

European Science Review

Nº 7–8 2021

July – August

European Science Review

Scientific journal

№ 7–8 2021 (July – August)

ISSN 2310-5577

Editor-in-chief

Lucas Koenig, Austria, Doctor of Economics

International editorial board

Abdulkasimov Ali, Uzbekistan, Doctor of Geography
Adieva Aynura Abduzhalalovna, Kyrgyzstan, Doctor of Economics
Arabaev Cholponkul Isaevich, Kyrgyzstan, Doctor of Law
Zagir V. Atayev, Russia, Ph.D. of Geographical Sciences
Akhmedova Raziya Abdullayevna, Russia, Doctor of Philology
Balabiev Kairat Rahimovich, Kazakhstan, Doctor of Law
Barlybaeva Saule Hatiyatovna, Kazakhstan, Doctor of History
Bejanidze Irina Zurabovna, Georgia, Doctor of Chemistry
Bestugin Alexander Roaldovich, Russia, Doctor of Engineering Sciences
Boselin S.R. Prabhu, India, Doctor of Engineering Sciences
Bondarenko Natalia Grigorievna, Russia, Doctor of Philosophy
Bogolub Tatiana Maksimovna, Ukraine, Doctor of Economics
Bulatbaeva Aygul Abdimazhitovna, Kazakhstan, Doctor of Education
Chiladze George Bidzinovich, Georgia, Doctor of Economics, Doctor of Law
Dalibor M. Elezovic, Serbia, Doctor of History
Gurov Valeriy Nikolaevich, Russia, Doctor of Education
Hajiyev Mahammad Shahbaz oglu, Azerbaijan, Doctor of Philosophy
Ibragimova Liliya Ahmatyanovna, Russia, Doctor of Education
Blahun Ivan Semenovich, Ukraine, Doctor of Economics
Ivannikov Ivan Andreevich, Russia, Doctor of Law
Jansarayeva Rima, Kazakhstan, Doctor of Law
Khubaev Georgy Nikolaevich, Russia, Doctor of Economics
Khurtsidze Tamila Shalvovna, Georgia, Doctor of Law
Khoutyz Zaur, Russia, Doctor of Economics
Khoutyz Irina, Russia, Doctor of Philology
Korz Marina Vladimirovna, Russia, Doctor of Economics

Kocherbaeva Aynura Anatolevna, Kyrgyzstan, Doctor of Economics
Kushaliyev Kaisar Zhalitovich, Kazakhstan, Doctor of Veterinary Medicine
Lekerova Gulsim, Kazakhstan, Doctor of Psychology
Melnichuk Marina Vladimirovna, Russia, Doctor of Economics
Meymanov Bakyt Kattoevich, Kyrgyzstan, Doctor of Economics
Moldabek Kulakhmet, Kazakhstan, Doctor of Education
Morozova Natalay Ivanovna, Russia, Doctor of Economics
Moskvin Victor Anatolevich, Russia, Doctor of Psychology
Nagiye Polad Yusif, Azerbaijan, Ph.D. of Agricultural Sciences
Naletova Natalia Yurevna, Russia, Doctor of Education
Novikov Alexei, Russia, Doctor of Education
Salav Sanatbek Komiljanovich, Uzbekistan, Doctor of Economics
Shadiev Rizamat Davranovich, Uzbekistan, Doctor of Education
Shhahutova Zarema Zorievna, Russia, Ph.D. of Education
Soltanova Nazilya Bagir, Azerbaijan, Doctor of Philosophy (Ph.D. of History)
Spasennikov Boris Aristarkhovich, Russia, Doctor of Law
Spasennikov Boris Aristarkhovich, Russia, Doctor of Medicine
Suleymanov Suleyman Fayzullaevich, Uzbekistan, Ph.D. of Medicine
Suleymanova Rima, Russia, Doctor of History
Tashpulatov Salih Shukurovich, Uzbekistan, Doctor of Engineering Sciences
Tereschenko-Kaidan Liliya Vladimirovna, Ukraine, Doctor of Philosophy
Tersvadze Mzia Giglaevna, Georgia, Doctor of Philology
Vijaykumar Muley, India, Doctor of Biological Sciences
Yurova Kseniya Igorevna, Russia, Ph.D. of History
Zhaplova Tatiana Mikhaylovna, Russia, Doctor of Philology
Zhdanovich Alexey Igorevich, Ukraine, Doctor of Medicine

Proofreading

Kristin Theissen

Cover design

Andreas Vogel

Additional design

Stephan Friedman

Editorial office

Premier Publishing s.r.o. Praha 8 – Karlín, Lyčkovo nám. 508/7, PSČ 18600

E-mail:

pub@ppublishing.org

Homepage

ppublishing.org

European Science Review is an international, German/English/Russian language, peer-reviewed journal. It is published bimonthly with circulation of 1000 copies.

The decisive criterion for accepting a manuscript for publication is scientific quality. All research articles published in this journal have undergone a rigorous peer review. Based on initial screening by the editors, each paper is anonymized and reviewed by at least two anonymous referees. Recommending the articles for publishing, the reviewers confirm that in their opinion the submitted article contains important or new scientific results.

Premier Publishing s.r.o. is not responsible for the stylistic content of the article. The responsibility for the stylistic content lies on an author of an article.

Instructions for authors

Full instructions for manuscript preparation and submission can be found through the Premier Publishing s.r.o. home page at: <http://www.ppublishing.org>.

Material disclaimer

The opinions expressed in the conference proceedings do not necessarily reflect those of the Premier Publishing s.r.o., the editor, the editorial board, or the organization to which the authors are affiliated.

Premier Publishing s.r.o. is not responsible for the stylistic content of the article. The responsibility for the stylistic content lies on an author of an article.

Included to the open access repositories:



The journal has the GIF impact factor 1.36 for 2018.

© Premier Publishing s.r.o.

All rights reserved; no part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the Publisher.

Typeset in Berling by Ziegler Buchdruckerei, Linz, Austria.

Printed by Premier Publishing s.r.o., Vienna, Austria on acid-free paper.

Section 1. Pedagogy

<https://doi.org/10.29013/ESR-21-7.8-3-5>

*Kuchkarova Mukaddas,
Teacher of Physical and mathematics faculty
Andijan State University
E-mail: prof_sirojiddin@mail.ru*

THE ACTUALITY OF THE PRINCIPLE OF CONSISTENCY IN THE TEACHING OF PHYSICS

Abstract. The article discusses the role of the principle of consistency in the teaching of physics and its importance. The application of the principle of consistency in the teaching of physics has been shown to form the core of important didactic research. It has been found that in the teaching process, it allows students to develop the skills to apply didactic principles appropriate to them. Since didactic principles apply to a common goal, it has been shown to be a key project that defines the content, form, and methods of the teaching process. The principle of coherence is given in the teaching of physics at different stages of education as the principle of correct distribution of teaching materials, the implementation of the necessary connections between them, and this is a step-by-step development.

Keywords: principle of consistency, didactics, consistency, system of continuous education, didactic principle.

As a result of the rapid development of science and technology in the republic due to the increasing flow of information, retention of information should be trained to deliver the consistent application of the principle of the educational process of the formation of theoretical knowledge, practical skills training and adoption of educational materials in various important factors in improving the efficiency of education is considered [1, 62–69]. The Action Strategy for the five priority areas of development of the Republic of Uzbekistan states: to stimulate research and innovation activities, to create an effective mechanism for the implementation of scientific and innovative practices, to establish specialized scientific and experimental laboratories, high-tech centers and technology parks at

universities and research institutes ...” is one of the important tasks [2, 18–26].

Updating the content of education, raising the level of knowledge, continuous improvement of teaching methods, increasing demands on the quality of knowledge of the trained staff require the teacher to constantly replenish and update their knowledge and methodological skills.

The purpose of teaching physics in the system of continuing education is to educate, nurture and develop students. At the same time, one of the most important methodological issues in physics is to identify the content, structure and program of the course, textbooks, manuals and tools related to its teaching and find ways to use them effectively in the teaching process.

Principles of teaching – teaching plans of the organization, management ideas. They will be in the form of general guidelines, requirements, plans, norms that regulate teaching. The principles of teaching are derived from the basic laws of teaching.

The laws of teaching – events in education are necessary and objective, meaningful and repetitive connections. They mainly represent the connections between the main elements of the teaching process: the teaching process and society demand, the purpose and theme of teaching, teaching technology and its elements and conditions, training outcome concentration and verification, etc. Training in the laws of the plants consists of [3, 98–106]:

The learning process: – the compliance of society with the needs of each student, the performance of the functions of education, upbringing and development, the suitability of students for real learning opportunities and external opportunities that affect the process.

The teaching and learning process must be in close connection with each other, subject to pedagogical laws:

- the content of teaching is directly related to the purpose of teaching, which in turn is determined by the needs of society, the development of science, the capabilities of students and external conditions;
- Forms of teaching organization depend on the purpose, content and methods of teaching;
- provides the correct connection and structured conditions between all components of the training process, its positive outcome;
- teaching should be carried out in accordance with the psychological characteristics of the student, personal comfort, the level of future development.

To enhance these laws in the teaching process, it is necessary to equip students with didactic principles appropriate to them. Since didactic principles apply to a common goal, they are a key project that defines the content, form, and methods of the teaching process. In other words, the didactic principle is a way of applying in practice the basic laws and laws of

the teaching process. This means that a clear project and clear plans emerge from each didactic principle.

Training should be carried out in accordance with the psychological characteristics of the demand, personal comfort, and the level of future development.

In the process of didactic development, didactic principles are analyzed, supplemented and modified. Some didactic principles are changed, some disappear, and new principles emerge instead. In particular, Comenius considered the principle of harmony with nature as the main didactic principle. At that time, he also established other principles. A. Dis-terveg, on the other hand, indicated that special requirements should be placed on didactic principles.

At present, all didactic principles have been analyzed and redesigned in accordance with the needs of society and pedagogical achievements.

They consist of the following effective didactic principles:

- the consciousness and activity;
- demonstration;
- systematic and sequential;
- durability;
- reliability;
- scientific;
- linking theory with practice;
- consistency;
- historical;

Among these principles, we will look at the content of the principle of consistency.

The training of highly qualified physics teachers in higher education institutions requires them to fully understand and comprehend the scientific basis of the physics course in secondary schools, academic lyceums and vocational colleges, the sequence between physics and its teaching at different stages. However, the row, this question was satisfactory wrong to say a little orange settings would be. This is because it is not possible to have a clear idea of how the theories being studied will be explained in terms of the stages of teaching. Dynamic laws occupy a central place in their physical worldview,

and there is almost no room for probable statistical laws. The reason for such shortcomings is the failure to take into account the principle of consistency, which is one of the important principles of didactics in the teaching of general physics, theoretical physics and methods of teaching physics in higher education.

In essence, the principle of consistency implies the correct distribution of teaching materials in the teaching of physics at different stages of education, the implementation of the necessary connections between them, and its gradual development.

The application of the principle of consistency in the learning process can be based on the following [4, 66–79]:

- the concept of continuity reflects the real existing development in nature, society and human thinking, describes the relationship in development and its development. Since didactics is a theory of teaching and learning, it is also a didactic principle relevant to this development;

since consistency is a philosophical category, it is also associated with other categories. For scientific work of didactic nature, the ability to analyze the interrelationships of the concepts of consistency and generalization, consistency and interdisciplinary connection, consistency and systematization is especially important;

- since development has quantitative and qualitative indicators, it is necessary to study the types of sequences in accordance with the level of development of knowledge, based on the relationship between the concepts of sequencing and generaliza-

tion. That is, this method can be applied to scientific research of didactic content;

- the principle of consistency is considered as an important methodological principle in pedagogical and didactic research. Summarizing all available ideas, consistency can be described as follows: “Consistency in teaching represents an important link between the stages of development of knowledge, skills and abilities, the knowledge gained in the previous stage of training is preserved and applied in the next stage. Old and new knowledge will unite and become one.”

Thus, consistency in the teaching of physics should take into account not only the development of basic concepts and theories at different stages of teaching, but also the inverse relationship. This is the essence of involvement in the reverse – in various stages of physical concepts, laws and theories of teaching students to study the consistency of the activities of the formation of their students would be able to apply it more effectively. This, in turn, leads to a deeper mastery of the teaching material in the physical context, and in the future creates a solid foundation for a more perfect mastery of the physics course in higher education. In short, it will lead to a spiral growth of students’ knowledge of physics in the future.

The principle of consistency in the learning process is based on:

- qualitative formation of knowledge by changing the active work of students at the initial stage of acquisition of knowledge;

- ensure that all elements of knowledge and definitions of physical quantities are memorized at all stages of learning and used at the right time.

References:

1. Karimov I. A. Man, his rights and freedoms are the highest value. – Tashkent: Uzbekistan, 2006.
2. Mirzheyov Sh. M. Critical analysis, strict discipline and personal responsibility should be the daily rule of every leader’s activity. Report of the enlarged meeting of the Cabinet of Ministers on the main results of socio-economic development of the country in 2016 and the most important priorities of the economic program for 2017. – Tashkent: NMIU of Uzbekistan, 2017.
3. Djoraev M. Methods of teaching physics (general issues). – Tashkent: “Abu Matbuot-Konsalting”, 2015.
4. Radjabov U. A. Principle of sootvetstviya v fizicheskix teoriyax. Fizicheskaya teoriya. – M.: Nauka. 1980.

Section 2. Physics

<https://doi.org/10.29013/ESR-21-7.8-6-8>

Nasriddinov S. S.,
Esbergenov Daryabay Muratbaevich,
Institute of Semiconductor Physics and Microelectronics
of the National University of Uzbekistan, Tashkent, Uzbekistan
E-mail: edaryabay@gmail.com

NICKEL-RELATED COMPLEX DEFECTS IN SILICON

Abstract. Electrically active nickel-related deep levels in *n*- and *p*-type silicon are investigated using the method of Deep-Level Transient Spectroscopy (DLTS). Two deep levels with energies $E_v + 0.17$ eV and $E_c - 0.42$ eV are observed in *n*- and *p*-type silicon diffusion-doped with nickel. It was revealed that wet chemical etching in silicon doped with nickel leads to the formation of various complexes related to hydrogen, with levels at $E_c - 0.18$ eV, $E_c - 0.54$ eV, $E_v + 0.26$ eV, and $E_v + 0.55$ eV.

Keywords: defect complex, DLTS, silicon, transition metals, hydrogen.

1. Introduction

Significant efforts are currently being made to develop gettering and passivation methods to remove impurities from the active region of a silicon device. To study the effect of these methods, it is necessary to know the diffusion and electrical properties of impurities inside a silicon crystal [1; 2]. Thus, the study of transition metal impurities such as nickel, cobalt, copper is becoming more and more important for semiconductor technology.

As is known, nickel has the highest diffusion coefficient and solubility, even at room temperature it easily diffuses into the crystal lattice [3]. Diffusion of nickel in silicon leads to the creation of deep levels. For many years, scientists have studied the energy levels of nickel in silicon, trying to understand the nature of various defects. Until now, using the Hall and DLTS methods, two levels of nickel in silicon have been observed: a donor level at $E_v + (0.15 \div 0.18)$ eV and an acceptor level at $E_c - (0.38 \div 0.47)$ eV. In

addition, a third double acceptor level of nickel was found at $E_c - (0.07; 0.08)$ eV [4].

Impurities of transition metals, in particular Ni in Si, have been studied for a long time, and the properties of isolated atoms have also been studied quite well. But, at the same time, there is insufficient information on the nature of nickel-hydrogen compounds (Ni – H), in which H acts as a passivator, and until now the study of complex Ni – H defects in Si has been considered only in two works [4; 5]. Therefore, in this work, the task is set to fill in the missing amount of information on the identification of defects associated with nickel and their interaction with hydrogen in silicon by DLTS and structural analysis.

2. Experimental technique

For the study, we prepared substrates in the form of *n*- and *p*-type silicon plates, grown by the Czochralski method, 10 × 5 mm in size and 2 mm thick. The Si samples were doped with Ni impuri-

ties by the thermal diffusion method at temperatures from 800 to 1150 °C for 2–5 h.

Before making a Schottky contact, the samples were wet chemically etched in a mixture of $HF : HNO_3 : CH_3COOH$ in a ratio of 3 : 5 : 3 (CP-4). It is known that etching in CP-4 occurs with the participation of hydrogen in a thin layer under the surface of the sample [6].

After etching and making contacts, the samples were annealed for 20 min. at a temperature of 120 °C. At this temperature, hydrogen diffuses into the sample.

3. Results and discussions

The results of the measurements of the DLTS spectra of n-Si and p-Si samples in different states are shown in (Fig. 1 and 2).

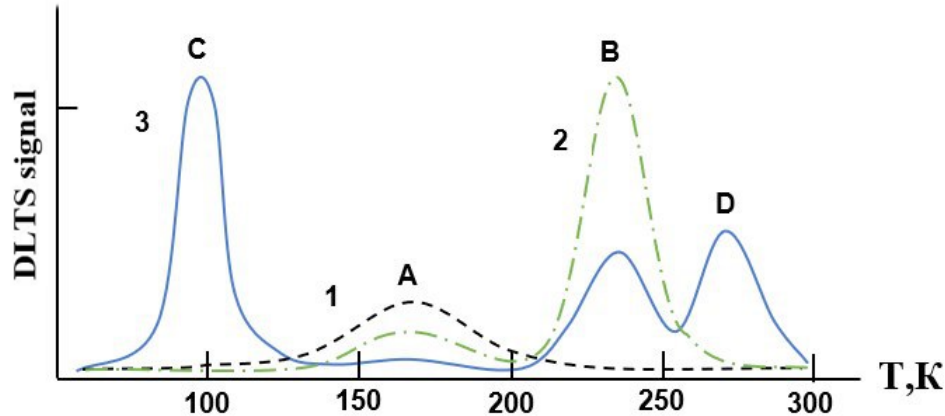


Figure 1. DLTS spectra of n-type Si samples. 1 – initial sample n-Si <P>; 2 – doped with nickel n-Si <Ni>; 3 – after the introduction of hydrogen n-Si <Ni-H>

The spectrum of the initial n-Si samples (Fig. 1, curve 1) shows one peak A at 167 K with an ionization energy $E_C - 0.31$ eV, which is associated with technical uncontrolled impurities. Such a low level was also recorded in [7] with an energy of $E_C - 0.30$ eV at 165 K. After diffusion doping of Ni in n-Si <Ni> samples (Fig. 1, curve 2), a deep Ni acceptor level with an ionization energy of $E_C - 0.42$ eV (peak B) at 240 K.

Upon the introduction of hydrogen, two additional levels were observed in the n-Si <Ni-H> samples: $E_C - 0.18$ eV at a temperature of 98 K (peak C) and $E_C - 0.54$ eV at 273 K (peak D). Structural analysis showed that the $E_C - 0.18$ eV and $E_C - 0.54$ eV deep levels refer to complex defects NiH and NiH₂, respectively, which is confirmed by work [4]. Also, in works [4, 8] the level $E_C - 0.18$ was investigated, but the author of [8] identifies it as a thermal defect.

The decrease in the concentration of Ni levels in the n-Si <Ni-H> samples is explained by the process

of passivation of defects to hydrogens. Complete hydrogen passivation of the $E_C - 0.31$ eV level is also observed [9; 10].

DLTS spectra of p-type Si samples are shown in (Fig. 2). As can be seen from the figure, the initial p-Si samples (Fig. 2, curve 1) create a DL with an ionization energy $E_V + 0.43$ eV at 230 K (peak F) related to technical uncontrolled impurities. Deep donor level of Ni is observed in p-Si <Ni> samples upon diffusion with an ionization energy $E_V + 0.17$ eV at 80 K (Fig. 2, curve 1, peak G). And in the p-Si <Ni-H> samples after the introducing of hydrogen, the spectrum shows 2 new levels, with energies $E_V + 0.26$ eV at 155 K (peak H) and $E_V + 0.55$ eV at 280 K (peak J). The results of the structural analysis and comparison of the results of other authors showed that the H and J peaks are associated with complex Ni – H defects, which also agrees with the results of [4; 5]. These levels are formed in passivation by hydrogen atoms as in p-type silicon.

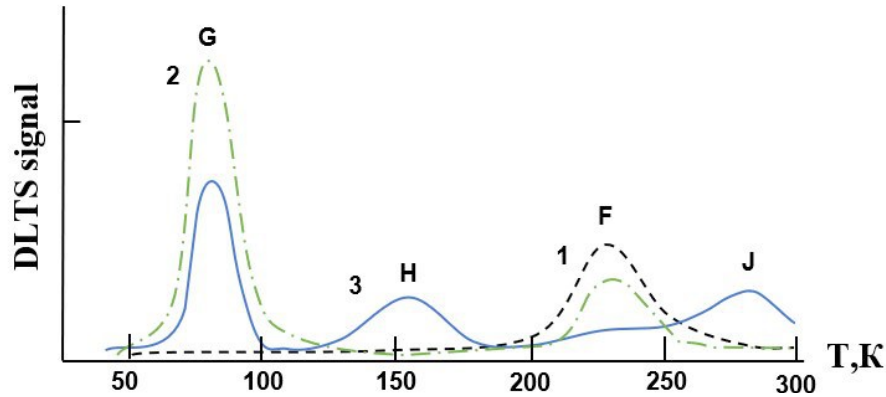


Figure 2. DLTS spectra of p-type Si samples. 1 – initial sample p-Si ; 2 – nickel-doped p-Si <Ni>; 3 – after the introducing of hydrogen p-Si <Ni-H>

4. Conclusions

Thus, it was found that diffusion doping of Ni in Si leads to the formation of two deep levels with energies $E_V + 0.17$ eV and $E_C - 0.42$ eV. It was revealed that after the intentional introduction of hydrogen, four additional DLTS peaks are observed in the samples. Analysis of the spectra showed that the pres-

ence of hydrogen atoms in silicon passivates the nickel levels, which leads to the formation of various Ni-H complexes. It is shown that defects of the Ni-H type are localized in the band gap of silicon with energies $E_C - 0.18$ and $E_V + 0.26$ eV. In addition, it was found that the $E_V + 0.55$ and $E_C - 0.54$ levels of the NiH₂ complex belong to the same defect level.

References:

1. Benton J. L. Transition Metals in Silicon, Encyclopedia of Materials: Science and Technology, Elsevier, 2001.– P. 9403–9409. URL: <https://doi.org/10.1016/B0-08-043152-6/01700-9>
2. Oda O., Khalfalla Y. E., Benyounis K. Y. Semiconductors Grown from the Melt: Reduction of the Dislocation Density, Reference Module in Materials Science and Materials Engineering, Elsevier, 2016. URL: <https://doi.org/10.1016/B978-0-12-803581-8.03682-1>
3. Lindroos J., Fenning D. P., Backlund D. J., Verlage E., Gorgulla A. et al. J. Appl. Phys.– 113. 2013.– 204906 p. URL: <https://doi.org/10.1063/1.4807799>
4. Scheffler L., Kolkovsky V. I. and Weber J. Journal of Applied Physics – 116. 2014. 173704 p. URL: <https://doi.org/10.1063/1.4901003>
5. Shiraishi M., Sachse J. U., Lemke H. and Weber J. Mater. Sci. Eng. B58. 1999.– 130 p. URL: [https://doi.org/10.1016/S0921-5107\(98\)00280-3](https://doi.org/10.1016/S0921-5107(98)00280-3)
6. Weber J., Knack S., Feklisova O., Yarykin N. and Yakimov E. Microelectron. Eng.– 66. 2003.– 320 p. URL: [https://doi.org/10.1016/S0167-9317\(02\)00926-7](https://doi.org/10.1016/S0167-9317(02)00926-7)
7. Kitagawa H., Tanaka S., Nakashima H. and Yoshida M. J. Electron. Mater.– 20. 1991.– 441 p. URL: <https://doi.org/10.1007/BF02657824>
8. Khojakbar S. Daliev Journal of Scientific and Engineering Research, – 4 (5). 2017.– P. 211–215. available at: URL: <http://jsaer.com/download/vol-4-iss-5-2017/JSAER2017-04-05-211-215.pdf>
9. Hallam B. J., Hamer P. G., Ciesla née Wenham A. M., Chan C. E., Vicari Stefani B., Wenham S. Prog Photovolt Res Appl.– 28. 2020.– P. 1217–1238. URL: <https://doi.org/10.1002/pip.3240>
10. Santos P. & Coutinho J., & Torres V. J. B. & Rayson M. J. & Briddon Patrick. (2014). Applied Physics Letters. 105.032108-032108. URL: <https://doi.org/10.1063/1.4891575>

Section 3. Philosophy

<https://doi.org/10.29013/ESR-21-7.8-9-12>

*Gaffarova Gulchehra Gulamjanovna,
Department of social sciences, professor
Chirchik state pedagogical institute
E-mail: gafforovagulchehra3@gmail.com*

MODERN PHILOSOPHICAL INTERPRETATION OF ABU RAYKHAN BERUNI GNOSEOLOGY

Abstract. This article describes the modern philosophical and methodological interpretation of some scientific ideas of the great medieval Central Asian scholar Abu Rayhan Beruni.

Keywords: Abu Rayhan Beruni, knowledge, medieval, science, idea, scientific ideas, symmetry.

It should be noted that the promotion of natural, scientific and social ideas in Central Asia is also reflected in the work of Abu Rayhan Beruni. “Abu Rayhan Beruni is a great scientist and brilliant philosopher who amazes with the breadth of his knowledge and the evidence of his ideas. It is devoted to the current issues of natural science, philosophy, history and philology of that period” [10, 26]. Indeed, when I look at Beruni’s work, we can find that there is a comprehensive mindset in the study of being. While Beruni was creating in various fields of science, he was far ahead of his time with his advanced ideas. His natural-scientific ideas were confirmed centuries later, and his views form the foundation of modern science.

It should be noted that Abu Rayhan Beruni described the continuous development of knowledge as follows: is a symptom. “It is the duty of those who rule over people to take care of the progress of science” [1, 188]. Indeed, it can be said that these ideas of the scholar have not lost their essence even today, but are relevant. This is due to the fact that today in the world there is a widespread trend of “lifelong learning” for lifelong learning.

It should also be noted that some of Beruni’s scientific ideas were not taken into account in his time due to the limited philosophical approaches of the time, but over the centuries scientists have understood their essence and put them into practice.

In the Middle Ages, the development of mathematics and astronomy in Islamic culture was stimulated by vital needs and practical needs. Such a successful development of science has taken place on the basis of qualitatively new scientific approaches to world civilization, enriched with many scientific ideas and discoveries [5, 75].

In contrast to the Greek ideas and approaches, research has been conducted on the basis of new approaches, new concepts in geometry, astronomy, arithmetic, music, medicine and the doctrine of harmony.

The problem of symmetry has always been of interest to mankind. In modern philosophical concepts, symmetry is based on the study and explanation (development, order, and disorder) of complex problems for the present, ranging from simple issues.

In ancient Greece, the Pythagoreans had such approaches as harmony (harmony), the theory of

symmetry, Plato's theory of harmony in nature. The practical application of the symmetry approach in Greece was evident in the art of sculpture, in buildings built. They still amaze us today.

In Islamic culture, the immense diversity and beauty of the world created by Allah is embodied in calligraphy, calligraphy and ornamental patterns. With them they decorated mosques and minarets, roof paths and the walls of magnificent buildings. The notion of beauty is expressed in abstract geometric patterns.

Most of the patterns in Islamic architecture were based on traditional methods, but non-traditional methods, and the creation of symmetry in this form was based on new knowledge, new approaches. The development of science in Islamic culture has led to new discoveries based on new conceptual views and approaches that are different from Greek science.

The entrances in the wall of medieval architecture showed a change in the expression of symmetry, the limitation of Euclidean geometry. Central Asian scientists have discovered that there is a different type of symmetry than the classical one, and have put it into practice.

Later geometric patterns were based on symmetry and expressed beauty.

The discovery of "Penrose tiles" in the 1970s confirmed the correctness of the nonlinear mathematical theory of shapes. This discovery determines the structure of quasicrystals in nature.

Based on the view of symmetry discovered in medieval Central Asia, in 1984 D. Shehtman experimentally obtained a quasicrystalline alloy. This led to the discovery of a new direction, new concepts in science. D. Shehtman was awarded the "Nobel" Prize in Chemistry for the discovery of quasicrystals.

It is known that at that time in the works of Central Asian thinkers great importance was attached to the concept of harmony. Emphasizing that the concept of harmony is universal, they emphasized that it is not only related to the Universe but also to the private sciences. Harmony has been described

as the heart of man, an essential component of his activity. At the same time, disharmony is a necessary element of the integrity of harmony. Harmony is formed through disharmony. Problems such as order and disorder, the transition from disorder to order are among the current problems of modern science.

Thoughts on the importance of experience in the process of learning in the work of the scientist who created during this period. For example, according to al-Beruni, "I have doubts: its elimination depends on experience and re-testing, and even if there is unity among the narrators, its truth is not confirmed by experience" [4, 247]. Hence, practice is a method of acquiring knowledge through experience and approving its reality, a way of describing knowledge.

"Man," Beruni writes, "can think about any field of science when he is engaged in practice and has achieved precision in his research. At the same time, he must be a philosopher" [3, 90]. It is impossible not to agree with these views, because Beruni points out only one feature that is important for the development of science – development emphasizes that science should be based on philosophy, with philosophical methodology.

The existence of symmetry in living nature was also known in Ancient Greece. In the ninth century, Beruni scientifically proved that living nature could be represented in geometric shapes. At the same time he was able to show ornaments in morphology, crystals, beehives, snowflakes. Beruni points out that "the number of leaves that form mirrors at the edges often conforms to the rules of geometry when the flower opens. In many cases they are equivalent to chords, determined by a geometric method rather than on the basis of conical works. It is impossible to find 7 or 9 leaves in a flower that can be inserted into a right triangular circle by geometric methods. Conversely, the number of leaves in a flower will be 3, 4, 5 or 18. This condition is more common, but can sometimes be found in flower species with 7 or 9 leaves. "Flowers with such leaves can also be found in the above species" [2, 329]. Beruni discovered new forms of symmetry.

It is the idea of the existence of geometry in living nature and its product in philosophical observation in symmetrical configurations. In the twentieth century, according to Vernadsky, the symmetry that exists in living nature has not been well studied, and it is important to study this problem.

Modern science has confirmed Beruni's scientific views. Indeed, rotating symmetry has been confirmed to exist in the plant world, in simple animal organisms, and in some marine animals.

In the 19th century, some scientific works on symmetry in the plant and animal world were published. The symmetry found in the Beruni plant world does not exist in non-native nature. What is the reason why symmetry is necessary for survival and why does it appear. Living organisms have formed their own symmetry in the process of evolution.

“The fact that the organisms of the plant kingdom also have symmetry is related to their sunlight, natural (physical) endurance, and non-lying (the force of gravity of the whole universe)” [9, 192]. It is an adaptation to a specific external environment, a struggle for life.

In 1024, Beruni completed his work on astronomical and geographical problems, “Determining the final boundaries of places to check the distance between dwellings” – “Geodesy”. In this work, for the first time in the world, geodesy distinguished between independent complex problems and geodetic astronomy [7, 15]. Indeed, Beruni advanced scientific ideas in mineralogy, geodesy, astronomy, and many other fields. For this reason, “the combi-

nation of astronomer-mathematical and historical-ethnographic needs allowed Beruni to create a work “Chronometry” [6, 353–354].

It is well known that Beruni points out that the Earth is constantly changing, that man can only observe the results of ancient geological processes. According to him, the formation of the Earth covers huge geological periods. However, Beruni put forward a higher idea than this, and this idea remained a mystery to his contemporaries and for a long time after that. This was the idea of geotectonic change of the Earth [8, 321]. Of course, Beruni's idea is widely studied in modern science, and geotectonic processes are studied in connection with the interaction of layers and crusts of the Earth's lithosphere, their seismicity. Also, the idea of inequality in the motion of the Sun and the planets moving around it, and the first research on this subject, belongs to Beruni.

In general, the ideas put forward by Central Asian thinkers have contributed to the development of world civilization and have a direct or indirect place in the achievements of modern science. That is why the natural-scientific and socio-political ideas put forward by Central Asian thinkers are essentially important for the development of modern society and the further development of science, and these ideas are used directly or indirectly by humanity. In particular, the ideas of differentiation and integration (interdisciplinary) can be confirmed in Beruni's work [11]. This is why the repeated study and analysis of the works of great scholars is of great importance for the process of cognition.

References:

1. Abu Rayhan Beruni. Izbrannye proizvedeniya. – T. 11. 1963. – 188 p.
2. Beruni Abu Rayhan. Izbrannye proizvedenie. – Tashkent, 1957. – 329 p.
3. Beruni Abu Rayhan. Izbrannye proizvedenie. – T. 3. Geodesy. 1966. – 90 p.
4. Beruni Abu Rayhan. Mineralogy. – M., 1963. – P. 247, 273.
5. Bulatov M. S. Geometric harmony in architecture of Central Asia. – Moscow, 1987. – 75 p.
6. Bulgakov P. G. Life and work Beruni. – T., 1992. – P. 353–354.
7. Bulgakov P. G., Akhmedov A. A. Astronomy in Central Asia in IX–XV vv. / Research on the history and culture of Sredney Azii. – T., 1993. – 15 p.

8. Klassicheskaya nauka Sredney Azii i sovremennaya mirovaya tsivilizatsiya / Pod red. P.K. Xabibullaeva and A. F. Fayzullaeva.– T.: Fan, 2000.– 321 p.
9. Kontseptsii sovremennogo estestvoznaniya / Under ed. L. A. Mixaylova.– M., 2008.– 192 p.
10. Muminov I. Excerpts from the natural-scientific and socio-philosophical history of Uzbekistan.– Tashkent, 1999.– 26 p.
11. G'afarova G. G., Abdullaeva M. N. Abu Rayhan Beruni's scientific ideas in modern philosophical and methodological interpretation. The role of the written heritage of Eastern scholars in scientific, philosophical, spiritual thinking: a collection of scientific articles.– Tashkent: TDSHU, 2020. – P. 49–53.

<https://doi.org/10.29013/ESR-21-7.8-13-16>

*Kodirov Barhayotjon Sobirjonovich,
Teacher of the department of teaching history
Kokand state pedagogical institute
E-mail: Barxayot_@mail.ru*

THEORETICAL AND PRACTICAL BASIS OF INNOVATIVE DEVELOPMENT OF UZBEKISTAN

Abstract. The rapid development of all spheres of society requires the implementation of reforms based on modern innovative ideas, developments and technologies that will ensure rapid and quality progress of our country on the path to becoming a leader of world civilization. This article highlights the theoretical and practical foundations of the innovative development of the country through the analysis of the ongoing reforms, the ongoing work on the “Action Strategy”.

Keywords: Action strategy, development, reform, communication, education, science, innovation, digital economy, innovative technologies.

It is known that the basis of the development of our Republic is the idea of building a democratic and legal state, civil society. In the first years of independence, the path of development is reflected in the «Uzbek model», a system of principles that is now reflected in the Strategy of Action. Indeed, taking into account the socio-economic changes taking place in our country and the rapid changes in the world, a strategy of action has been developed for the future development of our republic.

The tasks set on the basis of the idea of development are being gradually introduced today. They are interdependent and interdependent. Reforms are being carried out on the basis of social orientation. In general, the large-scale democratic reforms implemented in our country during the years of independence based on the Uzbek model are an important basis for strengthening national statehood and sovereignty, security and law and order, inviolability of borders, rule of law, human rights and freedoms, interethnic harmony and religious tolerance. created the necessary conditions for a decent life of our people, the realization of the creative potential of our citizens. Therefore, “in our work we always rely on the strategic principles of implementing the” Uz-

bek model “of development and building a modern state” [4, P. 5].

The President of the Republic of Uzbekistan signed the Decree “On approval of the Strategy of innovative development of the Republic of Uzbekistan for 2019–2021” [2]. According to the decree, the Strategy of Innovative Development of the Republic of Uzbekistan for 2019–2021 and the target indicators of innovative development of Uzbekistan until 2030 were approved.

The theoretical and methodological basis of the consistent innovative development of Uzbekistan is reflected in the “Strategy of Action”. Social, economic and political reforms have expanded the scope of human activity, i.e. the area of opportunities, the areas of human activity associated with it have increased. In particular, democratic reforms continue to adapt to changing conditions, changes in human and social thinking. Therefore, “the idea that the reform of thinking is urgent is in turn a vital necessity for humanity to carry out deep, serious reforms in our education system” [9, P. 28]. Of course, changing the way a person thinks, providing him with new ideas is a problem that everyone faces throughout life. Especially today, when new ideas enter all spheres of human activity (politics, government, business, economy, education),

the socio-economic changes taking place in our country are trying to improve the quality of life and take a worthy place in the world community.

The reforms being carried out in our country are being carried out in the context of an innovative growth model. At the same time, the reforms being carried out in the field of education, modernization, active entrepreneurship, active investment, tourism development, innovative ideas and technologies, roadmaps in the digital economy are comprehensive, and the tasks are set in accordance with the period. At the same time, today the implementation of the “Action strategy” for 2017–2021 also includes five priorities for the development of the country. That is, improving the construction of the state and society; ensuring the rule of law and further reform of the judicial system; further development and liberalization of the economy; development of the social sphere; ensuring security, interethnic harmony and religious tolerance, pursuing a foreign policy in a well-thought-out, mutually beneficial and practical spirit [1].

We are witnessing the ongoing socio-economic changes in our country and the changing position of our country in the international arena on the basis of action plans. The strategy of action is based on the “Uzbek model” of development, the implementation of key ideas, as well as the introduction of new tasks and new opportunities. The algorithm of the strategy of action is aimed at communicating with the people, with other countries in the process of protecting human interests. Therefore, the interaction between man, the state, society, further strengthens the existing connections and influences between these elements. Of course, “dialogue, discourse, various forms of communication between leaders and the people are the most important aspects of the implementation of the Concept” [6, P. 87]. For this reason, the dialogue between the state and the people opens up new prospects for development, as well as allows to solve development problems based on laws and decrees.

The direction of the action strategy plans is multi-vector and each is multifunctional. Today, the inno-

vative development carried out in our country within the framework of the Action Strategy is reflected in a number of qualitative changes. That is, “structural and functional renewal has become a priority process in all spheres of society” [7, P. 5]. It is well known that “structure reflects the interrelationships and interactions between the elements of a system. Therefore, a change in the structure leads to a change in society” [8, P. 25]. Indeed, in a society that has entered such a period of change, the introduction of innovative technologies, unconventional thinking and foresight, the use of the latest production methods and tools are seen at the level of social need. That is, “if we start building our great future today, we must start it on the basis of innovative ideas, innovative approach” [5, P. 20].

It can be seen that in the development of mankind, innovative ideas have the power to change the scientific, social direction. They (innovative ideas) are formed in such areas of human science as scientific, social, political, economic. Innovative ideas in the field of science allow to organize new scientific directions, simplify production processes and create opportunities for the opening of new fields. In this regard, 2019 has been named the “Year of active entrepreneurship, support of innovative ideas and technologies” in our country. We can see this in the innovative changes in the field of education in our country. In particular, the strategy of action and the decisions taken in recent years on education form the basis of the ongoing reforms in the field of education in our country.

In today’s extremely complex world, innovative activity must also be flexible, adaptable, so that man can adequately adapt to a rapidly changing situation. Innovative activity is carried out on the basis of human thinking, his creativity, which is constantly updated and constantly increasing its effectiveness. The realization of a creative idea is an innovation. Of course, “innovation is the creation of previously non-existent objects, structures, values and methods (technologies) of activity, the expression of emerg-

ing innovations in signs, images and symbols. At the same time, it is a process of application to all spheres of society and human life through social assimilation and dissemination ” [7, P. 4]. So, innovation means that the mechanism of self-development is understood and the scope of knowing the world is expanded and enriched.

Our country has chosen the path of innovative development. The innovative development of the country is associated with overcoming the resistance of antiquity. This process is a reflection of the evolution of society, the evolution of human cognitive capabilities, the evolution of human intellect.

It should be noted that today the development of the digital economy is a multifaceted process and forms the basis of innovative development. The digital economy has a great impact on all spheres of social life, including human interaction, scientific research, science, education, knowledge generation, human cognitive processes. Therefore, the digital economy is a global trend that sets a new paradigm for the development of Uzbekistan. One of the main tasks is to provide people with scientific, practical and civic views on the digitalization process in the country, to look for opportunities for economic growth, to improve living standards and quality of life through integration and a huge synergistic effect. Also, in the digital economy, the use of modern computer and information systems by organizations, and especially by enterprises in the real sector of the economy, is an important condition for their effective operation.

It should be noted that digitalization and digital transformation of the economy in social development are also having an impact on the education system. This requires the formation and use of digital skills in education, the adaptation and development of new forms of mastering digital reality. Also, one of the modern sources of social development is the need to establish a system of continuous vocational education, actively update the knowledge of the population and the formation of the required competencies [10].

It is emphasized that in today's pandemic, entrepreneurship makes an important contribution to the development of our country. Because the development of small business and private entrepreneurship is one of the ways to solve the problem of employment. Indeed, the small business entrepreneurship sector is able to adapt quickly to rapid changes in the social situation and to receive innovations quickly, changing its activities in a short period of time. This makes it easier for them to change their products from one form to another, depending on the situation. That is why they are an active part of society.

At the same time, the most important tasks are to support and encourage small business and entrepreneurship in the country, to strengthen the economic power of our country, peace and stability, social harmony, to create favorable conditions for further increasing the share of this sector. That is, “an entrepreneur feeds not only himself and his family, but also the people and the state. I never tire of saying, even if it is repeated, that the richer the people, the richer and more powerful the state” [3, P. 15]. Of course, small business and private entrepreneurship today are becoming a guarantee and pillar of social and political stability in our society, a force that actively moves our country on the path of development. Opportunities are being created to take advantage of these factors in the action strategy. At the same time, new tasks are being set.

In short, the implementation of the “Action strategy” is aimed at reforming and modernizing the country, building a democratic state based on a developed market economy, a strong civil society, the rule of law, security and law and order, inviolability of state borders, interethnic harmony and religious tolerance. gives new strength to the zealous efforts of the path. Therefore, new perspectives and approaches to the implementation of the ideas of the “Action strategy” are being formed in the socio-economic environment. So, as we move on the path of innovative development of our republic, we need to develop human capital.

References:

1. Decree of the President of the Republic of Uzbekistan. "On the Strategy of Actions for the Further Development of the Republic of Uzbekistan" // Official publication / Ministry of Justice of the Republic of Uzbekistan. – Tashkent: "Adolat", 2018. – 112 p.
2. Decree of the President of the Republic of Uzbekistan. "On approval of the Strategy of Innovative Development of the Republic of Uzbekistan for 2019–2021". URL: <https://lex.uz/ru/docs/3913188>
3. Mirziyoyev Sh. M. Together we will build a free and prosperous, democratic state of Uzbekistan. – Tashkent: "Uzbekistan", 2016. – 15 p.
4. Mirziyoyev Sh. M. Critical analysis, strict discipline and personal responsibility – should be the daily rule of every leader's work. – Tashkent: "Uzbekistan", 2017. – 5 p.
5. Mirziyoyev Sh. M. Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the Oliy Majlis. – Tashkent: NMIU "Uzbekistan", 2018. – 20 p.
6. Abdullaeva M. N. Constructive dialogue-put k resheniyu problem // Opportunities and prospects for the integration of science, education and production in the system of "Uzbek model" of development: materials of the republican scientific-theoretical conference. – Tashkent: "Yangi asr avlodi". 2017. – 87 p.
7. Abdullaeva M. N., G'afarova G. G. The importance of innovation in the system of action strategies // Priorities of ideological and ideological education of youth: Proceedings of the Republican scientific-theoretical conference. – Samarkand, 2018. – 5 p.
8. G'afarova G. G. Philosophical and methodological bases of information generation in complex systems: Abstract diss .. fals.fan. doctors. – Tashkent, 2019. – 25 p.
9. Moren E. Method. Nature. Prirody. – Moscow, 2005. – 28 p.
10. Zabelina O. V., Maltseva A. V., Mirzabalaeva F. I. Ustanovki rabotayushchego naseleniya Rossii na nepreryvnoe professionalnoe obrazovanie // Kreativnaya ekonomika. 2019. – Tom 13. – № 4. – P. 773–790. Doi: 10.18334 / ce.13.4.40532

Section 4. Philology and linguistics

<https://doi.org/10.29013/ESR-21-7.8-17-20>

*Turakhodjaeva Mohidil,
Basic Doctoral Student in English Philology,
The National University of Uzbekistan
E-mail: turaxujayeva89@mail.ru; durdonga-e@mail.ru*

PLANT NAMES IN ENGLISH: THEORETICAL VIEWS

Abstract. The study of the scientific and local nomenclature of botanical lexemes has always attracted the attention of philologists. The interest in the study of this lexical group was explained by the need to understand their distribution in different languages, their derivational features, their semantic basis and etymology. The article discusses the peculiarities of research directions in the study of plant names in English, and different views of scholars on the issue.

Keywords: botanical nomenclature, terminology, plant names, taxonomy, structural-semantic, motivological, lexicographic, cognitive, linguo-cultural.

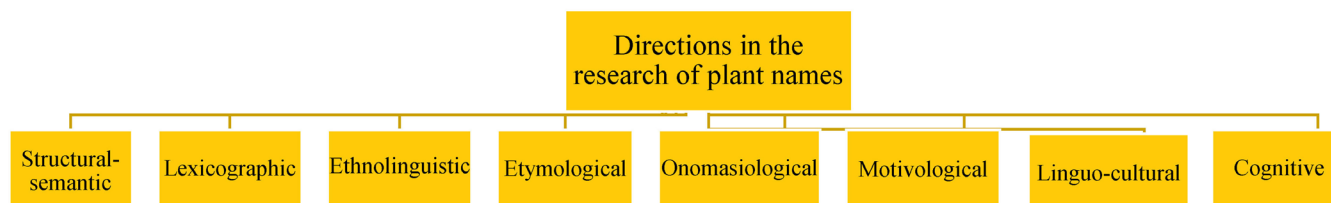
Plant names, on the one hand, represent the peculiarities of man's perception of the natural world, people's worldview and cultural traditions, and on the other hand are paradigmatic lexical-semantic group relations that form a group of objects with a stable quantitative structure as a very ancient system [1, 11]. Research on the botanical terminology involves a lot of materials, such as botanical literature, folk medicine materials and ethnographic sources, and the history of its structural-semantic study is closely linked with the history of the development of botany.

The structural-formal, systemocentric approach that dominated linguistics in the twentieth century

led to the study of the scientific nomenclature of botanical lexemes, the direction of research in English literary language and various dialects in terms of structural-semantic, etymological, onomasiological, motivological and lexicographic aspects.

Towards the end of the last century, the change of the scientific paradigm and the emergence of anthropocentric research in it, the need to conduct linguoculturological, ethnolinguistic and cognitive directions with new approaches to the lexicon of botany based on different views [2, 17].

Therefore, the development of the field is characterized by the following areas of research:



Scheme 1.

Botanical lexicon of English studied in the context of complex research in the field of botanical nomenclature [3; 4; 5].

C. T. Parmar's monograph, "The morphology of plant names in the Celtic languages", is devoted to the morphological analysis of plant lexemes. While studying plant names in Celtic languages, he analyzes the derivative models and morphological features of phytonym components in different dialects of languages [6].

One of the studies devoted to the naming of plants in Anglo-Saxon culture was U. Krishke's monograph, "The old English complex plant names: a linguistic survey and a catalogue", addresses important issues related to the lexical layer of Old English botany. The morphological and semantic features of botanical lexemes should be studied, taking into account their diachronic stratification, according to the author [7, 34]. The results of such an analysis shed light on important aspects of Anglo-Saxon culture and civilization, from which point of view this lexical layer can be described as a linguistic representation of the world in Anglo-Saxon texts [8].

The author's article "On the semantics of Old English compound plant names: motivations and associations" analyzes the morphological and semantic-cognitive basis of the complex structure of ancient English plants in the nomenclature *herbatarum* and nomenclature *arborum* in the glossary "Elfric's Glossary" [8]. Using semantic and grammatical analysis of ancient Indian Sanskrit grammar in the semantic and morphological analysis of lexemes of this group, the author divides complex structural names of plants into three groups: 1) *dvandva* – additional units; 2) *tatpuruṣa* – endocentric units; 3) *bahuvrīhi* – exocentric structures [7,98].

According to the author, this system provides information on the grammatical and semantic aspects of the plant. These structures are formed based on the relationship between the primary and secondary elements. For example, there is no primary or secondary element in the additive composition of "bitter-sweet",

all of which are semantically and morphologically equal. In endocentric structures such as "coffee tree", the lexeme "tree", which is a key element, has a grammatical and semantic connection, but the coffee lexeme has a semantic advantage over the main element because it defines a plant species [7, 101].

Anglo-Saxon Plant Names Survey (ASPNS) – The Anglo-Saxon Plant Names Survey is of great importance as a research project of the Institute of Historical Studies of Languages, University of Glasgow, UK [9]. In this project, the characteristics of species and family naming of plants in Anglo-Saxon society were studied and analyzed in the following prisms: linguistic (e.g., lexicographic or dialectal studies), geographical (e.g., land use methods), economic (e.g., food security), scientific (for example, in the field of medicine) and social (for example, in the field of clothing) [10, 42].

In the study "Plant names and folk taxonomies: frameworks for ethnosemiotic inquiry" by D. Hermann and S. Moss, we can see a cognitive approach to the analysis of plant lexemes. Focusing on the many facets of plant naming in English, the authors emphasize that ethnobiological (especially ethnobotanical) research can be effectively conducted as a result of the intersection of different disciplines related to onomasiology, such as lexicography, cognitive anthropology, and cognitive linguistics [11, 3]. This study is unique in that it analyzes nearly a hundred major vegetable names. These plant names are described as elements of a folk taxonomic system, so such a local nomenclature can be helpful in systematizing words, as well as in conducting research on the relationship between conceptual categories.

The collective monograph "Agricultural English", co-authored by G. Rață, I. Samfira and F. Sala, is also noteworthy. This monograph is a collection of studies on agricultural terminology in English, analyzing lexical systems in several fields such as biology, botany, ecology, gastronomy. In particular, the section "Morphology" analyzes the methods of making lexemes related to the agricultural terminosystem [12, 103].

A number of studies on the subject have also been conducted in Russian linguistics. As a result of research by linguists such as L.I. Milovidova, V.V. Kopocheva, L.D. Pocheptsova, O. P. Ryabko, and I. I. Kireeva [13; 14; 15; 16; 17], research on the lexicon of botany in English began to develop rapidly.

In the study of botanical lexicon within the structural-semantic systematic approach, different views on the problems of variation, synonymy, polysemy and homonymy belonging to literary language or dialects within the lexical-semantic group of plant names are proposed. In this direction, O. P. Ryabko conducted effective research and revealed the nominative and structural-semantic features of plant vocabulary in English on the example of complex substantive units [16].

The author pays special attention to the interpretation of the nominative-field properties of modifiers and auxiliary components of complex structural nominations, as well as the characteristics of plant names by appearance (shape, color, size, smell, taste, growth style), quality (positive or negative), classifies on the basis of space and time and purpose (including scope of application: for medicine, pharmacology, perfumery, construction, decorative purposes) [16, 6].

The structural-semantic features of the complex structural terms analyzed in this study may serve as a basis for determining the motivational aspects of plant nomenclature.

However, it is important to note that the author did not consider the boundaries between the sci-

entific and international nomenclature of botanical vocabulary and therefore did not identify any differences between the nominative parameters that characterize them. Such a trend is observed in almost all studies that analyze the issue from a structural-semantic and structural-morphological point of view.

In the work by I. I. Kireeva, the structural-semantic and pragmatic features of the linguoculturological code "Flora" in English are considered. In it, the author evaluates the linguoculturological code as a collective experience of words in the vernacular, phraseological units, expressed in various discourses and reflecting the structural identity of a culture with a national color, such as customs, traditions, lifestyle, and so on. According to the author, the linguoculturological code is a system of signs with a single figurative basis, acting as a sign and attached to the lexical-phraseological unified language [17, 5].

Giving a detailed description of the symbolic features of English plants, I. I. Kireeva notes that the basis of the English linguocultural code "Flora" is the botanical culture of the Celts, who lived in the British Isles in the VI–V centuries B.C [17, 6].

It can be inferred that plant names, which are a living symbol of the material and spiritual culture of the people, have been attracting the attention of not only botanists, but also ethnographers and linguists, dialectologists since the second half of the last century. Apparently, a lot of extensive research has been done on plant lexemes in English, and most of them are evolving in the field of linguistic cognitology.

References:

1. Дементьева А. Г. Когнитивные основы формирования переносных значений фитонимов: на материале английского, русского и французского языков [Электронный ресурс]: дис. ... канд. филол. наук / А. Г. Дементьева. – Тамбов, 2012. – С. 11.
2. Лукьянова И. В., Диалектная фитонимика в когнитивно-ономазиологическом аспекте: диссертация на соискание ученой степени кандидата филологических наук, 2018. – 17 с.
3. Цой Т. В. Лексико-семантическая и словообразовательная структура фитонимов и их закономерности описания фитонимов в толковых словарях: Автореф. дисс. ... канд. филол. наук. – Т., 1995. – 24 с.
4. Hunt T. Plant names of medieval England. – Cambridge: D. S. Brewer, 1989. – 334 p.

5. Willard N. Clute. *The Common Names of Plants and Their Meanings*. – Kessinger Publishing, LLC, 2007. – 299 p.
6. Parmar C. T. *The morphology of plant names in the Celtic languages*. Doctoral dissertation: Retrieved from British Library, 2005. – [Electronic resource]. – URL: e-theses EThOS – online service. <http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.419516> (Date of access: 11.08.2021).
7. Krischke U. *The old English complex plant names: a linguistic survey and a catalogue*. – Frankfurt am Main: Peter-Lang-Edition, 2013. – 486 p.
8. Хошимхужаева М. М. Мотивационно-номинативные свойства фитонимических лексем в английском, русском и узбекском языках // *В мире науки и искусства: вопросы филологии, искусствоведения и культурологии*. 2013. – № . 1 (24).
9. Anglo-Saxon Plant Names Survey (ASPNS) [<http://www.arts.gla.ac.uk/STELLA/ihs1/projects/plants.htm>]
10. Hough C. Place-name evidence for Anglo-Saxon plant-names // *COSTERUS*. 2003. – Т. 148. – С. 41–78.
11. Herman D., Moss S. Plant names and folk taxonomies: Frameworks for ethnosemiotic inquiry // *Semiotica*, 2007. – Vol 167. – P. 1–11. – [Electronic resource]. – URL: <http://www.degruyter.com/abstract/j/semi.2007.2007.issue-167/sem.2007.069/sem.2007.069>. (Date of access: 10.08.2021).
12. Rață G., Samfira I., Sala F. *Agricultural English*. – Newcastle upon Tyne: Cambridge Scholars Publishing, 2012. – 103 p.
13. Миловидова Л. И. О переводе английских ботанических терминов и названий на русский язык: Автореф. дисс. ... канд. филол. наук. – Л., 1964. – 23 с. Бородина А. В. Структура современной английской ботанической терминологии: Автореф. дисс. ... канд. филол. наук. – Краснодар, 1981. – 14 с.
14. Копчева В. В. Соотношение естественной и искусственной номинации (на материале названий растений): Автореф. дисс. ... канд. филол. наук. – Томск, 1985. – 17 с.
15. Почепцова Л. Д. Флористические названия в английском языке Австралии: Автореф. дисс. ... канд. филол. наук. – Киев, 1970. – 24 с.
16. Рябко О. П. Номинативные и структурно-семантические свойства сложных субстантивных образований (на материале наименований растений): Автореф. дисс. ... канд. филол. наук. – Ростов-на-Дону, 1988. – 16 с.
17. Киреева И. И. Структурно-семантические и прагматические характеристики английского лингвокультурного кода “флора”: Автореф. дисс. ... канд. филол. наук. – М., 2008. – 22 с.

<https://doi.org/10.29013/ESR-21-7.8-21-25>

*Egamnazarova Durdona Shuhratillaevna,
Acting associate Professor at Andijan State University, Uzbekistan
E-mail: durdona-e@mail.ru*

EXPRESSIVE SYNTAX: PRAGMATIC FUNCTIONS OF PARENTHESIS

Abstract. The primary focus of this article is different views of linguists on expressive syntax and the role of parenthetical constructions and their pragmatic functions in discourse. The fact that scholars agree that parenthesis is important as a form of expressive syntax that conveys the addresser's attitude towards the message, and that they are multifunctional units that signal the textual as well as interpersonal functions of language from a pragmatic standpoint is substantiated. According to the analysis of these views, it is also proved that the use of punctuation marks to separate parenthetical constructions makes them pragmatically more driven.

Keywords: expressive syntax, intensity, parenthesis, introductory phrases, inserted structures, pragmatic function.

The interpretation of any utterance depends on the functional selection by the addressee of means of various language levels, not only for the transmission of a message, i.e. actual data, but also to express their attitude to the transmitted information [1, 45]. A special role for the implementation of these communicative goals is played by the category of expressiveness, which has not lost its relevance for many years in view of its enormous importance in the communication process. Being in direct connection with the content plan, expressiveness is realized in terms of expression due to the possibility of selecting such means of actualizing the meaning that are capable of conveying the individual characteristics of the perception of the world of the addressee of the message and can be decoded by the recipient without losing the connotative and denotative meaning inherent in them. [2, 15]. The means of expressiveness are present at all linguistic levels, in linguistics there are quite a few concepts for the study of this speech category. I. V. Arnold refers expressiveness to the properties of the text or part of it, which convey its meaning with "increased intensity", thereby helping to interpret the addressee's attitude to the message [3, 60]. The category of expressiveness has a wide arsenal of means of

representation, presented at all levels of language and used directly in the process of interpersonal communication. Due to the actualization of the expressive means of the language in speech, which allows almost any linguistic unit to acquire an expressive meaning, the utterance acquires expression, i.e. the ability to convey the state of the speaker [4, 34].

Of particular relevance is the study of the features of expressive syntax, which associated with the growing interest of linguists in the analysis of text structure and pragmatic features of speech activity. Content conveyed at the syntactic level must be presented in the optimal form of expression for exact correspondence with the underlying meaning. It is thanks to the presence of a huge set of means of representation, the expressive category of language most accurately conveys not only the actual meaning laid down by the author of the message, but also his relation to the surrounding reality.

There are various interpretations of the category of expressive syntax. Syntactic expressiveness can be defined as "the property of syntactic forms to increase the pragmatic potential of utterances beyond the degree that is achieved the lexical meanings of the elements that fill these syntactic forms"

[5, 196]. In this definition, the expressiveness of the syntactic level is considered as a property of structures to enhance the expressiveness of an utterance without adding any additional semantic loading, which makes the category of expressiveness similar to the category of intensity. Trofimova E. A. defines syntactic expressiveness as “the property of syntactic structures to have an emotional directionality, as well as serve as a means of logical enhancement of expressiveness and imagery” [6, 240]. In this definition, structural properties of syntactic structures are added semantic, i.e. not only use the development of syntactic units to enhance the expressive effect, but also their ability express the emotional state of the speaker. O. V. Alexandrova describes the range of phenomena that fall within the scope of expressive syntax. She considers it necessary to study syntactic relationships both within a sentence and in superphrasal units, highlighting expressiveness through the division of texts [2, 7]. The scholar defines expressive syntax as “the doctrine of the construction of expressive speech, the subject of which is the linguistic foundations of expressive speech” [2, 7], and identifies the levels of expressiveness depending on the leading functional features of their constituent elements: predicative units, components of the actual division of the sentence, basic and parenthetical constructions and contextual syntagmas [2, 8].

Expressive syntax is based on expressive constructions. Halliday notes that syntactic constructions can act as a means of transmission of the author’s thoughts, his/her vision of the world in the most effective way in a speech situations [7, 21]. It means almost any element of syntax has an expressive potential. Expressive constructions can be defined as “A variant of a neutral syntactic structure that stands out in the discursive fragment and thereby reinforces the pragmatic impact on the addressee” [8, 84]. As can be seen from this definition, the main quality of these units is their opposition to the neutral flow of speech. Such constructions make it possible to express the speaker’s attitude to the utterance

and to influence the addressee, create a situation of a communicative act through the use of elements with semantics actualized for a specific situation.

EM. Beregovskaya notes that the expressive the syntax is based on the principle of symmetry [9, 19]. It is due to violation of symmetry in a neutral sentence, syntactic constructions create an expressive effect, attract the attention of the recipient and thereby help to interpret the statement.

One of the types of expressive syntactic constructions is parenthesis, which is the use of introductory and inserted constructions in a sentence in order to show a violation of the author’s way of thought, as well as for introduction of additional objective or subjective information [10, 27]. Parenthetical constructions in English is the object of study of many researchers, such as O. V. Alexandrova, E. N. Gorbachev, O. N. Polikarpova, E. S. Skoblikov [5]. Their nature has been studied, different typologies have been presented, the features of their use in different texts were considered. Parenthetical constructions have a complex nature, in which the sociolinguistic factor plays an important role [11, 112]. They are used in different types of discourse – political, scientific, media discourse, artistic etc. In general, the leading function of parenthetical constructions is the meaning of modal, emotional, expressive assessment, as well as the transmission of additional messages and associated information, clarifications, and comments [2, 56].

The term “parenthetical constructions” or “parenthesis” often means introductory and inserted constructions [12, 104]. E. S. Skoblikova distinguished between introductory words and inserted constructions. Introductory words are several functional and semantic categories of words and phrases that perform logical, connecting and contact-establishing functions [14, 7]. Inserted constructions are predicative units, words or phrases included in sentences, which interrupt the beginning of the sentence with additional explanations that arose from the speaker in the process of utterance [14, 9]. For

the convenience of presentation, both phenomena are preferred to be called as parenthetical constructions, or parenthesis. On the basis of existing research on parenthetical constructions, for further analysis of this phenomenon in the original and translation, the following types can be distinguished: according to their structure they are divided into one-word insertions, insertions-combinations and insertions-sentences; according to meaning they can be divided into referrals, exemplifications and deliberations; according to graphic order: commas, dashes, brackets; according to semantic function: function of addition and explanation, clarification, function of entering examples and linking information given in the text; according to their position in the sentence: initial, middle and end positions.

Literature studies on the grammar and syntax of the English language show that fixed infinitive constructions or phrases (*to cut a long story short, to tell the truth, to say the least, to put it mildly, so to say, needless to say, to make matters worse, to be honest with you, to begin with, to be sure, to be quite plain, to be more specific etc*) can be included in the structure of a sentence as adverbial phrases or combinations, that is, parenthesis, expressing the speaker's subjective attitude to the expressed thought, characterizes the way of its formulation:

*The horses, **needless to say**, were not mentioned again. Tom and Miss Baker, with several feet of twilight between them strolled back into the library, as if to a vigil beside a perfectly tangible body, while trying to look pleasantly interested and a little deaf I followed Daisy around a chain of connecting verandas to the porch in front.* (Fitzgerald F. S. *The Great Gatsby*, 19).

The use of parenthesis makes it possible to combine various semantic and temporal plans, creating semantic polyphony [15, 142]. Parenthetical constructions prosodically differ from the whole sentence, they are made out using the intonation of the inclusion, moreover, the length of the pause depends on the degree of semantic connection of the given construction with a specific statement [16, 44].

A. I. Anikin distinguishes inserted and introductory constructions, considering them to be different elements of syntax, and refers to parenthesis only introductory constructions in view of the limited semantics and lack of independence of introductory words that do not have a stylistic function [17, 12].

O. S. Akhmanova, claims that inserted constructions have a syntactic connection with one of the members of the main sentence and, as a rule, are used to make the statement more expressive [18, 230].

Inserted constructions occupy a special place in the system of syntactic expressive elements, since they can exist as separate units of syntax, but in this case they become neutral sentences, losing their expressive effect. Complicating a sentence, though they are not included in it, are considered a special inner speech of the author of the statement [19, 140].

Parenthetical constructions, insertion structures in particular, can act as a means of syntactic expressiveness, since they are able to convey not only additional information and factual data, but also thoughts and feelings of the author, his subjective attitude to the described phenomena. At the phonological level, such constructions are distinguished prosodically, i.e. using intonation of inclusion, pauses and tone changes that do not violate the integrity intonation of the entire sentence, in writing – with commas, brackets or dashes. The use of such parenthetical constructions breaks the symmetry of the statement, thanks to this, the proposal acquires an unusual sound, expressiveness, influences to the subconscious of the recipient, pointing to the implicitly expressed opinion of the author. When used for expressive purposes, this type of construction expresses the speaker's attitude, irony, sarcasm, emotional condition, etc [20, 30].

Parenthesis largely serves the textual and interpersonal purposes of language. These two functions are communicated via particles, model adjuncts, interjections, perceptive verbs, and other lexical components and linguistic expressions. The term "parenthesis" refers to a group of language phrases

whose principal purpose is to convey textual and interpersonal functions that are both pragmatic. They can have a structural function in highlighting key features of a topic [20, 31].

They can also perform a number of writer and reader-focused interaction activities. The process of text interpretation requires both sorts of functions. Interpersonal functions give the general structure of discourse by determining the kind of elements contained in the text. Structural information guarantees coherence and avoids an unintentional inference, whereas structural information ensures coherence and prevents an unintended inference. This means that coherence is connected to the sociolinguistics environment as much as the content.

The above analysis has revealed that parentheses are a distinct category that must be separated from other peripheral or unnecessary categories seen in spoken speech, such as interjections, fillers, routines, and so on. Analysis of the structural, functional and positional characteristics of parenthesis in the structure of sentences in modern English allows us to believe that these elements are special transfers in the structure of a sentence and, building on over static composition, can be an additional informative perspective, auxiliary messages, without affecting the main predication of the message, thereby contributing to the progressive movement of the information flow – they enrich the content and expressive aspects of the statement.

References:

1. Винокур Т. Г. О содержании некоторых стилистических понятий. Москва, Книжный дом «ЛИБРОКОМ», 2018. – 104 с.
2. Александрова О. В. Проблемы экспрессивного синтаксиса. На материале английского языка. – Москва, Книжный дом «ЛИБРОКОМ», 2009. – 116 с.
3. Арнольд И. В. Стилистика. Современный английский язык. Москва, Флинта: Наука, 2005. – 384 с.
4. Ярцева В. Н. Языкознание. Большой энциклопедический словарь. – Москва, Большая Российская энциклопедия, 1998. – 685 с.
5. Чайковский Р. Р. Общая лингвистическая категория экспрессивности и экспрессивность синтаксиса. Ученые записки: МГПИЯ им. М. Тореза. Вопросы романогерманской филологии, – 64. 1971. – С. 188–198.
6. Трофимова Э. А. О некоторых моделях выражения экспрессивности в английской разговорной речи. В кн.: Трофимова Э. А. Теория и практика лингвистического описания иноязычной разговорной речи: 1972. – Р. 239–243.
7. Halliday M. A. K. Linguistic function and literary style: An inquiry into the language of William Golding's *The Inheritors* // *The Language and Literature Reader*. – Routledge, 2020. – С. 19–28.
8. Куралева Т. В. Экспрессивные свойства расщепленных предложений в современном английском языке. Филологические науки. Вопросы теории и практики, – 5 (23). 2013. – Р. 83–85.
9. Береговская Э. М. Очерки по экспрессивному синтаксису. – Москва, Рохос, 2004. – 208 с.
10. Стариченок В. Д. Большой лингвистический словарь. Ростов-на-Дону, Феникс, 2008. – 811 с.
11. Кириллов А. Г., Ещеркин А. С. Сравнительный анализ английской и японской аниматопоэтической лексики в поликодовых текстах (на материале комиксов и манга) // Вестник Международного института рынка. 2017. № 1. – С. 116–122.
12. Водоватова Т. Е., Кеваева М. Н. «Звуковая живопись» поэтического текста (на материале стихов Эдит Луизы Ситуэлл) // Вестник Международного института рынка. 2016. – Т. 1. – № 2. – С. 104–109.
13. Поликарпова О. Н. Комментативная парантеза как единица композиционного синтаксиса. Дис. ... канд. филол. наук. – Барнаул, 2011. – 193 с.

14. Скобликова Е. С. Современный русский язык. Синтаксис простого предложения (теоретический курс): учеб. пособие. – 3-е изд., испр. и доп. – М.: Флинта: Наука, 2006. – 320 с.
15. Сердюкова Л. И. Вводная предикативная конструкция как компонент объемного предложения Уильяма Фолкнера. Сборник научных трудов МГПИИЯ им. – М. Тореза, – (77). 1974. – С. 142–148.
16. Дзионова З. А. Интонация вставных конструкций в русском языке. Вестник Московского государственного областного университета. Серия: Русская филология, – 5. 2010. – С. 43–46.
17. Аникин А. И. Соотношение вводных и вставных конструкций в современном русском языке. В кн.: Русский язык: сборник трудов МГПИ им. В. И. Ленина. Отв. ред.: Л. Ю. Максимов. – М., МГПИ: 1975. – С. 11–33.
18. Ахманова О. С. Словарь лингвистических терминов. Москва, Советская энциклопедия, 1969. – 608 с.
19. Нуралиева К. Т. Вставные конструкции в коммуникативно-экспрессивных синтаксических единицах разговорной речи в художественной прозе первой половины XX века. Историческая и социально-образовательная мысль, – 6 (6). – Ч 2. 2014. – С. 137–139.
20. Kan'an M. H. Functions of Parenthetical Structures in an English Newspaper Report // Adab al-rafidayn. 2012. – Т. 63.

Section 5. Chemistry

<https://doi.org/10.29013/ESR-21-7.8-26-29>

*Farmonov Jasur,
Tashkent Institute of Chemical Technology
Karshi Engineering Economical Institute*

*Serkayev Kamar,
Tashkent Institute of Chemical Technology*

*Samadiy Murodjon,
Tashkent Institute of Chemical Technology Yangiyer branch
E-mail: samadiy@inbox.ru*

*Usmonov Ilkham,
Research and production enterprise "Ilm-fan texnologiyalar"*

INVESTIGATION OF THE EFFECT OF HEAT TREATMENT ON THE RELEASE OF LINSEED OIL

Abstract. The article presents information on the effect of drying, that is, heat treatment on the extraction of linseed oil from flax seeds. The properties of oil at different drying temperatures are described in detail, moisture release at time intervals and the degree of oil release are determined depending on the duration of the drying process. The main parameters that determine oil recovery are seed oil content, drying temperature and drying time. It is concluded that it is technologically possible to increase the release of oil during heat treatment of flax seeds.

Keywords: flax seeds, linseed oil, heat treatment, drying, oil content, degree of extraction.

Introduction: Flaxseed oil, food, is obtained from flax seeds by cold pressing, which contributes to the preservation of its healing properties. Pressing with preliminary moisture-heat treatment at high temperatures leads to significant losses of vitamins. The preparation and processing of sesame and flax seeds into BAA oils involves the use of a mechanical method of obtaining products, while the method of cold pressing with preliminary gentle heat treatment is used to impart functional properties. Gentle heat treatment has some positive results. When the seeds are heated, up to 20%

of the starch contained in it passes into dextrans, which are easily absorbed by the body, toxic substances are destroyed. There is a slight denaturation of the protein, and due to the short processing time (30–150 sec.), The vitamin complex is almost completely preserved. The effect of heat treatment increases the absorption of nutrients by 20–25%, and a number of vitamins, including E, D, B4, in the absence of intense lighting and an oxidizing agent, are quite resistant to temperature [1].

Due to the high content of omega-3 and omega-6, flaxseed oil has beneficial medicinal proper-

ties, contributing to the normalization of metabolic processes in the body. Flaxseed oil, due to its unique composition, is used in medicine, and is now widely used in cooking. Flaxseed oil is perfectly combined with various oils and at the same time contains a large amount of omega-3 polyunsaturated fatty acids, without which the normal life of the human body is impossible. In addition, flaxseed oil has a high nutritional value, it increases the functioning of the immune system, stimulates the activity of the brain and other organs [2].

Flax seed has long been used in folk medicine due to its healing properties and a wide range of effects on various zones of the human body. The main nutrients that determine the biological value of flaxseed are: glycerides of linolenic (35–45%), linoleic (25–35%), oleic (15–20%), stearic (8–9%) acids, proteins (18–33%), carbohydrates (12–26%), organic acids [3].

Objects and Methods: The research was carried out on Central Asian flax with 38.10% oil content. Chemical analysis of the initial, intermediate and final products was carried out by known methods [4–6].

The oil content of seeds is understood as the content of crude fat and accompanying fat-like substances, which, together with the fat, pass into the ether extract from the studied seeds.

The essence of the methods for determining the acid number is to dissolve a certain mass of solvent oil in a mixture of solvents, followed by titration of the available free fatty acids with an aqueous or alcoholic solution of potassium or sodium hydroxide.

The method for the determination of moisture and volatile substances applies to oilseeds, cake, meal, and establishes the method of spectroscopy in the near infrared region, for the simultaneous determination of the following quality indicators:

- mass fraction of fat (in the measurement range from 1% to 60%);

- mass fraction of moisture and volatile substances (in the measurement range from 1% to 18%);
- mass fraction of protein (in the measurement range from 5% to 80%);
- mass fraction of fiber (in the measurement range from 2% to 50%).

Results and its discussion: Studies of the process of heat treatment of flax seeds for the yield of flaxseed oil in the temperature range from 80 to 130 °C for 30 minutes showed a decrease in seed moisture by 0.92% at a temperature of 80 °C, by 1.60% at 100 °C and by 2, 66% at 130 °C (Table 1). In this case, the oil yield increases from 19.60% without heat treatment to 25.52% when treated at a temperature of 100 °C and up to 28.82% at a temperature of 130 °C. Accordingly, the yield of cake with increasing temperature decreases from 80.40% without treatment and is 72.88% at a temperature of 100 °C and 68.51% at a temperature of 130 °C.

The decrease in the cake yield at a temperature of 100 °C is 9.35%, at a temperature of 130 °C 14.79%, while the oil yield increases by 30.20% at a temperature of 100 °C and by 47.04% at a seed treatment temperature 130 °C.

Figure 1 shows data on the effect of the duration of the drying process of flax seeds on the removal of moisture at a drying temperature of 130 °C, from which it can be seen that the drying process at a temperature of 130 °C is completed within 45–50 minutes and the maximum amount of moisture removed from flax seeds is 6%. An increase in the heat treatment temperature to 140 and 150 °C increases the removal of moisture to 2.90 and 3.60%, the cake yield to 70.98 and 77.27%, respectively.

In this case, the oil yield decreases to 26.12 and 19.13%, which indicates the inadmissibility of increasing the heat treatment temperature above 130 °C.

The optimal conditions for heat treatment are 130 °C, the duration of heat treatment is 30 minutes. Under these conditions, 2.61% of moisture is removed, the cake yield is 68.51%, and the oil yield is 28.82%.

Table 1.– Influence of heat treatment temperature on oil extraction and cake yield at a heat treatment time of 30 min

Nº	Heat treatment temperature, °C	Moisture release,%	Oil cake yield,%	Oil yield,%
1.	Without heat treatment	–	80.40	19.60
2.	80	0.92	78.82	20.26
3.	90	1.18	76.56	22.26
4.	100	1.60	72.88	25.52
5.	110	2.14	72.22	25.63
6.	120	2.47	70.18	27.34
7.	130	2.66	68.51	28.82
8.	140	2.90	70.98	26.12
9.	150	3.60	77.27	19.13

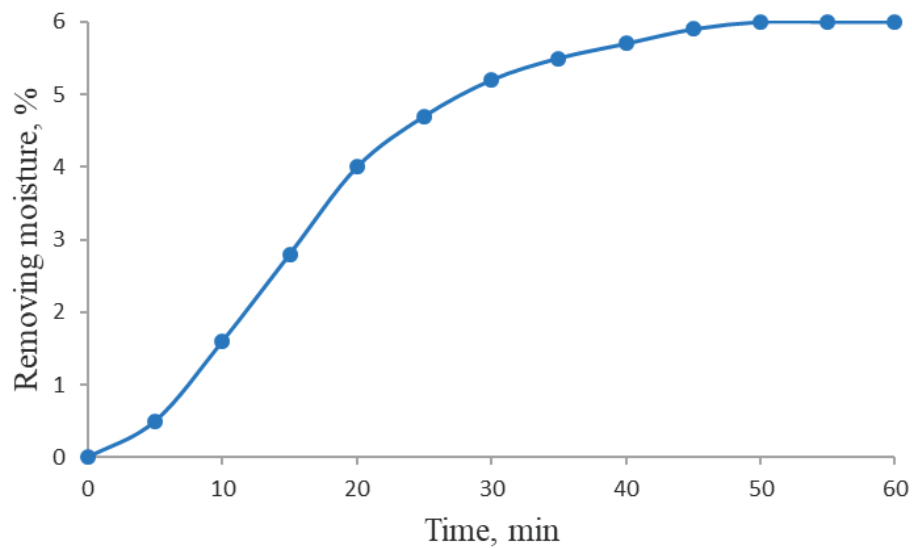


Figure 1. Influence of drying time on the release of moisture from flax seeds at a temperature of 130 °C

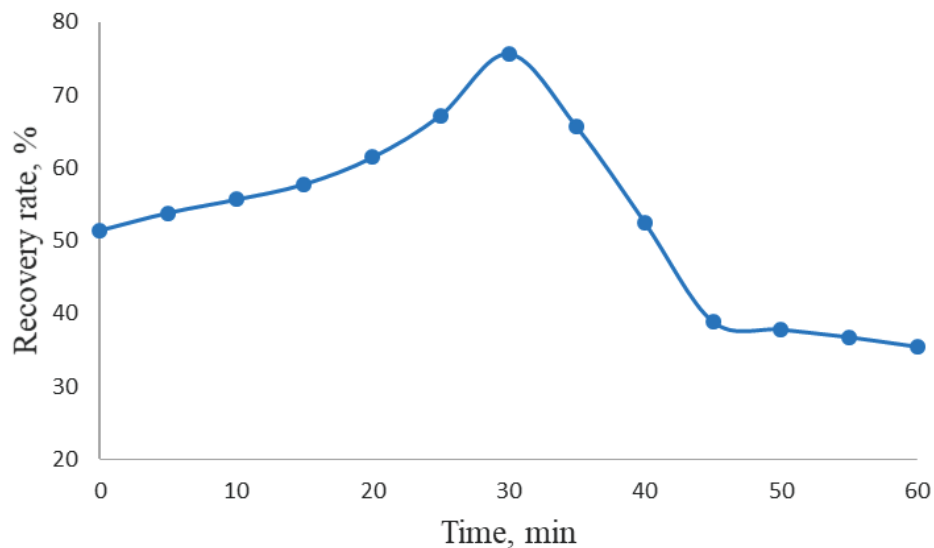


Figure 2. Influence of the duration of the pressing process and the temperature of heat treatment on the degree of oil recovery

Figure 2 shows the results of the effect of the drying time on the degree of oil recovery at a heat treatment temperature of 130 °C. With an increase in the duration of the drying process of flax seeds, the degree of oil extraction increases and reaches a maximum value of 75.64% at a time of 30 minutes, and then decreases rapidly. The optimal drying time for flax seeds at 130 °C is 25–35 minutes.

In this case, the degree of oil recovery is at least 65.6%. An increase in the duration of the drying process over 35 minutes leads to a decrease in the degree of recovery. With a process duration of 40 minutes, the recovery rate decreases to 52.5%, and with a heat treatment duration of 45 minutes, to 39.0%.

Table 2 shows the influence of technological indicators on the quality characteristics of the oil.

Table 2. – Influence of technological parameters of the process on the quality characteristics of oil

№	Drying temperature, °C	Drying time, min	Oil yield,%	Acid number	Chromaticity	Moisture,%
1.	–	–	19.60	0.48	40	1.71
2.	130	15	22.00	0.37	35	0.80
3.	130	30	28.82	0.26	30	0.11
4.	130	45	15.46	0.45	40	0.04

The table shows that the best indicators of flaxseed oil are observed at a seed drying temperature of 130 °C and a process duration of 30 minutes. In this case, the oil yield is 28.82%, the acid number decreases to 0.26, the color to 30, the moisture content does not exceed 0.11%.

Conclusions: Thus, the studies carried out have shown the possibility of increasing the degree of ex-

traction of flaxseed oil with the use of preliminary heat treatment. For this, the drying process must be carried out at a temperature of 130 °C and a process duration of 30 minutes. At the same time, the degree of oil extraction increases from 51.44% to 75.64%, the acid number decreases to 0.26, humidity to 0.11%, and color to 30.

References:

1. Morozkina T. S., Moiseyev A. G. Vitamins // T. S. Morozkina, A. G. Moiseyev. – Minsk: Asar, 2002. – P. 66–72.
2. Shcherbakov V. G., Lobanov V. G. Biochemistry and commodity science of oilseeds. – Moscow: Kolos. 2003. – 360 p.
3. Medicinal herbal raw materials. Pharmacognosy // ed. G. P. Yakovleva. – SPb., 2004. – 665 p.
4. O'zDSt 2438: 2012. Oil seeds. Methods for determining oil content. "Uzstandart", 2012. – 14 p.
5. O'zDSt 1203: 2015. Vegetable oils. Methods for determining the acid number. "Uzstandart", 2015. – 14 p.
6. GOST 11812–66. Methods for the determination of moisture and volatile substances. – M.: Standartinform, 2008. – 8 p.

Section 5. Economics and management

<https://doi.org/10.29013/ESR-21-7.8-30-33>

Meparishvili Davit,

Doctor of Business administration

Invited Professor, Ilia State University, Tbilisi, Georgia

E-mail: mefarishvilidavit@gmail.com

Maridashvili Manana,

Doctor of Business administration

Professor, Georgian National University, Tbilisi, Georgia

E-mail: manana.maridashvili@gmail.com

Sanikidze Ekaterine,

Doctoral student of Business administration

Georgian Technical University. Tbilisi, Georgia

FINANCIAL STABILITY AND RISK ASSESSMENT OF THE HEALTHCARE SECTOR IN GEORGIA

Abstract. The paper discusses healthcare sector financial stability and risk assessment in Georgia. Healthcare sector has excess capacities and they are not effectively used: the sector profitability indicators are worsening from past years; the healthcare related state expenses are permanently increasing and are uncontrolled and the state tries to balance it with the help of introduction of the state unified tariffs. Besides, high level of vagueness related to the expected regulations and state policy creates obstacles for encouragement of investments and complicates development of long-term investment or operation strategies by medical companies.

Keywords: health care management, financial stability, risk assessment, medical companies, health expenditures.

Introduction

Increasing of the state expenses has encouraged establishment of new medical institutions – in the years 2015–2020 the number of ambulatory institutions increased 1.4 times and the hospital bed capacity increased 1,5 times. As a result, now we are facing excess healthcare infrastructure and low effectiveness. In 2020 only 49% of the beds were occupied, thus lagging sharply behind the EU (77%) and CIS (83%)

average indicators. This has negative impact on the financial results of the sector. Health care as an important sector of the state, which includes a system of political, economic, social, legal, scientific, medical, sanitary and hygienic, anti-epidemic and cultural measures, organizes, provides and aims to protect the physical and mental health of each person.

Healthcare is an integral part of international development. An effective health care system can make

a significant contribution to the development of a country's economy and industrialization [1].

Healthcare sector capacities and effectiveness

The funding for health programs is growing every year and in 2020 will exceed one billion GEL. Its largest share, more than 70%, is universal health program spending. It is true that after the launch of the universal healthcare program in Georgia, the share of out-of-pocket payments in total healthcare expenditures decreased, but in 2019, about 56% of healthcare expenditures were still paid out of pocket, which is still high compared to EU (16%) and regional (38).%. Similar diseases (e.g., diseases of the cardiovascular system) united in one nosological group) plan to increase the share of inpatient cases reimbursed by 100% and the share of primary health care and prevention expenditures by 40% in total costs [2].

It is noteworthy that despite the significant increase in health expenditures in recent years, according to available data, among European and regional countries, Georgia is still one of the last places in the share of public health expenditures in both total health expenditures (2017–38%) and GDP (2017–2.9%) and in the state budget (2017–10%) [3].

According to the statistics of 2020, the bed load rate in Georgia is 49%, which is significantly lower than the average rates of the European Union (77%) and the CIS (83%). It is important to improve the cost-effectiveness of health services and to introduce the DRG (diagnostic grouping) model of financing hospitals and emergency care services, to introduce new standards of hospital infrastructure and human resources, which will significantly reduce the efficiency of the sector.

At the same time, there is an abundance of doctors and a shortage of nurses in Georgia. There are only 0.6 nurses per doctor in Georgia and 2 to 5 nurses in European countries. As a result, Georgian doctors are 3–5 times less productive than their counterparts in European countries, which means that they serve fewer patients [4].

An important challenge is the spread of COVID-19 in Georgia and its effective management; It should be noted that medical consumables are a major component of sector expenditures and account for approximately 25% of revenues. Clearly, in such conditions, the need for additional equipment (gloves, goggles and other protective equipment) to protect against a pandemic increases the cost of medical care. Medical supplies are mostly imported and the depreciation of the gel further increases their cost. At the same time, increased utility tariffs – from 2021 electricity tariffs for companies by 65–75%, and water tariffs will increase by about 48% compared to 2018–20.

Encouragement of investments and development

During past decades significant changes have taken place and significant progress has been made in Georgia in improving the health of the population, taking into account key risk factors and reducing health risks. Since 2006, the government has carried out market-oriented reforms.

Priority was given to state funding by providing access to medical care for vulnerable (targeted) segments of the population. Direct funding of medical institutions through state programs has replaced the model of financing with insurance and medical vouchers.

The development of the hospital sector began in 2007 and almost completely upgraded the medical infrastructure, privatizing most of the medical service providers, using the public-private partnership model and in the form of direct privatization. It is noteworthy that the private investment in medical infrastructure during this period amounted to more than \$500 million. Healthcare funding has been increased from GEL 80 million to GEL 380 million. The share of illegal payments has been significantly reduced from 67% to 6% and the level of corruption in the healthcare sector in general. Out-of-pocket payments were reduced from 90% to 75%.

Unlike the universal health care program, other state insurance programs were implemented by

private insurance companies, the beneficiaries of which were only the socially vulnerable, retirees, children under 5, students, children with disabilities and severely disabled persons. In 2014, all other state health insurance programs were abolished and their beneficiary citizens also joined the universal health care program. Consequently, private insurance companies no longer participated in state projects from this period [5].

It is true that according to statistics, the number of clinics increased from 2011 to 2019, however, the surplus medical infrastructure was often created without taking into account the medical needs of the population and it should be noted that the rapid increase in the number of clinics from the beginning Was the result of a health program [6].

The share of private, profit-oriented hospitals in Georgia in the total number of hospitals is 86% and is quite high compared to many developing and developed countries, the remaining 14% (mainly specialized medical institutions such as psychiatric, drug, etc.) are state-owned. Owned. It important to promote the development of other forms of ownership, in particular non-profit (non-profit) and public-private partnership medical organizations, which play an important role in developed countries [7].

The number of hospital beds exceeds the needs of the population. In 2020 only 49% of the beds were loaded, which is significantly lower than the EU (77%) and CIS (83%) averages. All this indicates the inefficient use of invested capital and other resources.

Conclusion

Increasing Financial stability and developing the effective risk assessment is crucial to controlling the growth costs of the health care sector, including increasing funding and access to funding, and strengthening the role of the planned outpatient sector. We consider it important to increase funding for medicines, which in turn will reduce the aggravation of a number of diseases at the level of inpatient treatment, thus saving a considerable amount of money spent in the universal program and improving the health of the population.

Accreditation and increase of remuneration, rational use of state investments, introduction and dissemination of innovative and high-tech products / services, projects, accurate determination of the volume of medical services that will be fully funded by the state and balanced with real opportunities, better transparency of state programs and Ensuring effective communication with the public using all means of modern mass media and the optimal solution of other topical directions, have a positive impact BS to achieve the improvement of the health system of the country, the health of the population and to raise the standard of living. The effective functioning of the Georgian healthcare sector envisages the improvement of such important issues as: improvement of the legal framework, improvement of the quality of medical services, improvement of the existing mechanisms for ensuring quality and safety in terms of infrastructure and human resources, improvement of state permits, licenses and certification system.

References:

1. Barasa E. W., Molyneux S., English M., & Cleary S. Setting healthcare priorities at the macro and meso levels: A framework for evaluation. *International Journal of Health Policy and Management*,– 4(11). 2015.– P. 719–732.
2. Baltussen R., Jansen M. P., Mikkelsen E., Tromp N., Hontelez J., Bijlmakers L., & Van der Wilt G. J. Priority setting for universal health coverage: We need evidence-informed deliberative processes, not just more evidence on cost-effectiveness. *International Journal of Health Policy and Management*,– 5(11). 2016.– P. 615–618.

3. Kapiriri L., Lee N.-M., Wallace L.J., & Kwesiga B. Beyond cost-effectiveness, morbidity and mortality: A comprehensive evaluation of priority setting for HIV programming in Uganda. *BMC Public Health*,– 19(1). 2019.– 359 p.
4. Li R., Hernandez-Villafuerte K., Towse A., Vlad I. & Chalkidou K. Mapping priority setting in health in 17 countries across Asia, Latin America, and sub-Saharan Africa. *Health Systems & Reform*,– 2(1). 2016.– P. 71–83.
5. Lion A., & Connor C. Why differentiating between health system support and health system strengthening is needed. *The International Journal of Health Planning and Management*,– 28(1). 2013.– P. 85–94.
6. Pichon-Riviere A. Priority-Setting Institutions in Health. *Global Heart*,– 7(1). 2012.– P. 13–34.
7. Watkins D. Universal health coverage and intersectoral action for health. 3rd edition. *Lancet* (London, England),– 391(10125). 2018.– P. 1108–1120.

Contents

Section 1. Pedagogy	3
<i>Kuchkarova Mukaddas</i> THE ACTUALITY OF THE PRINCIPLE OF CONSISTENCY IN THE TEACHING OF PHYSICS	3
Section 2. Physics	6
<i>Nasriddinov S. S., Esbergenov Daryabay Muratbaevich</i> NICKEL-RELATED COMPLEX DEFECTS IN SILICON	6
Section 3. Philosophy	9
<i>Gaffarova Gulchehra Gulamjanovna</i> MODERN PHILOSOPHICAL INTERPRETATION OF ABU RAYKHAN BERUNI GNOSEOLOGY	9
<i>Kodirov Barhayotjon Sobirjonovich</i> THEORETICAL AND PRACTICAL BASIS OF INNOVATIVE DEVELOPMENT OF UZBEKISTAN	13
Section 4. Philology and linguistics	17
<i>Turakhodjaeva Mohidil</i> PLANT NAMES IN ENGLISH: THEORETICAL VIEWS	17
<i>Egamnazarova Durdona Shuhratillaevna</i> EXPRESSIVE SYNTAX: PRAGMATIC FUNCTIONS OF PARENTHESIS	21
Section 5. Chemistry	26
<i>Farmonov Jasur, Serkayev Kamar, Samadiy Murodjon, Usmonov Ilkham</i> INVESTIGATION OF THE EFFECT OF HEAT TREATMENT ON THE RELEASE OF LINSEED OIL	26
Section 5. Economics and management	30
<i>Meparishvili Davit, Maridashvili Manana, Sanikidze Ekaterine</i> FINANCIAL STABILITY AND RISK ASSESSMENT OF THE HEALTHCARE SECTOR IN GEORGIA	30