territory to them, which caused protests from the Polisario Front and led to an armed conflict⁶. In 1976, the Polisario Front declared the Sahrawi Arab Democratic Republic (SADR), declaring the independence of Western Sahara. SADR became a member of the Organization of African Unity, but its sovereignty continued to be contested by Morocco, leading to continued conflict. Mauritania, however, abandoned its claims in 1979 and signed a peace agreement with the Polisario. By 1991, Morocco and the Polisario had reached a ceasefire with the mediation of the United Nations, but the issue of the final status of Western Sahara remained unresolved. Today, it remains divided between Moroccan-controlled territory and the so-called Free Zone,

³ Resolution of the 20th session (1965) A/RES/2072 (XX). / Question of Ifni and Spanish Sahara [Electronic resource] URL: <https://documents-dds-ny.un.org/doc/RESOLUTION/GEN/NR0/220/85/IMG/NR022085.pdf?OpenElement>

⁴ Salek A.M. The Problem of Western Sahara in the International and Regional Contexts: 1964-2002: Dissertation of a Candidate of Historical Sciences: 07.00.15. - Moscow, 2003. - 160 p.

⁵ POLISARIO Front // Official website of the SADR [Electronic resource] URL: <http://sadr-russia.ru/front-polisari/>

⁶ Vicens E.M. Western Sahara: Betrayed Independence. Collection of studies and documents on the modern history of the Sahrawi Arab Democratic Republic / Compiled by Vicens E.M. Moscow: Regnum, 2007. 117 p.

controlled by the Polisario Front. Morocco views Western Sahara as its southern provinces, invests in the region, and encourages settlement, but its status remains uncertain from an international perspective⁷. Many countries, especially in Africa and Latin America, support the Polisario Front and the right of the Sahrawis to self-determination. Most countries in Europe and Asia are neutral on the Western Sahara issue and support UN resolutions calling for a referendum or peace talks.

Today, the UN Declaration on the Rights of Indigenous Peoples, adopted by the UN General Assembly in 2007, formally enshrines principles that exclude the possibility of applying the concept of *terra nullius* to lands inhabited by indigenous peoples. Thus, Article 26 recognizes the right of indigenous peoples to their traditional lands, territories and resources that they have historically owned, used or occupied. States must recognize and respect these rights and take measures to ensure legal protection of indigenous peoples' territories. And Article 3 enshrines the right of indigenous peoples to self-determination, which implies their right to determine their political status and develop socially, culturally and economically according to their own preferences. Article 4 adds that indigenous peoples have the right to autonomy or self-government in matters concerning their internal and local affairs. Article 10 requires that States obtain the informed consent of indigenous peoples before removing them from their lands or implementing projects on those lands that affect them: "Indigenous peoples shall not be forcibly removed from their lands or territories. Relocation shall only be with their free, prior and informed consent and after agreement on fair compensation and, where possible, the right to return⁸". This provision also protects indigenous peoples from violent or coercive land acquisition, excluding the possibility of declaring their lands *terra nullius*. Article 28 establishes that indigenous peoples have the right to restitution or compensation for lands, territories and resources that they have lost without their consent. This provision is recognized as important for the restoration of historical justice, as it allows indigenous peoples to restore their rights to territory that has already been lost or to claim compensation for damages. The Declaration also recognizes the right of indigenous peoples to cultural and spiritual relationships with their land (Article 25). At the same time, land is considered an integral part of their culture, identity and beliefs, and not just an economic resource. The Declaration recognizes that many lands were appropriated during the colonial period without regard for these rights of indigenous peoples. Although the Declaration is not legally binding (it has the status of "soft law"), it has significantly influenced the development of international norms and standards. The authors conclude that its adoption reflects a global trend away from the concept

⁷ Podgornova N.P. The Problem of Western Sahara. Myth and Reality. Moscow: Institute of the Middle East, 2013. 236 p.

⁸ UN Declaration on the Rights of Indigenous Peoples: adopted by the UN General Assembly on 13 September 2007 // UN General Assembly Resolution A/RES/61/295. New York, 2007.

of terra nullius. This global shift in the perception of indigenous rights is reflected in the case of Antarctica, where the absence of a population and state affiliation facilitated the application of the principle of terra nullius. As an isolated continent, Antarctica was used only for expeditions and scientific research. This indeed created the basis for the application of the principle of *terra nullius*, since no state could naturally lay claim to it within traditional boundaries or influence. A number of states have laid claim to parts of Antarctica: in the early part of the last century, many countries made their claims based on de facto occupation and the establishment of bases. These bases were used for scientific research, mapping, and climate observation, as well as to maintain a permanent presence in the region. Norway, for example, formally laid claim to Queen Maud Land, citing the explorations and expeditions of Roald Amundsen, who was the first to reach the South Pole in 1911. The United Kingdom was one of the first countries to build bases on the Antarctic Peninsula. In 1943, Operation Tabarin saw the establishment of the first permanent British Antarctic station, Base A on Goodyear Island. The operation ended in 1945, but the base continued to operate for scientific research⁹. The oldest of the currently operating bases is the **Argentine Orcadas**, built on the South Orkney Islands back in 1903. Incidentally, it was built by the Scottish National Antarctic Expedition, but transferred to Argentina's control a year later.¹⁰ Chile began establishing its first permanent bases in the area just south of the country in 1947. One of the first was the **General Bernardo O'Higgins Riquelme base** on the Antarctic Peninsula¹¹. Australia claimed East Antarctica in 1933 and in 1954 one of Australia's oldest permanent stations, **Mosson Base**, was established, named after Douglas Mosson, an early explorer of Antarctica.¹² Thus, in 1992, the High Court of Australia made a landmark decision in *Mabo v Queensland (No. 2)*, which invalidated the application of *terra nullius*. The claim had been brought in 1982 by Eddie Mabo, a member of the Meriam people of the Mer Islands in the Torres Strait (now Queensland). Mabo and other Meriam claimed that they were the rightful owners of the land because their people had lived on it for thousands of years, long before colonisation. The State of Queensland attempted to challenge Mabo's claim, arguing that Aboriginal rights had been extinguished since colonisation and that the lands on Mer Island were Crown property. In 1985, Queensland

⁹ **Port Lockroy – Base A** [Электронный ресурс] // **British Antarctic Survey**. Access mode: <https://www.bas.ac.uk/about/about-bas/history/british-research-stations-and-refuges/port-lockroy-a/>.

¹⁰ **Swinney G.N. The Scottish National Antarctic Expedition (1902–1904) and the Founding of Base Orcadas** // **Scottish Geographical Journal**. 2007. Vol. 123, No. 3. P. 234–255. DOI: 10.1080/14702540701617865.

¹¹ **Garay Vera C. The Cold War and Chilean Antarctic Policy, 1946–1952** [Electronic resource]. Academia.edu. Access mode: https://www.academia.edu/37028254/THE_COLD_WAR_AND_CHILEAN_ANTARCTIC_POLICY_1946_1952.

¹² **Law P.G. Antarctic Odyssey: In the Footsteps of the South Polar Explorers**. Melbourne: Heinemann, 1983. 256 p.

passed the Coastal Islands Act, which vested title to the islands in the government, thereby attempting to deprive the claimant of their right to the land. However, the High Court ruled that the law was discriminatory and infringed the rights of the Indigenous people, allowing the case to proceed. The trial was lengthy and complex, involving detailed evidence gathering and examination of evidence about the Meriam people's cultural and spiritual connections to their land. Eventually, 10 years later, on 3 June 1992, the High Court of Australia ruled in favour of the plaintiffs, recognising that Indigenous peoples such as the Meriam people do have traditional rights to their land. The court ruled that the concept of *terra nullius* was flawed and could not be applied to land where there were already established Indigenous social and legal relationships. The court also ruled that the doctrine of native title was recognised in Australian law where the plaintiffs could demonstrate a connection to the land under their traditions and laws, and where that connection had not been broken. The Mabo decision was a key step in the passage of the Native Title Act in 1993¹³. The Act secures their rights to own and use land, establishes the procedure for confirming previous documents related to land ownership, leasing of territories for grazing, and determines the legal status of territories belonging to indigenous communities. In addition, it provides mechanisms for providing compensation for land lost by indigenous peoples. The document is distinguished by its complexity: it includes 253 paragraphs, as well as an appendix divided into seven parts, each of which relates to individual regions of the country - New South Wales, Victoria, Queensland, Western Australia, South Australia, Tasmania and the Northern Territory. Also, as part of the implementation of the provisions of the 1993 Act, two key institutions were created:

1. The Court of Indigenous Land Rights, responsible for the consideration of disputes and confirmation of property rights;
2. The National Land Fund, designed to restore historical justice and provide compensation to indigenous peoples for the loss of their lands.

That is, this law allowed other indigenous peoples of Australia to seek recognition of their land rights through the courts and negotiations. *Mabo v State of Queensland (No 2)* was a watershed moment for Indigenous rights. In reviewing the case, the author again concluded that by overturning *terra nullius*, the Australian High Court had effectively recognised the historical fallacy of this colonial doctrine. Something similar happened in Western Sahara. Spain also considered the territory *terra nullius*, despite the fact that it was already inhabited by local nomadic Sahrawi people with their own traditions and connections to the land. The Berlin Conference of 1884-85, also known as the Berlin Conference on the

¹³ Ananidze Fridon Revazovich, Kutsurov Odyssey Yuryevich Legal status of the indigenous peoples of Australia // Gaps in Russian legislation. 2016. No. 8. URL: <https://cyberleninka.ru/article/n/pravovoe-polozhenie-korennyh-narodov-avstralii>.

Partition of Africa, enshrined the idea that effective governance and presence were required to justify ownership of territory, which Spain attempted to do in Western Sahara. It established trading posts along the coast, including in areas now known as El Aaiun and Dakhla. At the same time, Spain ignored the rights of the Sahrawis, believing that their nomadic way of life did not meet the requirements that Europeans made of “civilized” peoples capable of owning territory. In December 1960, the UN adopted Resolution No. 1514, which approved the Declaration of Independence for colonial countries and peoples¹⁴. This document called on UN member states to immediately and completely eradicate all forms of colonialism. As a result, most European colonies in Africa gained sovereignty, but Western Sahara remained dependent on Spain. In September 1963, the Decolonization Committee was created within the UN, which began to systematically consider the issue of the status of Western Sahara¹⁵. On 16 October 1964, the Committee adopted its first resolution demanding that Spain respect the right of the people of Western Sahara to self-determination. The following year, at the twentieth session of the General Assembly, Resolution No. 2072 was approved, recommending that the Spanish government grant the region independence and end colonial rule¹⁶. When the status of Western Sahara was referred to the International Court of Justice in 1975, the Court ruled that Western Sahara was not terra nullius at the time of its occupation by Spain. The Court recognized the historical ties that the Sahrawis had with these territories. During this same period, attempts were made by the local population to create their own political organizations that could defend the interests of the Sahrawis. The most successful was the activity of Western Saharawi students, who in May 1973 founded POLISARIO - the Popular Front for the Liberation of Saguia el-Hamra and Rio de Oro, their motto being: “Let’s achieve freedom with arms in our hands.”¹⁷. By uniting various groups of the Sahrawi population seeking self-determination and liberation from foreign domination, they began a guerrilla war for the independence of Western Sahara. The leaders of the Polisario declared that they were the “only and legitimate representatives

¹⁴ UN Resolution No. 1514 on the granting of independence to colonial countries and peoples) // Official website of the UN [Electronic resource] URL: <http://www.un.org/ar/decolonization/declaration.shtml>

¹⁵ Makutchev A.V. UN Participation in Resolving the Problem of the Status of Western Sahara (1964-1975) // JSRP. 2016. No. 4 (36). [Electronic resource] URL: <https://cyberleninka.m/artide/n/uchastie-oon-v-reshenn-problemy-statusa-zapadnoy-sahary-1964-1975-gg>

¹⁶ Resolution of the 20th session (1965) A/RES/2072 (XX). / Question of Ifni and Spanish Sahara [Electronic resource] URL: <https://documents-dds-ny.un.org/doc/RESOLUTION/GEN/NR0/220/85/IMG/NR022085.pdf?OpenElement>

¹⁷ Salek A.M. The Problem of Western Sahara in International and Regional Contexts: 1964-2002: Dissertation of a Candidate of Historical Sciences: 07.00.15. - Moscow, 2003. - 160 p.

of the Sahrawi people in the struggle for self-determination and independence.”¹⁸ They were supported by Algeria, providing military and diplomatic assistance, which strengthened the position of the Polisario in the international arena. However, Morocco and Mauritania suddenly put forward their rights to the territory of Western Sahara, which complicated the process of decolonization. The governments of these countries also believed that they had historical rights to these lands. Under pressure from the international community and in the context of an internal crisis, Spain agreed to hold a referendum on self-determination in Western Sahara in 1975. However, instead of a referendum, Spain signed the Madrid Agreements with Morocco and Mauritania, transferring control of the territory to them, which caused protests from the Polisario Front and led to an armed conflict¹⁹. In 1976, the Polisario Front declared the Sahrawi Arab Democratic Republic (SADR), declaring the independence of Western Sahara. SADR became a member of the Organization of African Unity, but its sovereignty continued to be contested by Morocco, leading to continued conflict. Mauritania, however, abandoned its claims in 1979 and signed a peace agreement with the Polisario. By 1991, Morocco and the Polisario had reached a ceasefire with the mediation of the United Nations, but the issue of the final status of Western Sahara remained unresolved. Today, it remains divided between Moroccan-controlled territory and the so-called Free Zone, controlled by the Polisario Front. Morocco views Western Sahara as its southern provinces, invests in the region, and encourages settlement, but its status remains uncertain from an international perspective²⁰. Many countries, especially in Africa and Latin America, support the Polisario Front and the right of the Sahrawis to self-determination. Most countries in Europe and Asia are neutral on the Western Sahara issue and support UN resolutions calling for a referendum or peace talks. Today, the UN Declaration on the Rights of Indigenous Peoples, adopted by the UN General Assembly in 2007, formally enshrines principles that exclude the possibility of applying the concept of terra nullius to lands inhabited by indigenous peoples. Thus, Article 26 recognizes the right of indigenous peoples to their traditional lands, territories and resources that they have historically owned, used or occupied. States must recognize and respect these rights and take measures to ensure legal protection of indigenous peoples’ territories. And Article 3 enshrines the right of indigenous peoples to self-determination, which implies their right to determine their political status and develop socially, culturally and economically

¹⁸ POLISARIO Front // Official website of the SADR [Electronic resource] URL: <http://sadr-russia.ru/front-polisari/>

¹⁹ Vicens E.M. Western Sahara: Independence Betrayed. Collection of studies and documents on the modern history of the Sahrawi Arab Democratic Republic / Compiled by Vicens E.M. Moscow: Regnum, 2007. 117 p.

²⁰ Podgornova N.P. The Problem of Western Sahara. Myth and Reality. Moscow: Institute of the Middle East, 2013. 236 p.

according to their own preferences. Article 4 adds that indigenous peoples have the right to autonomy or self-government in matters concerning their internal and local affairs. Article 10 requires that States obtain the informed consent of indigenous peoples before removing them from their lands or implementing projects on those lands that affect them: “Indigenous peoples shall not be forcibly removed from their lands or territories. Relocation shall only be with their free, prior and informed consent and after agreement on fair compensation and, where possible, the right to return²¹». This provision also protects indigenous peoples from violent or coercive land acquisition, excluding the possibility of declaring their lands *terra nullius*. Article 28 establishes that indigenous peoples have the right to restitution or compensation for lands, territories and resources that they have lost without their consent. This provision is recognized as important for the restoration of historical justice, as it allows indigenous peoples to restore their rights to territory that has already been lost or to claim compensation for damages. The Declaration also recognizes the right of indigenous peoples to cultural and spiritual connections to their land (Article 25). At the same time, land is considered an integral part of their culture, identity and beliefs, and not just an economic resource. The Declaration recognizes that many lands were appropriated during the colonial period without regard for these rights of indigenous peoples. Although the Declaration is not legally binding (it has the status of “soft law”), it has significantly influenced the development of international norms and standards. The author concludes that its adoption reflects a global trend away from the concept of *terra nullius*.

This global shift in the perception of indigenous rights is reflected in the case of Antarctica, where the absence of a population and state affiliation facilitated the application of the principle of *terra nullius*. As an isolated continent, Antarctica was used only for expeditions and scientific research. This indeed created the basis for the application of the principle of *terra nullius*, since no state could naturally lay claim to it within traditional boundaries or influence. A number of states have laid claim to parts of Antarctica: in the early part of the last century, many countries made their claims based on *de facto* occupation and the establishment of bases. These bases were used for scientific research, mapping, and climate observation, as well as to maintain a permanent presence in the region. Norway, for example, formally laid claim to Queen Maud Land, citing the explorations and expeditions of Roald Amundsen, who was the first to reach the South Pole in 1911. The United Kingdom was one of the first countries to build bases on the Antarctic Peninsula. In 1943, Operation Tabarin saw the establishment of the first permanent British Antarctic station, Base A on Goodyear Island. The operation

²¹ UN Declaration on the Rights of Indigenous Peoples: adopted by the UN General Assembly on 13 September 2007 // UN General Assembly Resolution A/RES/61/295. New York, 2007.

ended in 1945, but the base continued to operate for scientific research²². The oldest of the currently operating bases is the **Argentine Orcadas, built** on the South Orkney Islands back in **1903**. Incidentally, it was built by the Scottish National Antarctic Expedition, but transferred to Argentina's control a year later²³. Chile began establishing its first permanent bases in the area just south of the country in 1947. One of the first was the **General Bernardo O'Higgins Riquelme base** on the Antarctic Peninsula²⁴. Australia claimed East Antarctica in 1933 and in 1954 one of Australia's oldest permanent stations, **Mosson Base**, was established, named after Douglas Mosson, an early explorer of Antarctica.²⁵

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²² **Port Lockroy – Base A [Электронный ресурс] // British Antarctic Survey.** Режим доступа: <https://www.bas.ac.uk/about/about-bas/history/british-research-stations-and-refuges/port-lockroy-a/>,

²³ **Swinney G.N. The Scottish National Antarctic Expedition (1902–1904) and the Founding of Base Orcadas // Scottish Geographical Journal.** 2007. Vol. 123, No. 3. P. 234–255. DOI: 10.1080/14702540701617865.

²⁴ **Garay Vera C. The Cold War and Chilean Antarctic Policy, 1946-1952 [Электронный ресурс].** Academia.edu. Режим доступа: https://www.academia.edu/37028254/THE_COLD_WAR_AND_CHILEAN_ANTARCTIC_POLICY_1946_1952.

²⁵ **Law P.G. Antarctic Odyssey: In the Footsteps of the South Polar Explorers.** Melbourne: Heinemann, 1983. 256 p.

DOI 10.34660/INF.2025.17.61.014

“一带一路”与上海合作组织双重影响下中白人道主义合作的深化路径
**WAYS TO DEEPEN CHINA-BELARUS HUMANITARIAN
COOPERATION IN THE CONTEXT OF THE DUAL INFLUENCE
OF THE “BELT AND ROAD INITIATIVE” AND THE SHANGHAI
COOPERATION ORGANIZATION**

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摘要。本文探讨了在“一带一路”倡议和上海合作组织（SCO）的双重影响下，中国和白俄罗斯不断发展的人道主义合作。“一带一路”强调经济合作，而“上合组织”则注重安全和政治参与，从而产生促进区域全面发展的协同效应。白俄罗斯是“一带一路”倡议的积极参与者，也是自 2024 年起成为上合组织新正式成员的白俄罗斯，在连接这两个框架方面发挥着战略作用。该研究强调了关键举措，包括文化交流、通过上合组织大学网络实现教育融合以及 SCOLAR 网络等青年合作平台。本文最后展望了旨在促进欧亚地区可持续发展、多边伙伴关系和文化丰富的未来合作战略。

关键词：中白合作、“一带一路”倡议、上海合作组织、人道主义交流。

Abstract. *This paper explores the evolving humanitarian cooperation between China and Belarus under the dual influence of the Belt and Road Initiative (BRI) and the Shanghai Cooperation Organization (SCO). The BRI emphasizes economic collaboration, while the SCO focuses on security and political engagement, creating a synergistic effect that promotes comprehensive regional development. Belarus, an active participant in the BRI and a new full member of the SCO since 2024, plays a strategic role in linking these two frameworks. The study highlights key initiatives, including cultural exchanges, educational integration through the SCO University Network, and youth collaboration platforms like the SCOLAR Network. The paper concludes with an outlook on future cooperation strategies aimed at fostering sustainable development, multilateral partnerships, and cultural enrichment across the Eurasian region.*

Keywords: *China-Belarus cooperation, Belt and Road Initiative, Shanghai Cooperation Organization, humanitarian exchange.*

The “Belt and Road Initiative” (BRI) and the Shanghai Cooperation Organization (SCO) create a complementary effect in the Eurasian region. The BRI focuses on economic cooperation, while the SCO is based on interactions in security and politics, contributing to the comprehensive development of the region. For example, the SCO supports the construction of the BRI, and in turn, the BRI deepens humanitarian cooperation within the SCO framework. The SCO provides a platform for humanitarian exchange, while the BRI expands both the scale and depth of humanitarian interaction. Despite certain competition between these two mechanisms, both reflect Chinese approaches to governance, development concepts, and modes of interaction. Their core values—the “Silk Road Spirit” and the “Shanghai Spirit”—are essentially similar as they correspond to the era’s theme of peace and development, promoting joint peace and common progress[1].

I. The Strategic Position of Belarus in the Belt and Road Initiative and the Shanghai Cooperation Organization

The Republic of Belarus has participated in the SCO since 2010 as a dialogue partner, as an observer since 2015, and as a full member since 2024. On September 16, 2022, during the SCO Heads of State Council meeting in Samarkand, Uzbekistan, a decision was signed to begin the procedure for Belarus’s accession to the Organization. On July 4, 2023, a Memorandum of Obligations of the Republic of Belarus to obtain the status of an SCO member state was signed. On July 4, 2024, at the summit in Astana, the accession procedure was completed, and Belarus became the tenth full member of the “SCO family”[2, p. 85].

Cooperation within the SCO and BRICS is an important part of international collaboration between China and Belarus. China assumed the rotating presidency of the SCO for 2024–2025 and proposed declaring 2025 the “Year of Sustainable Development of the SCO.” Under the slogan of its presidency “Promoting the Shanghai Spirit: SCO in Action,” China will hold more than 100 meetings and events focused on eight key areas of the Global Development Initiative[3].

On August 16, 2007, at the SCO Heads of State Summit in Bishkek, member countries signed the “Agreement on Cultural Cooperation.”[4] To take advantage of the emerging opportunities and further promote cultural exchanges, the cultural departments of the SCO member states not only diligently fulfilled their responsibilities but also actively cooperated with other specialized structures, jointly creating a broad platform for “greater cultural” interaction. For instance, in cooperation with educational institutions, the “Shanghai Cooperation Organization University” was founded; together with youth organizations and structures, 82 educational institutions were established, 20 of which are in China. The educational programs cover training for master’s, bachelor’s, postgraduate, and secondary vocational school students, with China being the first country to start admitting undergraduate students[5]. Additionally, the “SCO Youth Union” and other initiatives were

jointly created. These measures were first proposed by Russian President Vladimir Putin at the 2006 Heads of State Summit and received broad recognition and support.

Belarus is both an important participant in the Belt and Road Initiative and a new member of the Shanghai Cooperation Organization. This dual role allows it to act as a coordinating link between the BRI and the SCO. Since 2016, Belarusian President Alexander Lukashenko has repeatedly participated in SCO summits as the head of an observer state, emphasizing the organization's potential in promoting trade and economic cooperation, industrial and technological interaction, digital transformation, artificial intelligence, and the green economy. Belarus actively participates in SCO political-diplomatic, economic, trade, cultural, and humanitarian activities, striving to foster multilateral cooperation and regional development.

II. Results of Humanitarian Exchange Since Belarus's Accession to the Shanghai Cooperation Organization

1. Hosting the Meeting of Ministers of Culture of SCO Member States

On July 12, 2024, Belarus hosted a meeting of ministers of culture of SCO member states in Vitebsk as part of its traditional brand event—the International Festival of Arts “Slavianski Bazaar.” The event's theme was “In the Name of Peace and Creativity—Together with the SCO.” The meeting was attended by SCO Secretary-General Zhang Ming and representatives from all member countries. Discussions focused on optimizing cultural exchange mechanisms and planning joint events. Zhang Ming noted that Belarus's accession “gave new impetus to the deepening and practical development of cultural cooperation within our organization”[6].

During the meeting, proposals were also made for joint work to include cultural heritage sites of member states in the UNESCO World Heritage List, organize mutual art exhibitions, and other events. This event marks Belarus's transition from a participant to an initiator of cultural cooperation within the SCO.

Alexander Lukashenko is confident that the Organization should not be associated solely with security and economic issues. According to him, the SCO is a unique opportunity for mutual cultural enrichment, bringing people closer together, direct communication of youth organizations, and the activation of interactions in sports, tourism, science, and education[7].

2. Integration into the SCO University Network

Belarusian State University, Minsk State Linguistic University, and other institutions joined the SCO university alliance, which unites 82 educational institutions and covers seven training areas, including regional studies, ecology, and information technology. Through joint double-degree programs and a mutual credit recognition system, Belarusian students can participate in exchange programs in China, Russia, and other SCO member countries. At the same time, more students

from participating countries are being attracted to continue their education in Belarus[8].

On July 22, 2024, the first branch of the SCO Countries' Youth Platform SCOLAR Network in Belarus was opened at the Faculty of International Relations of BSU[9]. The branch, established by Belarusian State University, represents an active community of volunteers, uniting students, graduates, and young professionals to promote professional development, educational, entrepreneurial, and humanitarian projects, address youth issues, and support the development of the country and the Eurasian region. Given the key role of youth in international cooperation, the platform provides opportunities for exchanges, deepening mutual understanding, and strengthening friendships.

From November 13 to 15, Belarusian and Russian students participated in modeling the SCO structure at BSU[10]. China-Belarus educational cooperation is actively developing. The Education Subcommittee of the Intergovernmental Cooperation Committee, established by the education ministries of the two countries, effectively promotes interaction. The parties signed an agreement on mutual recognition of diplomas and degrees and concluded more than 500 cooperation agreements, over 100 of which were signed in recent years. These initiatives contributed to the creation of 10 new joint educational programs, six of which are already being implemented. The universities of the two countries jointly carry out 40 educational programs.

Additionally, the parties established seven joint scientific and educational institutions, including three laboratories, two centers, and two institutes. Six Confucius Institutes and eight Confucius Classrooms operate in Belarus, while 12 Belarusian research centers are opened in Chinese universities. In 2023, about 8,000 Chinese citizens studied in Belarus. On November 21 of the same year, the parties signed an agreement on the creation of an alliance of Belarusian and Chinese universities[11].

Conclusion

In 2025, China, relying on public organizations such as the Shanghai Cooperation Organization Good-Neighborliness, Friendship and Cooperation Committee, will continue to develop and deepen brand events, including traditional medicine forums, people's friendship forums, youth exchange camps, and youth development forums. As part of the "SCO Tourism and Cultural Capital 2024–2025" program, a series of cultural events will be organized in Qingdao. China also actively implements a plan to provide 1,000 places for young people from SCO countries to participate in exchange programs in China over the next five years, contributing to mutual enrichment of civilizations and strengthening mutual understanding among peoples of different countries[12].

Looking optimistically to the future, China and Belarus, as all-weather comprehensive strategic partners, SCO member states, and active participants in the Belt and Road Initiative[13], will continue to strengthen policy coordination and institutional building within the SCO. They will also promote the alignment of SCO mechanisms with the Eurasian Economic Union and other regional structures, ensuring reliable institutional support for the implementation of the Belt and Road Initiative and jointly creating a new model of cooperation that is more positive, comprehensive, effective, and pragmatic.

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赋能学习者：将评估转化为主动学习工具
**EMPOWERING LEARNERS: TRANSFORMING ASSESSMENTS
INTO ACTIVE LEARNING TOOLS**

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摘要。学习评估是一种强调评估在帮助学生取得最佳成绩方面的重要性的概念。它表明学生需要我们的帮助，以确保他们从讲座和活动以及评估中学习。创建有助于学生学习的评估的关键原则包括课堂评估技术、顶点项目、作品集、演示文稿和论文或报告，其中包括形成性和总结性评估。它强调，糟糕的评估会导致学生失去动力，因此让学生参与学习并进行公平评估至关重要。这种方法使学生能够取得成功，并鼓励他们将来更加努力。

关键词：学习评估、有效反馈、顶点项目、作品集、演示文稿、论文、报告。

Abstract. *Assessment for Learning is a concept that emphasizes the importance of assessments in helping students achieve their best. It suggests that students need our help to ensure they learn from both lectures and activities, as well as assessments. Key principles for creating assessments that help students learn include Classroom Assessment Techniques, Capstone Projects, Portfolios, Presentations, and Papers or Reports, which include both formative and summative assessments. It emphasizes that demotivation can result from poor assessments, so it is crucial to involve students in their learning and create fair assessments. This approach empowers students to succeed and encourages them to try harder in the future.*

Keywords: *assessment for learning, effective feedback, capstone projects, portfolios, presentations, papers, reports.*

Introduction

Assessment for Learning means we think about how our assessments can help students do their best. Maybe you assume that all assessments help students learn or that all motivated students will automatically learn from any tests we give them, as long as they try hard and study. But this is not the case. Students need our help

in order to make sure that they learn from not only our lectures and activities, but from our assessments as well. Here are some key principles to keep in mind so that you can create assessments that help students learn.

The first principle for assessment for learning is to help students become active in their own learning. Sometimes students feel that classes are passive, that the teacher is in control and they have very few opportunities to have control over their grade. They might feel that even when they study hard, they can't score well on important tests or papers. This is de-motivating for students. You can help by making sure students know your classes aren't just passive—students play an active role. You can do this by linking assessments to your student learning objectives that are in the syllabus. This way, students can see why they are being assessed in specific areas. You can also explain to them why the assessment is important and how it will help them in their careers. Third, you can strive to create assessments that are linked to their futures. Whenever possible, make assessments that are based on real tasks your students will need to do in the future. For example, you can ask students to role play an interaction, in English, between a hotel manager and a guest who has a complaint or a shop-assistant and a customer. Possible areas to grade on would be if students use key vocabulary effectively, if they speak so that their English is comprehensible, or if they employ strategies covered in class to deal with customer complaints. A fourth way to help students be active in their own learning is to ensure that your assessments are fair. Prepare students for your assessments, such as by giving them a study guide for an exam or answering questions about the assessment before they take it. Be sure you have sufficiently covered all material that you will assess. If you haven't covered it sufficiently, it is not fair to assess students on it. And finally, when you give assessments, make them as interesting as possible. In some cultures, having competitions in class is very effective to get students motivated. You can choose to grade or not grade these competitions.

The second is to give effective feedback to students. Feedback should be given so that students understand what they did correctly or incorrectly and so that they understand what you recommend—for example, you might need students to understand that they got the wrong answer and why it was wrong, or maybe they need to understand that they did a process or lab experiment wrong and why. If students only find out what they got right or wrong, with no feedback on why, they are less likely to learn.

One way to help students stay on track with feedback is to make it an ongoing part of the course. You can create progress sheets or assignments, where you ask students to record their progress throughout the time period of the assignment. You can then give them feedback on their progress, to keep them motivated and on-track. You can give students feedback through written comments (for example,

on a paper or rubric) or in person (such as in a conference, during office hours, or before or after class). Or you can structure peer review activities. One of the best ways to give clear feedback is by using a rubric. A rubric is a grid that describes what grading criteria are and what is expected for each criteria; they will be discussed in more detail in this course.

Effective feedback generally does three things: identifies strengths, identifies opportunities for improvement or weaknesses, and suggests next steps.

The third principle for assessment for learning is to give students opportunities to reflect on their own learning. We don't want students to only take a test and forget about it and the information they learned. Instead, we want them to look at their results from the assessment and think about what they did well and how they could do better. This is reflective learning. You can help students do this by asking them to write two or three things they want to learn, at the beginning of each unit. Then, at the end of each unit, after an assessment, ask them to reflect on if they met their goals. They can write their reflection and turn it in to you, or they can share their reflections in a small group discussion during class. Be sure to do this several times during the semester so that students become more skilled at doing these reflections. Student goals should be specific. For example, if your field has a specific test they will need to pass in order to become certified, their goal might be to learn the information required in order to pass that test. You can also ask students to help each other by giving feedback to each other so that everyone learns more. This is often called "peer review" or "peer assessment." It does not mean that students grade each other. It means that they look at each other's work, such as a paper or presentation, and offer suggestions on how to make it better. Then, they can make any revisions before they turn in their work to the instructor and it is graded. When students help each other, they learn from each other as well.

Methods

Following are some options for assessing student learning and performance: Classroom Assessment Techniques, Capstone Projects, Portfolios, Presentations, and Papers or Reports. Both formative and summative assessments are included.

Discussion

Classroom Assessment Techniques (CATs) (Angelo & Cross, 1993) are intended to provide immediate feedback about the whole classes' understanding of course content, not what individual students understand. They are therefore a type of formative assessment. It is usually best to try the CAT yourself or give it to a colleague before you try it with your class, to ensure that your directions are clear. You can also tell students what the results of the CAT were (without any student names)—this helps them see how you plan class and also shows them how their learning compares with others in the class.

Capstone projects are culminating projects, meaning they take place at the end of a unit or course. They are useful to demonstrate how well students can

integrate information and apply it in some way. They are particularly effective for students who are approaching graduation, since these projects can be done with experts in the field, local businesses, or other real-world groups. Capstone projects can be done in groups or individually, and many include more than one type of assessment. For example, students can be asked to interview an industry expert, collect their findings into a group written report, and present the main findings to the class.

Portfolio is a collection of materials that have been created and assembled by the student. They can be individual or group projects. Contents of the portfolio can be text (such as papers or reports), images (such as pictures of students interviewing an industry expert), audio files (such as a recording of an interview), or other files such as slides. They can be created in paper form, in a binder, or they can be ePortfolios and put online. Portfolios can be summative or formative; many instructors make them both. For example, students can turn in the individual parts of their portfolio throughout the course, and then revise them based on peer or instructor feedback, and finally collect them all into a final portfolio for a grade. Portfolios can be very useful for the job seeking and interviewing process and can be updated by the student even after the course is over. Keep in mind that portfolios can include any types of contents.

Presentations can be in a group or individual and can be summative or formative. Presentations will be most effective if students have clear guidelines on what is expected, if they are directly related to course content and students' future careers or lives, and if they are carefully regulated in terms of length of presentation and visuals so that they are not too long or confusing. Presentations can be done in-person during class, or they can be recorded and watched by the instructor and peers for homework.

Papers or reports that focus on students' future career writing needs will be the most beneficial and motivating for students and thus easier to grade. Papers can be written for group projects or individually, they can be formative or summative, they can be long or short, and they can be formal or informal. Informal writing assignments focus on helping students learn or explore material. For example, students can write on online discussion boards or even make their own English-language blogs related to course content. They can also post via social media related to course content. With social media, extra attention needs to be paid to privacy and security, and not all students or classes will want to explore this idea for informal writing. Instructors often worry about plagiarism if they assign writing tasks. In order to minimize chances that students will just copy text from a book or online source, and not complete their own assignments teachers should choose course topics that are difficult for students to copy from other sources or to require students to turn in drafts of their paper before the final, so that you can

check that they are doing their own work. One more way to check is to watch for inconsistencies in students' papers—look for fonts that are different or wording that seems beyond your students' English proficiency level. Teachers should explain to students the importance of doing their own work for their future career development and tell them you care about their ideas and will read their work. And, finally, the topics assigned should be interesting to students and connected to their lives and careers.

Conclusion.

Remember that when a student tries very hard to do well on an assessment and that student fails or does poorly, this can be very de-motivating, causing them to not want to try harder in the future. The more we can involve students in their learning and create fair assessments, the greater chance there is that they will feel empowered to succeed.

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中学英语语法教学中的演绎法和归纳法

**DEDUCTIVE AND INDUCTIVE APPROACHES TO TEACHING
ENGLISH GRAMMAR IN SECONDARY SCHOOLS**

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摘要。英语语法对于母语人士和第二语言使用者来说都很难学习。语法规则和例外太多，因此不同时代的教师使用了各种方法来教授语法。今天，我们生活在一个重视读写能力的社会，并愿意采用更有效的方法来取得语法教学的最佳效果。

本研究的目的是调查中学英语语法教学是如何进行的，总结反映语法教学方法作为英语教学方法的作用的数据。为了实现这一目标，研究目标由目标设定决定：选择各种语法教学方法，并分析关于英语教学中归纳和演绎语法方法的问卷以及教师对它们的态度。

关键词：语法教学、归纳法、演绎法、研究目标、调查、问卷。

Abstract. *English grammar is difficult to learn for both native and second language speakers. There are so many rules, and exceptions that different generations of teachers have used various approaches to teaching grammar. Today, we live in a society that prizes literacy and is willing to adapt to more effective methods to achieve the best results in teaching grammar.*

The purpose of this study is to investigate how the English grammar teaching is carried out in secondary schools, summarize the data reflecting on the role of grammar teaching approaches as the EFL. To satisfy this aim, research objectives are determined by its target setting: to select various approaches in teaching grammar and analyze questionnaires on inductive and deductive grammar methods in teaching English and the teachers' attitudes towards them.

Keywords: *teaching grammar, inductive approach, deductive approach, research objectives, survey, questionnaires.*

Introduction. Grammar is a set of rules that dictates how a language works, making it easy to comprehend. Without proper grammar, one would have no idea how to speak or write in English.

To teach grammar is very important and it plays a significant role in every English foreign language classroom. And through teaching grammar, teacher aims to enable his students to be able to make progress in their linguistic competence. Learners use grammar as a tool or resource for comprehension, and creation of oral and written discourse efficiently, effectively, and appropriately depending on the situation.

Teaching grammar to young learners is considered quite challenging for English teachers. Different characteristics between young learners and adult learners make teachers and academics less certain about how grammar should be presented, whether deductively or inductively.

As teachers, we've likely all been given grammar to teach students and have asked ourselves how we could possibly communicate the rules to our students. True, it is difficult to convey the complicated rules of grammar to students learning a language, simply explaining the rules is not enough. When it comes to TEFL teaching, there are traditionally deductive and inductive approaches in teaching grammar.

Both deductive and inductive teaching have their advantages and disadvantages and which approach language teachers use can depend on a number of factors, such as the preferences of the teacher and learners, characteristics of language which is going to be learnt, learners' age. However, perhaps, it is generally accepted that a combination of these two approaches is best suited for the EFL classroom. What is inductive and deductive grammar teaching? What are advantages and disadvantages? Which is better?

A deductive approach involves the learners being given a general rule, which is then applied to specific language examples and honed through practice exercises. A deductive approach teaches rules first, then the rules are used in examples and activities.

The deductive approach is the most traditional method of grammar teaching. Basically, the teacher explains the rule, and then has the students practice some examples. If a teacher was teaching comparatives using this method, adjectives would be given and translated into the students' first language. The teacher would explain how the adjectives change when comparing and show a few examples. The teacher would then have the students practice in pairs while checking that they understand.

Krashen (1982), the inductive method “seems much more reasonable (compared to the deductive method) - why make students guess the rule?” He claims that the rule should be practiced until it is internalized, and teachers should do this. [6]

According to Thornbury (1999), the deductive approach is a procedure that begins with a teacher outlining a rule before giving examples of how the rule is used in the target structure. After that, students practice their language skills by applying general rules to particular examples.[8]

According to Eisenstein (1987), the deductive approach increases the teacher’s control over students, which may make students less afraid to produce incorrect structures related to how the target language is functioning. [3, 282]

We, English teachers, practiced both approaches in our English grammar teaching and found the following advantages and disadvantages of these two approaches.

The advantages of a deductive approach:

-It gets straight to the point, and so can be time-saving. Many rules especially rules of form – can be simply and quickly explained and allow more time for practice and application.

-It is very suitable for the intelligence and maturity of many adult students, as well acknowledges the role of cognitive processes in language acquisition.

-It gives opportunity for the teacher to deal with language points as they come up, rather than having to prepare some materials in advance.

The disadvantages of a deductive grammar approach:

-Starting the lesson with a grammar presentation may be not understandable for some students, especially at young ages. They may not have sufficient language (language which is used to talk about grammar rules). They may not be able to understand the rules involved.

-Grammar explanation encourages a teacher-centered, transmission-style classroom; teacher explanation is often at higher position than students’ involvement and interaction.

-Such an approach encourages the belief that learning a language is simply a case of knowing the rules.

Inductive Approach. An inductive approach involves the learners detecting, or noticing, patterns and working out a ‘rule’ for themselves before they practise the language. The inductive approach would begin with examples of a grammar principle in the context of written or spoken language, and from there, students would have opportunities to notice what rules are being followed.

For the inductive approach, rules are likewise discovered and not directly discussed. Instead, students learn the rules through examples and testing them out.

Inductive instruction exposes students to new grammatical frameworks or rules in a natural language setting. Inductive instruction benefits from the con-

cept of “noticing.” Instead of elaborating on a specific concept. The teacher gives students a variety of examples to illustrate the use of the concept for the students. Students are expected to “notice” how the concept operates through the use of examples during instruction. [1]

Students are supposed to “discover” the grammar through a series of steps, using these steps to infer both the form and the meaning of the grammar.

The advantages of an inductive approach:

- Rules learners discover for themselves (student-centered) how to use, when to use some structures than rules they have been presented with. This makes the rules more meaningful, memorable and acquired.

-Students participate in the learning process more actively, rather than being simply passive listeners: therefore, students are more attentive and more motivated.

-Students work things out for themselves and it prepares them for greater self-reliance and autonomy.

The disadvantages of an inductive approach:

-Much time and energy are spent while working out rules with students.

-The time taken to work out a rule may be at the expense of time spent in putting the rule to some sort of productive practice.

-It can demand teachers to work on planning a lesson. They need to select and organize the data carefully so as to guide learners to an accurate formulation of the rule, while also ensuring the data is intelligible.

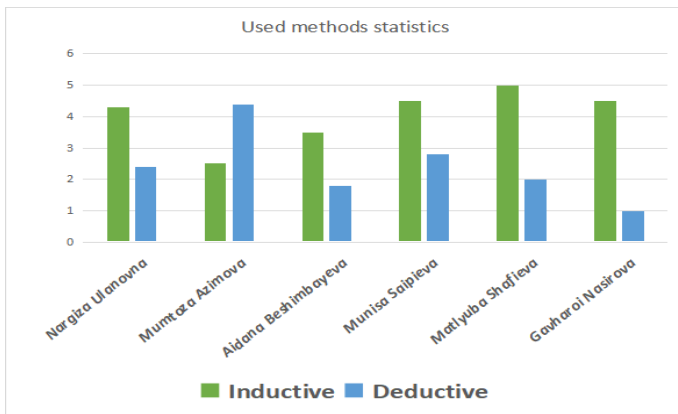
-An inductive approach frustrates students who would prefer simply to be told the rule.

Used Methods. The research is based on complex analysis where *descriptive* methods with the help of which various approaches in teaching grammar are revealed. We also used a *comparative* and *component* analysis method on the collected material, analyzed the inductive and deductive grammar methods in teaching English and the teachers’ attitudes towards them in teaching grammar.

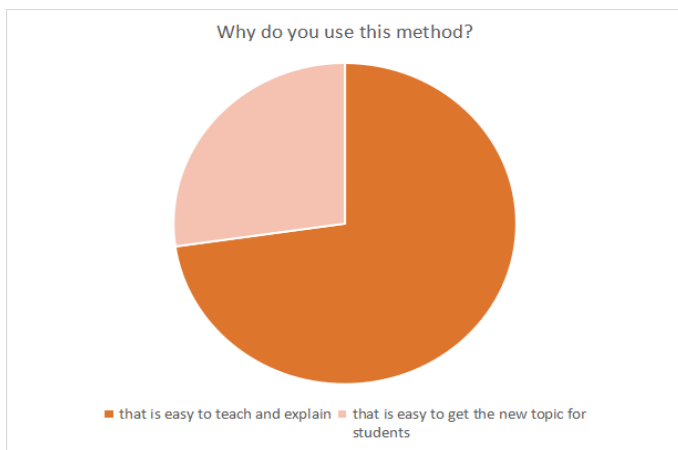
Gathering data from different levels of classes enabled us to add a comparative aspect into this research paper and look for possible similarities and differences between the teachers and between the class levels. Thus, the research questions of this paper are: 1) What kinds of grammar teaching methods do the teachers use? 2) What does the chosen methods depend on? 3) What are the differences and similarities between class levels?

Inductive and deductive methods are widely used by school teachers to teach English grammar. In our opinion, the inductive method is more responsive and helps to achieve better results. Students perform the task themselves, write the results and analyze them. This has a good effect on memorization and understanding of the topic. With this method, the goal of the lesson will be achieved slowly but

qualitatively. As we said above, we were satisfied with the results of the exam. From what we have seen in students, it is easier to remember the topic in the inductive method. The reason is that the student prepares the topic himself.



Above that, we've surveyed the teachers. The school we were in wasn't that big, so there weren't many English teachers. Therefore, six teachers participated in the survey. Each teacher gave his/her opinion and told what method is used. The survey focused on questions about which method was most commonly used, which method was convenient to use, and which method was available to students when using. As you can see, many teachers have chosen the inductive method. Most teachers are young, even they prefer to work with the inductive method.

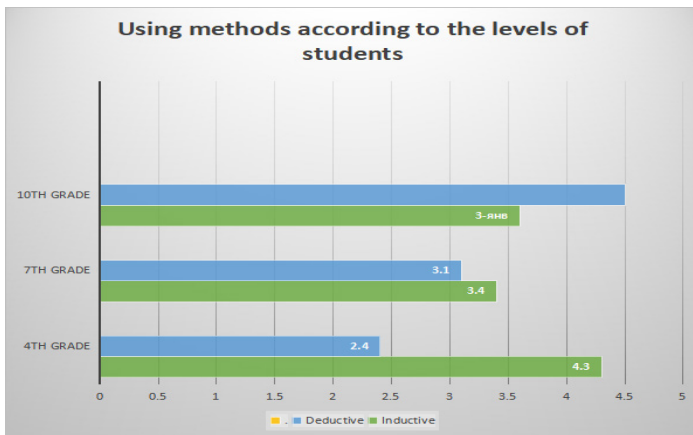


Some teachers prepare a lesson according to their convenience or ability. Others spend a lot of time learning, depending on the level of understanding of students, to interest students and have the opportunity to use them later. As mentioned above, we surveyed the same important issue. Why do you use this method? There were questions about its impact or interests. The results of the survey show that it is easy to convey the topic to students by inductive method. The inductive method is also easy to use with modern technology.

We got almost all the information on the deductive method. Logically and practically in the deductive method, the teacher says more and more is in the center of attention. And interestingly, this deductive method is more focused on working with students with a higher language level. Even if students' study in the same place and receive the same information, their perception is different and, as a result, the level of students differs. This is even more evident in language learning.

So, gradually the results of the above methods were revealed. The contribution of the teachers of the school where we were practicing were also very great. Now let's see how these two methods affect the lessons, depending on the level of students, how useful they are, what methods can be used for which students, and whether the lessons will be understandable depending on the teacher.

We used deductive and inductive methods in our practicum with three classes, 5th, 7th, and 10th grades at school. We are not wrong when we say that we have an unexpected result. You can see this in the following diagram.



Each class showed different results. In other words, methods work depending on the level of language proficiency of students. So, look at the scheme. We used both deductive and inductive methods among these classes. And how big the difference is, as you can see above. It turns out that the use of the deductive method

shows good results in the training of high school and high school students. The deductive method focuses on the teacher or teacher-centered.

But the inductive method showed a different result. Because in general statistics under the inductive method, the results of students at almost all levels were the same. In other words, here we can use this method for students of all levels. There are several important reasons for this. This is the focus of the student's attention. And, being the focus of the student solves a lot. For example, a student solves a problem, works with grammatical principles, works independently, actively participates in the lesson, remembers information well, and can show leadership qualities in group sessions. Each of these points plays an important role in learning the language and working with grammatical analysis, and this indicates the effectiveness of the inductive method.

Conclusion

It is concluded that inductive teaching is more effective for teaching English grammar – in secondary schools of Kyrgyzstan where English is taught as a second language. It is further concluded that inductive teaching is more effective for teaching English grammar – at undergraduate level. Students who were taught English grammar, using the inductive teaching method exhibited superior performance in their post-test scores compared to those who were taught through deductive teaching. Therefore, the study concludes that, at the undergraduate level, inductive teaching is more effective than deductive teaching for the instruction of English grammar.

So, it is necessary for teachers to vary their techniques and ways of teaching according to their students' interests and achievement levels with more emphasis on using the inductive way of teaching grammar. Teachers and instructors are encouraged to participate in different intensive training courses in order to be aware of various modern methods of teaching English language.

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探索人的本质的现代哲学

MODERN PHILOSOPHY IN SEARCH OF THE ESSENCE OF MAN

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注释: 反对现代人非人化趋势需要哲学去理解人及其本质。在具有丰富理解这一问题历史经验的西方理性哲学中, 人的本质是按照实证主义的方式寻求的。结果, 无论是启蒙运动还是后现代主义都未能成为理解人的突破口。辩证唯物主义是一种富有成效的替代方法, 它在政治上的失信暂时减缓了世界哲学的发展, 世界哲学正在经历前所未有的危机。面对当今的主要问题——人的本质和存在, 辩证唯物主义方法成为摆脱精神生产领域危机的唯一出路。

关键词: 人、人的本质、意识、公共意识、文艺复兴、后现代、超人类主义、实证主义、哲学危机、辩证唯物主义。

***Annotation.** Opposing the modern trend of human dehumanization requires philosophy to understand man and his essence. In Western rational philosophy, which has a rich historical experience of understanding this problem, the essence of man was sought in the ways of positivism. As a result, neither the Enlightenment nor postmodernity became a breakthrough in understanding man. A productive alternative was dialectical materialism, the political discrediting of which temporarily slowed down the development of world philosophy, which is currently experiencing an unprecedented crisis. In the light of the problem of the essence and existence of man, which is the main one today, the method of dialectical materialism becomes the only way out of the crisis in the sphere of spiritual production.*

***Keywords:** man, the essence of man, consciousness, public consciousness, Renaissance, postmodern, transhumanism, positivism, the crisis of philosophy, dialectical materialism.*

The general feeling of the apocalypse that has begun does not leave many people. Compared to the project of transhumanism, postmodernity already seems like child's play. And although the end of the world has been announced quite often in the past, the arguments of those who draw attention to the unprecedentedness of today's apocalypse are quite convincing. "The qualitative change of the world

inspires anxiety for man himself” is the general state of mind. This is where the specifically philosophical question of worldview arises: what is man? All European philosophy in its history, starting from antiquity, was the process of solving this philosophical question. And the achievements on this path, in our opinion, are undoubted. Why is the finale of the process so sad? Where is the apocalypse coming from? Where did humanistic European philosophy fail and went down the wrong path, if we, in the end, speak about the end of man? And why does the jurisprudence **condicio sine qua non** become not a philosophical but a political question?

The essence of man, rational philosophy looked for in comparison with other living beings: this is what man has, but is not in nature without man, in the animal world. And it seemed obvious that it was consciousness, since nature itself, without man, is devoid of consciousness. In the Age of Enlightenment, which made reason a priority, it seemed obvious that the subject – the bearer of consciousness is the human individual with a specific brain. This political program was implemented by the philosophers of the European Enlightenment T. Hobbes, D. Locke, S.L. Montesquieu and others: the essence of man was seen in individual consciousness. This narrowed concept of consciousness was later “scientifically” fixed in philosophical positivism: the core of consciousness is thinking, which is a product of brain activity.

The search for the essence of man in individual consciousness led to the tendency of “psychologization” of European philosophy. This tendency was clearly manifested throughout the 20th century; and the reverse side of this process was the increasingly acute posing of the main question of philosophy in psychology itself – the so-called psycho-physical problem (mind-body problem). As a science, psychology, after its birth in the 70s, experienced two methodological crises. The first one – in the 20s of the XX century, denoted by L.S. Vygotsky’s article “Historical meaning of psychological crisis” (1927) [Vygotsky, 1982]; the second one – in the 50-60s, reflected in A.N. Leontiev’s article “Biological and social in human psyche” (1960) [Leontiev, 1981]. But this second methodological crisis in psychology was identified in our country much earlier by the same A.N. Leontiev in the discussion of 1948 on his book “Sketch of the development of the psyche” (1946). Already then, within the framework of the methodology of dialectical materialism, A.N. Leontiev raised the question of the relationship between meanings and values in individual consciousness (for details, see: [Sokolova, 2021]).

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It is no exaggeration to say that the philosophical solution to the problem of subject and object is the definition of the essence of man. The postmodern era has prioritized the need to define more precisely the subject of philosophy and to dialectically separate the individual and society. That is, the individual with his individual consciousness should be left to psychology (with all its multischool nature, which is not a disadvantage, but a dignity of scientific psychology), and social consciousness should be left as the subject of philosophy. Are we looking for the essence of man in the being of an individual or in social being? What is primary in the ontological dimension? Reality for us is only the individual in its uniqueness and uniqueness or social relations, which are objective in their essence. Western philosophy has failed to cope with this historical challenge. And the main anxiety of J. Baudrillard is the anxiety about the "disappearance of the social" [Baudrillard, 2016]. That is, we understand that the social as objective relations of social groups and institutions has not disappeared anywhere; the problem is different - the disappearance of the social in the consciousness of the crowd, the average person, mass consumer, living first in the world of mass media, then in the world of brands, and now in the world of virtual reality, with which today they do not know how to interact: whether it is objective or subjective. The term "information society" perfectly disguises this most important philosophical problem about the essence of being, being part of the methodological fog that covers today's social reality.

This main vice of positivism: the inability to see society as a system as a subject and to make social consciousness rather than individual consciousness the subject of its analysis - was perfectly stated by W. Descombes. For the positivist, he wrote, "the history of science, this supreme authority of positivism, does not exist" [Decomb, 2000, p.88]. Why? Because positivism does not know the history of science as the history of the immanent stream of consciousness and cognition in general, in its integrity. Positivism is available only in particulars - individual scientific ideas, personalities, theories and hypotheses.

The problematics of public consciousness in the second half of the 20th century in the West was pushed aside by the acute interest in the problems of mass

society and mass consciousness. Another tendency of the 20th century – the tendency to desacralize the mass consciousness of the consumer, determined only by the market and personal profit - also contributed to the displacement of public consciousness (in its institutionalized forms) by mass consciousness, i.e. ordinary consciousness. Postmodernity, like the Age of Enlightenment, could have become a platform for a deeper knowledge of man, his essence, if philosophers and psychologists had been able to agree on the subject (the object is the same – man!) of research. Alas, postmodernity for Europe has become a breeding ground for transhumanism – the process of dehumanization of man. The political and social mechanism of this transformation is already clear today. If man is an individual, and the essence of man is his consciousness, then we subordinate human existence to this essence – individual consciousness. The fact of social determinacy of this very individual consciousness is either not noticed or is specially masked, glossed over or simply “scientifically” refuted and denied. And most often it is profaned: the determination of individual consciousness by society is reduced to a flat and trivial statement of the fact that adults raise children and society raises individuals. A “scientific” fact, that is, an empirically obvious fact for the layman, is his individual independence, as soon as material survival in this world ceases to be a problem. The most shocking example of such subjective idealism in social reality for us is Western gender consciousness tricks: the normal cultural pyramid, when the social gender is built on the basis of the biological, and the individual on the basis of the social (despite all the diversity of cultures), is turned upside down, as a result of which the “free” individual chooses his own not only the social gender, but also the biological one, guided by pseudoscientific research based on the methodology of subjective idealism.

The social essence of man is not reduced to the statement that people cannot live without each other and exist only in society. This statement is a truism for social philosophy. For the philosopher, the social essence of man means that man and his being can be understood and defined only as a society, and the individual with his uniqueness only in a social context, in the field of social meanings and values. Personality is a concept that reflects this social context of the individual. This second way in the Age of Enlightenment was set by J.B. Vico [Vico, 1994] and I.G. Herder [Herder, 1977], but it did not become the main way for European philosophy and was not perceived by the political subject of Europe as a cultural program. Public consciousness as a special social institution was either completely outside the boundaries of strategic philosophical studies of European philosophy and psychology, or, at best, it was studied with pragmatic political purposes – as something hindering progress, the basis of which was declared to be the individual and his freedom as a possibility of choice. Later, in the 19th century, this direction in the study of consciousness was continued by Hegel [Hegel, 2000] and K.

Marx [Marx, 1974; Marx K., Engels F., 1979], and already in the 20th century it was accepted in the USSR as the philosophical basis of the political program – as dialectical materialism.

Dialectical materialism as the methodological basis of Marxism has experienced a long history – from its inception, approval, official victory, deadening political dogmatization and, finally, devastating emasculation, which was inevitably followed by the current period of marginalization and even demonization and denigration. Meanwhile, its importance as a methodological basis for a fundamentally different political-social program from the “consumer society” and postmodernity was perfectly understood by its enemies, who repeatedly attempted to refute it (see, for example, [Bergner, Jan, 1961]). Unfortunately, we relied too much on our “practical” victories of real socialism, and little time was devoted to serious developing discussions on theoretical and methodological topics. We preferred, looking down on our political and economic victories, to conduct theoretical discussions internally, avoiding direct discussions with real worldview opponents.

An example of a serious discussion in psychology is the already mentioned discussion of 1948. Leontiev’s attempt to solve the psycho-physical problem on the basis of dialectical materialism ran into the already established and canonized domestic positivism. An honest analysis of this debate was published in 2021 [Sokolova, 2022]. Some of Leontiev’s own thoughts from this analysis allow us to understand how, from the positions of dialectical materialism, it is possible to solve the psycho-physical problem and for a philosopher not to drift into psychologism. Thus, A.N. Leontiev believed that the basis of personal meaning is not consciousness (individual or social, it does not matter), but activity; meaning is a subjective-objective category born in activity as a substance that generates both subject and object. Meaning, according to the dialectical-materialist approach, is an objective-historical product, an ideological, superstructural phenomenon, which is mastered by man, while meaning arises as a product of the social being of a given person, as a product of his own life in society. But for this meaning to be adequate and to be born at all, a sufficiently developed individual consciousness is necessary, not the consciousness of a philistine-consumer. But it is also necessary to have an appropriate state policy aimed at adequate understanding of objective, social relations. E.E. Sokolova quotes D.B. Elkonin: “The role of motives can hardly be overestimated. It seems to me that on the question of motives and their role in human activity the main battle between our Soviet and bourgeois psychology will now be played out” (Scientific Archive of the Russian Academy of Sciences, 1948b, p. 46). A.N. Leontiev’s works reveal the dialectics of motives and goals in individual activity, which is important for understanding the subsequent postmodern era: your personal “wants” and needs are of course important, but one should not forget about what social result you want to get in the end. And

vice versa: the goal of building communism is beautiful, but how does this goal fit with the personal motives that drive people on the ground?

This opposition to positivism is the reason for the appearance of the article “Biological and Social in the Human Psyche”, which was first published in 1965 in the second edition of *Problems of the Development of the Psyche*. It is not yet present in the first edition of 1959. In 1969, A. N. Leontiev, P. Y. Galperin, A. V. Zaporozhets, and D. B. Elkonin clarified and clarified the activity theory in a joint discussion. The materials of the discussion (based on a transcribed tape recording) were first published only in 1990 and later included in a new edition of Leontiev’s monograph “Activity. Consciousness. Personality” (2004). The first edition of the monograph was published with the footnotes in 1975. All this serves as a clear example of a serious scientific approach in Russian psychology to solving the question of the essence of a human being. The methodological basis for solving this problem was dialectical materialism, and positivism became a serious internal opponent.

But if domestic psychology (thanks to the school of L.S. Vygotsky!) managed to stand on its feet in the search for the essence of man, this, alas, cannot be said about domestic philosophy. The famous discussion between E.V. Ilyenkov and A.A. Zinoviev can be considered a methodological challenge. The discussion itself and its methodological significance, as well as the significance of E.V. Ilyenkov’s works for understanding the essence of man are well known to specialists (see, for example, [Mareev, 1997]), and we will not write about it here. Let us only recall the topic of E.V. Ilyenkov’s doctoral dissertation of 1968, which directly echoes the problem of the essence of man: “On the Question of the Nature of Thinking. On the Material of the Analysis of German Classical Dialectics”. The dialectical approach to the problem of consciousness, however, did not prevail in late Soviet times; one has to state the victory of positivism in domestic philosophy up to the postmodern era. That consciousness is exclusively a product of the human brain, this statement can be found in our Soviet philosophical encyclopedias. So the philosophical ground was already prepared for the easy victory of postmodernism in the 1990s: if consciousness is a product of the brain, then a personal hierarchy of values is born in each individual brain of a rationally thinking (for he is homo sapiens!) individual.

The victory of positivism in our country can be clearly seen in the problems of public consciousness. Unlike the West, we did not have a material base for the formation of mass consciousness - the society of mass consumption. Apparently, that is why the problem of social consciousness in the 50-60s was still in the field of view of our researchers, as can be judged by the discussion on the pages of the journal “Questions of Philosophy” in 1957-1959, as well as by the works on this topic by W. Kelle and M. Kovalzon (1959), G.M. Gak (1960), A. Spirkin (1960),

B.F. Porshnev (1966), A.K. Uledova (1968), V.P. Tugarinov (1971) and others. But later, in the 70's and then in the 80's, the majority of Russian humanitarians, being carried away by empirical research, abandoned the problem of social consciousness and, following their Western colleagues, began to write about mass consciousness. In 1987, B.A. Grushin stated: "We can guarantee that the reader will hardly find in the literature any strict, corresponding to the requirements of logic, general definitions of this concept [social consciousness]; as a rule, they are not even in the books specifically devoted to this subject" [Grushin, 1987, p. 3, 47].

What should Marxists do in the epoch of the apocalypse? The most important task for today, in our opinion, is a deep theoretical study of the dialectical-materialist approach in all spheres of spiritual production, especially in humanitarian knowledge: in philosophy, psychology, sociology, political science, philology and others. Dialectical materialism today is the last bastion of Marxism and, being alienated and marginalized, needs revival.

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俄罗斯消费者对全球和本土品牌及产品的态度
**CONSUMER ATTITUDE TOWARD GLOBAL VS. LOCAL BRANDS
AND PRODUCTS IN RUSSIA**

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这项工作致力于研究俄罗斯公民与全球和本地产品和品牌相关的消费者行为，以及直接或间接影响这一行为的因素，例如个人特征、人口组成。研究结果将使国际公司和本地制造商更好地了解俄罗斯消费者的具体情况、全球化程度以及对全球产品偏好的趋同程度。

值得注意的是，这项研究是在该国独特的背景下进行的。近年来，俄罗斯面临军事冲突、经济不稳定、国际制裁等诸多严峻挑战，这些都为研究消费者偏好创造了复杂的条件。所有这些因素都对俄罗斯人如何看待全球和本土品牌产生了重大影响。

关键词：全球产品、本地产品、个性特征、全球化、融合、品牌态度

Abstract. *This work is devoted to the study of consumer behavior of Russian citizens in relation to global and local products and brands, as well as factors directly or indirectly influencing this, such as personal traits, demographic components. The results will allow international companies and local manufacturers to better understand the specifics of the Russian consumer, the degree of his globalization and convergence of preferences for a global product.*

It is worth noting that this study was conducted in the country's unique context. In recent years, Russia has faced many serious challenges, including military conflicts, economic instability, and international sanctions, which have created complex conditions for studying consumer preferences. All of this factors have had a significant impact on how Russians view global and local brands.

Keywords: *global products, local products, personality traits, globalization, integration, brand attitude.*

Materials and methods

The study was conducted in several stages, which included literature analysis, putting forward a number of hypotheses, developing and conducting a questionnaire, checking the quality of the data obtained and analyzing them (using a number of tests and methods such as validity test, reliability, factor analysis, correlation test, structural equation model (SEM)), as well as summing up the results and analyzing the hypotheses. During the study, software such as SPSS, AMOS was used.

The key issue of this study is the degree of globalization and consumer preferences in Russia.

This study proposes a research model of the matching relationship between consumer behavior, regional modernization, and other factors.

In general, regional modernization, personality traits, demographic variables, and industry characteristics are the main factors affecting the convergence of global consumer preferences [1,2]. It is important to emphasize that regional modernization is a crucial explanatory variable in this study, as it significantly affects another key explanatory variable: personality traits, including global identity, social expectations, and self-construction [3].

The questionnaire for this study was developed based on the Likert scale [4]. The study had a total of 84 questions, divided into the following categories: Identity, Social desirability, Self-construal, Regional modernization, Global convergence of consumer preferences, Demographic variables as well as questions on three categories of goods (catering, clothing and electronics).

During the survey, 200 respondents were interviewed. The data were quantitatively analyzed to understand the demographic characteristics and to compare the values of the two regions with each other and as a whole.

122 respondents were born and live in the Khabarovsk region, which is 61 percent of the total number of respondents, mainly because the author of the work is a resident of this region and part of the survey was conducted manually. While respondents belonging to the Moscow region make up 39 percent.

According to statistics, it can be seen that the proportion of men and women in the sample is balanced, and the proportion of men is slightly lower, which is consistent with the composition of Russian's population, indicating that the sample has good randomness. Secondly, the age coverage from under 18 years old to over 50 years old has an appropriate proportion, the largest proportion is 19-25 years old, 26-30 years old, followed by 31-40 years old, showing a normal distribution, in line with the law of age distribution, the cumulative proportion of respondents between 19-40 years of age is 97.5, this part of the population is precisely the main force of consumption. The sample can well represent the consumption preferences of Russian consumers.

In terms of academic qualifications, most of them are undergraduates, accounting for 54%, followed by master’s degree, accounting for 21%, followed by junior college, high school and doctoral degree.

In terms of income, most of them have are more than 40000 rubles but less than 80000, accounting for 39,5%, followed by 80000- 150000 rubles, accounting for 32,5%, while 40000 an less rubles accounts for 26,5%, while more than 150000 rubles accounts for a relatively low proportion 1,5%.

The wage distribution in this study also conforms to the law of random sampling and is consistent with the national average wage level.

From the perspective of occupation, employees and freelancers account for the largest proportion, 69%, followed by students, accounting for 31%. In addition, it also includes government, freelance, scientific research staff and so on, covering a wide range of occupations.

Validity and reliability tests were then performed using Cronbach Alfa (0,919) values and KMO values, as well as factor analysis for each subscale and the entire questionnaire. In addition, correlation analysis was performed and a structural equation model was established to test the hypotheses. Mean analysis was also performed to improve reliability. All calculations were performed using dedicated software - SPSS and AMOS.

The results of SEM analysis are presented in the following table

Table 1.
Standardized Regression Weights

			Estimate	S.E.	C.R.	P
GI	<---	RDL	0,186	0,006	2,671	0,008
ISC	<---	GI	-0,289	0,054	-4,375	***
ISC	<---	RDL	0,34	0,004	5,158	***
LSD	<---	RDL	-0,265	0,002	-3,874	***
DSC	<---	GI	0,73	0,024	18,876	***
HSD	<---	GI	0,376	0,029	7,379	***
DSC	<---	RDL	0,308	0,002	7,953	***
HSD	<---	RDL	-0,707	0,002	-13,208	***
HSD	<---	ISC	0,447	0,037	8,539	***
HSD	<---	LSD	0,142	0,098	2,87	0,004
GPP	<---	GI	-0,208	0,048	-3,473	***
LPP	<---	GI	-0,707	0,039	-9,489	***
GBP	<---	GI	-1,308	0,042	-23,461	***
GPP	<---	HSD	-0,699	0,102	-9,494	***
GBP	<---	HSD	0,206	0,047	5,759	***
LPP	<---	HSD	0,03	0,049	0,552	0,581

LBP	<---	HSD	0,15	0,074	2,246	0,025
GPP	<---	LSD	-0,027	0,143	-0,509	0,611
GBP	<---	LSD	-0,06	0,089	-1,761	0,078
LPP	<---	LSD	-0,053	0,081	-1,161	0,246
LBP	<---	LSD	-0,125	0,147	-1,865	0,062
LPP	<---	DSC	1,214	0,066	15,125	***
GPP	<---	ISC	0,431	0,061	6,787	***
GBP	<---	DSC	0,596	0,067	10,751	***
LBP	<---	DSC	0,38	0,066	5,859	***
GPP	<---	RDL	-0,583	0,005	-7,66	***
LPP	<---	RDL	0,006	0,003	0,092	0,926
G3	<---	RDL	0,277	0,005	4,067	***

The analysis of the hypotheses is presented below.

H1: Regional modernization is positively related to global identity.

Analysis: The results indicate a positive influence of RDL (regional modernization) on GI (global identity) with a standardized regression weight of 0.186. This supports H1.

H2: There is a negative correlation between regional modernization and social desirability.

Analysis: The results indicate a negative influence of RDL (regional modernization) on HSD and LSD (social desirability) with a standardized regression weight of -0,707 and -0,265. This supports H2.

H3a: There is a negative correlation between regional modernization and dependent self-construal.

Analysis: The results indicate a positive influence of RDL (regional modernization) on DSC (dependent self-construal) with a standardized regression weight of 0,308. This rejects H3a.

H3b: There is a positive correlation between regional modernization and independent self-construal.

Analysis: The results indicate a positive influence of RDL (regional modernization) on ISC (Independent self-construal) with a standardized regression weight of 0,340. This support H3b.

H4a: Global identity is positively related to global product preferences.

Analysis: The results indicate a negative influence of GI on GPP (global product preferences) with a standardized regression weight of -0.208. This reject H4a.

H4b: Global identity is negatively correlated with local product preferences.

Analysis: The results indicate a negative influence of GI on LPP (local product preferences) with a standardized regression weight of -0.707. This support H4b.

H4c: Global identity is positively related to international brand preference.

Analysis: The results indicate a negative influence of GI on GBP (global brand preferences) with a standardized regression weight of -1.308. This reject H4c.

H5a: Social desirability is positively correlated with product preference.

Analysis: The results indicate a negative influence of HSD on GPP (global product preferences) with a standardized regression weight of -0.699. And other relations are not significant so its reject H5a.

H5b: Social desirability is positively correlated with brand preference.

Analysis: The results indicate a positive influence of HSD on GBP (global brand preferences) with a standardized regression weight of 0.206, HSD on LBP is not significant, and LSD has don't significant relations with GBP and LBP. So H5b is part supported.

H6a: Dependent self-construal is positively associated with local product preference.

Analysis: The results indicate a positive influence of DSC on LPP (local product preferences) with a standardized regression weight of 1.214. This support H6a.

H6b: Independent self-construal is positively associated with global product preferences.

Analysis: The results indicate a positive influence of ISC on GPP (global product preferences) with a standardized regression weight of 0,431. This support H6b.

H6c: Dependent self-construal is positively related to brand preference.

Analysis: The results indicate a positive influence of DSC on GBP (global brand preferences) and LBP (local brand preferences) with a standardized regression weight of 0,596 and 0,380. This support H6c.

H7a: Regional modernization is positively related to global product preferences.

Analysis: The results indicate a negative influence of RDL on GPP (global product preferences) with a standardized regression weight of -0,583, however correlation analysis and empirical tests shows medium positive correlation all industries so this hypothesis can be called Part Supported.

H7b: Regional modernization is negatively correlated with local product preference.

Analysis: The results do not show a direct relationship between regional modernization and local product preference, mean analysis and correlation analysis also don't show any negative correlation. Thus, we cannot confirm H7b based on the current data and its rejected.

H7c: Regional modernization is positively related to global product purchasing behavior

Analysis: The results indicate a positive influence of RDL on global product purchasing behavior which in the context of the study is represented by question G3 with a standardized regression weight of 0,277. This support H7c.

Results and discussion

Several hypotheses were overturned, while the main hypotheses based on literature analysis and previous studies were confirmed. The degree of modernization is positively correlated with the convergence of global consumer preferences. The hypotheses that were rejected included the impact of regional modernization on dependent self-perception, the positive impact of global identity on global product and international brand preferences, and the hypothesis that there is a negative correlation between regional development and local product preferences. In terms of the three basic views of convergence theory, this study supports the third view: cross-convergence, that is, the coexistence of convergence and divergence. The study found that, in general, preference convergence is a general trend in the process of modernization, especially with the development of national economies, the improvement of consumer purchasing power, and the further development and expansion of multinational corporations and international brands in emerging market countries, the convergence trend will continue and become more obvious. However, the degree of convergence is not only affected by regional economy, but also by industry characteristics and consumer personality traits. Among them, consumer personality traits are one of the mediating variables between modernization and convergence.

In addition, based on the data obtained in the mean value analysis process, the portrait of Russian consumers is as follows. Russian consumers' global identity is not high, but "low social expectations" are at the average level, but "high social expectations" are also at the average level, and independence is at a medium level. In addition, we can see low dependent self-concept. Overall, there are great differences in consumers' attitudes towards products and brands. Overall, brand preferences are more affected by the degree of regional modernization. Product preferences reflect different degrees of global convergence. There is a big difference between purchase intention and actual purchase behavior. Russian consumers have a general preference and purchase intention for global brands, but are mainly limited by purchasing power due to objective conditions. Therefore, we see that the lower indicators reflect specific purchases of domestic goods (due to poor quality or lack thereof) and global goods (due to limited supply). In terms of industry, consumers prefer global standardized products to local adaptive products. In addition to the use function, products such as clothing and mobile phones are also specific tools for consumers to express themselves and communicate with society. For Russian consumers, except for food, they have a stronger preference for global products.

There are large regional differences in consumers' preferences for global products in the catering industry, but there are almost no differences in preferences for domestic food, and consumers prefer Russian catering. However, in the clothing

industry, the score for global product preference is much higher than that in the catering industry. This shows that the degree of global convergence reflected in the clothing industry is stronger than that in the catering industry. In consumer electronics, consumers have a much higher average preference for global products, but the average actual purchase behavior is very low, reflecting a high degree of global convergence but fewer opportunities for actual purchases. Therefore, the global convergence of consumer preferences in the clothing and consumer electronics industries has a significantly higher level.

Secondly, in comparison, regions with a higher degree of modernization pay slightly more attention to catering brands. In the clothing industry, compared with the brand effect, consumers also pay attention to the style, texture and other product characteristics of the clothing itself, but the importance of the brand is higher than that in the catering industry. In electronic products, the importance of the brand is significantly higher. At the same time, in economically developed regions, consumers pay more attention to the brand of electronic products, and the support for national brands is not high. Consumers choose to buy consumer electronics products of international brands.

The results of the study provide an understanding of the portrait of Russian consumers in an unstable economic and geopolitical situation, as well as a shortage of global product imports due to sanctions. The results obtained provide a basis for further research and a reference for organizations to improve consumer satisfaction.

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DOI 10.34660/INF.2025.28.91.019

欧亚地区国家和人民关系中的国家利益和价值取向
**NATIONAL INTERESTS AND VALUE ORIENTATIONS IN
THE RELATIONS BETWEEN STATES AND PEOPLES OF THE
EURASIAN SPACE**

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摘要。本文探讨了国家利益与价值取向的差异和相互关系。认为不存在与价值取向相矛盾的国家利益，因为在人民和国家生活中体现任何形式的真善美的愿望都与其国家利益相一致。当国家和人民的国家利益的实现不会导致对世界真实观念的遗忘、道德规范的违反以及自然和社会和谐的破坏时，国家和人民的国家利益就充满了有价值的内容。

关键词：国家利益、价值取向、种族冲突、国家间冲突、准价值修辞、纵容邪恶、法律规制。

Abstract. *The differences and interrelationships of national interests and value orientations is considered in the article. It is asserted that there are no national interests that contradict value orientations, because the desire to embody any form of true, good and beautiful in the life of peoples and states corresponds to their national interests. The national interests of states and peoples are filled with valuable content when their implementation does not lead to the oblivion of true ideas about the world, the violation of moral norms and the destruction of harmony in nature and society.*

Keywords: *national interests, value orientations, ethnic conflicts, interstate conflicts, quasi-value rhetoric, connivance to evil, legal regulation.*

Understanding the differences and interrelationships of national interests and value orientations plays an important role in shaping plans for cooperation between states and peoples of the Eurasian space.

Despite the fact that the word “values” is constantly used by statesmen, politicians, journalists, representatives of various fields of knowledge, participants in public discussions, the content of the concept that this word denotes does not become public knowledge. Meanwhile, the reduction of values to particular forms of their embodiment or the denial of the specifics of the forms of value embodi-

ment in the real life of states and peoples inevitably leads to problems and conflicts in the relationship between states, different ethnic groups, individuals and public organizations.

Only such relationships between states and peoples can be recognized as meaningful that based on both the recognition of values as the ultimate meanings of human existence and the desire to embody these meanings in real activities of states and ethnoses.

Values as the ultimate goals and meanings of human culture always act as the universal unifying foundation of any kind of socio-cultural activity, while national interests, by definition, are expressions of the needs of some states and peoples.

The priority of values in relation to any goals and means of activity should be understood solely in the sense that any goal and any means of achieving it can be recognized as socio-cultural if they contain the possibility of embodying Truth, Good and Beauty in them [2]. At the same time, all the specific concepts through which the meaning of values is revealed are filled with a content well-defined and traditional for representatives of each ethnic group and citizens of each state.

A genuine unification of states within the framework of a union requires the development of common ideas for all members of the union about acceptable forms of values for them. These ideas should be based on the understanding that the embodiment of a well-defined form of values in one's own life of an ethnic group or a state does not contradict any other forms of value embodiment. The point is not how people dress or what they prefer to eat, but whether their behavior is a deliberate insult to the people around them.

Even if a cultural subject considers a particular form of value embodiment to be false and inconsistent with its content, imposing one's own understanding of the forms of value embodiment on another cultural subject is incompatible with the essence of value regulation.

The national interests of states and peoples are filled with valuable content when their implementation does not lead to the oblivion of true ideas about the world, the violation of moral norms and the destruction of harmony in nature and society. Under no circumstances and ideological cover-ups can the struggle for annihilation, the desire by violent means to force representatives of another ethnic group or citizens of another state to accept their own point of view be considered valuable and meaningful.

There are no national interests that contradict value orientations, because the desire to embody any form of true, good and beautiful in the life of peoples and states corresponds to their national interests.

Contradictions between value orientations and national interests arise either when "values" are understood not as universal goals and meanings of human existence, but as the desires and whims of individuals who have lost their socio-cul-

tural essence; or when such goals are presented as national interests that are considered in all cultures to be the product of greed, meanness, betrayal and other vicious immoral qualities of people.

The complexity of analyzing the real causes of interstate and ethnic conflicts is due to the fact that even the most base, inhuman goals and cruel means of achieving them are justified by their alleged involvement in the traditional value orientations of conflicting peoples and states. In order to involve broad sections of the population or a large part of an ethnic group in a conflict, it is necessary to address the deepest, fundamental layers of ethnic identity. And these are precisely the layers that are associated with values. No conflict can arise and develop if meaningful and valuable issues are not addressed.

The mobilization of citizens or representatives of ethnic groups to confront each other requires the genuine beneficiaries of these conflicts to create ideological support in which any economic, political, legal, etc. disagreements should be presented as a “conflict of value systems”, as encroachments on traditional ethnic, national, and religious values. The opinion of the opposite side should be understood as a violation of justice, distortion of history, an attempt on the precepts of ancestors, etc., and one’s own claims as the restoration of justice, historical truth, authentic traditions, etc.

When trying to resolve an interstate or ethnic conflict, it is necessary to distinguish between value orientations and quasi-value rhetoric, lies, and mystification, in which values are used only to cover up value-meaningless goals and inhumane ways to achieve them. Thus, in the case of territorial conflicts, it is necessary to understand whether the territorial claims of one of the parties are really related to national interests and ethnocultural ideas about historical truth and justice, about love for the motherland and loyalty to the precepts of the ancestors, etc. Or we are just looking at the struggle of the ruling clans for the territorial and economic redistribution of spheres of influence.

No matter how bloody the ethnic conflicts provoked by the dominant clans may be, the resolution of these conflicts with the subsequent peaceful coexistence of the ethnic groups involved in them is possible precisely because the fundamental value orientations of the ethnic groups are not really affected in them.

At the same time, the real differences in the traditional ideas of good and evil, true and false, beautiful and ugly for various social groups create a constant field of tension in interethnic and interstate communication. Lowering or removing this tension requires strict adherence to the path of finding and using meaningful forms and methods of resolving disagreements acceptable to all participants in communication.

It should be emphasized that traditional forms of values must be protected. However, they have to be defended not from those who adhere to other traditions,

but from those who use quasi-value rhetoric to destroy the meaningful foundations of human existence [1].

There are no forms of embodying Truth, Good and Beauty in the culture of each of the peoples inhabiting the Eurasian space that would be incompatible with the national interests of other peoples. However, all the peoples and states of Eurasia have internal and external ill-wishers and criminal elements who seek to harm these peoples, their neighbors, and the whole of humanity, which refuses to live by the rules of biological or class domination.

The national and ethnocultural policy of the “collective West”, based on bribery, blackmail, threats, dissemination of false information and deep disrespect for the national interests and traditional cultures of all peoples and states of Eurasia and the world as a whole, carries an absolute evil that threatens not only the biological existence of mankind, but also the socio-cultural essence of man.

The protection of state sovereignty and the traditional way of life requires tireless efforts not only by law enforcement agencies, but also by all citizens of the Eurasian states, who are obliged to resist any attempts by enemies to unleash ethnic or interstate conflicts, using quasi-value rhetoric to cover their hostile goals. A necessary condition for the value-based defense of national interests is the legal regulation of relations between ethnic groups and states. Violating the laws of one’s own or any other state does not correspond to either national, personal or group interests, or the value orientations of citizens of all states of the Eurasian space. No corruption schemes or illegal actions of individual citizens, representatives of government agencies or diasporas that harm the citizens of any Eurasian state should go unpunished.

There is nothing more destructive to national interests than connivance to evil, which is always expressed in the desire to humiliate or destroy the socio-cultural essence of man, to turn the subject of culture into an animal obeying only biological instincts and the will of the trainer. Military confrontation will inevitably result from connivance and lack of resolute resistance to any encroachments on the sovereignty of the state or on traditional for the citizens of the state forms of values.

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游泳运动员 受定量缺氧影响 的状况

THE CONDITION OF SWIMMERS WITH METERED HYPOXIA

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文章讨论了 光谱指标变化 游泳者三时刻缺氧影响下的 心率变异性. 实验组中, 积分缺氧效应有明显的刺激作用 与安慰剂组相比, 处于恢复期. 已安装 VLF-波浪 在缺氧条件的影响下变化不太明显, 相比之下 LF/HF 频谱的组成部分.

关键词: 缺氧效应, 心率变异性频谱分析, 游泳者

Abstract. *The article examines the change in the spectral parameters of heart rate variability under the influence of three-moment hypoxic effects on swimmers. In the experimental group, interval hypoxic exposure has a pronounced stimulating effect in the recovery period compared with the placebo group. It has been established that MDA waves change less markedly under the influence of hypoxic conditions, in comparison with those that do NOT make up the spectrum.*

Keywords: *hypoxic effects, spectral analysis of heart rate variability, swimmers.*

游泳运动员在训练过程和竞赛活动中经常会遇到与直接运动活动的具体情况相关的缺氧状况, 但也与其实实施的条件有关. 为了增强和加速对这种特定条件的适应, 在训练过程中使用了各种缺氧效果 [2]. 缺氧条件会引起各个系统的反应, 同时为心脏活动的调节创造复杂的条件. 心率变异性的频谱指标对缺氧条件敏感 [1]. 在我们的研究中, 在剂量缺氧期间, 我们根据光谱分析数据检查了心率调节系统的反应.

游泳运动员参与了这项研究: 体育硕士候选人 (n=12) 体育大师 (n=8). 受试者被分为同质组, 每组 10 人. 使用计算机程序记录和分析心率的频谱指标 «多光谱». 记录5分钟心率变异性记录值: 背景值, 然后实验组和安慰剂组运动员暴露于含10-15%氧气的低氧气体混合物中, 通过面罩呼吸

大气- 第一阶段。该研究提供了三个阶段的数据。低氧混合气体的总呼吸时间为15分钟，总持续时间为35分钟。功率测量 VLF, LF 和

HF 通常以绝对功率单位进行 ms^2 。整体功率谱指标特点 TP- 反映神经体液对心律影响的总活动；VLF- 频谱的超低频部分的波；LF- 波反映自主神经系统主要交感神经和部分副交感神经部分音调变化的影响；HF - 这些是频谱的高频部分的波；该范围内的功率主要与呼吸运动相关，并反映自主神经系统副交感神经部分的振动。

对实验组游泳运动员心律频谱参数的分析表明，第一阶段总体功率谱下降（50%），这表征了明显程度的心肌缺氧。本组研究后，在进行缺氧试验时，一般功率谱没有出现压低，这表征了急性缺氧对心脏活动调节不存在负面影响。这在更大程度上适用于高频分量。在研究前后的安慰剂组中，没有观察到整体功率谱的下降。类似的图片适用于频谱图的其他组成部分（表1）。

表1- 研究期间游泳者的频谱图指标，（米±米）

团体	指标	背景I	I 博览会	II 背景	II 博览会	III 背景	III 博览会	恢复
安慰剂	TP	7551,2 ±946,7	5721,5 ±1077,6	5784,7 ±941,9	7764,7 ±3267,7	5956,2 ±591,5	7455,2 ±3627,8	9318,8 ±1357,3
	VLF	2554.2 ±617.6	1394.2 ±393.1	1732.7 ±387.5	2004.3 ±754.3	1705.4 ±306.3	2229.8 ±737,4	2629,2 ±613,3
	LF	2010,5 ±384,5	2719,6 ±553,1	2292,4 ±393,6	3248 ±1319,9	27341 ±446,4	2489,5 ±976,9	4122,6 ±821
	HF	3256,9 ±574,5	2691,3 ±422,2	2167,7 ±321,9	2802,2 ±1379	2011,9 ±358,6	3536,7 ±1895,5	3328,6 ±765
实验性的	TP	7260,5 ±2242,3	4393,1 ±1070,9	3502,6 ±593,6	3883,9 ±832,2	3947,4 ±1155	5072,5 ±1097,2	10642 ±3038,8
	VLF	1512,3 ±341,4	1041,2 ±243	1363,6 ±264,1	1217,7 ±252,6	1397 ±399,2	1453,2 ±406,8	3671,2 ±1019,2
	LF	1961,9 ±515,4	1457 ±356,7	1100 ±268,5	1439,9 ±326,2	1367,8 ±439,3	1784 ±401,6	3623,4 ±1120
	HF	3786,3 ±1653,4	1894,9 ±550,4	1039,2 ±286,9	1226,8 ±372,8	1163,8 ±391,3	2185 ±631,1	3347 ±1233,7

频谱图分析表明，在暴露后的实验组中，心脏以更有利且更经济的模式运行。

一开始，频谱分析显示抑郁症，然后，相反，心脏工作有所节省，频谱总功率分量的变化表明了这一点。因此，频谱图指标比心率和心电图指标与心肌缺氧的特点有关。间歇性缺氧暴露对急性外源性缺氧条件下心率调节的稳定性具有显著的正向作用。低氧训练增加神经中枢对缺氧因素的抵抗力，激活机体的防御系统，从而消除对机体的不良影响 [2]。由于

该方法对身体有积极作用且没有负面影响，因此有望改善运动员赛前的机能状态，特别是在需要抵抗缺氧因素和高水平运动的运动中 监管体系的运作。

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DOI 10.34660/INF.2025.93.38.021

儿童高热综合征的临床发病机制及矫治方法
**CLINICAL, PATHOGENETIC ASPECTS AND METHODS OF
CORRECTION OF HYPERTHERMIC SYNDROME IN CHILDREN**

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摘要。高热综合征是发热的一种病理变异，表现为体温快速升高且不充分，伴有微循环障碍、代谢病理、重要器官和系统功能障碍增加，尤其是中枢神经系统受损。采用病因和致病性矫正方法进行综合治疗将防止高热的不良后果的发展。

关键词：高热综合征、发热、退热药、温度测定。

Abstract. *Hyperthermic syndrome is a pathological variant of fever, in which there is a rapid and inadequate increase in body temperature, accompanied by impaired microcirculation, metabolic pathology, an increase in dysfunction of vital organs and systems, in particular, damage to the central nervous system. A comprehensive approach to therapy using etiotropic and pathogenetic methods of correction will prevent the development of undesirable consequences of hyperthermia.*

Keywords: *hyperthermic syndrome, fever, antipyretic drugs, thermometry.*

Fever is an increase in internal body temperature, which is an organized and coordinated reaction of the body to a disease or any damage, is a protective and compensatory reaction, due to which the bactericidal activity of the blood increases, the activity of leukocytes is stimulated, phagocytosis, the production of endogenous interferon increases, and the metabolic intensity increases [1].

The aim of the work is – to study the theoretical aspects of the features of the development and clinical course of hyperthermic syndrome for complex pathogenetic therapy.

Research problems - to determine the physiological significance and pathological effect of fever associated with an infectious disease. To study the features of the pathogenesis of hyperthermic syndrome and polysystemic clinical manifestations. To identify the main approaches to antipyretic therapy in children.

Materials and methods

In the preparation of the article, the scientific databases of the Russian Science Citation Index, CyberLeninka, Web of Science, PubMed were used.

Results and its discussion

The pathogenesis of fever is based on the activation of granulocytes and macrophages with the intensive formation and release of inflammatory mediators, interferons and endogenous pyrogens (interleukin 1, interferon γ , tumor necrosis factor α , prostaglandin E, etc.), the action of which is aimed at changing the functional activity of the thermoregulatory center, localized in the preoptic zone of the anterior hypothalamus and responsible for the balance of the processes of formation and heat release. Pyrogens cause a decrease in heat sensitivity and an increase in the activity of cold-sensitive neurons due to an increase in the intracellular concentration of calcium and cyclic adenosine monophosphate. The temperature of the “installation point” of the thermoregulation center becomes higher, and the normal body temperature is perceived by the body’s thermoregulation system as low, as a result of which heat production increases and heat transfer decreases [2, 3]. In fever, in addition to stimulating the cells of the immune system with exogenous pathological factors, the production of lymphokines is activated, which stimulate a cascade increase in pyrogen release due to the secondary activation of macrophages. Hormones are also involved in the pathogenesis of fever through exposure to the thermoregulation center. In particular, an increase in body temperature in infectious diseases against the background of thyroid hyperfunction reaches higher numbers, since thyroxine increases the sensitivity of the temperature-regulating center to endogenous pyrogens and, acting in pathologically large quantities, disrupts the processes of oxidative phosphorylation in tissues, which increases heat production. Glucocorticosteroids, on the contrary, block fever by reducing the formation of endotoxins in leukocytes [4, 5]

Given the peculiarities of thermoregulation in childhood, it is necessary to note the presence of an imbalance between heat dissipation and heat production with a predominance of the latter. Heat release in children in the first months of life is imperfect, with extremely immature evaporation processes and the main role of vascular heat release in the cooling process. Therefore, overheating for children in the first months of life is as dangerous as hypothermia.

Depending on the level of fever, fever is divided into subfebrile - 37.2-38 ° C, low febrile - 38.1-39 ° C, high febrile - 39.1-41 ° C and hyperthermic - more than 41 ° C.

When conducting a diagnostic search, it is necessary to differentiate between “red” and “white” fever.

With “red” fever, heat dissipation corresponds to heat dissipation, the skin is moderately hyperemic, hot, moist, the limbs are warm to the touch. An increase in pulse and respiration corresponds to an increase in temperature, that is, for each degree above 37 ° C, the respiratory rate becomes higher by 4 breaths per minute, and the heart rate - by 10 beats per minute.

“White” fever is prognostically less favorable. The skin is pale, “marble,” with a cyanotic tint of the nail plates and lips, peripheral spasm of blood vessels occurs, heat production decreases, a positive symptom of a “white spot” is revealed, the limbs are cold, tachycardia and shortness of breath. The child’s behavior is disturbed - he becomes lethargic or agitated, delirium and convulsions may occur. The effect of antipyretics in white hyperthermia is insufficient [6, 7].

The pathological variant of fever, in which there is a rapid and inadequate increase in body temperature, accompanied by impaired microcirculation, metabolic disorders, an increase in dysfunction of vital organs and systems, in particular, damage to the central nervous system, is hyperthermic syndrome (HS). Due to a deep violation of thermoregulation in children with an increase in body temperature above 39 ° C due to excessive heat production, insufficient heat transfer or violation of hypothalamic thermoregulation, HS is an indicator of the particular severity of the disease [4, 5].

Fever has a significant impact on the functional activity of all organ systems. Thus, an increase in body temperature by each degree above 37 ° C increases the metabolic rate by 12%, breathing rate by 4 breaths per minute, pulse rate - by 10 beats per minute. Increasing the speed of basic exchange increases the need for energy supply. The increased frequency of respiratory movements and the depth of respiration with an increase in alveolar ventilation create a state of hyperventilation with the development of hypocapnia, respiratory alkalosis, the severity of which increases with increasing body temperature and is maximum at a temperature of 40-41 ° C. In hypocapnia, a vascular spasm develops with a decrease in cerebral blood flow and the development of seizures. Higher body temperature, on the contrary, begins to inhibit pulmonary ventilation, which contributes to a delay in the elimination of carbon dioxide (CO₂) with an increase in its content in the blood and disruption of oxygen utilization processes, as evidenced by a decrease in the arteriovenous difference. The cardiovascular system reacts to an increase in body temperature by tachycardia and peripheral vasodilation, which reduces venous return to the right heart and, accordingly, stroke volume, reduces

tissue perfusion, and causes the development of metabolic acidosis with increased vascular permeability.

At temperatures exceeding 41 ° C, changes occur at the cellular level with a change in the structure of mitochondria, lysosomes, protein molecules, and therefore all enzymatic systems can be inactivated, microcirculation is disrupted with a tendency to sludge syndrome and disseminated formation of microthrombi. As a result, the development of multiple organ failure with the critical condition of the patient is possible.

In the etiological structure of HS, viral and bacterial infectious factors, toxic-allergic processes, dehydration, traumatic and hypoxic tissue damage are distinguished. In rare cases, in newborns, the causes of HS can be natal trauma and intranatal asphyxia, systemic hypoxia, and respiratory distress syndrome [4, 6].

The clinical picture of hyperthermic syndrome includes:

- oppression;
- motor and speech excitation;
- hallucinations;
- clonic-tonic convulsions;
- syncopal states;
- pale skin, acrocyanosis;
- chills;
- decreased appetite;
- increased work breathing, shortness of breath;
- asphyxia, which can occur against the background of convulsions and lead to death;
- violation of systemic hemodynamics: blood pressure drop, tachycardia, increased peripheral vascular resistance.

A persistent increase in temperature above 40 ° C, the preservation of convulsive syndrome for more than two hours can cause irreversible organic changes in the brain both in newborns and children of the first months of life, and in older children. In the clinical picture, in addition to convulsions, in this case, hypotension, tachycardia, pale skin, cyanosis, shortness of breath (due to increasing pulmonary edema) can be observed. With a steady increase in body temperature to 42 ° C, death can occur.

As a complication of HS, older children may develop adrenal insufficiency, which is manifested by a decrease in systemic blood pressure, bradycardia with a further increase in systemic hypoperfusion. In addition to peripheral vasodilation, abdominal spasm (accompanied by abdominal pain syndrome) and peripheral vessels may occur.

Malignant hyperthermia is a prognostically unfavorable clinical variant of HS. It is characterized by a rapid increase in body temperature to 42 ° C, an increase in cardiovascular insufficiency, instability of blood pressure, muscle hypertonicity,

a tendency to develop disseminated intravascular coagulation syndrome, metabolic and electrolyte disorders represented by acidosis, hyperkalemia, hyperphosphatemia, hypokalemia [3, 5, 6].

When treating HS, it is important to adhere to a pathogenetic approach that includes not only antipyretic therapy, but also the correction of the pathology that caused its development.

Indications for antipyretic therapy are [5]:

- all cases of white fever.
- moderate fever (38°C) in patients with epilepsy, oncological pathology, symptoms of increased intracranial and blood pressure, heart defects, hydrocephalus and other prognostically unfavorable risk factors;
- moderate fever in children in the first 3 months of life;
- moderate fever in children under 3 years of age with consequences of perinatal CNS damage (especially in children with extremely low birth weight);
- all cases of high fever (39°C and above) regardless of the child's age.

When choosing an antipyretic drug, you need to take into account:

- efficiency;
- safety and tolerability;
- availability of convenient dosage forms, ease of dosing;

According to the approved clinical guidelines, paracetamol (acetaminophen) should be used as antipyretic therapy for HS in a single dose of 10-15 mg/kg orally or ibuprofen 5-10 mg/kg (from the age of 6 months) [4, 5].

If it is impossible to use or the absence of paracetamol and ibuprofen, it is allowed to use a 50% solution of metamizole sodium (analgin) in children at a dose of: up to 1 year 0.01 ml/kg, over 1 year - 0.1 ml per year of life. It is allowed to combine with a 2% solution of chlorpyramine in children under 1 year old in a dose of 0.01 ml/kg, over 1 year old - 0.1 ml/year of life, but not more than 1 ml. In the presence of venous access, paracetamol can be administered (slowly intravenously) to children over 1 year of age at a single dose of 15 mg/kg [5].

The tactics of antipyretic therapy may differ depending on the type of fever.

In "white" fever:

- paracetamol or ibuprofen orally, if the child is in serious condition and it is impossible to use the drugs orally (if venous access is provided) - intravenous slow administration of a paracetamol solution based on a single infusion for children 1 year of age and older at a dose of 15 mg/kg;
- in case of impossibility of use or in the absence of paracetamol and ibuprofen, intramuscular administration is possible:
 - 50% metamizole sodium solution at 0.1 mL per year of life;
 - 2% papaverine solution for children under 1 year old - 0.1-0.2 ml, over a year old - 0.1-0.2 ml per year or drotaverine solution in a dose of 0.1 ml per year of life;

- 2% solution of chlorpyramine at 0.1 mL per year of life, but not more than 1 mL.

In “red” fever, the starting therapy is:

- paracetamol in a single dose of 10-15 mg/kg orally;
- ibuprofen in a single dose of 5-10 mg/kg in children over 6 months of age;
- physical cooling methods are carried out immediately after the administration of antipyretic drugs. A single application of physical measures should last no more than 30-40 minutes.
- if therapy is ineffective for 30 minutes, emergency measures are carried out in the same way as with “white” fever.

In case of fever lasting more than three days, as well as in case of HS of any duration, it is necessary to decide whether it is advisable to conduct antibiotic therapy according to the spectrum of sensitivity to antibiotics established on the basis of an analysis of possible etiological factors or laboratory diagnostic results.

Indications for hospitalization will be the following clinical features [5, 6]:

- ineffective use of two or more antipyretic therapy regimens;
- ineffective use of initial therapy for white fever in children 1 year old;
- combination of persistent fever and prognostically unfavorable risk factors (epilepsy, arterial and intracranial hypertension, hydrocephalus, heart disease, etc.);
- hemorrhagic rash with fever, as well as sleep disturbance, refusal to eat and drink, anxiety, tachycardia, shortness of breath (exclude meningococemia);
- fever with abdominal pain and vomiting (exclude appendicitis, urinary tract infection).

When treating children with HS, it is important to timely determine the fact of dehydration and begin its correction according to the age and body weight of the child. In some cases, in severe hyperthermia accompanied by toxinemia, cardiovascular dysfunction and clinical manifestation of adrenal insufficiency, hormone therapy with glucocorticosteroids is indicated [8].

For correction of convulsive syndrome introduced is 0.5% solution of diazepam at the rate of 0.1 ml/kg of body weight, but not more than 2 ml once. In the absence of positive dynamics, intravenous (or intraosseous) administration of sodium valproate lyophilisate at a rate of 10-15 mg/kg of bolus for 5 minutes, dissolution every 400 mg in 4 mL of solvent (water for injections), then intravenously drop-by-drop 1 mg/(kg x h) is dissolved every 400 mg in 500 mL of sodium chloride 0.9% solution or dextrose 20% solution [5].

When conducting antipyretic therapy, it is necessary to take into account the pharmacokinetic features of drugs. In particular, the elimination half-life in paracetamol is 1-4 hours, and in ibuprofen 6-7 days with predominant metabolism in the liver and excretion by the kidneys. In this regard, concomitant hepatic and/or

renal failure will be restrictions on the use of these drugs, especially ibuprofen, since in these conditions the cumulative effect and toxic effect will develop quite quickly [7].

It is advisable to select the dose and frequency of antipyretic agents with a certain degree of caution. A number of scientific publications present the results of a clinical analysis of the safety of paracetamol, ibuprofen, which demonstrate a high risk of hypothermia with course use at medium and high doses.

Thus, hyperthermic syndrome is an undesirable and clinically unfavorable variant of the course of fever (as a protective and adaptive reaction of the body in the infectious process), accompanied by polysystemic metabolic and functional disorders, which requires timely complex pathogenetic therapy, including both etiological and symptomatic methods of correction.

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子宫肌瘤患者月经分泌物的结构特点

STRUCTURAL FEATURES OF MENSTRUAL DISCHARGE IN PATIENTS WITH UTERINE FIBROIDS

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注释。本文提供的数据使我们能够考虑使用楔形脱水法对子宫肌瘤患者进行月经分泌物检测，这是一种有前途的方法，可用于识别在慢性子宫内膜炎背景下形成的子宫内膜增生过程的各种组织类型。将获得的数据与传统方法检查这种病理患者的结果进行比较，我们不仅可以提高子宫内膜肌病早期诊断的有效性，还可以选择最佳治疗方案，客观评估其结果，从而保护妇女的生殖健康。

关键词：子宫肌瘤、子宫内膜增生过程、慢性子宫内膜炎、月经分泌物的结构标志物。

Annotation. *The data presented in this article allow us to consider the use of the wedge dehydration method of menstrual discharge in patients with uterine myoma as a promising method for identifying various histotypes of endometrial hyperplastic processes formed against the background of chronic endometritis. Comparison of the obtained data with the results of traditional methods of examining patients with this pathology allows us to count not only on increasing the effectiveness of early diagnostics of myoendometrium diseases, but also on choosing the optimal treatment plan, objectively assessing its results and thereby preserving women's reproductive health.*

Keywords: *uterine myoma, endometrial hyperplastic processes, chronic endometritis, structural markers of menstrual discharge.*

Introduction. The problem of the established steady growth in the incidence of uterine myoma and endometrial hyperplastic processes remains one of the most complex and in many ways, a phenomenon of recent decades that is still not completely clear, a detailed explanation for which scientists have yet to give [1,2].

According to M.R. Orazov et al. [3], disturbances in the delicate balance between proliferation and apoptosis in endometrial tissue that arise for a number of reasons can lead to the development of local pathological changes of varying degrees of severity. At the same time, the structural and functional boundary between normal and pathologically altered endometrium can be difficult to identify at the initial stages, so there remains a need to search for informative markers for early diagnosis and prognosis of the development of this pathology, which, with its timely detection and adequate intervention, allow for positive results to be achieved [4,5,6].

Promising in this regard is the microscopic study of the structures of a drop of biological fluids (facies) formed during the transition during the drying process to a solid phase as a result of the dehydration process. The microscopic picture of the facies is distinguished by structures characteristic of each type of human biological fluids associated with the features of the course of physiological and pathological processes in the body [7,8].

When using the technology of morphological analysis of biological fluids, even the most initial pathological changes in molecular structures can be observed immediately, without the “incubation period” required to assess changes at the cellular, organ and (or) systemic levels, which opens up opportunities for the earliest diagnosis of the developing pathological process [9].

Purpose of the study: Uto improve the method of diagnosing endometrial pathology in patients with uterine fibroids by identifying markers of inflammation and proliferation in the menstrual discharge of the examined patients.

Material and methods

The study included 111 patients with uterine myoma, who were divided into 3 groups: 1st - 40 patients with slowly growing uterine myoma, 2nd - 30 patients with rapidly growing (proliferating) uterine myoma, 3rd (control), which included 41 practically healthy women. The age of patients in these groups was comparable ($p > 0.05$).

A comprehensive (structural and biochemical) study of menstrual discharge from female patients was conducted. The specified biological fluid in the amount of about 5 ml, obtained from the uterine cavity by aspiration with a Pipelle probe on the 2nd–3rd day of the desquamation phase, was centrifuged for 5 minutes at a speed of 3,000 rpm.

The wedge dehydration method was used to study menstrual discharge, which is microscopy of the facies structures formed during the drying of this biological

fluid. The technical methods of the method consisted in the fact that a drop of the supernatant liquid of the centrifugate with a volume of 10-20 μl was applied to a defatted glass slide. After drying it at a temperature of 20-25° C and a relative humidity of 65-70% for 24 hours, microscopy of the prepared preparations was performed. The study and images of the structure-forming elements of the facies of menstrual discharge were carried out at magnifications from $\times 10$ to $\times 80$ using a binocular microscope from Leica I CC 50 and a color digital camera Pixera.

Research results

When studying menstrual discharge, the following morphological types of facies were identified: radial, partially radial, irradial, circular. The variants of the norm include radial and partially radial types of facies, which have a high degree of ordering of the main structural elements (sectors, units, concretions).

In the examined women in the control group, radial and partially radial types of facies were registered in $84.7 \pm 4.53\%$ of cases. In this case, peripheral and central zones were distinguished in the facies, in which structures characteristic of the normal structure of the endometrium (radial, arcade cracks, separations, concretions) were visualized.

In patients with uterine fibroids with normal endometrial structure, the following types of facies were identified: radial, partially radial (Fig. 1), irradial, circular.

In patients with slowly growing myoma of the uterus and normal structure of the endometrium, the radial type of facies was recorded in $42.5 \pm 7.82\%$, partially radial in $37.5 \pm 7.65\%$.

Despite the fact that in rapidly growing uterine myoma the radial type of facies was still quite common (in $46.6 \pm 9.11\%$ of cases), the fact of an increase in the number of facies with a radial reactive type (in $16.7 \pm 6.80\%$) and irradial (in $20.0 \pm 7.30\%$ of cases of observations) was noteworthy (Fig. 2). The radial reactive type of facies with a high level of structuring indicated the tension of the body's adaptive systems, and the appearance of the irradial type indicated the formation of pathological processes in the organ under study.

When studying the facies of patients with uterine myoma, changes were noted in the structural features of a number of structures and their number depending on the morphological state of the endometrium.

In patients with abnormal uterine bleeding against the background of chronic endometritis in combination with endometrial hyperplasia, special attention was drawn during microscopy to the fact of the appearance of the so-called "Lingual structures" (Fig. 4) - markers of inflammation, detected both as single and numerous, common elements characterizing the degree of expression of the inflammatory process of the endometrium. "Toxic plaques" - markers of intoxication, "comb structures" - markers of angiospasm and microcirculation disorders were detected significantly more often in this group compared to the control group ($p < 0.05$), but

the dominant markers were “triradiate cracks” and “lingual” structures. In patients with uterine myoma in combination with endometrial hyperplasia, their frequency increased by 2.4 times, respectively, compared to the control group.

When studying the facies of menstrual discharge in groups of patients with uterine myoma with hyperplastic endometrium while maintaining radially, abnormal structures appeared, the number of which increased as the severity of myoendometrium pathology increased.

Thus, in patients with uterine myoma in combination with endometrial hyperplasia, the number of pathological structural markers gradually increased in the structure of the facies - “three-beam” (Fig. 4) and “cordial” “cracks, as well as “tongue structures” ($51.2 \pm 5.46\%$) - markers of inflammation both in the form of single and numerous, widespread elements, correlating with the severity of the inflammatory process of the endometrium.

The predominantly “three-beam” structural marker turned out to be the most characteristic for the facies of patients with atypical endometrial hyperplasia.

Conclusion. The search for optimal non-invasive and minimally invasive methods for obtaining sufficient information about the state of the endometrium and identifying its initial pathological changes continues to be an urgent problem. The data presented in the article allow us to consider the identification of structural markers of inflammation and proliferation in menstrual discharge as a promising method for diagnosing not only CE, but also various histotypes of EHPE. The presented results allow us to count not only on increasing the effectiveness of early diagnostics using this method of the endometrial pathology in question, but also on choosing the optimal treatment tactics and objectively assessing its effectiveness.



Figure 1. Menstrual flow facies: partially radial type, x 10

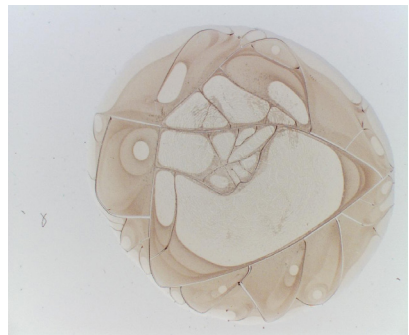


Figure 2. Facia of menstrual discharge in a patient with rapidly growing uterine myomai in combination with endometrial hyperplasia, irradial type, x10

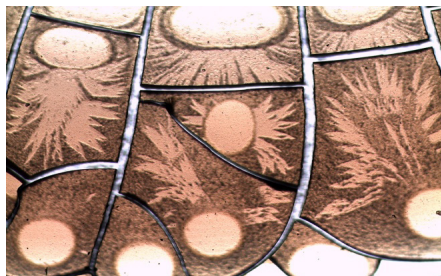


Figure 3. Fragment of the menstrual facies of a patient with abnormal uterine bleeding against the background of chronic endometritis and endometrial hyperplasia, in the peripheral zone “lingual structures”, x 50

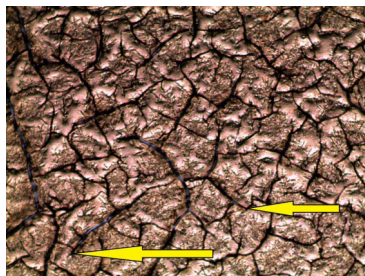


Figure 4. Fragment of the menstrual discharge facies of a patient with uterine myoma in combination with adenomyosis, chronic adnexitis, central zone “tri-radial fissures”, x 50

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DOI 10.34660/INF.2025.16.28.023

UDC: 618.14-006.36-089.87

子宫平滑肌瘤行子宫动脉栓塞术患者的临床特征及躯体状态描述
**CLINICAL FEATURES AND CHARACTERIZATION OF SOMATIC
STATUS OF A PATIENT PLANNED FOR UTERINE ARTERY
EMBALIZATION IN UTERINE LEIOMYOMA**

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摘要。新的技术解决方案和治疗方法要求优化规划患者选择的方法。子宫动脉栓塞术 (UAE) 治疗子宫平滑肌瘤也不例外。本文分析了子宫平滑肌瘤患者的临床特征和躯体病理。在选择一种有利于低侵入性器官保留技术的治疗方法——子宫动脉栓塞术时, 确定选择患者的适应症非常重要。以队列研究为例, 对接受 UAE 的患者的临床表现和躯体病理进行了评估。结合个人经验和临床病例分析, 形成了患者画像。

关键词: 子宫平滑肌瘤、肥胖、躯体病理、子宫动脉栓塞术 (UAE)、育龄。

Abstract. *New technological solutions and methods of treatment require optimization of the approach to planning the patient's choice. Uterine artery embolization (UAE) for uterine leiomyoma is no exception. The article analyzes the clinical features and somatic pathology of patients with uterine leiomyoma. When choosing a treatment method in favor of a low-invasive organ-preserving technology - uterine artery embolization, it is important to determine the indications for choosing a patient. Using a cohort study as an example, an assessment of the clinical picture and somatic pathology of patients who underwent UAE was*

carried out. A patient portrait is formed, taking into account personal experience and analysis of clinical cases.

Keywords: *Uterine leiomyoma, obesity, somatic pathology, uterine artery embolization (UAE), reproductive age.*

Uterine leiomyoma is one of the most common diseases of the female reproductive system. According to various sources, uterine fibroids rank 2nd among gynecological diseases and occurs in 30-77% of women. In this case, 70% are women of reproductive age [1, 2, 3]. One of the main problems of this disease is a decrease in the quality of life and reproductive potential. For a long time, conservative attempts to treat this tumor have failed, and mainly reduce symptoms. Surgical treatment methods have developed together with the technical capabilities of the surgical instrument and anesthesia. At the present stage, embolization of the uterine arteries for uterine leiomyoma is an alternative method. This type of treatment is aimed at reducing the risks associated with radical surgery, anesthesia, duration of surgery, blood loss, and patient phobia before surgical treatment. Currently, uterine fibroids are treated using conservative and surgical methods of treatment [4]. In this regard, as an alternative to surgical treatment, a minimally invasive intervention called uterine artery embolization (UAE) has become widespread. Occlusion of the uterine arteries using UAE is offered to women who categorically refuse surgery or want to preserve the uterus.

Uterine artery embolization (UAE) is a highly effective, minimally invasive, organ-preserving method of treating uterine fibroids [5].

Uterine artery embolization was first performed by the American physician O. Smith in 1970 to stop bleeding in the postoperative period. Later, this method was used to stop postpartum uterine bleeding when conservative measures were ineffective. However, a description of this method in the scientific literature appeared only in 1979.

Uterine artery embolization (UAE) for the treatment of uterine fibroids began to be used in the early 1990s in France. Gynecological surgeon J. Ravina used the method of endovascular occlusion of the uterine arteries before performing hysterectomies or myomectomies in patients with uterine fibroids in order to reduce subsequent intraoperative blood loss. He noted the disappearance or reduction of clinical manifestations of the disease in a significant number of patients with a simultaneous reduction in the size of the uterus and myoma nodes. In September 1995, in the journal *The Lancet*, a group of researchers led by J. Ravina presented their experience of using UAE to treat uterine myoma in 16 patients. The randomized studies EMMY and REST compared UAE with hysterectomy and proved that it is possible to perform UAE in the treatment of women with symptomatic myoma: menstrual flow decreased and pain in the lower abdomen completely dis-

appeared. This technique was used in women both in the postmenopausal period and in reproductive age, planning a pregnancy in the future. In Russia, the first embolizations were performed in 1982 at the Scientific Center of Obstetrics, Gynecology and Perinatology of the USSR Academy of Medical Sciences together with specialists from the Department of X-ray Surgical Diagnostic and Treatment Methods of the A.V. Vishnevsky of the USSR Academy of Medical Sciences as a preoperative preparation for patients with arteriovenous angiodysplasia of the pelvis. Later, embolization was performed in patients with massive postpartum hemorrhages. In 1998, by order of the Ministry of Health of the Russian Federation, this method was included in the list of permitted endovascular interventions. Only in 2004 was an industry standard for the use of UAE published, developed jointly by several dozen leading specialists in the field of gynecology and endovascular surgery, where the indications and technical aspects of the intervention, as well as methods for eliminating and preventing complications, were considered in detail.

Today, UAE is used worldwide as an alternative to hysterectomy in patients with uterine fibroids. About 25,000 uterine artery embolizations are performed worldwide annually, which is the result of coordinated actions by gynecologists and endovascular surgeons in determining the treatment tactics for patients with uterine fibroids.

According to the clinical guidelines of the Ministry of Health of the Russian Federation, uterine fibroids are a benign monoclonal tumor originating from the smooth muscle cells of the cervix or body of the uterus. Hormones such as estrogens and progesterone, which are of a steroid nature, contribute to the growth of uterine leiomyoma. Neoangiogenesis, various growth factors and a woman's lifestyle (early menarche, lack of childbirth, obesity) also affect the pathogenesis.

According to the clinical protocol 2024-2026, indications and contraindications for UAE are determined by an obstetrician-gynecologist [3]. When choosing a treatment method, the doctor must take into account both the individual characteristics of the patient and the nature of the disease (localization of nodes, size of the uterus, etc.)

Many authors consider submucous and subserous myomas on a thin stalk, associated with the expulsion of the myomatous node into the abdominal cavity, to be contraindications to uterine artery embolization. Oncological processes in the uterus and an infectious process or intolerance to the contrast agent are also considered contraindications. Some doctors consider the desire to preserve the woman's reproductive function to be a contraindication, since at the moment, UAE does not guarantee the preservation of fertility. However, more than one pregnancy has been registered after uterine artery occlusion. In addition, most pregnancies ended in childbirth, and the children were born healthy.

Research conducted by F.L. Hutchins and his team [6] showed that women aged 33-39 who underwent uterine artery embolization (UAE) to treat uterine fibroids showed no significant changes in FSH, estradiol, antral follicle count, or ovarian volume within a year after the procedure. However, there is evidence that in some cases, UAE can lead not only to menstrual cycle irregularities, but also to the development of premature menopause [7,8].

The data from various schools and authors on the use of UAE in the treatment of patients with uterine fibroids prompted us to share our observations.

A cohort study of sixteen cases of uterine leiomyoma treatment using the UAE method was conducted in patients at the gynecological department of the Leningrad Regional Clinical Hospital, a state budgetary healthcare institution. The main complaints of the patients were: hyperpolymenorrhea in 100%, pain syndrome - 12.5%, general weakness - 25%, anemic syndrome was detected in 37.5% of patients.

The duration of the disease with uterine leiomyoma up to 5 years was 56.3%, more than 5 years - 43.8%.

The patient's age was in the range of 35-56 years, while the average patient age was 46.13 years. At the same time, 69% of women were in late reproductive age, 19% in perimenopause, 12% in menopause (Figure 1).

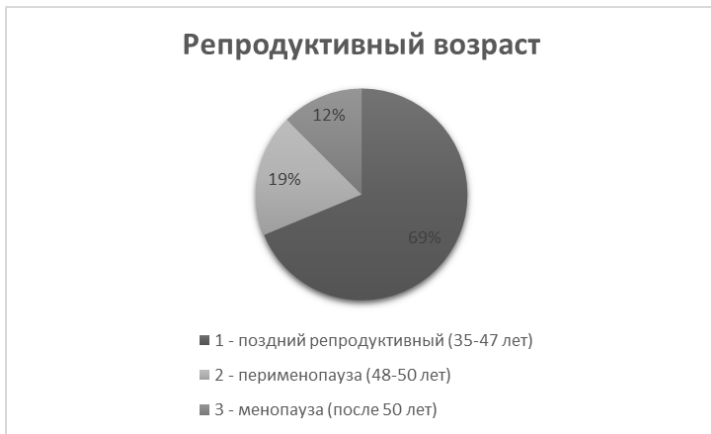


Figure 1. Distribution of patients according to reproductive age.

During the study, the body mass index (BMI) was normal in 12% of cases, excess body weight was observed in 56% of patients, obesity of the first degree in 19%, obesity of the second degree in 13%.



Figure 2. Body mass index of the subjects.

Patients with excess body weight and obesity were more common in the reproductive age group, while in menopause this indicator is significantly lower.

The relationship between the body mass index and the patient’s reproductive age is shown in Figure 3.

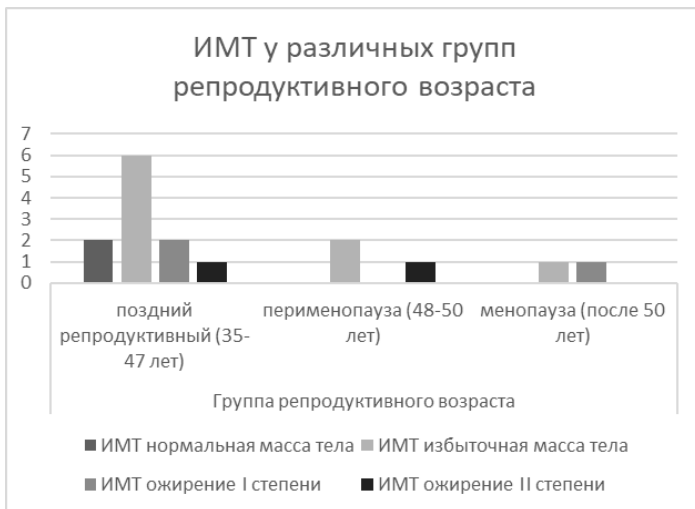


Figure 3. Relationship between BMI and reproductive age of patients

When considering concomitant diseases, the following somatic pathologies were identified: obesity/overweight, anemia, varicose veins and hemorrhoids,

chronic gastritis and peptic ulcer, hypertension, urolithiasis, pituitary microadenoma, fatty hepatosis and multinodular goiter.

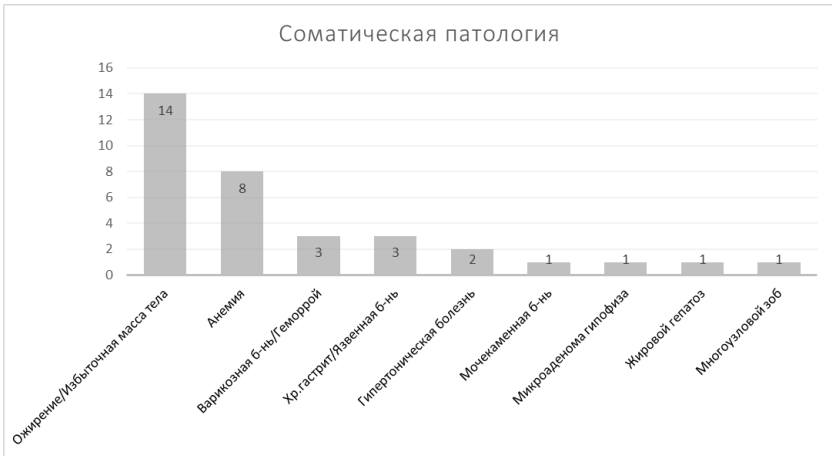


Figure 4. Somatic pathologies of patients

The predominant somatic pathologies were obesity - 14 people, anemia - 8, varicose veins and/or chronic gastritis - 3 patients.

Conclusions: Uterine artery embolization is a successful alternative for women who categorically refuse surgical treatment with symptomatic uterine leiomyoma and want to preserve the organ. At the same time, absolute contraindications to surgical treatment from the somatic pathology side were not found in our patients.

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DOI 10.34660/INF.2025.60.93.024

皮埃尔罗宾综合征临床病例
A CLINICAL CASE OF PIERRE ROBIN SYNDROME

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摘要。本文介绍了一种颌面部先天畸形——皮埃尔·罗宾综合征。皮埃尔·罗宾综合征是一种先天性异常，其特征是存在舌下垂、小颌畸形和气道阻塞，从而导致各种并发症。皮埃尔·罗宾综合征是一种严重的面部畸形，导致严重的解剖和功能障碍。

关键词：颌面部先天畸形、小颌畸形、小颌畸形、舌下垂。

Abstract. This article describes a congenital malformation of the maxillofacial region - Pierre Robin syndrome. Pierre Robin syndrome is defined as a congenital anomaly characterized by the presence of glossoptosis, micrognathia and airway obstruction, which leads to various complications. Pierre Robin syndrome is a severe malformation of the face, leading to significant anatomical and functional disorders.

Keywords: congenital malformation of the maxillofacial region, microgenia, micrognathia, glossoptosis.

Introduction. Pierre Robin syndrome is a congenital malformation of the maxillofacial region, characterized by three main clinical pathognomonic signs: underdevelopment of the lower jaw (microgenia), glossoptosis (underdevelopment and retraction of the tongue) and the presence of a cleft palate.

This syndrome was first described by the French dentist Pierre Robin (1923).

The population birth rate of newborns with Pierre Robin syndrome, according to various authors, ranges from 1:8500 to 30,000 newborns. The incidence is equally common in both girls and boys [1].

The data provided by various authors on the mortality rate of Pierre Robin syndrome indicate that in a mild form it is 16%, and in a severe form it reaches 41.4% [1].

It should also be noted that it is quite difficult to assess the prognosis for the life and health of a fetus with Pierre Robin anomaly, since microgenia may be expressed insignificantly, and the diagnosis of clefts of the soft palate and small clefts of the hard palate prenatally causes difficulties, even in families with a high genetic risk and with targeted expert ultrasound examination [1].

Unfortunately, according to scientific research and available statistics, congenital malformations of the fetus do not tend to decrease.

Thus, Pierre Robin anomaly, being one of the multiple multifactorial defects of intrauterine development, is still found today.

Below are just some of the scientific papers that describe this congenital malformation of the fetus.

Thus, S. Takeshita and colleagues (2017) described two cases of the birth of children with Pierre Robin syndrome with severe obstruction of the upper respiratory tract. Thus, in the first case, the newborn boy was born prematurely at 36 weeks of pregnancy, weighing 2574 g. Pregnancy and childbirth were without clinical features. Hereditary history was not burdened. After birth, the newborn was diagnosed with micrognathia and cleft palate. In addition, severe shortness of breath immediately developed. The airways were completely blocked. For therapeutic purposes, nasotracheal intubation was performed, followed by tracheostomy [2]. In the second case, a full-term newborn girl weighing 2282 g was born at 37 weeks of gestation. The pregnancy and childbirth were also uneventful. According to the ultrasound examination, a congenital malformation of the fetus was not diagnosed. Immediately after birth, she developed severe shortness of breath, in addition, the girl also had micrognathia and a cleft palate. As in the first case, a tracheostomy was performed [2]. Subsequently, E. Mass et al. (2018) described a clinical case of Pierre Robin syndrome in a 7-year-old child. The boy was born prematurely, at 29 weeks of gestation and weighed 1180 g. The diagnosis was made immediately after birth, in addition, hearing problems were observed. For 3 months, he was in the intensive care unit, on the 20th day of life, a tracheotomy was performed. Subsequently, the child had difficulties with feeding, due to which a gastrostomy was installed at 3 months. During the first year of life, breathing problems were common. Surgical correction of the cleft palate was performed at 1 year of life. In the second year of life, the tracheostomy and gastrostomy were removed [3].

In addition, Wright M et al. conducted a meta-analysis of the prevalence of Pierre Robin syndrome depending on geographic location and ethnicity. The study included 22 countries and analyzed 2272 cases. As a result of the analysis, it was proven that the disease occurs in all countries and in different ethnic groups. In addition, it should be noted that in European countries there was a tendency for a higher prevalence of this pathology [4].

Taking into account the rare congenital pathology, we present information about our own clinical case.

Thus, a multiparous woman, H., 36 years old, came to the emergency department of the regional perinatal center of the State Budgetary Healthcare Institution of the Arkhangelsk Oblast, the Amur Regional Clinical Hospital, for planned hospitalization with the diagnosis: Pregnancy 23 weeks 5 days. BOH. Severe microgenia-glossoptosis. Severe increasing polyhydramnios. Suspected Pierre Robin syndrome. CHD: ventricular septal defect.

The patient's obstetric history was burdened by 5 spontaneous miscarriages in the early stages of pregnancy and premature operative delivery.

The patient's somatic history was not burdened.

The patient denied bad habits and hereditary diseases.

In the first trimester of pregnancy, the patient suffered from a mild acute respiratory viral infection. During pregnancy, the patient underwent timely screening ultrasound examinations at 13 and 23 weeks using mid-range and expert-class equipment.

Screening echography in the first trimester of pregnancy did not reveal any fetal developmental abnormalities. At 23 weeks of pregnancy, according to the study, the fetus was diagnosed with cleft palate, micrognathia, and ventricular septal defect. In addition, increasing polyhydramnios was observed (AFI-260 mm). Based on the above, colleagues did not exclude syndromic genetic pathology, namely Pierre Robin syndrome.

Dynamic echography of the fetus at 24 weeks of pregnancy confirmed the diagnosis, polyhydramnios was increasing (AFI-280 mm).

A full range of examinations was carried out in the pregnancy pathology department in accordance with current clinical guidelines. In addition, a telemedicine consultation was held with the Federal State Budgetary Institution "National Medical Research Center for Obstetrics, Gynecology and Perinatology named after Academician V.I. Kulakov". A repeat expert-class ultrasound was recommended at the State Budgetary Healthcare Institution of the Arkhangelsk Oblast "Center for Family Health and Reproduction".

According to the expert-class ultrasound - Pregnancy 24 weeks 4 days. Pierre Robin syndrome. Severe lower micrognathia/aplasia of the lower jaw, glossoptosis.

The prognosis for the life of the fetus is unfavorable, the family decides to terminate the pregnancy.

After receiving the patient's consent, feticide of the fetus was performed, hormonal preparation of the cervix for childbirth was started.

On the 2nd day from the moment the cervix began to prepare for childbirth, regular labor activity developed, followed by delivery of a dead premature fetus weighing 600 grams.

Upon visual examination of the fetus after birth, as well as pathological autopsy, the diagnosis was confirmed.

The patient was discharged in satisfactory condition on the 3rd day of the postpartum period.

Conclusion. It should be noted that the above observation is of interest from a clinical point of view, since it is rare in the practice of a doctor.

It is necessary to understand that timely detection of fetal developmental anomalies has important diagnostic and clinical significance, allowing to predict possible complications and outcomes for the fetus.

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DOI 10.34660/INF.2025.42.26.025

麦芽制剂对面包品质的影响
INFLUENCE OF MALT PREPARATIONS ON THE QUALITY OF BREAD

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摘要。面包和烘焙产品在各个国家都很受欢迎。其制备工艺漫长而复杂。为了解决这些问题，已经开发出一种使用麦芽制剂制造该方法。目前，在测试准备过程中使用麦芽是相关的。麦芽是发酵过程的催化剂，同时也是天然的面粉改良剂。添加麦芽烘烤的面包松软，味道辛辣。研究的目的是研究黑麦、小黑麦、小麦、豌豆、大麦和大豆麦芽对烘焙酶促过程强度的影响。研究的主要目的是准备和准备基于谷物和豆类原料的各种麦芽的发酵过程，确定酵母对各种麦芽的提升能力，烘烤小麦和黑麦面包的原型。在准备勺子的过程中，向所有样品中添加面粉、水、麦芽和酵母，并在面团中的黑麦中添加酵母和茶。麦芽有黑麦、小黑麦、小麦、豌豆、大麦和大豆。在黑麦莫斯科模具中，面包屑内部水分含量为 50%，优质面粉中的小麦粉水分含量为 44%，烘烤制备的面团样品。用多项式和对数方程描述了由小麦粉和各种麦芽组成的酸面团的发酵过程，可靠性 R^2 近似值从 0.9662 到 1。在小麦和黑麦面包的生产中使用小麦麦芽获得了最佳效果。略逊于小麦豌豆和大豆麦芽。使用黑麦麦芽制作的小麦面包得分最低。而在制作黑麦面包时，大豆麦芽的强度较低。

关键词：面团、面包结构、不同种类的麦芽、基本和附加原料、黑麦和小麦面包。

Abstract. Bread and bakery products are in demand in various countries. The technology of its preparation is long and complex. To solve these problems, a method of manufacturing this product using malt preparations has been developed. Currently, it is relevant to use malt during the preparation of the test. Malt is the catalyst of the fermentation process and at the same time a natural flour improver. Bread, baked with the addition of malt, is obtained porous and spicy to taste. The purpose of the research is the influence of rye, triticale, wheaten, pea, barley and soy malt on the intensity of the enzymatic processes of bakery. The main objectives of the study were to prepare and prepare for the fermentation process of various malts based on grain and bean raw materials, to determine the lifting power of yeast with various malts, to bake prototypes of wheat and rye bread. During the preparation of the spoons, flour, water, malt and yeast were added to all the samples, and in the rye in the dough, leaven and tea were added. Malt rye, triticale, wheat, pea, barley, soybean were used. Prepared samples of the dough were baked when the rye Moscow mold was 50% moisture content inside the crumb for bread, and 44% for the wheat flour from the premium grade flour. The processes of fermentation of sourdough consisting of wheat flour with various malts are described by polynomial and logarithmic equations with the reliability of R2 approximation from 0.9662 to 1. The best results were obtained using wheat malt in the production of both wheat and rye bread. Slightly inferior to wheat peas and barley malt. The smallest number of points scored wheat bread, made with the use of rye malt. And when making rye bread, soy malt was less intense.

Keywords: dough, bread structure, different kinds of malt, basic and additional raw materials, rye and wheat bread.

Introduction

S. cerevisiae is a unicellular eukaryote and therefore contains membrane-bound organelles such as a nucleus, endomembrane system, and mitochondria. Yeast cells divide as quickly as once every 90 minutes under optimal laboratory conditions through a process called budding, in which smaller daughter cells are pinched off, or budded, from the mother cell (Figure 1) [1].

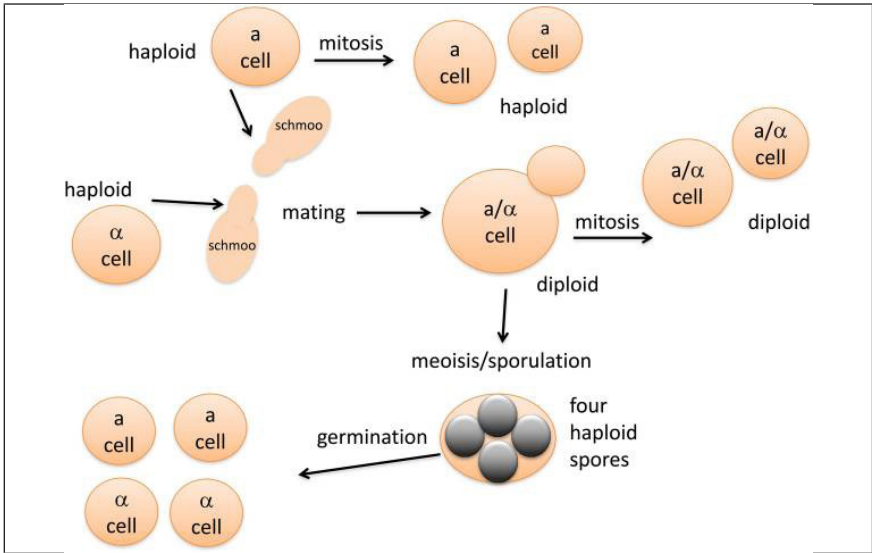


Figure 1. Life cycle diagram of budding yeast (photo by Christine Walls) [1]

The technological process of producing yeast dough is quite lengthy. Therefore, scientists and technologists are constantly looking for ways to activate the yeast cell.

At present, the question of activation of the yeast dough with malt remains progressive. In baking malt improves the quality of flour: it enhances the absorption of water, provides elasticity of the dough, enhances the fermentation process, improves the structure of the bread crumb [2].

At the heart of the modern concept of technical and technological improvement of malt production are several basic principles: improvement of malting and intensification of test [3].

In the baking industry, non-fermented (white, ferment-active) malt is used, which has a sugary ability due to the high content of active α -amylase for sugary of flour brews in the preparation of liquid yeast, wheat starter cultures, in the production of certain types of bread (Riga, VI-TEB, etc.) to improve the quality of bread in the processing of flour with low sugar-forming ability.

Malt flour has a positive effect on the structure and volume of bread. E. N. Vedernikova pointed to the expediency of using 1.0-2.0% malt preparations in the production of bakery products of low weight (50-100g) inhibition of the process of their staling [4].

R. D. Polandova with co-authors [5] proposed a method of preparation of brew for sourdough, consisting in mixing wheat flour, malt, and enzyme preparations, as well as whey and water. The mixture is heated to 50-55°C and used in the preparation of leaven.

Bread, cooked with the use of tea leaves, has a pronounced taste and aroma, reduced speed of staling, but the process of making tea leaves is long and time-consuming.

In addition to brewing from malt extracts are used by crushing malt, mash preparation, separation and evaporation of the finished wort.

Malt extracts are produced in the form of thick, viscous syrup and powder. They are dietary products with a high content of glucose, maltose, soluble dextrans, readily available for flour amylases and maltose bakery yeast, contain proteins and a variety of biologically active substances, which makes it possible to use them in the production of low-calorie products. Malt extracts used in the manufacture of baked goods, dry Breakfast cereals, baby foods, confectionery to improve consistency, sweetening substances, replacing part of the sugar. Products have a characteristic sweet taste and malt aroma.

Additives 1-2% malt extract to the mass of flour in sugar and butter varieties of cookies contribute to the friability of the product [6].

The all-Union research Institute of the beer and alcohol industry has developed a technology for the production of extract from malt sprouts. From them, an aqueous extract is obtained, into which water-soluble substances pass, the extract is evaporated and a malt extract with a content of 60% solids is obtained.

When used in baking yeast maltose activity 85-100 min by adding the extract can be 30-35% to reduce the amount added to the dough pressed yeast. The duration of fermentation of the sponge and dough prepared on these yeasts, and the duration of proofing are reduced.

All the above works show that barley malt is mainly used for beer production and yeast activation in the production of bakery products [6].

Considering the positive indicators of white barley malt, D. Toshev studied its influence on the main components of flour in the production of semi-finished products from biscuit and sand dough and proposed to use it in catering.

The use of malts in bread baking was also used by other scientists: Akzhigitova L.V. (2003); Dubtsov G.G. (2020); Iunikhina V.S. (2003); Lyunina E.M. (2006); Malkina V.D. (2014). However, research in this area continues and moves to another level.

Research part

Thus, white barley malt can be considered as a mandatory component in the formulations of yeast, biscuit, sand, custard, gingerbread, wafer, puff and other types of dough, included in order to reduce the formulation of sugar bookmarks and reduce on this basis the energy value of products.

Production of high – quality bread of a wide range is one of the urgent and modern problems. We have developed a research scheme includes the use of different types of malt preparations in the preparation of sourdough in the production of wheat dough.

The aim of the research is the influence of rye, triticale, wheat, pea, barley and soy malt on the intensity of enzymatic processes of baking.

The main objectives of the study were to obtain and prepare for the fermentation process of various malts based on grain and legume raw materials, determination of the lifting force of yeast with different malts, baking prototypes of wheat bread.

During the preparation of the sponge, flour, water, malt and yeast were added to all samples. Used rye malt, triticale, wheat, pea, barley, soy (one of each species in one sample). The prepared test samples were baked to achieve inside the crumb for rye bread Moscow mold 50% humidity, and for wheat bread from flour mold - 44%.

A special place among the processes under consideration is given to microbiological. They are associated with the spontaneous development of flour microflora and other components of the formulation, as well as with the vital activity of yeast and lactic acid bacteria introduced with starter cultures [3].

Colloidal and biochemical processes that occur during the preparation of the dough, determine its gas-forming ability and physical properties that determine the porosity of the products. The mechanical effect on the dough during its kneading and cutting intensifies the flow of these processes.

The technology of preparation of the dough with barley malt, as well as with intensive kneading and shortening the duration of fermentation before cutting was studied by many scientists. It was found that an increase in the degree of mechanical treatment of the test increases the attack ability of proteins and starch enzymes [4].

To improve the nutrient medium of yeast, we subjected the starch of flour to sugary by enzymes of various malts. The prepared mixture was kept for 20-30 minutes at a temperature of 38 ° C, then yeast and other components were added in accordance with the scheme of the experiment.

In the process of kneading the dough with increasing air access decreases the content of sulfhydro groups in it. The amount of soluble protein fraction increases not only as a result of moisturizing flour and enzymes, but also largely due to mechanical action on the components of the flour. The biochemical processes accelerate the maturation of the dough, increase the specific volume of bread and the formation of its porosity [3].

Therefore, in our further studies, the prepared samples of the support were kept in a thermostat, every 20 minutes they were removed, the lifting force of the yeast

was measured and intensively mixed. The duration of fermentation of sourdough with malt was different. The process of fermentation of sourdough based on wheat flour with pea malt proceeds 2 times faster than other samples. The greatest lifting power of the samples with wheat malt and slightly less intensive increases the dough with triticale and barley malt.

According to many foreign and domestic authors, wheat flour dough requires intensive kneading due to poor swelling of wheat proteins. When the temperature of the dough increases as a result of intensive kneading, it turns out to be more plastic and better retains its gas-holding ability. With enhanced machining due to a significant increase in the amount of incoming air during kneading the dough is intense reproduction and activation of the life of baking yeast [7, 8].

Loosening pastry on activated yeast, using in the formulation of different types of malt (table. 1), throughout the fermentation period has a value above the control. After 1 hour it is 2.2 times higher than the control. A significant increase continues. By the end of fermentation, the degree of looseness of the experimental test is 1.5 times higher than the control [7, 8].

Table 1.
The degree of looseness of the pastry on activated yeast

Sample	Duration of fermentation, min					
	30	60	90	120	150	180
Control	0,11	0,17	0,24	0,31	0,35	0,46
With wheat malt	0,21	0,37	0,44	0,54	0,61	0,68
With rye malt	0,18	0,16	0,40	0,56	0,60	0,67
With triticale malt	0,19	0,39	0,42	0,52	0,60	0,65
With soy malt	0,24	0,40	0,50	0,68	0,68	0,69
With pea malt	0,13	0,29	0,41	0,57	0,60	0,63

The necessary degree of looseness of the test, judging by the value of the controlled indicator, in the experiment is achieved after 90 minutes of fermentation, that is, 2 times faster than in the counter. But the above indicators do not give a complete description of the properties of the prepared semi-finished product, so we have conducted studies on the structural and mechanical properties of the dough on activated yeast. As in previous studies, they were determined by the indicators of compressibility, relative plasticity and elasticity by the approved method. The results of the experiments are presented in table. 2. [7, 8].

Table 2.
Change of structural and mechanical properties of the pastry by improved technology

Samples	ΔH_{all} , un. of the dev.	ΔH_{pr} , un. of the dev.	ΔH_{el} , un. of the dev.	Relative plasticity, %	The relative elasticity, %
Control	107	73,2	33,8	68,4	31,6
With wheat malt	106	72,2	33,0	67,9	29,3
With rye malt	105	72,0	32,6	69,2	31,0
With triticale malt	108	73,4	34,3	70,0	29,8
With soy malt	107	72,0	34,1	70,2	31,3
With pea malt	106	70,8	33,2	68,0	31,0

The data presented in the table show-elastic and plastic properties of the pastry are at the level of control, which involves obtaining high quality products. Several better results were obtained using triticale and soy malt. On the basis of obtained data we can conclude about the feasibility of using different types of malt in the manufacture of pastry products, prepared using the straight dough method.

He processes of making bread was carried out in accordance with GOST 2077-84 [9] and GOST 27842-88 [10]. Baked wheat bread samples were subjected to organoleptic evaluation, the results of which are shown in the table. 3.

Table 3.
Organoleptic evaluation of the quality of the developed products

The name of the malt	Sample quality indicators					Sum of points
	Appearance	Taste	Color	Smell	Consistency	
	Wheat bread					
Rye	4.5	4.5	4.5	4.5	4.7	22,7
Triticale	4.7	4.9	4.8	4.8	4.8	24,0
Wheat	4.9	4.9	4.9	4.9	5.0	24,6
Pease	4.9	4.8	4.8	4.9	4.9	24,3
Barley	4.5	4.6	4.7	4.8	4.7	23,3
Soy	4.7	4.8	4.8	4.9	4.9	24,1

The best results were obtained using wheat malt in the manufacture of wheat (24.6 points) bread. Slightly inferior to wheat pea and barley malt. The lowest number of 22.7 points scored wheat bread prepared using rye malt.

Studies on the effect of malts on the quality of yeast dough show positive dynamics. The addition of a baking improver based on buckwheat malt in the production of bread from wheat flour with “strong” gluten improves the organo-

leptic and physicochemical quality indicators of finished products (Korshenko L.O. et al., 2014). The use of buckwheat flour in saccharified brew at a dosage of 75% worsens the properties of gluten, makes it stronger, more elastic, less elastic, transfers it to the 2nd quality group in terms of quality, elasticity and extensibility, which causes a decrease in porosity by 14.5% and a decrease in the specific volume of wheat bread by 7.7% (Patokin D.A., Andreev A.N., 2014). Therefore, the use of functional additives and non-traditional types of raw materials in the following areas: increasing the nutritional value of bread using high-protein products, new sugar substitutes; using functional additives in the processing of rye flour with increased autolytic activity; increasing the nutritional value of bread through the use of non-traditional types of raw materials; intensifying the bread production process and increasing its yield; using new types of grain raw materials; using rye flour of new grinds (Fedorova R.A., 2011) - all these technologies allow us to obtain high-quality bread.

Conclusion

On the basis of the conducted researches it is possible to draw the following conclusion:

modern technologies of production of malt and bread baking constantly develop, at the same time new and technically and technologically already existing methods of receiving malt and production of foodstuff with its use are created and improved. The rye, triticale, wheat, pea, barley and soy malt obtained by us in laboratory conditions is used in the preparation of sourdough for samples of wheat bread. Are leaked the processes of fermentation of the dough consisting of wheat flour with a variety of malts, described the polynomial and logarithmic equations when the accurateness of the approximation R^2 0.9662 to 1. The best results were obtained by using wheat malt in the manufacture of wheat bread. Slightly inferior to wheat pea and barley malt. The lowest number of points scored wheat bread, cooked using rye malt. Therefore, in bread making apart from wheat and rye malt can be recommended to use triticale, pea, barley malt and soy.

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温度对蛋白质-碳水化合物混合物粘度的影响
**INFLUENCE OF TEMPERATURE ON THE VISCOSITY OF
PROTEIN-CARBOHYDRATE MIXTURES**

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摘要。本文介绍了根据乳化剂配方成分类型和工艺流程模式对酱料流变特性的研究结果。发现温度升高，蛋奶混合物的粘度增加。粘度取决于原始产品的稠度。当温度改变时，粘度在 7 月 10°C 时变为 0.02，而如果在 25°C 时改变，即在溶液的临界温度之前，粘度会变为 0.72。

关键词：粘度、乳化剂、产品质量、浓度。

Abstract. *The article presents the results of a study of rheological characteristics of sauces depending on the type of emulsion formulation components and modes of the technological process. Found that temperature increases the viscosity of the egg-milk mixture increases. Viscosity depends on the consistency of the original product. When you change the temperature on the viscosity changes to 0.02 1°C in July, and if you change at 25°C, i.e. before the critical temperature of solution viscosity it changes to 0.72.*

Keywords: *viscosity, emulsion, the quality of the product, the concentration.*

Introduction

In food technology, physical impact processes on food systems are frequently encountered. The effect of temperature on the electrical behavior of a protein biopolymer (papain) and carbohydrate biopolymers such as gum acacia, gum tragacanth, and guar gum was investigated using the AC impedance method (S. Muthulakshmi, и др., 2014) [1].

The observed processes represent bulk electrical properties of the material, which indicate uniform relaxation reactions in biopolymers. The increase in bulk conductivity in biopolymers with temperature is due to jumps of charge carriers between trapped sites. The depression parameter shows the electrical equivalent circuit for biopolymers. The alternating current conductivity in biopolymers follows a universal power law. It follows that the alternating current conductivity depends on frequency, and the biopolymer papain obeys the large polaron tunneling model, acacia and guar gum obey the ion or electron tunneling model, and tragacanth gum obeys the correlated barrier jumping model of conductivity mechanisms. [1, 2].

In addition to electromechanical action, binary systems are often affected by temperature, both heating and freezing processes. Loss of vitamin E and accumulation of fat oxidation products are observed during microwave action on binary protein-carbohydrate systems. The losses established during the study directly depend on the power of the microwave oven used and the duration of microwave action on the food product. The effect of microwave waves on fatty and fat-containing food products is minimal with a processing time of less than 3 minutes at an average power of 500 W, and the intensity of formation of oxidative spoilage products is comparable [3].

Typical examples of fat emulsion are milk, cream, sour cream. The size of fat droplets in milk usually fluctuates within the range of 0.1...10 microns, rarely reaching 22 microns (a micron is 1/1000 of a millimeter).

There is another reason why emulsified fat is easier to digest than fat in the form of large droplets. The fact is that the so-called surface tension forces act on the surface of any liquid. Each droplet of liquid is covered with a film, and in order to stretch or tear it, a certain amount of work must be done. In our body, fat taken with food must be emulsified, i.e. broken down into tiny droplets. As a result, fat digestion is facilitated, and energy expenditure on digestion is reduced. For example, the body would have to spend 100-150 calories in the process of assimilation to emulsify 50 g of vegetable oil. When making mayonnaise sauce, we perform this work in the technological process and thereby reduce the body's energy expenditure on digestion.

Dishes that preserve the natural fat emulsion include sour cream and milk sauces, fruits and berries with cream, milk and fermented milk products, drinks with milk and cream, whipped cream and other products with sour cream.

Obtaining an emulsion in cooking allows you to introduce flavoring substances that are not soluble in fats into fatty sauces. You cannot combine oil with tomato, vinegar, dissolve salt in it, but you can add these substances to a fat emulsion, for example, mayonnaise, obtaining various flavor shades (derivatives of mayonnaise sauce).

Therefore, the purpose of the work was to develop modes of technological processes for the production of protein-carbohydrate mixtures of the emulsion type.

Materials and methods

The objects of the study were egg-milk, egg-milk-sugar mixtures, which are used in the production of rich yeast dough, omelettes, puree and milk soups, emulsion sauces. In the process of performing the work, organoleptic, rheological, physicochemical and statistical research methods were used.

Results and discussion

A number of technological factors: temperature, concentration of constituent components, reaction of the environment affects the consistency of protein mixtures. Due to thermal exposure, the structure of proteins changes, their ability to aggregate increases. Highly mobile protein solutions of eggs and egg-milk solutions increase their viscosity under the influence of heat (Table 1).

*Table 1.
Effect of temperature on the viscosity of egg-milk mixtures*

Object of study	Optimum temperature of the mixture, °C	Viscosity of the mixture, Pa s	Organoleptic Indicators
Mixture of yolk, milk and sugar	50	3,080	The mixture has become slightly cloudy, the consistency is uniform
Mixture of yolk, milk and sugar	75	8,404	The mixture is non-uniform, cloudy, gel-like
Egg-milk mixture with sugar	60	2,879	The mixture is opaque the consistency is delicate
Egg-milk mixture with sugar	62	2,889	The mixture is opaque the consistency is denser
Egg-milk mixture with sugar	65	2,895	The mixture is opaque the consistency is denser

This property of egg proteins is widely used in culinary practice in the manufacture of egg-milk mixtures used as a base for some sweet dishes (creams, ice cream), dressings for cream soups, and in the production of mayonnaise [4]. The consistency of egg-milk mixtures depends on the concentration of proteins and the qualitative composition of the mixtures.

One of the indicators that significantly affects the structure of emulsion-type sauces and yeast dough prepared without sponge is their density. We have conducted studies to identify the effect of egg protein concentration, individual egg components, and their nature on the viscosity of the egg-milk mixtures under study.

As a result of the studies, it was found that with increasing temperature, the viscosity of the egg-milk mixture increases. Viscosity depends on the consistency of the original product. However, when analyzing the dynamics of viscosity change, it should be noted that with a temperature change of 1 ° C, the viscosity changes by 0.02, and with a change of 25 ° C, i.e. up to the critical temperature of the solution, its viscosity will change by 0.72, and not 0.50; i.e. for binary mixtures (yolk: milk) there is a dependence on the properties, concentration and interaction of the components of the mixture. Let us apply existing formulas for calculating the viscosity coefficient of a binary mixture of liquids (1-8) [5, 6].

Calculation methods:

Kendall-Monroe method (binary mixture):

Kendall and Monroe (Kendall J. and Monroe K.P.) proposed an empirical equation for calculating the viscosity coefficient of a binary mixture of liquids:

$$\mu_{mix}^{1/3} = x_1 \cdot \mu_1^{1/3} + x_2 \cdot \mu_2^{1/3} \quad (1)$$

Arrhenius method (binary mixture):

Arrhenius S.A. considered the logarithms of the viscosity of liquids forming a mixture to be additive:

$$\lg \mu_{mix} = x_1 \cdot \lg \mu_1 + x_2 \cdot \lg \mu_2 \quad (2)$$

Lima Method (binary mixture):

Lima (Lima F.W.) modified the Sauders method (described on the page: Calculation of the viscosity coefficient of a liquid). The calculation formula is:

$$\lg(\lg(10 \cdot \mu_{i,mix})) = \rho_{i,mix} \cdot \left[\frac{\sum_{i=1}^n x_i \cdot J_i}{\sum_{i=1}^n x_i \cdot M_i} \right] - 2,9 \quad (3)$$

Shukla-Bhatnagar method:

Shukla and Bhatnagar (Shukla R.P. and Bhatnagar R.P.) developed a method according to which it is sufficient to determine the rheochores of the pure components of the mixture to calculate the viscosity coefficient:

$$\mu_{mix}^{1/8} = \frac{\rho_{mix}}{M_{mix}} \cdot \sum_{i=1}^n x_i \cdot R_{ch,i} \quad (4)$$

Lobe Method:

Lobe (Lobe V.M.) proposed the following equation as giving the best results, in agreement with the experimental data:

$$\mu_m = \rho_m \sum_i \Phi_i \frac{\mu_i}{\rho_i} \exp\left(\sum_{j \neq i} \frac{\alpha_j \Phi_j}{RT}\right) \quad (5)$$

In order to use this equation for an N-component mixture, it is necessary to know N experimental values of the mixture viscosity in order to pre-determine all the characteristic viscosity parameters. - α_j .

For a binary mixture, Lobe wrote equation (5) in the following form:

$$\mu_m = \rho_m \left[\Phi_1 \frac{\mu_1}{\rho_1} \exp\left(\frac{\alpha_2^* \Phi_2}{RT}\right) + \Phi_2 \frac{\mu_2}{\rho_2} \exp\left(\frac{\alpha_1^* \Phi_1}{RT}\right) \right] \quad (6)$$

where:

$$\alpha_1^* = -1,7 \ln \frac{\mu_2 \rho_1}{\mu_1 \rho_2} \quad (7)$$

$$\alpha_2^* = 0,27 \ln \frac{\mu_2 \rho_1}{\mu_1 \rho_2} + \left(1,3 \ln \frac{\mu_2 \rho_1}{\mu_1 \rho_2}\right)^{1/2} \quad (8)$$

Index * refers to the component with lower viscosity

Calculation examples

Ingredients: yolk, milk; egg, sugar: T=50 - 75 °C; $x_1=1,440$; $x_2=1,506$

Designations

R = 8,3143 ± 0,0012 - universal gas constant, J/(mol deg;

T - temperature, °C;

x - molar concentration, mol/l;

ρ - liquid density, g/cm³;

μ - coefficient of viscosity of liquid, m²/s.

Discussion and recommendations

The Kendall-Monroe formula - formula (1) - can be recommended for non-associated, similar to each other non-polar liquids. The Arrhenius formula is preferable in these cases. According to [6], for binary systems: yolk: milk the error is less than 1%.

The Lim formula - formula (2) - is recommended for mixtures of not very polar liquids and those similar in structure. The average error is 12% [6].

The Shukla-Bhatnagar formula - formula (3) - for binary systems: egg: sugar the average error is 0.5-1% (maximum up to 4%).

The conducted studies allowed us to establish mathematical dependencies that describe physicochemical and rheological processes with minimal error. This approach solves the issue of the quality of manufactured products. Protein-carbohydrate systems are not stable and the homogeneity and stability of both the suspension and the emulsion depend on the mathematically established modes. Pismenny S.A., Varivoda A.A. (2022) established the dependence of the stability of systems based on a protein-carbohydrate composition on the pH of the medium and the emulsification temperature [6, 7]. It was found that for the maximum implementation of the functional and technological properties of the composition, the active acidity of the medium should be within 4.5...6 units, and the rational temperature for obtaining stable emulsions based on the composition is the temperature 20...35 °C. The possibility of using protein-carbohydrate semi-finished product in the technology of emulsion sauces is also substantiated. It is established that protein-carbohydrate semi-finished product has high stabilizing and emulsifying properties [7, 8]. The conducted studies make it possible to expand the range of emulsion products, increase their nutritional and biological value, more fully use the potential of dairy and vegetable raw materials and will allow to obtain a product with improved organoleptic characteristics and improved quality composition. The selection of sauces for dishes is also carried out using computer design methods based on the content of proteins and fats in each prepared dish in accordance with the principles of rational nutrition. The mathematical methods used in the work made it possible to obtain optimal concentrations of the protein-carbohydrate mixture and temperature data for stabilizing the emulsion.

Conclusion

The creation of emulsion food products with complex biological action based on prescription compositions is of scientific and practical interest from the standpoint of resource-saving technologies and medical and biological efficiency of population nutrition. Until now, the works that have been carried out in this direction have been isolated and have not been widely implemented in practice. In this regard, the results of this scientific work can be recommended for implementation in the production of yeast dough, sauces and puree soups produced at food industry and public catering enterprises.

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DOI 10.34660/INF.2025.85.18.027

中性pH值条件下合成聚合物在箱板纸松香施胶中的应用
**THE USE OF SYNTHETIC POLYMERS IN LINER BOARD ROSIN
SIZING UNDER NEUTRAL PH VALUE**

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摘要。尽管使用基于烷基烯二聚体蜡和烯基琥珀酸酐乳液的化学品对纸张施胶的技术得到了发展，但在纸张和纸板的生产中仍然使用各种改性松香产品。该出版物展示了许多新型合成聚合物在中性 pH 范围内使用松香对半浆和牛皮纸浆组成的衬板进行施胶的技术中的成功工业应用。使用合适的合成聚合物可显著提高使用松香施胶的效率并扩展该技术的功能。

关键词：妥尔油松香、明矾、PAC、PolyDADM'c、中性施胶、聚乙烯亚胺、聚乙烯胺、半浆、牛皮纸浆。

Abstract. *Despite the development of the technology of sizing paper with chemicals based on the of alkylketendimer-wax and alkenyl-succinic anhydride emulsions, various modifications of rosin products are still used in the production of paper and board. The publication shows the successful industrial application of a number of new synthetic polymers in the technology of sizing paper with rosin in the neutral pH range for liner board from a semi-pulp and kraft pulp composition. The use of adapted synthetic polymers significantly increases the efficiency of sizing using rosin and expands the capabilities of the technology.*

Keywords: *Tall oil rosin, Alum, PAC, PolyDADM'c, neutral sizing, polyethyleneimine, polyvinylamine, semi-pulp, kraft pulp.*

Despite the development of the technology of sizing paper with chemicals based on the alkylketendimer-wax and emulsions of alkenyl succinic anhydride, various modifications of rosin sizing products are still used in the production of paper and board not only for special purposes. In order to comply with modern environmental requirements, the technology of modifying rosin size with alum and aluminum polyoxochloride (PAC), as well as synthetic polymers of the polydiallyldimethylammonium chloride class (PolyDADM,c) is widely known in order to use the rosin sizing agents at a higher pH level of the furnish, up to neutral, but in practice, the effect of such dispersions actually took place at a pH not higher than 6.5 units [5,6]. The successful use of modified polyethyleneimine (modPEI)

is known, also partially 30% hydrolyzed polyvinylamine (PVAm) for the same purposes at pH level of up to 7.0 – 7.3 units from a semi-pulp and kraft pulp composition under a high concentration of anionic and other aproductive substances [1,2,3]. However, as the demand for rosin products decreased, they were not further improved and remained at the same level of dispersions with alum and PAC, maleic anhydride. If we talk about the use of a range of synthetic polymers for rosin sizing, two points should be taken into account when choosing them as rosin particle fixatives, especially since paper furnish in technology most often has a concentration of anionic trash and conductivity of a non-technological level, which reduce the effectiveness of the reagents. In one case, the molecular weight may be so small that the molecules are adsorbed inside the fiber capillaries and the ability of the synthetic polymer to bond between particles in the stock suspension is significantly reduced. At the other extreme, the high molecular weight of the chemical (over 3 million g/mol, as in polyacrylamides or polyethylene oxide, starches) leads to the predominance of bridge bonds between fibers, increased flocculation, rather than the process of fixation of rosin particles and aproductive substances on the fiber. Foreign sources claimed that it was preferable to use polymers with a low cationic charge density by analogy with alum, but this theory was not confirmed by Russian practice [7].

It has been noted that a higher cationic charge and a lower molecular weight of the polymer increase the probability of its direct interaction with the fiber surface, and a lower cationic charge and a high molecular weight of the polymer increase the probability of an initial interaction in the liquid phase with all colloidal substances, including rosin and resin particles, and their agglomeration [3]. Thus, in order to prevent possible deposits in the wet end of the paper machine, the interaction mechanism polymer with these components of the paper pulp should be predominantly mosaic, passing into the bridging mechanism of retention chemistry. That is, it is important to take into account two technological points: a) the sizing effect depends on the type of polymers used in chemical technology, b) the sizing effect depends on the structure of the retention and formation polymers used.

In this publication, the so-called tall oil rosin size, in which abietic resin acid predominates, was used in the technology of liner board internal sizing in conjunction with polymers of high cationic polyethyleneimine (highcatPEI), modPEI and 90-95% hydrolyzed PVAm product.

The three reagents for long-term practical tests differed in molecular weight, cationic charge density, chemical structure, and in the effectiveness of the properties of fixation and retention of components of aproductive substances and particles of rosin size in pulp. The first is a highcatPEI with a molecular weight of 800 thousand daltons and a charge density of + 11 meq/g, in contrast to a modPEI with a molecular weight of 1 million daltons with both fixation and retention properties,

with a charge density of +6.5 meq/g. The PVAm-product with a hydrolysis degree of 90-95% is characterized by a molecular weight of 340 thousand daltons and a charge density of +12 meq/g with the properties of fixation and retention, increasing the strength of the paper web in a wet and dry state. The value of the cationic charge corresponds to the measurements at pH = 7.0 and decreases slightly with its growth. The content of the active substance of PEI reagents was 22-25%, PVAm - 20-22%. The concentration of anionic contaminants of the composition – cationic demand – had a high level, 2300 – 2400 mg of PolyDADM,c/l, and the conductivity reached 3000 mkSiem/cm. Chemicals were selected on the basis of a large sample of practical data on pulp and paper enterprises in Russia, which is summarized in Fig.1 [3].

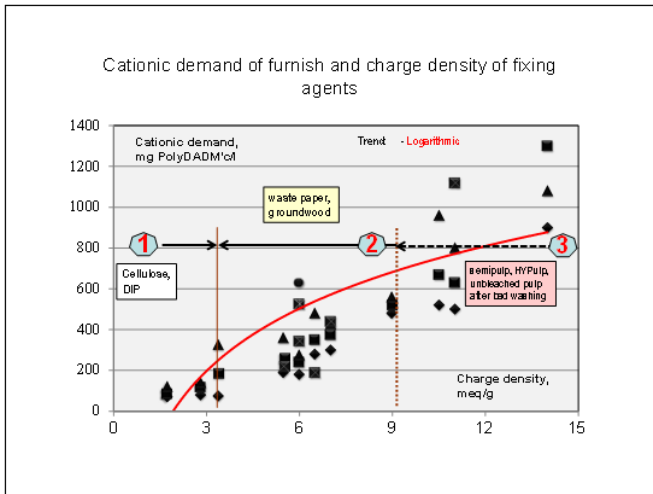


Figure 1.

Possessing the properties of fixation and retention, including rosin particles, the efficiency of the products of modPEI and PVAm should presumably be higher in comparison with alum and PAC, or with PolyDADM;c, in furnish with such negative parameters for the technology. The speed of the paper machine (PM) in the production of liner board from semi-pulp and kraft pulp with 150 g/m² was 500 – 550 m/min. The consumption of highcatPEI in the process of three day operation was 1.5 – 2.0 kg as received/ton; at the same time, the dry matter consumption of rosin size and alum has almost halved, and the pH of the furnish in the headbox of the paper machine has gradually increased to 6.5 units (Fig. 2, 3). It can be assumed that the particles of the highcatPEI adsorb on the surface of the fibers,

initially displacing anionic substances from it into the liquid phase; further, due to the high cationic charge, these substances and rosin particles are fixed with the formation of a complex on the fiber and an increase in the effect of hydrophobation, with a decrease in the consumption of both alum and rosin. To further increase the pH of the furnish, a higher reagent dosage may be necessary, and also, since the fixation process takes place on the fine fibers of the composition, an interconnected system of retention chemicals, without which mechanical retention in the structure of the paper web prevails.

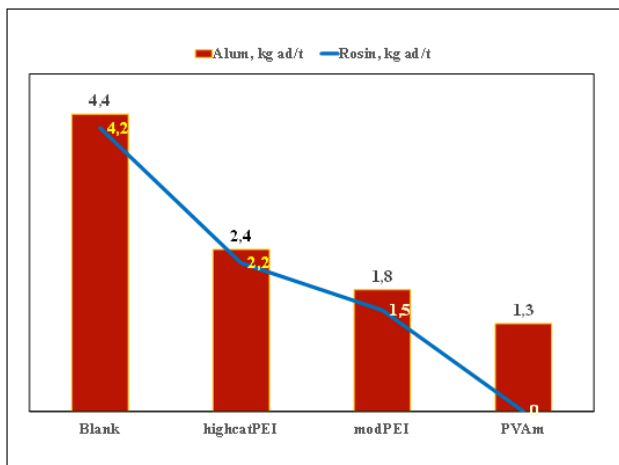


Figure 2.

The action of particles of 2 kg as received/ton modPEI was apparently somewhat different from the mechanism with a high cationic reagent. As shown by the data of measurements of the current potential and cationic demand of the stock, the turbidity of the filtrate during the drainage of the headbox stock on the Schopper-Riegler apparatus, at the first stage, anionic trash of the furnish and rosin particles is neutralized in the liquid phase due to the middle cationic charge of the chemical. Further, due to the reagent retention properties, this complex is fixed on a fine fiber, then on a longer fiber fraction without significant enlargement of fibrous flocs. This mechanism is confirmed by an increase in the first pass retention on the wire by more than 5%, a decrease in the consumption of rosin to 1.5 kg ad/t and the pH level of the furnish from the headbox of 7.2 units (Fig. 2, 3, 4).

PVAm polymers with a hydrolysis degree of 0 – 15% – 30% are mostly used for retention and drainage; with a degree of hydrolysis of 75% - 100% - for strengthening the wet web in the wet end, increasing the properties of the strength in a dry and wet state on the reel of the machine, fixing productive substances.

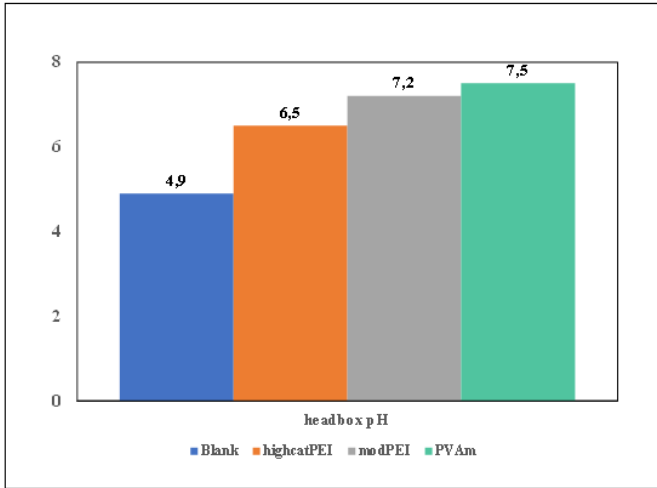


Figure 3.

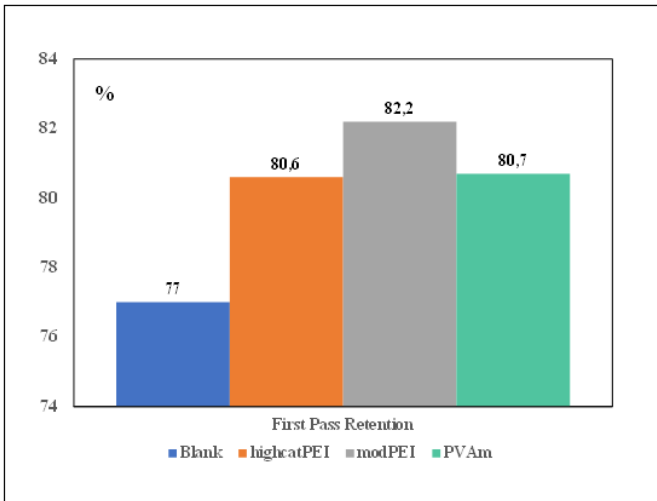


Figure 4.

The action of particles of the selected PVAm structure combines the mechanisms of both polyethylenimine products, however, at a low molecular weight, a higher dosage of the reagent than 2 kg/t is required for dense adsorption and higher first pass retention on the machine, but effective fixation of anionic substances and

retention made it possible to reduce the consumption of alum to 1.3 kg of ad/t, to exclude rosin from the production technology with the achievement of pH = 7.5 units [3,4]. The effect of hydrophobation of liner to the requirements of quality standards was achieved due to the so-called self-sizing – due to the fixation and retention of natural resin particles of the fiber [3,6]. Simultaneously with the increase in the pH of the furnish from the acidic to the neutral range, alum passes through the isoelectric point, transforming into alkaline aluminum compounds, participating less and less in the sizing process. Summarizing the above, with the correct selection and selection of polymer dosing points, it is possible to use any type of rosin sizing agents at a neutral pH level of paper furnish.

Conclusions:

1. The use of adapted synthetic polymers significantly increases the efficiency of sizing with the use of rosin and expands the capabilities of the technology, including the composition of paper pulp with a high concentration of aproductive substances.
2. With all three selected polymers, pseudo-neutral and pH neutral technology is possible, but the highcatPEI must be complemented by a reliable retention system.
3. ModPEI and PVAm products are most effective when used on their own in rosin sizing technology at a neutral pH range of paper furnish.
4. The minimal dosage of alum is necessary to neutralize anionic contaminants in the liquid phase of stock, which increases the efficiency of polymers.

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通过提高 SEVERS 的质量来减少大豆损失
**REDUCTION OF SOYL LOSS BY INCREASING
THE QUALITY OF SEVENS**

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摘要。增加阿穆尔州的大豆产量尤为重要。大力发展其加工，增加消费者对其产品（蛋白质和油）的需求。由于播种面积扩大，总产量增加，其可能性已耗尽；储备是提高种子的质量。已确定大豆具有生物学差异 - 种子的质量。形成较早的种子具有更高的生长能量、发芽率、生产力和更高的绝对重量。

已经开发了在收获期间分离和收集这些种子的技术，该技术简单、劳动强度低，并且由于该地区播种的种子损坏严重且质量差（平均高达 20% 的种子质量不合格），因此需要对收获种子地块的收割机进行现代化改造。

增加大豆产量的重要作用是减少谷物破碎造成的间接作物损失，尤其是在收获和加工作物时。给出了联合收获期间获得的大豆谷物破碎和微损伤含量的实验数据。大豆收获的农业技术评估表明，收获大豆时，破碎值处于 1.5... 4.8% 的水平，比准备播种的种子中的破碎值 3.2... 6.34% 要小。确定种子中的破碎百分比不会降低，相反，破碎值增加了 1.32... 2.1 倍，微损伤从 1.34% 增加到 5.89%。种子中的破碎大豆粒使油籽杂质的价值增加，从而增加了播种率。这部分昂贵的种子材料被不必要地播种在土壤中。播种时土壤中的微损伤达到 60%，无法产生幼苗。当将用于收集种子粒的联合收割机引入生产时，可以防止这些损失（俄罗斯联邦专利号 2679508）。

关键词：大豆、种子、油性混合物（粉碎）、联合收割机、谷物升降机、螺旋输送机。

Abstract. *The increase in soybean production in the Amur region is especially important. Intensively develops its processing and increases consumer demand for its products (protein and oil). The increase in gross harvest due to the expansion of sown areas has exhausted its possibilities; the reserve is to improve the quality*

of seeds. It is established that soybeans have a biological difference - the quality of the seeds. Seeds, the formation of which begins earlier, have increased growth energy, germination, productivity, higher absolute weight.

The technology of isolation and collection of these seeds during harvest harvesting has been developed, is simple, low-labor and requires modernization of the harvester for harvesting seed plots, due to significant damage and poor quality of seeds sown in the region (on average up to 20% sown substandard seeds).

An important role in increasing soybean production is to reduce indirect crop losses from grain crushing, especially when harvesting and processing crops. Experimental data on the content of crushing and microdamage in soybean grains obtained during combine harvesting are given. The agro technical assessment of soybean harvesting showed that when harvesting soybeans, the crushing value is at the level of 1.5... 4.8% and is a smaller percentage than in seeds prepared for sowing 3.2... 6.34%. It was determined that the percentage of crushing in seeds does not decrease, but, on the contrary, increases in crushing by 1.32... 2.1 times and in microdamage from 1.34% to 5.89%. Crushed soybean grain in seeds makes an oilseed impurity by the value that increases the seeding rate. This part of the expensive seed material is needlessly sown in the soil. Micro-damage during sowing in the soil by 60% does not give seedlings. It is possible to prevent these losses when a combine harvester for collecting seed grain is introduced into production (Patent of the Russian Federation No. 2679508).

Keywords: *soybean, seeds, oily admixture (crushing), combine harvester, grain elevator, tape-screw transporter.*

1. Introduction

Soy of different varieties is an annual plant with a stem height of 400 to 800 mm. The stem and branches are straight or cranky, and depending on the clogging of the crops are different in thickness - from thin (3-4 mm on clogged) to rough (8-10 mm on clean). The bushes, depending on the angle of divergence of the branches, are compressed, and wide. Flowering and legume formation occurs as the plant grows. Seeds that start forming earlier have higher growth energy, germination, productivity, and higher absolute weight [11].

Beans formed on soybean bushes are divided: as large, small and medium. Maximum length of 60-80 mm, minimum 20-25 mm. In shape, the beans are straight, slightly curved and sickle-shaped. In most varieties of soybeans, the beans are distributed over the stem and branches more or less evenly, but for some, the bulk of them develop mainly in the lower or middle part of the plant [12].

In harvester harvesting, soy plants are cut by a reaper, causing total losses of up to 0.12-0.15 t / ha. Losses are due to non-cut beans in the lower part of the plants,

cut fallen, combed with a motovilo reaper and free grain, due to the fact that the cut height used in harvesting reapers is from 675 to 1140 mm. To reduce the listed losses of the soybean crop, LLC “KZ” ROSTSELMASH is doing a lot of work on the development of a low-cut soybean harvester [13].

Soybean, with a high content of protein and fat, is the most important crop of the Far East. The area of its crops in Russia is increasing annually, which is due to the constantly growing demand for soybean products from the food and feed industry [1, p. 69].

Soybean cultivation technology provides for the use of modern technology during the entire period of cultivation from sowing to harvesting soybeans [2, p. 330]. The use of innovative soybean cultivation technologies ensures a high yield. In increasing soybean production, an important role is played by reducing direct and indirect crop losses (the content of broken and micro-damaged grains in seeds) obtained during grain harvesting, part-time work and seed harvesting [3, p. 16].

A lot of work is devoted to the issue of reducing damage to soybean grain during harvesting and post-harvest work [4, p. 17]. Moreover, each researcher, studying a separate working element of the threshing-separating or transporting device of the combine, finds a certain technical solution that allows significantly reducing damage to soybean grain in its pure form [5, p. 26]. At the same time, the authors experiment in laboratory conditions on grain, the physical and mechanical properties of which cannot fully correspond to natural conditions [6, p. 237].

The resistance of the soybean grain to mechanical damage is largely predetermined by its humidity. When treating seeds with conditioned humidity of 12-14%, a minimum of damage is noted. Mechanical damage increases when treating both dry (at $W = 8\%$) and wet ($W = 18\%$) seeds [7, p. 37], but the type of damage changes. Dry seeds from impact and pinching break down mainly into small parts, and at the same time the seeds contain a large amount of finely chopped grain. The crack of the shell and cotyledons during further processing leads to the loss of the embryo and the decay of grain on the cotyledons (halves) [8, p. 51]. In the general form of damaged seeds are broken across the grains and seeds with a broken part of the cotyledon and a knocked out germ [9, p. 48]. Wet seeds are deformed under load, and as a result, the total mass of damaged seeds consists of flattened, fractured grains and grains with dents and breakage of the shell [10, p. 82].

2. Methods

The performance of all mechanized works related to cleaning and post-harvest processing is carried out by machines designed for cultivation of grain crops, which by design features and technological modes of work do not fully meet the requirements of the entire set of physical and mechanical properties and features of soybean culture.

A ground grain of soy is a solid heterogeneous body containing a number of organic and inorganic substances. By design, consisting of two spermatozoa, the

embryo and is covered with a dense peel (seed shell) that protects its inner part. The shell of soy is up to 7% of the weight of the whole grain, the semi adults and the embryo account for respectively about 91% and 2% of the mass of the whole grain. Soybean humidity is 12%.

The structure of different layers of the soy shell with cells that are longitudinal or transverse, the abundance of capillaries, the predominance of carbohydrates in the chemical composition of the shell, subject to arborization, lead to the fact that the resistance to the resulting bursting forces during impact and pinching at the shell is small, especially at low humidity. Due to the different, not matching geometrically structure of the individual elements of the shell, and their mutual arrangement, the strength of the soybean shell is not the same and is variable by more than 1.5 times when changing the direction of the effect of the force on the grain. On the basis of these properties, it is subject to rupture, destruction during force interaction, and as a result, the seeds completely lose germination and disintegrate into component parts (skin, cotyledons, embryo, called crushing or oilseed admixture). The increased (6-9%) content of oilseed impurities in soybean seeds, as well as reduced germination due to injury (3-4%) reduces their sowing qualities, and in the commodity fraction their set weight, which is a loss.

Soybean seed damage is a local or general destruction of grain as a single and complex biological system. Both in degree and in nature, these failures can be different. As a result of mechanical action on the part of working organs during threshing, soybean grain can be crushed, part of its shell is torn off, the embryo is knocked out or partially destroyed, part of the cotyledon is broken off. When the soldered grain is moved in screws and elevators, the grain is pinched in the gaps between the casing and screw of the screw or scraper and chute when it deviates, as a result its seed shell (peel) is damaged and soybean grain is broken into halves. Therefore, the soybean grain is damaged to various degrees during harvesting and part-time work, is not completely sorted on sieves during part-time work, and is contained in greater quantities in seeds prepared for sowing.

The content of soybean seed crushing was determined according to GOST 12036-85 «Seeds of the main culture» The crushing included five types of damage associated with loss of germination, these are the crushing of the seed along, the crushing of the seed across the cotyledons, quarters and finely crushed parts, and part of the cotyledon in the embryo region was repelled. Microdamage included the following types of damage associated with the destruction of the seed shell: this will knock out the embryo, cracks along and across the seed, including seeds passing through the embryo that have lost part of the shell.

There are many methods for determining micro-damaged seeds, and if we consider that the accuracy of determining micro-damaged seeds of all existing methods does not exceed, as in visual determination, we can dwell on the method

of directly viewing seeds through a 7-8-fold binocular magnifying glass, which is most widely used in the practice of assessing seeds in tests of combine harvesters. For viewing and analysis, the selected sample is divided into parts with the help of a divider and three weighed portions weighing at least 100 grams of seeds are isolated. Each sample is divided into fractions, the separated fractions are weighed, the remaining seeds are viewed through a binocular magnifying glass, then microdammed ones are isolated, then the percentage is weighed and determined. The obtained data are recorded in tables.

3. Results

Study of damage to soybean seeds during harvesting and post-harvest treatment showed a high percentage of seed fragmentation (Table 1).

Table 1
Oilseed content in soybean grain during harvesting and post-harvest processing in farms of the Amur region.

Farming	Sort of soi	Processing stage	Contents fragmented grain, %
OAO «Priamurie»	October 70	Combine cleaning, Postharvest	7 ± 0,75 8 ± 0,74
OAO «Priamurie»	Vniis - 1	Combine cleaning, Postharvest	8 ± 0,76 7 ± 0,68
OAO «Volkovsky»	Vniis - 1	Combine cleaning, Postharvest	9 ± 0,94 8 ± 0,21
Experienced Soybean Farm	Vniis - 1	Combine cleaning, Postharvest	5,5 ± 0,44 2,6 ± 0,38
OAO «Dimsky»	Vniis - 1	Combine cleaning, Postharvest	8 ± 0,31 5 ± 0,38

The working organs of the combine differently produce a forceful effect on the grain in the process of breaking its connection with the leaves of the beans and damage it. After the threshing device of the combine, soy seeds are most damaged when they are moved by transport devices, of which there are quite a lot in the combine itself and in the grain-purifying production line. These means of mechanization do not fully correspond to the biological and physic-mechanical features of soybeans: weak resistance to shock loads, globularity, contributing to the active movement of grain, twice the size of grain, low grain humidity during harvesting.

To improve the quality of soybean seeds, a promising direction, along with other techniques, is to improve the differentiated method of grinding and separation of grain during harvesting, with the release and collection of easily rejuvenated, high-quality, biologically complete seeds for sowing in a separate bunker and collecting the remaining domesticated seeds in the second bunker [11].

Analysis of the results of the agro technical assessment of soybean seeds obtained in 2021-2024 during the actual harvesting of soybeans in the farms of the Amur Region in the optimal agro technical time with grain humidity of 13... 16% by domestic and imported combines (Vector 410, Acros 530, Amur-Palesse KZS-1218-40, Claas «Tucano 430», Case IH 6088, «John Deere W650») shows that the bunker grain contained: weed impurity 0.42... 2.1%, crushed seeds - 1.5... 4.8%, micro-damaged - 0.6... 1.34%, damaged by pests, diseases and frost – 1.64... 11.6% (Table 2).

Table 2

The quality of bunker grain during combine harvesting of soybeans in 2021-2024 in seed farms of the Amur Region.

Harvester brand, grade soi	Weed impurity, %	Crushing, %	Microdamage, %	Patients, eaten, frost, %	Weight 1000 seeds, g
Vector 410, soy grades Alyona	0,98	4,72	1,1	1,64	157,5
Acros 530 soy grades Alyona	0,42	4,83	1,15	1,9	154,7
Claas «Tucano 430» soy grades Alyona	1,82	1,4	0,71	3,7	147,2
«Amur- Palesse» KZS-1218- 40 soy grades Alyona	0,11	3,48	1,0	1,64	155,0
Vector 410, soy grades Sentyabrinka	0,98	4,72	1,1	1,64	175,5
John Deere W650, soy grades Batya	1,2	1,85	1,0	11,6	225,2
Claas «Tucano 430» soy grades Batya	2,1	3,63	1,34	6,6	211,0
Case IH 6088 soy grades Batya	1,22	1,5	0,6	7,3	213,4

A study of the sowing qualities of soybean seeds propagated in seed farms for sale to commodity producers shows that the use of an outdated combine park in harvesting and the deterioration of grain cleaning equipment do not allow obtaining high-quality seeds.

In the seeds of selection of VNII soybeans, DalNIIX, Canadian varieties cultivated in seed farms, the content of crushed and micro-damaged seeds is different. Maximum crushing (6.34; 5.73; 5.41; 3.2%) and microdamage (2.71; 4.34; 4.14; 4.97%) was detected in seeds in the farms of the Tambov region on soybean varieties Persona, Alena, Lazurnaya, Prudence (Table 3).

Table 3

Analysis of the quality of soybean seeds of various varieties taken from seed farms of the Amur oblasti

Area, soy grade	Crushing, %	Cracks in the cotyledon and embryo region, %	Sick, frosty, pest-damaged, %	Weight 1000 seeds, g
Tambov District, Soybean Variety: «Kitrosa»	1,3	1,6	0,5	156,8
«Person»	6,34	2,71	0,73	117,86
«Evgenia»	1,8	3,65	0,35	186,5
«Azure»	4,30	4,35	0,15	171,06
	5,41	4,14	0,8	161,85
«Alyona»	5,73	4,34	0,53	167,0
«Prudence»	3,2	4,97	0,13	174,8
	1,09	2,6	0,91	192,3
«Luxury»	1,01	1,71	0,57	148,1
	0,38	2,0	1,47	161,7
«Umka»	3,88	2,54	1,0	173,5
Konstantinovsky District, Soybean Variety: «Umka»	3,55	1,31	1,34	176,6
«Bonus»	1,64	1,66	2,28	174,1
«Luxury»	1,67	1,84	2,41	163,15
«Prudence»	5,74	1,87	0,72	174,7
	4,32	5,89	3,10	168,7
«Azure»	2,59	1,24	1,92	180,3
«Person»	3,44	0,73	0,74	114,4
«Alyona»	3,76	5,14	1,09	167,7
	2,16	2,63	5,14	162,76
Ivanovo District, Soy Variety: «Terek»	1,26	1,53	2,49	168,8
«Umka»	4,64	1,77	3,56	188,1
«Alyona»	1,0	1,48	1,34	171,0
«Luxury»	1,34	1,80	1,55	154,3
«Dauria»	3,21	2,52	1,01	165,8
«Prudence»	2,44	3,94	1,60	187,1

4. Discussion of results

The rational scheme of two flow air-grid cleaning combine for harvesting soybeans for seeds is a monoblock design. Effective separation of soybean seeds in quality on the first (seed) and second fraction occurs when using the upper sieve with elongated (70 instead of 22 mm) petals of the blinds, the size of the overlap of

the upper sieve with a 300 mm thunderhead and a long pitched board for the first flow of 500 mm... At the same time, the lattice-planked subdrum of the first drum should have, especially behind the first plank, an intensive zone of seed separation.

When modernizing the combine harvester and grain cleaning machines, it is proposed to replace the grain elevator with a tape screw according to the patent for utility model No. 169329.

This will allow one harvester of two-phase threshing with two flow treatment to reduce by 25% the total loss of grain behind the harvester and allocate a separate stream of 53-57% of biologically complete, with a low content (1.2-2.1%) of damaged and high-quality soybean seeds that do not require post-harvest work. During the harvesting period of 10-12 working days, the modernized combine harvester will provide seeds for up to 1000 hectares of sown areas.

In the seeds of the farms of the Konstantinovskiy district on the varieties Prudence, Alena and Umka, the crushing value is slightly lower and is (5.74; 3,76; 3.55%), but significantly higher microdamage (5.89; 5,14; 1,34%). The amount of crushing and micro-damage is much lower in the seeds of farms in the Ivanovo region. In this area, during the construction of a seed plant, the movement of soybean grain on non-damaging belt conveyors is introduced. Here, the crushing of soybean seeds in the varieties Umka, Dauria and Prudence is (4.64; 3,21; 2.44%) and microdamage (1.77; 2,52; 3,94%). The smallest mass of 1000 seeds in the marked varieties is possessed by small seeds of soybeans of the Persona variety (114.4... 117.9 g), the crushing of which is 6.34... 3.44%, and microdamage is located within 2.71... 0.73%. The highest mass of 1000 seeds is a variety - Prudence (180.3 g), in which crushing is located within 2.44... 5.74%. And the Lazurnaya variety (174.8 g), the crushing of which is 4.30... 5.41% and microdamage - 4.14... 4.35%. The above seed quality data for the three areas of the area show that the highest amount of mechanically damaged soybean seeds is observed in the Canadian breeding variety Prudence; from varieties of selection of VNII soybeans - Person, Alena, Azure.

5. Conclusion:

1. An analysis of the agrotechnical assessment of soybean grains during combine harvesting and seeds of part-time workers prepared for sowing shows that the content of crushed and microdampled grains in seeds does not decrease, but, on the contrary, increases in crushing by 32% and microdamination by 3.7 times. And this does not mean that crushed grain is not sorted on the screens of grain cleaning machines. It's just that when working part-time and moving in screws and noria, soybean grains receive new damage and their content in seeds, does not decrease, but, on the contrary, increases.

2. When updating the combine park for timely harvesting of grain and soybeans and improving the quality of marketable grain, farms are advised to pur-

chase new, productive combine harvesters of models: Case IH 6088, John Deere W650, Claas “Tucano 430,” which receive better quality grain when threshed.

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磁场中微团簇水对石墨的分层作用

GRAPHITE STRATIFICATION BY MICROCLUSTER WATER IN A MAGNETIC FIELD

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摘要。本文提出了一种在磁场中通过微团簇水剥离石墨并从中获取石墨烯的模型。微团簇水剥离石墨的模型基于表面层的厚度，对于石墨而言，表面层是三个单层石墨烯。磁场对水的作用导致表面张力增加，张力大小增加三倍。利用所获得的方程，可以在磁场中通过微团簇水剥离石墨，并以环保的方式获得石墨烯。

关键词：模型，插层，剥离，石墨，石墨烯，磁场，水团簇。

Abstract. *The article proposes a model of graphite exfoliation by microcluster water in a magnetic field and obtaining graphene from it. The model of graphite exfoliation by microcluster water is based on the thickness of the surface layer, which for graphite is three monolayers of graphene. The effect of a magnetic field on water leads to an increase in surface tension with a threefold increase in the magnitude of the tension. Using the obtained equations, it is possible to obtain graphite exfoliation by microcluster water in a magnetic field and obtain graphene in an environmentally friendly way.*

Keywords: *model, intercalation, exfoliation, graphite, graphene, magnetic field, water clusters.*

The synthesis of graphene and graphene-like materials is based on increasing the interplanar distance, weakening the interaction forces between graphite layers, and subsequent exfoliation of graphite. However, it is impossible to use mechanically obtained graphene [1, 2] on an industrial scale. We have also proposed a

method for exfoliating layered graphite crystals with microcluster water [3], the theoretical justification for which is given in [4, 5].

The aim of this article is to model the intercalation of graphite by microcluster water in a magnetic field.

Graphite is a thermodynamically stable sp^2 -hybridized allotropic modification of carbon. The crystal structure of graphite [6] has hexagonal symmetry and consists of flat layers of carbon atoms located parallel to each other (Fig. 1a). The structure of graphite layers is shown in Fig. 1b, constructed using the methodology of our work [7].

The R(I) layer is described using the methodology [7] by the equation:

$$R(I) = 0,17 \cdot 10^{-9} \cdot \alpha \cdot \nu [m]. \quad (1)$$

In equation (1), one parameter must be known – the molar volume of the element, which is equal to $\nu = M/\rho$ (M is the molar mass, ρ is its density), $\alpha = 1 \text{ m}^{-2}$ is a constant to maintain the dimensionality ($R(I) = [m]$). Using formula (1), we calculate R(I) (Table 1) for graphite parallel to the plane $x = a = b$ and perpendicular to this plane $x = c$.

Table 1.
Parameters R(I) of graphite [8].

Graphite	Structure	M, g/mol	ρ , g/sm ³	R(I) _a , nm	R(I) _c , nm
C	C6/mmc-D _{6h} ⁴	12,0107	2,26	0.90 (3)	2.46 (3)

From Table 1 it is evident that the thickness of the R(I)a layer is equal to: 0.9 nm in the upper plane and 2.46 nm perpendicular to this plane (Fig. 1a), i.e. it is a nanostructure. In Table 1 the number of graphite monolayers is given in brackets, equal to $n = R(I)/a$ (a is the lattice constant of graphite). It is evident that the number of monolayers in graphite is three.

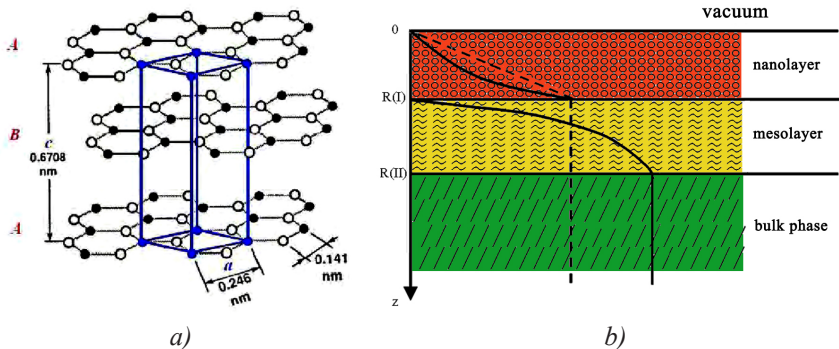


Figure 1. Graphite structure [6] (a); graphite layer structure [7] (b).

Graphite practically does not react in pure water. Its layered structure does not allow water molecules to penetrate between the graphite layers. Therefore, graphite remains stable and does not dissolve [9]. In two Patents (Lorenzen L.H.) more than 20 years ago, a process for obtaining microcluster water was described [10, 11]. First, the source water is boiled to obtain steam. Next, the steam is passed through a magnetic field and the steam condenses at a temperature above 0 °C in the presence of light in the range from far infrared to ultraviolet spectrum. At least one metasilicate salt stabilizer and a food additive template are added to the condensed steam. The concentration of the food additive is 1%. The condensed steam is exposed to a pressure of more than 1 atm; and then the pressure is released to produce microcluster water. Microcluster water gives a resonance signal NMR 170 at 115 HZ, has a conductivity of at least 3.7 μS/cm and a surface tension of less than 61 dynes/cm. According to Rusanov A.I., the thickness of the surface layer should be understood as a layer of water, which is electrically neutral and has a size of 1-2 nm [12]. According to the idea of Ken Jordan [13], this layer of water consists of 6 of its molecules (6x0.193 = 1.15 nm). Using the experimental data, we calculate R(I) using formula (1) at T = 25 °C = 298 K; γ = 72.8 10⁻³ (J/m²); ν = 18 10⁻⁶ (m³/mol); R₀ = 8.31 (J/K mol); R(I) = 1.1 nm. This means that the number of monolayers in the R(I) layer is equal to n = R(I)/a (a = 0.193 nm is the radius of the water molecule) ≈ 6. It can be concluded [14] that the thickness of the surface layer of water meets the condition of Rusanov A.I. [12] and the clusters of Ken Jordan [13]. In other words, the cluster structure of water, like all liquids, is a phenomenon caused by the difference in the interaction of atoms on the surface and in the volume. For liquids, mixing of layers leads to the cluster structure of most of it. An aqueous solution of density ρ(r,z,t), which moves according to the dependence β(t) in a cylinder, can be described by the diffusion equation:

$$\frac{\partial \rho(r, z, t)}{\partial t} = D \left[\frac{\partial^2 \rho(r, z, t)}{\partial z^2} + \frac{1}{r} \cdot \frac{\partial}{\partial r} \left(r \frac{\partial \rho(r, z, t)}{\partial r} \right) \right]. \quad (2)$$

where D is the diffusion coefficient of the solution.

We will choose the conditions on the boundary and the initial condition in the form:

$$\begin{aligned} \rho(r, z, t) \Big|_{t=0} &= \varphi(r, z), \\ \rho(r, z, t) \Big|_{t=0} &= \varphi(r, z), \\ \rho(r, z, t) \Big|_{z=0} &= \gamma_1(r, t), \\ \rho(r, z, t) \Big|_{z=\beta(t)} &= \gamma_2(r, t), \end{aligned} \quad (3)$$

Solving it, taking into account some details, we finally get:

$$\rho(r, z, t) = J_0\left(\frac{2r}{R}\right) e^{-a^2 t} \left\{ \frac{e^2 J_0\left(\frac{2r}{R}\right)}{16a^3} \ln t + \frac{LJ_1\left(\frac{2r}{R}\right)}{16a^3} e^{-a^2 t} \ln(t-1) + \left(1 - \frac{1}{\sqrt{t}}\right) \left(\frac{a^2}{z\pi} + \frac{a^3}{\pi^2 z\beta(t)}\right) + \left(1 - \frac{1}{\sqrt{t}}\right) \frac{2a}{\sqrt{\pi}} \frac{1}{[z - \beta(t)]} \right\}, \quad (4)$$

If time t is very large, then as a result we will get:

$$\rho(r, z, t) = \frac{D^{3/2}}{\pi^2} J_0\left(\frac{2r}{R}\right) \cdot \frac{t}{z\beta(t)}, \quad (5)$$

Let us denote $z = v t$, where v is the flow velocity, t is the time of its movement. We will assume that the phase separation movement is self-similar $\beta(t) = \beta_0 t$. We will use the asymptotic representation of Bessel functions, then for $r = R$ we obtain:

$$\rho(r, z, t) = \frac{D^{3/2}}{\pi^{5/2}} \cdot \frac{1}{v \cdot \beta_0 \cdot t}, \quad (6)$$

Above, $v(z, t)$ is the velocity of the solution at point z at time t . Assuming that $v(z, t)$ depends only on the density ρ , we have that when the crack is empty ($\rho = 0$), the solution moves with a maximum velocity $v = v_{\max}$. When the crack is filled, the velocity drops to a complete stop ($v = 0$), when $\rho = \rho_{\max}$. Mathematically, this will look like this:

$$\rho = \rho_{\max} \left(1 - \frac{v}{v_{\max}}\right), \quad 0 \leq v \leq v_{\max}. \quad (7)$$

Relationships (6) and (7) are shown in Fig. 2. From formula (6) we can see a significant dependence of the solution flow density on the diffusion coefficient, i.e. on its rheology, which is equal, according to the classical Newtonian theory, to $D = \nu$, where ν is the kinematic viscosity coefficient. We will consider the issue of solution viscosity from the standpoint of the thermodynamic approach.

As a response function we take the kinematic viscosity ν , then we have:

$$\nu = \frac{kT}{c} \cdot \frac{W}{G_n^0} \cdot N, \quad (8)$$

where $NkT = PV = (V=1)P$ is the pressure in the solution flow; W is the kinetic energy of the particles (molecules) of the solution $W = m V^2/2$; G_c^0 is the energy of the mixture (solution); $c = \text{const}$, m is the mass of the particles, V is their speed.

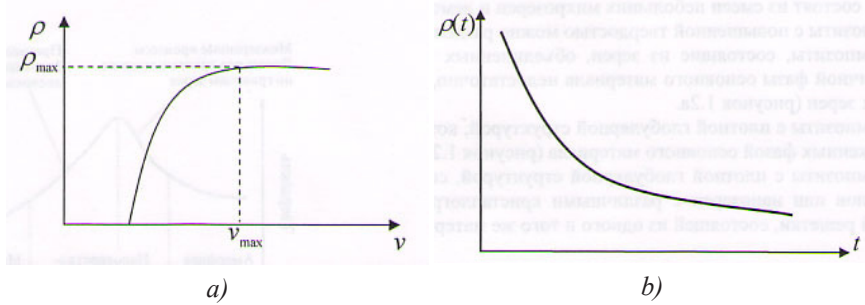


Figure 2. Dependence of flow density on the speed of solution movement (a), dependence of flow density on time (b).

Equation (7) will take the form (Fig. 3a):

$$v = \frac{1}{c} \cdot \frac{P}{2G_{\text{нб}}^0} \cdot mV^2. \tag{9}$$

Considering that $G^0 = \gamma S$, S is the area, we obtain the following equation for the relationship between the viscosity of the solution and its surface tension γ (Fig. 3b):

$$v = \frac{J}{\gamma}, \tag{10}$$

where J is the liquid constant under given thermodynamic conditions. Equation (10) is valid for graphite, for which the solution flow is proportional to the surface energy $\gamma = W_a/2$, where W_a is the adhesion energy of graphite.

Let us rewrite formula (8) in the form:

$$W_D = \cdot 10^3 \cdot \sqrt{\frac{L_{\text{н}}}{\check{E} \cdot v \cdot t} \cdot \frac{L_{\text{н}}}{\check{E} \cdot v \cdot t}}, \tag{11}$$

Here for aqueous solutions $J = 2 \cdot 10^{-8}$, $\beta_0 = 0.2$.

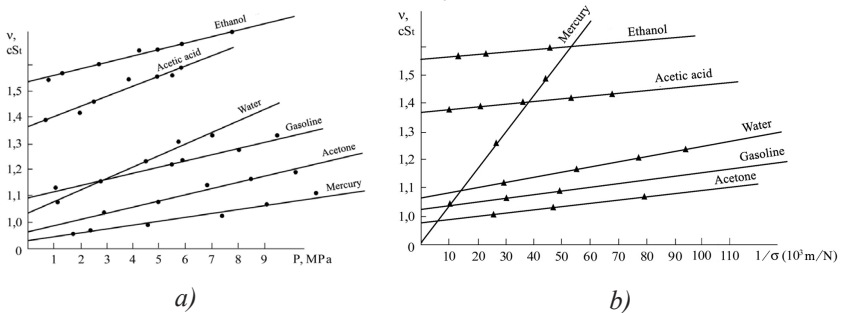


Figure 3. Theoretical dependences of kinematic viscosity on pressure for some liquids (a), illustration of formula (10).

In formula (11), all parameters on the right side are determined experimentally and give the value of W_p . If the value of $W_p > W_{ac}$, then graphite splits to form graphene.

Intercalation of water into graphite and its subsequent exfoliation is possible when the following relationships are met:

$$\begin{aligned} W(C) - W(H_2O) &\rightarrow \min, \\ \gamma(C) - \gamma(H_2O) &\rightarrow \min, \end{aligned} \tag{12}$$

where $\gamma(C) = 0.798 \text{ J/m}^2$ is the surface energy of graphite in the c plane; $\gamma(H_2O) = 0.0728 \text{ J/m}^2$ is the surface energy (surface tension) of water.

Equation (12) shows that any effect on water (chemical impurities, vibration, ultrasound, electric and magnetic fields, increased temperature, etc.) leading to an increase in $\gamma(H_2O)$ will contribute to the exfoliation of graphite. In work [15], a system of permanent magnets mounted on a piezoelectric plate was used to activate water to modulate the magnetic field. The conductivity and permittivity of water activated by this source were experimentally studied. The effect of a magnetic field on bidistilled water ($0.84 \cdot 10^{-4} \text{ Ohm}^{-1}\text{m}^{-1}$) leads to an increase in surface tension with an increase in the magnitude of the tension (Table 2).

Table 2.
Parameters of bidistilled water in a magnetic field [15]

Magnetic field, T	pH		Surface tension		Dielectric constant	
	fractions of a unit	%	10^{-3} N/m	%	F/m	%
0.19	0.35	5.1	1.6	2.2	1.5	1.8
0.35	0.44	6.4	3.7	5.1	1.4	1.7
0.48	0.62	9.1	4.7	6.4	1.4	1.7
0.57	0.62	9.1	5.3	7.3	1.4	1.7

From Table 2 shows that $\gamma(H_2O)$ increases with a three-fold change in magnetic field strength, i.e. linearly: $\gamma(H_2O) = \alpha H$, where α is the proportionality coefficient and H is the magnetic field strength. Since in our case $\alpha = 3$, equation (12) yields: $\gamma(C) - 3H = 0$ and $H \approx 0.3 \text{ T}$. With such a magnetic field strength, graphite can be exfoliated with water.

Thus, using equations (2) - (12), it is possible to obtain exfoliation of graphite with water in a magnetic field and obtain graphene in an environmentally friendly way.

Graphene, created 21 years ago, is a unique material that is destined to become the substance of the 21st century. Graphene has a wide range of applications. The global graphene market began to grow only five years ago, which was due to the high cost of graphene. The method we proposed for obtaining graphene from

graphite with microcluster water deserves further study, since it can provide an environmentally friendly and reliable method for obtaining a high-volume initial product.

This scientific article was published as part of the grant funding for 2024-2026 IRN No. AR32488258 “Development of an innovative technology for obtaining graphene by intercalating graphite with microcluster water and modifying HTSC ceramics with graphene” (the study is funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan).

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数字化转型改善伊拉克的会计业务
**DIGITAL TRANSFORMATION TO IMPROVE ACCOUNTING
OPERATIONS IN IRAQ**

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摘要。 各行各业的数字经济已经开始改变所有这些领域，因此我们注意到，我们今天看到的现代技术在各个领域都发挥着根本性的作用。在这些领域中，我们看到会计也开始积极应用这些现代技术，例如金融机器人、机器学习和自适应智能。数字化转型和人工智能已成为重要主题，也是日常工作流程不可或缺的一部分。我们的研究论文分析了智能会计的进展及其在会计和审计中的应用。本文对正在考虑的这一主题进行了全面的分析。它还涉及研究这种数字化转型的本质的内容，确定了它在会计和审计领域的主要任务，并强调了该领域数字化转型的主要策略。分析了数字化转型和人工智能的过程，并确定了数字化转型和人工智能在会计中的主要优势、威胁和弱点。本文提出了改进这一数字化转型过程的措施。在考虑和跟进降低风险的同时，正确利用这种数字化转型的好处可以提高该领域的会计水平。

关键词： 会计、数字化转型、审计、人工智能、会计。

Abstract. *The digital economy in all sectors has begun to transform all these areas, so we notice that the modern technology that we see today plays a fundamental role in the diversity of areas. Among these areas, we see that accounting has also begun to actively apply these modern technologies, for example, financial robotics, machine learning and adaptive intelligence. Digital transformation and artificial intelligence have become important topics and an integral part of the daily work process. Our research paper analyzes the progress made in smart accounting and its applications in accounting and auditing. This paper provides a comprehensive analysis of this issue under consideration. It also addresses the content of examining the essence of this digital transformation, its main tasks in the field of accounting and auditing are determined, and the main strategies for digital transformation in this field are highlighted. The processes of digital transformation and artificial intelligence have been analyzed and the main advantages, threats and weaknesses of digital transformation and artificial intelligence in accounting have been identified. The paper proposes measures to*

improve the use of this process of digital transformation. Proper use of the benefits of this digital transformation while considering and following up on risk reduction can raise accounting in this field.

Keywords: *Accounting, Digital Transformation, Auditing, Artificial Intelligence, Accounting.*

Introduction

A digital infrastructure is formed at different levels, and the necessary systems are created, which are improved by introducing new technologies and merging into a single information space. We note that digital transformation has taken an important place in our current world and in turn has been reflected in our daily lives. Through what we will address in this field, which has become very important, which is digital transformation, we show that comprehensive studies of the prospects for applying artificial intelligence in the field of accounting and auditing have been conducted, and a comprehensive analysis of a number of scientific researches dedicated to the issue under consideration has been conducted.

The study identified important problems in accounting and auditing related to the poor quality of financial reports and improving the most costly processes according to the transition to the digital system in Iraqi companies and proposed measures to improve the use of digital transformation in the field of accounting. It can be said that digital transformation in accounting and auditing using the main trends of digital transformation seems promising, but it requires careful planning and proper management of these processes.

The study aimed to apply modern machine learning methods to data sets, advanced artificial intelligence in the field of accounting has the ability to identify hidden statistical patterns in reports, recognize patterns and form informed conclusions. This makes it a promising tool for automating the process of collecting and processing financial data, analyzing reports, and verifying compliance with accounting standards and rules. The purpose of the study includes a comprehensive study of the theoretical foundations and practical possibilities of using innovative achievements of digital transformation in the field of accounting and auditing, the development of detailed recommendations for the gradual and systematic implementation of solutions within the framework of professional activities, taking into account all the identified risks and limitations, as well as monitoring the effectiveness and safety of their use.

Literature Review

Nowadays, in light of the global economic transformations characterized by rapid growth and development, many economic entities are actively working on implementing plans to introduce digital transformation into the accounting workflow in order to improve the quality of financial reports and optimize the most

costly operations. However, it is also important to take into account the potential risks and obstacles that economic entities may face during the digital transformation of accounting (Arif, 2022).

Ahmed study (2023) addressed the role of digital transformation in activating the application of the conceptual framework for financial reporting and its reflection on the development of the accounting profession and its practices. Analytical research was used through a field study and a statistical analysis program was used. The results of the study were that digital transformation has revolutionized the way financial data is processed and presented and has led to improving the quality of accounting data, which in turn has led to improving the quality of financial reports. Abbas and Al-Asadi (2022) also explained the impact of digital transformation on electronic accounting operations (accounting disclosure). The study found a significant impact of digital transformation on the quality of electronic accounting disclosure at the Bank of Baghdad, and there are no significant differences between the average responses of sample members regarding digital transformation on the quality of electronic accounting disclosure.

One of the most comprehensive works on this topic was the one that comprehensively examined the issues of using digital transformation and artificial intelligence in the field of accounting and its potential impact on its accounting processes. This concept is similar to the concept of technological models, where information and communication technologies are the core of transformation and part of the general stage of change in society, along with the use of digital transformation and artificial intelligence in the field of accounting, etc. (Steklovna, 2019).

Identifying the main points and touching upon the advantages that can be obtained through the use of intelligent agents in the automation of accounting functions, such as reducing human error and increasing work efficiency in the main areas of using advanced machine learning algorithms and speech recognition to improve their accounting processes (Andyik, 2024).

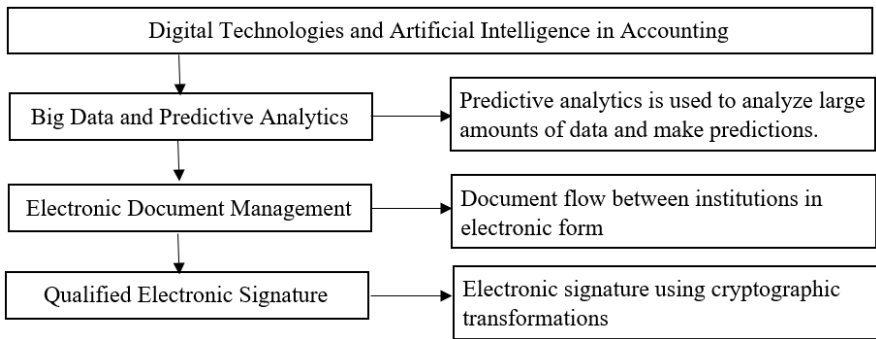
In this area under consideration is also a comprehensive and in-depth analysis of the prospects for the application of digital transformation and artificial intelligence in the financial and accounting sphere of corporate activities, since intelligent systems trained on the basis of machine learning can be very effectively used to ensure the automation of financial reporting and detect cyber threats and fraud in the financial sector by analyzing large amounts of data (Sosnovskayna, 2018).

One of the main areas of improving the efficiency of financial management is the development and implementation of smart solutions that ensure complete automation of the classification and processing of various business documents related to the cash flows of companies and institutions. The use of modern computer vision and image recognition technologies makes it possible to fully automate scanning, extracting information and maintaining electronic journals, thereby sig-

nificantly reducing the time required for accounting and cash accounting procedures. These different approaches to digital transformation indicate the breadth of the topic under study and the need for further analysis of the digital transformation process.

Accounting digitization is the creation of new programs and updating of old ones for organizing, analyzing and calculating indicators (Andyik, 2024)

The digital transformation of the accounting sector facilitates the implementation and deployment of a range of digital technologies (Figure 1).



Source: Data collected by the researcher

Figure 1. Applications of digitization and artificial intelligence in general

In addition, methods based on deep learning of neural networks and big data analysis are actively being developed, which make it possible to accurately predict economic indicators and optimize business processes based on objective assessment of alternative scenarios using advanced machine learning methods.

Many leading companies are using innovative intelligent platforms, including artificial intelligence, to transform financial activities and improve their efficiency. A prominent example in the world is KPMG’s use of the IBM Watson cognitive platform to enable deep statistical analysis of large amounts of data and improve workflow (Bashkatova, 2024).

Practical framework for research

Accountants are directly involved in complex statistical analysis of large amounts of source data, including indicators of economic entity performance and macroeconomic trends. Using deep methods of horizontal and vertical information processing, specialists are able to implement financial modeling and forecasting on a large scale. This ensures high accuracy of accounting and tax records, risk assessment, and forecasting of business development prospects (Table 1).

Table 1

Key trends in digital transformation of accounting

Description	Transformation Type
Data Entry Automation	Using specialized software and algorithms to automatically enter data from raw documents.
Electronic Document Management	Exchange of electronic documents between counterparties and within the organization
Data Analysis and Reporting	Using analytical tools to analyze accounting data and create reports.
Ensuring data security	Implementing information security methods to prevent unauthorized access to accounting data

Source Data collected

Thus, the accountant gradually becomes a full-fledged analyst, making a significant contribution to the overall strategic management process of the organization, and not limited to routine functions of working with digital information.

The introduction of digitalization elements of digital transformation into the practice of accounting and auditing allows to significantly improving the process of processing financial data, increasing the efficiency of the work of the relevant specialists. At the same time, it is necessary to take into account the potential risks and limitations of innovative approaches.

In order to comprehensively assess the opportunities and threats, a SWOT analysis of the use of digital transformation and artificial intelligence in accounting was conducted, the results of which are presented in Table 2.

Table 2

SWOT Analysis of the Use of Digital Transformation and Artificial Intelligence in Accounting

Strengths	Weak points
<ul style="list-style-type: none"> - Allows you to automate many routine tasks in accounting practice - Improve the accuracy and efficiency of accounting and auditing processes - Improve the forecasting of economic indicators 	<ul style="list-style-type: none"> - Depends on the quality of the entered information / lack of sufficient flexibility for change - Lack of emotional intelligence - Causes difficulties in changes - Complicates implementation
Opportunities	Threats
<ul style="list-style-type: none"> - Identify and record documents - Provide data-based recommendations when the manager makes business development decisions - Forecast the organization's key performance indicators 	<ul style="list-style-type: none"> - Errors and inaccuracies in the program - Data security and confidentiality - Job losses and deterioration of working conditions

Source Data collected

Making more informed strategic decisions, reducing internal and external risks, and managing day-to-day operating costs more effectively are potential benefits that can be achieved by improving forecasting methods for key performance indicators of companies and organizations such as revenues, profits, profitability, etc. The introduction of digitalization and artificial intelligence elements into accounting and auditing practices holds a number of promising possibilities.

Conclusion

Reducing the cost of accounting equipment It is worth noting that this indicator does not indicate a decrease in the number of employees in the company, but on the contrary, it indicates an increase in qualifications. Companies and institutions can save significant amounts of money in accounting and reduce the possibility of errors. It will also allow companies to become more transparent in their financial reports instead of the routine work of employees.

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上合组织国家的科学研究：协同和一体化

国际科学大会的材料

2025 年 2 月 12 日，中国北京

编辑A. A. Siliverstova

校正A. I. 尼古拉耶夫

2025 年 2 月 12 日，中国北京

USL。沸点：98.7。 订单253. 流通500份。

在编辑和出版中心印制

无限出版社

