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METHODOLOGY OF FORMING MATHEMATICAL ABILITY IN PRIMARY CLASS STUDENTS

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Annotation. *In this article, methodical recommendations and methods for the formation of mathematics talent and potential in primary school students are presented. The main emphasis is on developing primary school students' interest in mathematics. Extracurricular activities, clubs and Olympics are covered in detail.*

Keysword: *Mathematics, circle, potential, arithmetic material, organization, quiz, mathematical excursion, mastery rate, Math press.*

In our country, teaching mathematics in elementary grades is generally considered as the first stage of mastering the school mathematics course. Many of the topics in the high school math curriculum should be solidified in the elementary grades so that they remain in students' minds for a lifetime, while other topics should be studied early in the curriculum in preparation for further study in later grades. It is introduced only for the purpose of learning or it is introduced to have the opportunity to increase the level of thinking ability in the process of forming certain skills and abilities. The above considerations should be taken into account when it comes to children's conscious and firm acquisition of a certain amount of knowledge, skills and abilities in the field of mathematics in the primary grades of the school. One of the important issues of primary education was and remains the formation of students' conscious and solid calculation skills (often brought to automatism). The mathematics course involves summarizing the educational material to the extent that the students can, understanding the general principles and laws underlying the studied mathematical arguments, and understanding the connections between the observed phenomena. This mainly refers to the study of the properties of actions, existing connections between them, mathematical relations and connections that are the basis of practical learning and skills formed in children. The theory not only helps to acquire practical learning and skills, but is one of the main tools that helps the teacher to teach mathematical relationships between the issues considered in theory and practice, to increase the effectiveness of mathematics teaching. Teaching students to apply acquired knowledge, skills and abilities in different situations should be considered as a special issue of education. This is the

beginning of work aimed at preparing students for polytechnic. This issue is inextricably linked with the more general issue of developing children's cognitive abilities. Already in primary school, a lot of work should be done for children to observe and compare, distinguish similarities and differences in the compared phenomena, analyze, synthesize, generalize, abstract, clarify. The issue of forming children's ability to think logically is inextricably linked with the issue of developing correct, clear, concise mathematical speech in them. This is one of the important tasks of primary education. When talking about developmental education, it is a mistake to think that the work consists only in the development of cognitive abilities (perception, memory, thinking, imagination, speech). This is also the case when doing mathematics requires only explaining how memory and thinking can be tested (which is third-year teaching material). In order to avoid similar methodological mistakes that lead to artificial overloading of students, it is necessary to clearly imagine the whole system of working on the arithmetical material in grades I-IV, the importance of the elements of the theory provided for in the program and It is important to understand the position.

One of the main subjects taught in secondary schools is mathematics. The practical importance of this science is so great, the interdisciplinary connection is so strong that no life problem can be solved without mathematical elements and logical observations. Therefore, this science is taught from the time when the human mind and thinking begin to develop, up to the higher, higher education levels of the educational system. However, the process of teaching the concepts of mathematics, which is considered a serious and abstract science, is not always easy. Since mathematics is a fundamental science, the effective teaching of this subject at a certain stage of the educational system depends very much on how it was taught in the previous stages. As a result, the effective teaching of mathematics to future professionals and students depends, first of all, on how the elements of this subject are taught to the students of preschool educational institutions and elementary school students. will be Experiments show that the role of preparing preschool children for the first grade in the family, in kindergartens or in preparatory groups is invaluable in facilitating the learning of young students, ensuring their mental development, and educating independent work skills. . The main activity of my child at this age is play, and since my attention, interest and goals are not yet balanced and directed in one direction, teaching mathematics to children of this age is a rather complicated process. is considered, that is, it is very difficult to replace my child's game activity with mental activity, educational activity. That is why it takes a long time to achieve positive results through this process. However, the importance of mathematics in elementary grades is not only in imparting mathematical knowledge, but by teaching the elements of this science, the teacher introduces children to the world and explains natural phenomena. It develops them in

every way, that is, it develops their logical thinking and mathematical abilities, attention and intelligence, qualities of will, observation, independence and creative initiative. Getting students interested in science and getting them to be absorbed in learning is the main factor determining the effectiveness of primary education. For this reason, it is necessary to find forms of teaching that arouse great interest and motivation in academic work in all students and create a strong desire to learn the basics of science, to teach them to conduct logical observation, to connect science with life. such as binding are always urgent issues before educators and pedagogues. Extracurricular activities, Olympiads and clubs take the main place in making students interested in mathematics, along with interesting and effective lessons.

In mathematics, extracurricular work is understood as voluntary training of students based on the material related to the program, organized outside of class. The main tasks of extracurricular work are:

- deepening and expanding students' knowledge and practical skills;
- development of students' logical thinking, ingenuity, mathematical intelligence;
- to increase their interest in mathematics, to find gifted and talented children;
- education of demandingness, will, attitude to work, independence, organization and humanity.

The following types of extracurricular activities are found:

- Mathematical minutes, hours.
- Mathematics circles.
- Mathematical competition and Olympiads.
- Fun math nights and quizzes.
- Mathematical Press.
- Mathematical excursion.

Extracurricular activities have some distinctive features compared to classes:

1. It does not apply to the mathematics program by its content. But the imparted knowledge should match the strength of the students.
2. Extracurricular activities should attract all students as much as possible, that is, it should be interesting. Even low-achieving students can become active learners through curiosity.
3. Extracurricular activities are organized based on the principle of discretion, but it is necessary to ensure interest. These classes are not graded, but students who actively participate are encouraged.
4. Depending on the content and form of the training, it can last from 10-12 minutes to 1 hour.
5. Diversity of content and forms of extracurricular activities.

Extracurricular activities include: fun word problems, brain teasers, humor problems, missing information or information overload problems, logic problems, fun math stories, arithmetic puzzles, games, tricks, puzzles, historical information, etc.

The method of organizing and conducting extracurricular activities should be based on the following:

1. The lesson is conducted taking into account the knowledge, skills and abilities acquired by students.
2. Extracurricular activities are organized in order to be based on the principles of students' desire, curiosity, creativity and to satisfy their individual opinions.
3. The forms of conducting extracurricular activities are different from the lessons, and the interesting side is strong.

A necessary condition for this is the complexity of planning and systematic work. It should be noted that individual and group trainings should not be conducted systematically, on the contrary, the main work should be done in the classroom. Out-of-class work has a number of specific features compared to the form of a classroom lesson:

1. In terms of its content, it is not limited by the state program, mathematical material should be given in accordance with the knowledge and skills of students.
2. It is not yet possible to talk about the persistent interest of children in mathematics in primary grades.
3. Ingenuity, intelligence, quick calculations, use of effective methods of solving should be encouraged.
4. Lessons are scheduled for 45 minutes and can be scheduled for 10-12 minutes or an hour, depending on the content and forms of conducting extracurricular activities.
5. Extracurricular activities are characterized by a variety of content, depending on the form and type (interesting math classes, clubs, quizzes, etc.).

In order to arouse interest and support in mathematics minutes, these tasks should not be similar to ordinary mathematical tasks given in classes. All kinds of interesting arithmetical and geometrical problems, more difficult problems, funny problems, problems related to problem solving, interesting squares, rebuses, riddles, etc. serve as material for training. Math club is one of the most common types of work outside of the formal classroom in mathematics. Its main task is in-depth work with students who have a special interest in mathematics. The work of the math club differs from the fun math lessons in the following ways: When choosing students for the math club, their special interests, inclinations and capabilities in relation to mathematics should be taken into account. They independently prepare visual aids (abacuses, cards

with examples for some games, etc.), thoroughly prepare for conducting math evenings, etc. In order to hold a math club, you need to make a work plan for it in advance. For example, we present the approximate plans of some class activities in the second semester in the 2nd grade: I. activity.

1. Inventing rebuses.
2. Interesting questions about addition.
3. Exercises for testing knowledge of counting within 100.
4. Issues that require ingenuity.
5. It's a joke.
6. Riddles.
7. Happy counting (out of 20) game.

II. training.

1. Inventing rebuses.
2. Poetic issues that require ingenuity.
3. Exercises on the analysis of geometric figures.
4. It's a joke.
5. "Fill the number" game.

III. training. Class-type group exercise. The content of the use (possibilities) of historical materials in elementary mathematics lessons.

In fact, the great thinkers of the Uzbek people have created new ideas and doctrines in their researches and discoveries in the long past to educate people to be polite, morally high, perfect, hardworking, and patriotic. These are. Musa al-Khorazmi (783-850), Abu Rayhan Beruni (973-1048), Ibn Sina (980-1037); Omar Khayyam (1048-1131); Nasriddin al-Tusi (1201-1274); Mirza Ulug'bek (1394-1449), Ghiyasiddin al-Koshi; The rich scientific and spiritual heritage left to us by Ali Kushchi (1402-1474) and others is the basis of our opinion. In the works of these scholars, great attention is paid to children's study, work, manners, and the duties of teachers in this work. In particular, according to the opinion of Nasriddin al-Tusi, the teacher should feel the responsibility to win the trust of the students and take a place in their hearts in order to influence the students' intelligence. Abu Nasr Farabi says that one of the main tasks of a teacher is to focus on the acquisition of moral standards, practical skills and qualifications of young people. According to Ibn Sina, knowledge of historical sources is a noble and useful activity. He emphasizes that the study of science and things with the help of the human mind is considered important in the activity of a person. In the pedagogical work of Abu Rayhan Beruni, his ideas about the purpose, tasks and place of education, the development of a person and the young generation are built on the basis of humanism in the true sense. The most important of the pedagogical ideas of Abu Rayhan Beruni is the need to acquire knowledge carefully and firmly.

It is the sacred duty of every spiritual and creative specialist to deeply study the scientific heritage left by our ancestors and apply it to the process of education and training. Below we recommend an example of how to conduct a circle activity in the classroom to increase the effectiveness of the mathematics lesson in elementary grades.

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PHYSICAL AND CHEMICAL PROPERTIES OF THE PROCESS OF SAPONIFICATION OF COTTON SOAPSTOCK UNDER ULTRASONIC INFLUENCE

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ABSTRACT

The article shows the possibility of assessing the transportability of soapstock, saponified by various methods - classical and ultrasonic. It was found that after ultrasonic treatment, the density and viscosity of the soapstock significantly decreased compared to the classical method of processing branch waste from edible oil industry. At the same time, the foaming capacity of the soapstock increased with an increase in the saponification temperature after the initial and 5 minute soak. In a 5 minute settling, the foaming ability of the soapstock turned out to be lower than its initial settling.

The foam ratio of the soapstock, saponified by the ultrasonic method, is relatively from 1.5 to 2.5 times less than by the classical method of soapstock saponification. Indicators of rheological properties of saponified soapstock proved the acceptability of pumping soapstock from one apparatus to another. Whereas, the foaming properties and the foam ratio indicate premature foam control in the production of soap, as well as the properties of the resulting detergent based on the basic solution - saponified soapstock.

Key words: *soapstock, ultrasonic method, density, viscosity, foaming properties.*

INTRODUCTION

The problem of rational processing of fat waste from the oil and fat industry in order to obtain competitive products is relevant today. Depending on the type of oilseeds (soybean, canula, palm, sunflower, etc.), soapstock is about 5-9% of the total crude oil and is used for the production of fatty acids, animal feed and soap products

for synthetic detergents. Although soapstock is a secondary resource for the production of the necessary crude fatty acids from it, the issue of disposal does not always have its potential. Difficult to process among the waste products of the oil and fat industry is cotton soapstock due to its complex colloidal system.

Analysis of the results of studies of soapstock from cottonseed, carried out by gas chromatography-mass spectroscopy (GC-MS), showed that the soapstock mainly consists of moisture and solvent (about 49%), fatty acids (about 60% in terms of dry weight), organic phosphates, monoglycerides, diglycerides, triglycerides, sterols, waxes and waxy substances as well as unsaponifiables such as polyhydric alcohols, carbohydrates, sterols, tocofelores,. In addition, it has been proven that gossypol (a polyphenolic compound) is contained in cottonseed soap stock in an amount of 7.5% [1-4].

Existing methods of processing this fatty waste using catalysts, turbulent mode using live steam with a pressure of more than 3 atm, or other technical solutions do not allow to achieve the expected results. This can be attributed by the presence of undesirable saponifiable substances such as gossypolic acid, phospholipids, etc., which are ballast (NaOH, KOH).

The Republic has its own oil and fat industry, which processes 1.4 million tons of cotton seeds to produce 0.25 million refined oil and 25 thousand tons of soap stock. The classical technology of cotton soapstock saponification, including circulating mixing with pumps under the violent turbulent effect of steam, needs serious improvement. Until now, on the basis of such a method, a duration of about 4-6 hours is required, which is not effective from the point of view of overspending both material and energy resources. The output of the final product, soap glue, does not exceed 90%.

Due to the fact that the saponification process proceeds through heterogeneous reactions, foaming is observed. This phenomenon occurs due to the formation of strong films of soaps and surfactants over the soap stock, the results of which are the proper mixing of free fatty acids, phosphatides, color pigments, as well as the desertification of triglyceride with alkalis. In this case, the rheological and foaming properties of saponification products play a key role.

Scientific and technical literature provides the results of studies of the rheological properties of triglyceride and soap stock.

In [5], the rheological properties of two complex mixtures of short-chain triglycerides were experimentally determined. The dynamic or absolute viscosity of the mixtures was measured at a shear rate of 0.32 to 64.69 s^{-1} at a temperature of 25 to 80°C. The compositions of the mixtures were based on the oil of the plant species Cuphea viscosissima VS-320, a natural source of short-chain triglycerides.

In [6], the rheological properties of confectionery fat (shortening) with similar physicochemical characteristics, but different functionality at small and large vibrational shifts were studied. Particular attention was paid to the mechanical behavior of shortening, characterized by resistance to softening during operation and the formation of continuous thin fat films during rolling and rolling of the dough. All confectionery fats had a weak frequency dependence and comparable G' values from 0.6 to 4.5·106 Pa, resembling viscoelastic solids (G' > G").

Valishevsky et al. neutralized the soapstock mixture with acid and reduced the viscosity by adding ethanol before GC analysis [7, 8].

Studies have been carried out to obtain thickeners, which are a soap and non-soap component that holds together liquid lubricants and additives. Soap thickeners mainly consisted of lithium, calcium, sodium, aluminum or barium fatty acid soaps obtained from cotton soap stock. The chemical structure, viscosity and rheological properties of greases have a direct impact on their performance [9].

It was found that the viscosity of sodium soap based on saponified cotton soapstock decreases with increasing temperature 25, 45 and 85°C 21.5; 16.2 and 10 Pa·s, respectively [9-11].

As for the issue of soapstock transportation, the paper [12] studied the rheological property of a by-product of vegetable oil refining and neutralization (soapstock), a product of potential economic interest, but currently underestimated. According to the authors of the work, it is possible to increase the economic value of soapstock by increasing its fat content, since the selling price of soapstock depends on its fat content. A high fat content results in a higher viscosity, making it difficult to transport. It has been established that the soapstock has a complex rheology: at 20% fat it behaves like a pseudo plastic, and at more than 30% fat it behaves like a Bingham plastic. Thus, it is necessary to dilute the soapstock with water, which reduces its viscosity (and fat content) and facilitates transportation. The information given in the literature indicates the insufficiency of studying the foaming and rheological properties of cotton soapstock as an intermediate in order to obtain soap, crude fatty acids, esters, biofuels, detergents, etc. on its basis.

METHODS

The object for the study was the cotton seed soapstock of JSC "Urganch yog'-moy" (Khorezm, Uzbekistan) composition (wt.%): neutral fat 9.9; total fat 35.1 moisture and volatile substances 55.

Sodium hydroxide of 99% purity was used as an alkaline reagent, which was purchased from JSC :Fortek"-PE (Uzbekistan).

The studied soapstock was diluted with water with a hardness of 7 mmol equiv/l at a ratio of soapstock : H_2O = 1 : 1.

The density of soapstock samples was determined by the pycnometric method and its value was calculated by the formula:

$$\rho = \frac{m}{V} \quad (1)$$

where m – mass of soapstock pulp, g; V– pycnometer capacity, cm^3. The measurement accuracy is ± 0,05%.

Since cotton seed soapstock has a complex colloidal system and does not obey Newton's law [13]. In this study, in contrast to [9-11], where the kinematic viscosity was determined, the dynamic viscosity of the soapstock was studied. To determine the viscosity, a rotational viscometer HAAKE Viscotester 1 plus (Germany) was used. When measuring viscosity, the HAAKE Viscotester 1 plus is switched off when the button is pressed for 3 seconds. The operating hours are then displayed for 3 seconds and the last measuring range is saved. The measurement accuracy is ±3.

Prior to determining the rheology, soapstock samples were subjected to saponification by the classical method using a 42% sodium hydroxide solution at 95°C for 120 min without the use of any additional catalysts or technical approaches.

In the second case, soapstock samples were saponified with 42% sodium hydroxide solution at 95°C for 120 min under sonication using a surface Cavitator Ultrasonic Cleaner (USC-3L, China) at Power: 220 VAC/20 Hz.

Soapstock saponified by classical and ultrasonic methods were conventionally designated as SP-C and SP-U, and the original raw (crude) soapstock - SP.

Due to the fact that soap stock usually contains sodium soap and other surfactants, the foaming property of raw and saponified soapstock was studied by the method of D. Ross and G. Miles [14].

This method is based on whipping the foam with a freely falling jet of solution. In this case, it is necessary to determine the initial foam height H_o and the foam height after 5 minutes H_5. After that, the stability of the foam can be judged by the ratio H_0 /H_5.

The expansion ratio (S_f) of saponified soapstock foam was determined by classical and ultrasonic methods. The foam ratio is a dimensionless value representing the ratio of the foam volume to the total volume of the solution, liquid, etc.

The foam expansion rate was calculated using the formula [15]:

$$S_f = \frac{V_f}{V_1} \quad (2)$$

where V_f is the volume of foam, cm^3, V_1 is the total volume of the foam concentrate solution.

This value, which characterizes the foaming process, is described using the dependence of the equation between the initial volume of foamy liquid V_0 and the volume of liquid by time τ, or express the volume of liquid flowing from it per unit

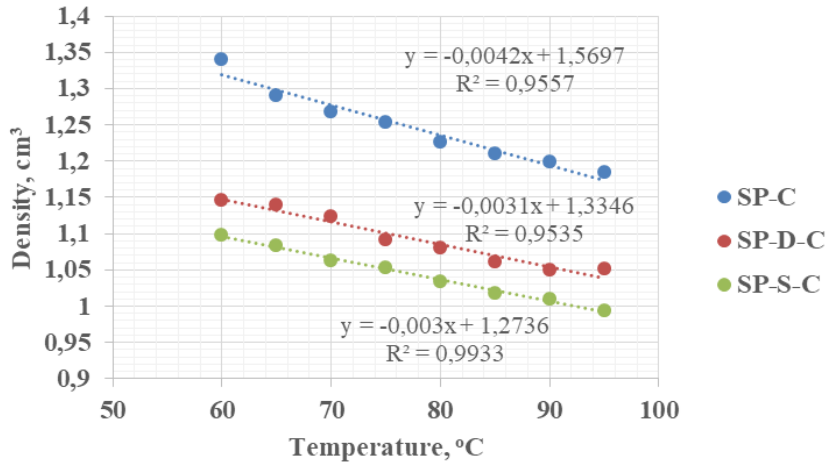
time *(dV/dτ)* [16-18]. In our case, taking into account the foaming ability of soapstock saponification under various conditions, we take the time of 0 and 5 minutes.

RESULTS

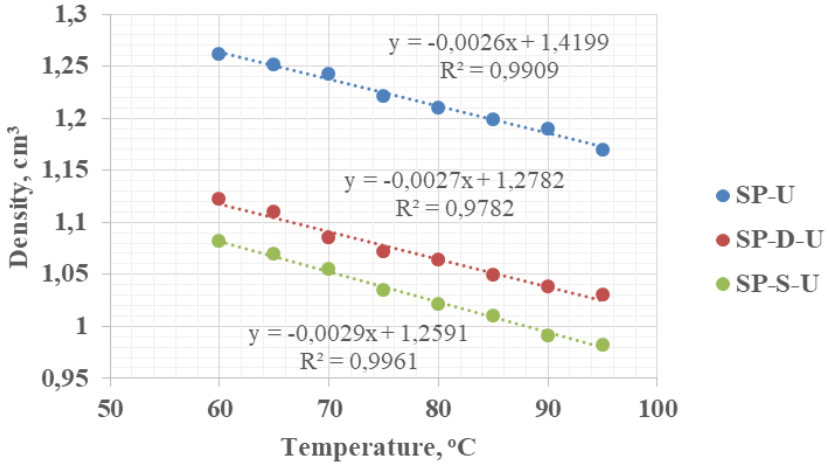
Figures 1 and 2 show graphical representations of the dependence of the change in density and viscosity of raw soapstock and its saponified form, obtained by classical and ultrasonic methods. They have a mathematical straight-line and power dependence, as well as a correlation coefficient, R^2, which varies in the range of 0.95-0.99. Processed by Excel 2019. As can be seen from the figures, raw soapstock under normal conditions has relatively high density and viscosity values compared to raw soapstock under the influence of ultrasound. So if under normal conditions in a raw soapstock the density with an increase in temperature from 60 to 95 °C has a density of 1.3402 to 1.1840 g/cm^3, then the density of the soapstock after ultrasonic treatment at the studied temperatures is in the order of 1.2611 to 1.1692 g/cm^3. In this case, it can be noted that the density of the soap stock under ultrasound is 1.06 and 1.01 times less than the density of the soapstock under normal conditions. A similar pattern is observed in the case of studying the density of the soapstock diluted with water, both under normal and under ultrasonic conditions. It shows that the density of raw and diluted soapstock under normal and ultrasonic conditions is, respectively, from 1.1452 to 1.0514 and from 1.1224 to 1.0303 g/cm^3 under the studied conditions. This means that the density of the soapstock under ultrasonic action is, on average, 1.02 times less than the density of the soap stock studied under normal conditions. In addition, the density of the dilute soapstock compared to the crude undiluted one decreases on average from 1.17 to 1.13 and from 1.12 to 1.13 times, respectively, under normal and ultrasonic conditions.

As for the study of the density of these soapstocks after their saponification by classical and ultrasonic methods, one can see a significant difference between them. For example, the density of the soapstock after saponification by classical and ultrasonic methods decreases from 1.0971 to 0.9931 and from 1.0822 to 0.9821 g/cm^3 with an increase in temperature from 60 to 95 °C, respectively. At the same time, it can be seen that the density of the soapstock saponified by the ultrasonic method is, on average, 1.01 times less than by the classical method.

An important value of viscosity also plays an important role in assessing the rheological properties of the soapstock in various types of its processing. An increase in temperature from 60 to 95 °C helps to reduce the viscosity of the soapstock from 1.94 to 1.25; from 1.29 to 1.12 and from 1.25 to 1.14 m Pa·s and from 1.82 to 1.17; from 1.28 to 1.10 and from 1.24 to 1.01 mPa·s, respectively, in the case of normal and ultrasonic saponification conditions (Fig. 2).

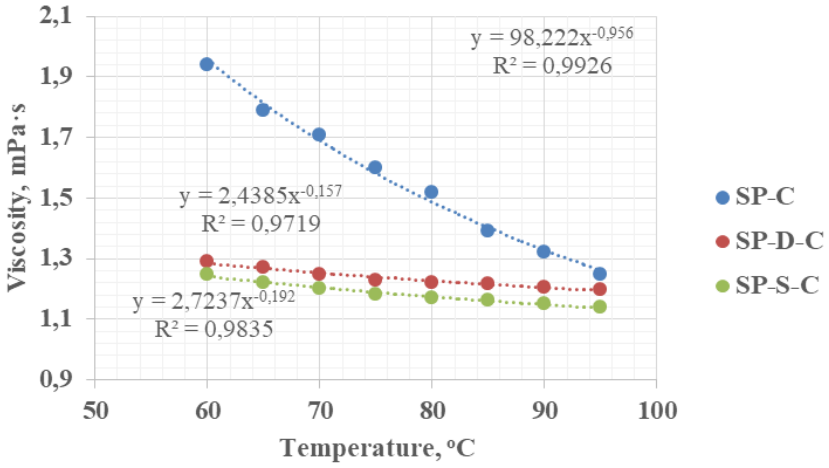


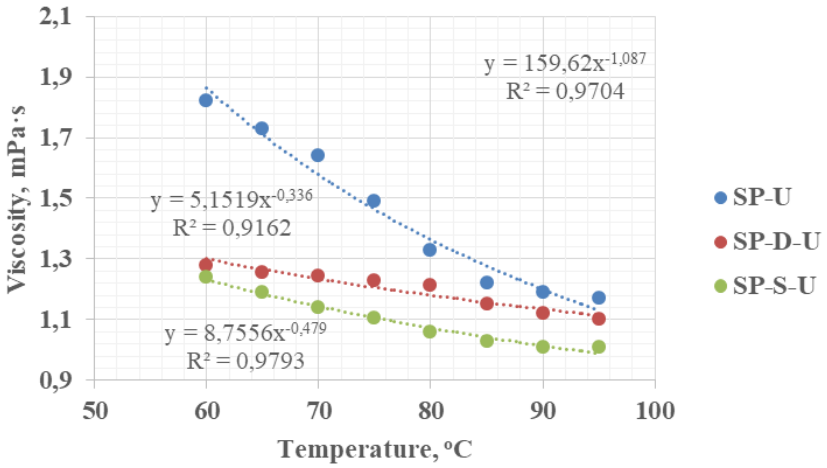
a)



b)

Figure 1. The dependence of the change in the density of raw, (SP-C, SP-U) diluted (SP-D-C, SP-D-U) and saponified (SP-S-C, SP-S-U) soapstock by classical (a) and ultrasonic (b) methods





b)

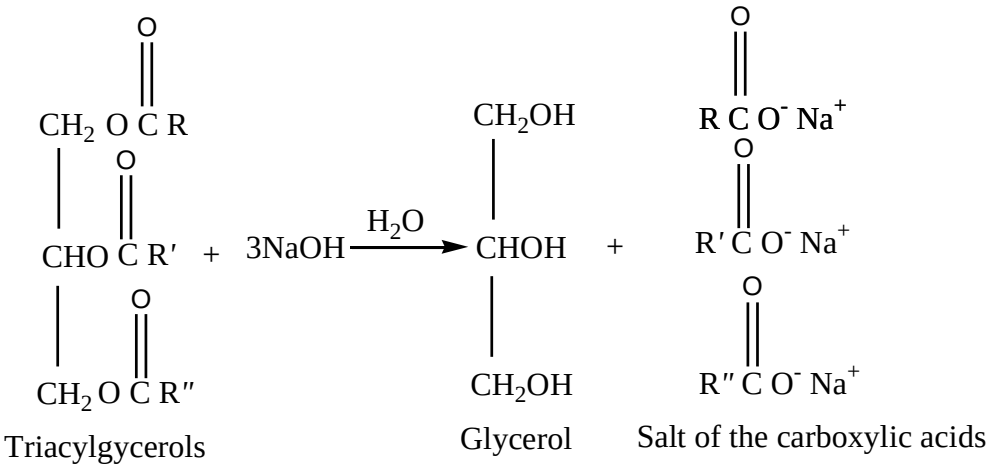
Figure 2. The dependence of the change in the viscosity of raw, (SP-C, SP-U) diluted (SP-D-C, SP-D-U) and saponified (SP-S-C, SP-S-U) soap stock by classical (a) and ultrasonic (b) methods

If we compare the viscosity indicators, we can make sure that the viscosity of the raw, diluted and saponified soapstock by the ultrasonic method is on average 1.06; 1.02 and 1.06 times less compared to soap stock processed by the classical method.

At the same time, a significant difference between the rheological properties of raw and saponified soap stock is attributed by the formation of free water during the saponification process according to the equation:

$$C_3H_5(RCOO)_3 + 3NaOH \rightarrow 3RCOONa + C_3H_5(OH)_3 \quad (3)$$

or



$$RCOOH + NaOH \rightarrow RCOONa + H_2O \quad (4)$$

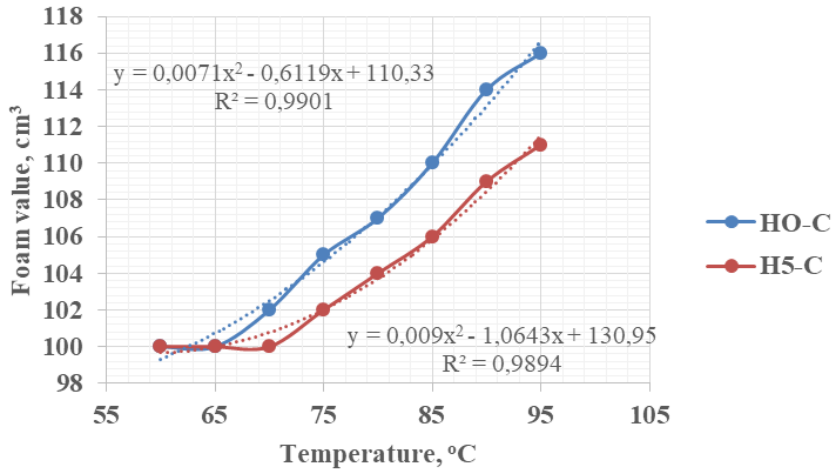
In this case, water dilutes the soapstock, which leads to a decrease in density and viscosity. These indicators are quite suitable for transporting soapstock from one apparatus to another.

Thus, the regularity of the series for the decrease in the indicators of the rheological properties of the soap stock from the data of Fig. 1 was established. 1 and 2 as follows :

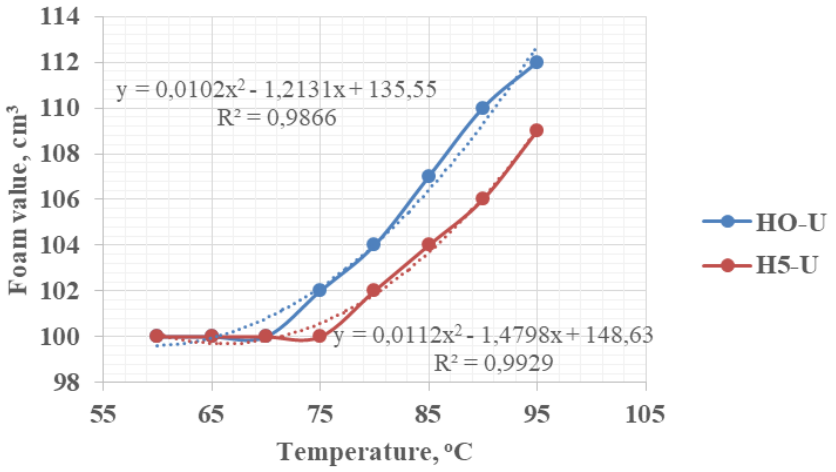
SP-C > SP-D-C > SP-S-C > SP-U > SP-D-U > SP-S-U

Taking into account the fact that ultrasonic impact could destroy the structural and mechanical strength of the cotton soapstock, causing destabilization in general.

The foaming property of cotton seed soapstock in the initial and 5 minutes settling after its saponification by the classical and ultrasonic methods is shown in Figure 3. All the results of the study have a mathematical dependence of the polyminal graphic image and are correlated in the range R^2 = 0.98-0.99.



a)



b)

Figure 3. The dependence of the change in the foaming properties of the soap stock, saponified by classical and ultrasonic methods, after the initial (HO-C) and 5-minute (H5-U) exposure

th

from 70 °C, which is due to the low intermolecular interaction of the constituent substances of various nature in the soapstock.

The foaming ability of the saponified soapstock, as a basis for obtaining detergents, also has sufficient stability due to the presence of viscous high-molecular surfactants in it, which play the role of a stabilizer [19]. In all cases, the results of the study show that the values of the foam volume after 5 minutes of exposure, compared to the initial value, decrease from 105 to 102 at 75 °C and from 116 to 111 cm^3 at 95 °C when the soap stock is saponified by the classical method. Whereas in the case of ultrasonic treatment, the foam volume is relatively low and varies from 102 to 100 and from 112 to 109 cm^3, respectively, at 75 and 95 °C.

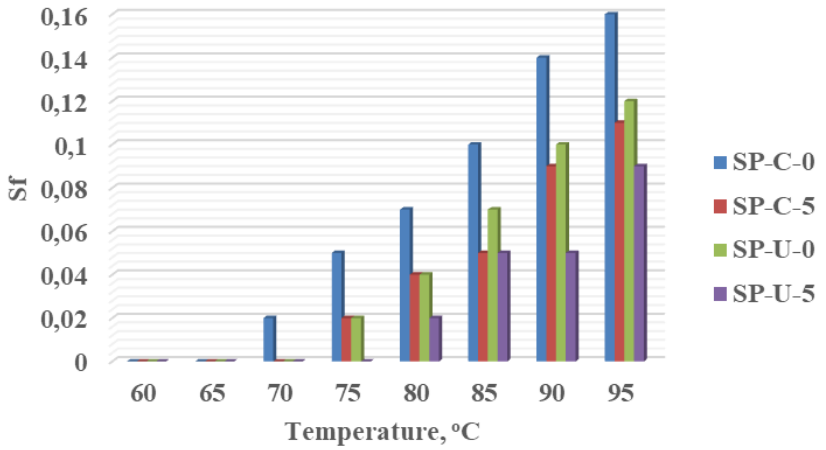


Figure 4. Dependence of the change in the foam ratio (S_f) of the soap stock saponified by classical and ultrasonic methods after the initial (SP-C-0, SP-U-0) and 5-minute (SP-C-5, SP-U-5) exposure on temperature

Comparative results of the study show that under ultrasonic treatment, the volume of foam is reduced by an average of 1.03 times compared to the classical method of soapstock processing.

The indicators of the foaming property served to calculate the foam ratio (equation 2) of the soapstock during its saponification by the studied methods. The results of the calculated data are presented in Figure 4. The data show a trend towards an increase in the foam ratio with an increase in the soapstock saponification temperature. For example, with an increase in temperature from 75 to 95 °C, the foam

expansion ratio increases from 0.05 to 0.16 and from 0.02 to 0.11, respectively, after the initial and 5 minute exposure of the saponified soapstock by the classical method. At the same time, the same picture is observed in the case of an increase in the expansion ratio of the foam of saponified soap stock, saponified by the ultrasonic method, which varies from 0.02 to 0.12 and from 0 to 0.09 with an increase in temperature from 75 to 95 °C. The foam ratio of the saponified soapstock is almost 1.5 to 2.5 times less than that of the saponified soapstock by the classical method, respectively, after the initial and 5 minute exposure.

CONCLUSION

Thus, the dependence of the change in the rheological properties of saponified soapstock by classical and ultrasonic methods on temperature has been studied. It was found that the density and viscosity of the saponified soapstock by the ultrasonic method is from 1.06 to 1.02 times less than in comparison with the classical method. In any case, with an increase in temperature from 60 to 95 °C, the density and viscosity of the soapstock, saponified by two methods, significantly decrease, which is attributed by intermolecular interactions inside the soapstocks.

On the one hand, the indicators of foaming ability and foam ratio increase with increasing temperature, but on the other hand, a 5-minute exposure of the saponified soapstock mass is 1.03 and from 1.5 to 2.5 times less compared to the initial stage.

The rheological properties of the saponified soapstock reveal the availability of their transfer from one apparatus to another. As for the foaming properties and the foam ratio, they give a characteristic of the premature control of the foam in the production ofsoap, as well as the properties of the resulting detergent based on the base solution - saponified soapstock.

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MATEMATIK ANALIZNING AYRIM DOLZARB MUAMMOLARI

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ANNOTATSIYA

Ushbu maqolada matematik analizning ayrim dolzarb masalalaridan biri murakkab funksiyani xususiy hosilalari yordamida topish masalasi ko‘rib chiqiladi. Maqoladan oliy ta’lim muassasalari talaba yoshlari hamda qiziquvchi yoshlar foydalanishlari mumkin.

Kalit so‘zlar: *Xususiy hosila, murakkab funksiya, differensil, chiziqli almashtirish, chiziqli bog‘liqlik.*

SOME IMPORTANT ISSUES OF MATHEMATICAL ANALYSIS

ABSTRACT

This article considers one of the mathematical problems of finding a complex function using its personal derivatives. Higher education students and interested youth can download the article.

Keywords: *Eigenderivative, complex function, differential, linear substitution, linear dependence.*

KIRISH

Matematik analiz fani oliy matematikaning asosiy tarkibiy qismi bo‘lib, ushbu fanni o‘rganish uchun talabaladan algebra va analiz asoslaridan dastlabki bilimlari kerak bo‘ladi. Matematik analiz asosan funksiyalarni va o‘zgaruvchi miqdorlar orasidagi munosabatlarni o‘rganadi. Uning asosini esa differensial va integral hisob tashkil etadi. U o‘ziga xos tadqiqot uslubiga ya’ni cheksiz kichik yoki limitga o‘tish vositasida analiz qilish, asosiy tushunchalarning ma’lum majmuasi (funksiya, limit, hosila, differensial, integral, qator) ga ega.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

1-ta’rif. Ushbu

$$\lim_{\Delta x_k \to 0} \frac{\Delta x_k f(x^0)}{\Delta x_k}, (k = \overline{1,m})$$

limitga $f(x) = f(x_1, \dots, x_m)$ funksiyaning x^0 nuqtadagi x_k o‘zgaruvchi bo‘yicha xususiy hosilasi deyiladi va u $\frac{\partial f(x^0)}{\partial x_k}$ kabi belgilanadi.

Xususiy hosilaning geometrik ma’nosini bilish uchun $M \subset R^2$ to‘plamda aniqlangan $z = f(x, y)$ funksiyani qaraymiz. Aytaylik $x_0, y_0 \in M$ bo‘lib, bu nuqtada $\frac{\partial f(x_0,y_0)}{\partial x}$ va $\frac{\partial f(x_0,y_0)}{\partial y}$ lar shunday bo‘lsin. $z = f(x, y)$ funksiya grafigi R^3 da biror sirtni aniqlaydi. $\Rightarrow z = f(x, y_0)$ ning grafigi sirt bilan $y = y_0$ tekislikning kesishishida hosil bo‘lgan Γ_1 chiziq bo‘ladi. $z = f(x_0, y)$ning grafigi Γ_2 chiziq bo‘ladi. Agar Γ_1 va Γ_2 chiziqlarning $(x_0, y_0, f(x_0, y_0))$ nuqtasiga o‘tkazilgan urinmaning Oxy tekisligi bilan hosil qilgan burchaklarini mos ravishda α va β deb belgilasak, unda

$$\frac{\partial f(x_0,y_0)}{\partial x} = tg\alpha \text{ va } \frac{\partial f(x_0,y_0)}{\partial y} = tg\beta$$

bo‘ladi. Bundan $z = f(x, y)$ sirtning (x_0, y_0, z_0) nuqtasiga o‘tkazilgan urinma tekislik tenglamasi ushbu

$$z - z_0 = \frac{\partial f(x_0, y_0)}{\partial x} \cdot (x - x_0) + \frac{\partial f(x_0, y_0)}{\partial y} \cdot (y - y_0)$$

ko‘rinishda bo‘lishini hosil qilamiz.[1]

NATIJALAR

Masala. $\frac{\partial u}{\partial x}$ *va* $\frac{\partial u}{\partial y}$ xususiy hosilalarni hisoblash va f va g fuksiyalarning hosilalarini (f va g -differensiallanuvchi funksiyalar) yo`qotish yo`li bilan shunday tenglama tuzingki, $u(x, y) = f(x - y, y - z)$ funksiya uni qanoatlantirsin.

Yechish. Berilgan funksiyaning to‘la differensialini hisoblab olamiz

$$u = f(x - y, y - z) \quad u(x, y) - ?$$
$$du = df(x - y, y - z)$$
$$du = f'_{x-y} d(x - y) + f'_{y-z} d(y - z)$$
$$du = f'_{x-y}(dx - dy) + f'_{y-z}(dy - dz)$$
$$du = f'_{x-y}(dx - dy) + f'_{y-z}(dy - dz)$$
$$du = f'_{x-y} dx + \left(f'_{y-z} - f'_{x-y}\right) dy + \left(-f'_{y-z}\right) dz$$

xususiy hosilalar uchun

$$u'_x = f'_{x-y} \ , \ u'_y = f'_{y-z} - f'_{x-y}$$
$$u'_z = -f'_{y-z}.$$
$$u'_y = -u'_z - u'_x$$
$$u'_x + u'_y + u'_z = 0$$

tenglik o‘rinli ekanligidan,

$$u(x, y, z) = x - y + y - z$$

$$u(x,y,z) = x - z$$

Tekshiramiz:

$$u'_x = \frac{\partial(x-z)}{\partial x} = 1$$

$$u'_y = \frac{\partial(x-z)}{\partial y} = 0$$

$$u'_z = \frac{\partial(x-z)}{\partial y} = -1$$

Demak,

$$u(x,y,z) = x - z$$

Ikkinchi tomondan,

$$u(x,y,z) = (x-y)\cdot(y-z) = xy - xz - y^2 + yz$$

Chiziqli funksiyalarning nisbati ko‘rinishida ifodalasak,

$$u(x,y,z) = \frac{x-y}{y-z}$$

ga ega bo‘lamiz.

Masala. $u = f(\frac{x}{y};\frac{y}{z})$ $u(x,y,z)-?$

Yechish.

$$du = df(\frac{x}{y};\frac{y}{z})$$

$$du = f'_{\frac{x}{y}} d\left(\frac{x}{y}\right) + f'_{\frac{y}{z}} d(\frac{y}{z})$$

$$du = \left(\frac{1}{y}\cdot f'_{\frac{x}{y}}\right)dx + \left(\frac{1}{z}\cdot f'_{\frac{y}{z}} - \frac{x}{y^2}\cdot f'_{\frac{x}{y}}\right)dy - (\frac{y}{z^2}\cdot f'_{\frac{y}{z}})dz$$

$$u'_x = \frac{1}{y}\cdot f'_{\frac{x}{y}}$$

$$u'_y = \frac{1}{z}\cdot f'_{\frac{x}{y}} - \frac{x}{y^2}\cdot f'_{\frac{x}{y}}$$

$$u'_z = -\frac{y}{z^2}\cdot f'_{\frac{y}{z}}$$

Bundan,

$$f'_{\frac{x}{y}} = y\cdot u'_x$$

$$f'_{\frac{y}{z}} = -\frac{z^2}{y}\cdot u'_z$$

$$u'_y = \frac{1}{z} \cdot \left(-\frac{z^2}{y} \cdot u'_z \right) - \frac{x}{y^2} \cdot (y \cdot u'_x)$$

$$u'_y = -\frac{z}{y} \cdot u'_z - \frac{x}{y} \cdot u'_x$$

$$x \cdot u'_x + y \cdot u'_y + z \cdot u'_z = 0$$

Demak, $u(x, y, z) = \frac{x}{y} + \frac{y}{z}$

Tekshirish.

$$x \cdot \frac{\partial \left(\frac{x}{y} + \frac{y}{z} \right)}{\partial x} + y \cdot \frac{\partial \left(\frac{x}{y} + \frac{y}{z} \right)}{\partial y} + z \cdot \frac{\partial \left(\frac{x}{y} + \frac{y}{z} \right)}{\partial z} = 0$$

$$x \cdot \left(\frac{1}{y} \right) + y \cdot \left(\frac{-x}{y^2} + \frac{1}{z} \right) + z \cdot \left(\frac{-y}{z^2} \right) = \frac{x}{y} - \frac{x}{y} + \frac{y}{z} - \frac{y}{z} = 0$$

XULOSA

Agar $f(x)$ funksiya x^0 nuqtada differensiallanuvchi bo‘lsa, u holda bu funksiya shu nuqtada uzluksiz bo‘ladi. Murakkab funksiyalarni xususiy hosila yordamida sodda ko‘rinishga keltirishda ushbu xossadan foydalanamiz. Dastlab murakkab funksiyaning differensialini topib, soddalashtirishlardan so‘ng har bir argument bo‘yicha xususiy hosilalarni hisoblab, natijani integrallaymiz. Yuqoridagi natijalardan texnika, fizika va matematikaning boshqa ko‘plab sohalarida foydalanish mumkin.

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ISLOM MANBALARIDAGI BAHS VA DALILLASH USULI ZAMONAVIY ARGUMENTLASH NAZARIYASI TALQINIDA

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Annotatsiya: *Maqolada Islom dinning muqaddas manbalaridagi bahs yuritish va dalillash usulining tinglovchilarni ma'lum bir e'tiqodlar, xatti-harakatlar va axloqiy fazilatlarning to'g'ri yoki xatoligiga ishontirishdagi o'rni zamonaviy argumentlash nazariyasi tamoyillari asosida yoritib berilgan. Shuningdek bahsga oid masalalarda imom G'azzoliyning «Ihyo ulum ad-din» asaridagi munozaraga doir bildirilgan fikrlari falsafiy tahlil qilingan.*

Kalit so'zlar: *bahs, dalil, isbot, nutq, argumentlash nazariyasi va amaliyoti, ishonch-e'tiqod, mantiqiy fikrlash, ritorik dalil, haqiqat.*

МЕТОДЫ ДОКАЗАТЕЛЬСТВА И СПОРА В ИСЛАМСКИХ ИСТОЧНИКАХ В ИНТЕРПРЕТАЦИИ СОВРЕМЕННОЙ ТЕОРИИ АРГУМЕНТАЦИИ

Аннотация: *В статье на основе принципов современной теории аргументации освещается роль доказательства и спора в священных источниках ислама в убеждении слушателей в правильности или неправильности тех или иных убеждений, поступков и нравственных качеств. Кроме того в статье также анализируются с философской точки зрения взгляды Имама Газали о споре и доказательства в его трудах «Ихья улум ад-Дин» .*

Ключевые слова: *спор, аргумент, доказательство, дискурс, теория и практика аргументации, вера, убеждение, логическое мышление, риторический аргумент, истина.*

METHODS OF PROOF AND DISPUTE IN ISLAMIC SOURCES IN THE INTERPRETATION OF THE MODERN THEORY OF ARGUMENTATION

Resume: *Based on the principles of the modern theory of argumentation, the article highlights the role of proof and argument in the sacred sources of Islam in convincing listeners of the correctness or incorrectness of certain beliefs, actions and moral qualities. In addition, the article also analyzes from a philosophical point of view the views of Imam Ghazali on the dispute and the evidence in his writings "Ihya ulum ad-Din".*

Key words: *dispute, argument, proof, discourse, theory and practice of argumentation, faith, belief, logical thinking, rhetorical argument, truth.*

KIRISH

Bahs-munozara va dalillash qarama-qarshi fikrlarni isbotlashning maxsus shakli, shuningdek, masalaning to‘g‘ri yechimini izlashning maqbul usuli sifatida insoniyat tarixining eng qadimgi davrlaridayoq muayyan ijtimoiy va siyosiy vaziyat ta’siri ostida yuzaga kela boshlagan hodisadir. Xususan, tanqidiylik va bahs-munozara qilish ruhiyati islom olamining ham ilk tarixiy bosqichlaridayoq markaziy o‘rinni egallab kelganligiga guvoh bo‘lishimiz mumkin. Binobarin, Qur’oni Karimda so‘zlashuv, dalillash va munozara uslubi o‘zining keng qamrovliligi, qo‘yilgan masalalarning aniqliligi bilan ajralib turadi. Insonning aqliy tafakkuri uchun keltirilgan mantiqiy dalillar bilan bir qatorda Qur’onda tinglovchilarga psixologik ta’sir ko‘rsatadigan emotsional dalillar ham mavjud bo‘lib, unda muayyan e’tiqod va xatti-harakatlarga emotsional munosabat bildirish yo‘li bilan tinglovchilarni belgilangan fikrni qabul qilishga ishontirilish holati kuzatiladi. Shu yo‘l bilan insonlarda aqliy qanoat va qalb osoyishtaligi hosil bo‘ladi. Bu tuyg‘ularni his etgan inson hayotda ruhiy kuch olgan va o‘z ishonch-e’tiqodi ortidan ruhiy mu’tadillikga erishgan.

MAVZUGA OID ADABIYOTLAR TAHLILI

Qur’onda barcha insonlarga, ularning millati, irqi, ijtimoiy kelib chiqishi va ilmiy salohiyati darajasidan qat’iy nazar birdek murojaat qilinganligini kuzatamiz. Ma’lumki, agar murojaatlardagi ma’lumotlar empirik tajribaga va ayniqsa konkret dalillarga asoslanmaydigan bo‘lsa, odamlar bunday ma’lumotlarni noo‘rin qabul qila boshlagan bo‘lar edilar. Shu bois muqaddas manba uning to‘g‘riligini tasdiqlovchi dalillar, ya’ni ritorik argumentlar bilan to‘yintirilganligining guvohi bo‘lishimiz mumkin. Ritorik argumentlar – tezisning to‘g‘riligini isbotlashga qaratilgan nutqiy fragmentlardir. Qur’ondagi ritorik argumentatsiya tinglovchilarni ma’lum bir e’tiqodlar, xatti-harakatlar va axloqiy fazilatlarning to‘g‘ri yoki xatoligiga ishontirishdagi vosita vazifasini bajaradi.

Odatda Qur'on matni ritorik dalillarning barcha arxetiplarini o'z ichiga mujassam qilgan degan fikrlar ko'plab uchraydi. Ushbu bu holatni ikki xil vaziyat bilan tushuntirish mumkin:

birinchidan, Qur'on yuborilgan paytlarda arablar murakkab falsafiy mulohazalar va mantiqiy tuzilmalardan foydalanmaganlar va shu sababli Qur'on tilida arablar nutqining o'ziga xos xususiyatlari hisobga olingan. Bu borada Qur'onning Ibrohim surasidagi 4-oyatida shunda keltirilgan: «Biz har bir payg'ambarni (hukmlarimizni) bayon qilib berish uchun o'z qavmining tili bilan (so'zlaydigan qilib) yubordik» [1. 255].

ikkinchidan, falsafiy va mantiqiy mulohazalar o'sha davrda ko'pchilik uchun tushunarsiz bo'lgan, shu sababli falsafiy va mantiqiy dalillarga asosan haqiqatni boshqa yo'l bilan isbotlashning imkoni bo'lmay qolgandagina murojaat qilish tavsiya etiladi.

Ma'lumki, insonlar o'rtasidagi bahs va ixtiloflar xoh diniy, xoh dunyoviy ishlarda bo'lsin, qadimdan davom etib kelayotgan dialektik jarayondir. Zaruriyat va talab-ehtiyoj borki, bahs va ixtiloflar bo'ladi. Bu haqiqat Qur'oni Karimning ko'plab oyatlarida ham ta'kidlanadi. Masalan. «Hud» surasining 118-119-oyatlarida: «Agar Robbingiz xohlaganida edi, (barcha) odamlarni bir ummat (bir xil dinga tobe) qilgan bo'lur edi. (Ular) mudom turlicha (har xil e'tiqodda) bo'lib boraveradilar» [1. 235]. Ya'ni agar Alloh ixtiyor qilganida edi insonlarning e'tiqodlarini bir xil qilib qo'yar edi. Zero, Rabbimiz bunga qodir. Lekin Rabbimiz bunday qilmadi, aksincha yomon va yaxshini bir-biridan ajratish uchun hayotni ixtilofli qilib yaratdi. Demak dunyo shunday yaratilganki unda insonlar o'z fikrlari, yo'nalishlari, maqsadlari va orzu-umidlari borasida har xil bo'lishda davom etadilar. Fikrimizning mantiqiy davomi sifatida quyidagi «Baqara» surasining 251-oyatiga ham e'tiborimizni qaratamiz: «Agar Alloh odamlarning birini ikkinchisi bilan daf etib turmas ekan, shubhasiz, Yer fasodga (buzg'unchilik va xarobaga) aylangan bo'lar edi, lekin Alloh (barcha) olamlarga (nisbatan) fazl egasidir» [1. 41]. deyiladi. Yuqorida keltirilgan muborak oyat to'g'ri yo'ldagi odamlarni har zamon va har yerda yomonlarga qarshi kurashishga va har qanday vosita bilan fasod va tug'yon-isyonga qarshi turishga buyurmoqda. Dialektika nazariyasining «Qarama qarshiliklar birligi va kurashi» qonunida ham rivojlanish va taraqqiyotning asosiy regulyatori etib qarama qarshiliklar o'rtasidagi doimiy kurash asoslantirilganligini kuzatamiz.

Diniy va dunyoviy ixtiloflarning sabablari turlicha bo'lib, shular orasidan haqiqatga erishish maqsadida sodir bo'ladigan bahslarni misol tariqasida keltirib o'tish mumkin. Bunday ixtiloflarda haqiqatni to'la-to'kis bilish uchun dalil-hujjatlar keltiriladi va bu holat ulamolar tilida bahs-munozara deb nomlanadi. Shuningdek, g'arazli niyatdagi, kibrga ketish oqibatidagi, nodonligu ilmsizlik sababidagi ixtiloflar

ham bo‘ladiki, bu holat ulamolar nazdida manmanlik, kibr, janjal, o‘jarlik deyiladi. Ixtilof sabablaridan yana biri kishining bahsi ixtilof mavzuini har tomonlama to‘g‘ri tushuna bilmasligi hisoblanadi. Zero, haqiqatga bo‘lgan da’voning ilmsiz kishi tomonidan bir tomonlama talqin etilishida nisbiylik darajasi juda yuqori bo‘ladi. Shunday masalalaraga oid bahslar borasida imom G‘azzoliyning «Ihyo ulum ad-din» kitobida ham quyidagicha fikr bildirilgan, «Tortishayotganlar xatoni aniqlab, haqiqatga intilishlari lozim. Kamchilik yoki xatolik o‘zida namoyon bo‘lishi yoki u bilan tortishayotganda ko‘rinishidan qo‘rqmasligi kerak. Raqibini dushman deb emas, do‘st sifatida ko‘rishi kerak. Agar u xatoni ochib bersa va haqiqatni aytsa, minnatdorchilik bildirishi zarur»[3. 216]. Zamonaviy argumentlash nazariyasi talqinida ham bahs mavzusining aniqligi uning samarali bo‘lishini belgilaydi, deb hisoblanadi. Agar bahs predmeti aniq bo‘lmasa, tortishuv behuda ketadi, ba’zi hollarda u axloqiy meyorlar doirasidan chetga chiqib, o‘zaro haqorat qilish darajasigacha yetib boradi. Shuning uchun bahsning maqsadini aniqlash va shundan keyin uning to‘g‘ri-noto‘g‘riligi to‘g‘risida dalilli bahsni boshlash kerakligi talab etiladi. Imom G‘azzoliy shuningdek: «Haqiqatga intiluvchi insofli bo‘lishi kerak!! Haqiqatni tan olmayotganlar ko‘p narsani tushunmaganlari uchun undan uzoqlashmoqdalar» deydi. Imom G‘azzoliy o‘z mulohazalarini davom ettirib, taassuf bilan shunday fikr yuritadi: «Zamonamizda so‘zlashuv odobidan behabarlarning ko‘payib ketgani achinarlidir. Ular o‘z qabih niyatlariga yetishish yo‘lida turli uslublardan foydalanishadi. Niyatlari – faqat g‘olib chiqish, faxrlanish, maqtanish, xolos. Haqiqatni qidirib topish masalasi esa ularni tashvishlantirayotgan narsalarning eng oxirgisidir!!!»

Islom falsafasining mashhur namoyondasi Imom Shofi’iy (r.a.) ham munozara yuritish odobiga doir ko‘plab pandu nasihatlar qatorida quyidagicha fikrlarni bildirganlar: «Men bir odam xato qilib qolar, deb hech kutmaganman. Bir kishi bilan suhbatlashganimda, Alloh taolo mening yoki uning tilidan haqiqatni chiqarar, deb umid qilganman. Haqiqat va hujjat keltirganimda, dalilni qabul qilsa, muhabbatim oshgan. Agar kimdir o‘sha haqiqatni inkor qilsa va katta ketsa, nazarimdan tushgan va men uni inkor qilganman. Men ilmim bilan insonlarni qoniqtirgan bo‘lsam, ilmni faqat Allohdan deb bilganman».

Insonlar o‘rtasidagi ixtiloflarning sabablaridan yana biri odamlarning hech bir dalil-hujjatsiz boshqalarning fikriga taqlid qilib mukkasidan ketgan holda ergashib ketishlaridir. Agar Qur’oni Karimga nazar tashlaydigan bo‘lsak, unda ota-bobolariga va o‘zlaridan kattalarga ko‘r-ko‘rona taqlidiy ergashib ketgan g‘ofil, johil va adashgan kishilar bayonini uchratsak bo‘ladi. Xususan, Baqara» surasining 170-oyatida: “Ularga (Mushriqlarga): «Alloh nozil etgan hukmlarga (oyatlarga) ergashingiz!», deyilsa, ular: «Yo‘q, biz ota bobolarimizni ne uzra topgan bo‘lsak, o‘shanga ergashamiz», deydilar. Ota-bobolari bordiyu, hech narsaga aqllari yetmaydigan va to‘g‘ri yo‘ldan

yurmaydigan bo‘lsalar ham-a!» [1. 26]. deyilgan. Qur’oni Karim taqlid qiluvchilarga istehzo qilgan holda raddiya beryapti: «agar ota-bobolari ko‘p narsaga aqllari yetmaydigan, to‘g‘ri yo‘lni topolmaydigan bo‘lsalar ham-a?» Demak, ko‘pincha odamlar orasida sodir bo‘ladigan tortishuvlar mavzu-mohiyatni, voqelikni atroflicha o‘rganmaslik va tushunmaslik sababidan kelib chiqadi. Shuningdek, ko‘r - ko‘rona taqliddan yoki hasad va hoyu havaslarga berilib, umum e’tirof etilishi kerak bo‘lgan haqiqatdan o‘zlarining shaxsiy manfaatlarini ustun qo‘yishdan, nodonligi manmanlik sabablardan kelib chiqadi.

TADQIQOT METODOLOGIYASI

Maqola ilmiy bilishning tarixiylik, analiz va sintez, umumlashtirish, tizimlashtirish, induksiya, deduksiya va modellashtirish usullari asosida yoritilgan bo‘lib, Islom manbalaridagi bahs yuritish va dalillash usuli zamonaviy argumentlash nazariyasi talqinida tadqiq etilgan.

TAHLIL VA NATIJALAR

Biz diniy va dunyoviy ishlardagi munozaralarning azaldan mavjud bo‘lib kelayotganligini tahlil qilib, bu munozaralarni keltirib chiqaradigan bir qancha sabablarni ko‘rib chiqdik. Shu yo‘sinda endi insonlar o‘rtasidagi bahs-munozara va ixtiloflarni tartibga solib turuvchi islomdagi axloqiy normalar va xulq asoslarini ham tadqiq etib ko‘ramiz. Shuni e’tirof etib o‘tish kerakki, islom dini joriy qilgan axloq normalari va xulq asoslari bahs-munozaralarni turli usulda tartibga solib turishda o‘zini yorqin namoyon etadi. Shu maqsadda insonlar o‘rtasidagi muloqot to‘g‘rilik va haqiqatga mo‘ljallanib, safsata, yolg‘on, bo‘hton va xomxayollardan uzoq bo‘lishi lozimligiga da’vat etiladi. Qur’oni karimda payg‘ambarlar va ularning qavmlari o‘rtasidagi bo‘lib o‘tgan o‘zaro so‘zlashuvlarga oid oyatlarga nazar tashlasak, ibratli insonlar yolg‘onlarga chek qo‘yish maqsadida haq gaplarnigina gapirganining guvohi bo‘lamiz. Shuningdek, bunda tortishuv yoki nizo asosiy mavzudan chiqib ketmasligi kerakligi talab etilganligini ham kuzatishimiz mumkin. Chunki bahs-munozara qiluvchilar ko‘pincha muayyan mavzu bo‘yicha tortishayotganlarida boshqa mavzularga ham o‘tib ketilish holatlari hayotda ko‘p kuzatiladi. Natijada ular qaysi mavzu yuzasidan tortishayotganlarini bilmay qoladilar. Agar biz Qur’oni karimga nazar tashlaydigan bo‘lsak, payg‘ambarlar bilan qavmlari o‘rtasida kechgan bahslar, munozara va tortishuvlarda u zotlarning mavzudan tashqariga chiqmaganlarini ko‘ramiz.

XULOSA

Xulosa o‘rnida aytadigan bo‘lsak, an’ana va bid’atlarga mukkasidan ketishlik, ko‘r-ko‘rona taqlid qilgan holda ergashish zamonaviy argumentlash nazariyasi talqiniga ko‘ra vorisiylik qonuniyatining buzilishini ko‘rsatadi va buning oqibatida tanazzul kelib chiqib, rivojlanish va taraqqiyot sustlashadi. Ayniqsa, bu taqlidga

o‘jarlik, haqni tan olmaslik va hoyu havasga berilish qo‘shilsa, tanazzul yanada yiriklashadi. Demak, islom manbalarida keltirilgan amallar va chaqiriqlar yig‘indisidan hosil bo‘lgan ilm ma’lum darajada tanqidiy-tahliliy va innovatsion uslubga asoslangan, degan xulosaga borsak o‘rinlidir.

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STRATEGIC MANAGEMENT AS A KEY TO ENHANCING THE ECONOMIC POTENTIAL OF INDUSTRIAL ENTERPRISE

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Abstract: *In today's complex conditions of development and the functioning of economic entities, there is a need to improve the industrial enterprise's economic potential so that can adapt to an unstable external environment. One of the directions for solving this problem is the formation of effective strategic management and the development of science-based strategies for the development of industrial enterprises.*

Keywords: *strategic management; economic potential; the management of the industrial enterprise; environmental changes; strategy implementation.*

Introduction.

The paradigm of business and entrepreneurial activity is that each enterprise seeks to enhance its economic potential in order to effectively manage the organization whole. It is not uncommon for an enterprise when the lack of a development strategy, a low managerial responsibility, and a lack of relevant information about the economic potential of an enterprise brings to the bankruptcy of a business. The relevance of the problem is the fact that the modern environment of enterprises is characterized by an extremely high degree of complexity, dynamism, and uncertainty. The ability to adapt to changes in the external environment is the main condition in business, therefore determining the management strategy of the organization's behavior and implementing this strategy into practice are the main task of managers.

Literature review.

The topics with the development of the strategic management of industrial enterprises have been studied in the scientific works of many scientists: Ch. Gil, G. Mintzberg, Drucker, G. G. Ackoff, D. Lempel, P. Alstrend, O.A. Ermansky Porter, B. and others. However, the theoretical issues of strategic management and ways to improve it in industrial enterprises remain insufficiently studied. The disagreements in the opinions of different scientists regarding the study of these issues indicate the need for further scientific research [1].

Methods.

The word “strategy” is derived from the Greek word “strategos”; stratus (army) and “ago” (moving). Strategy is an action that managers take to reach one or more of the organization’s goals [2]. Strategic management is the continuous planning, controlling, analyzing, and evaluating of all work processes in the company’s needs to meet its goals and objectives.

Changes in innovative environments will require industrial enterprises to constantly improve their strategies for success. The strategic management process helps organizations obtain information on their present situation, develop action plan, and analyze the effectiveness of the implemented management strategies [3].

The essence of strategic management lies in the response to three key questions:

1) What is the current state of the enterprise?
2) In what position would it like to be in three, five, ten years?
3) How to achieve the desired position?

To answer the first question, managers should have a good understanding of the current situation in which the enterprise exists, before deciding where to go next. Therefore, the management should create a database that provides the process of making strategic decisions with relevant info for the analysis of past, present and future situations.

The second question reflects such an important feature of strategic management as its orientation to the future. It is necessary to clearly define what to strive for and what goals to set.

The third issue of strategic management is related to the implementation of the chosen strategy, during which the two previous stages can be adjusted. The most important components or limitations of this stage are the available resources, the management system, the organizational structure, as well as the personnel who will implement the chosen strategy. I. Ansoff recommends considering strategic management as consisting of two complementary subsystems: analysis and selection of a strategic position and operational management in real-time.

Thus, strategic management, in contrast to strategic planning, is an action-oriented system that includes consideration of the process of implementing the strategy, as well as evaluation and control. Moreover, the implementation of the strategy is a key part of management, since in the absence of implementation mechanisms, the strategic plan remains only as a fantasy [4].

The strategic management process is divided into several stages. While the end result will differ from one business to the next, there are simple chronological steps that organizations can take to put strategies into action.

Determine your strategic intent. Strategic management begins with strategic intent, which is the definition of organizational objectives and their use as a standard against which performance and progress are measured.

Strategy Development – The next step is to develop the strategy, which necessitates a company health check via a SWOTanalysis. It is where businesses examine themselves forensically, looking at their internal and external environments.

Strategy Execution – A strategic management blueprint is a good place to start, but it must be implemented. Strategies must be implemented to ensure a company's survival, growth, and expansion.

Strategy evaluation – This process can be used by an organization to determine what it does better than its competitors, where it needs to improve, and what advantages its competitors have.

The study of the current situation at the industrial enterprise by highlighting the most significant variables in specific circumstances and their interrelated consideration makes it possible to increase the efficiency of the strategic management process. To determine the main directions for the development of the economic potential of an enterprise, it is advisable to use a situational approach, the center of which is a set of specific circumstances and factors that affect the organization in the course of its lifecycle.

To plan the economic potential of the industrial enterprise, it is advisable to use an approach in which the strategic gap is assessed. "The strategic gap is the interval between the opportunities provided by the existing growth trends of the enterprise and the desired guidelines necessary to solve immediate problems and strengthen the enterprise in the long term.

In the process of developing strategic management for enhancing the economic potential of an enterprise, one should comply with the requirements of the law of correlation between the control and managed systems, which necessitates the adequacy of the subject of management to the object of management. In accordance with this law, changes in the control system affect the development of the controlled one, and vice versa. Therefore, it is necessary to provide coordination and linkage measures to transform the management object (between each type of production resources), into the measures to transform the management subject (between its constituent elements). Such coordination will ensure the proportionality and correlation of the development of the enterprise as a whole.

Coordinating the processes of developing the industrial enterprise's economic potential and reducing resistance to changes, will allow achieving the set strategic goals in a quality and timely manner. This is the reason for the need for theoretical and

methodological development, as well as practical implementation of the concept of strategy management in an enterprise.

At the moment of solving each strategic task, we propose to monitor the change in economic potential, which includes a block of tactical actions, assessing the state of the enterprise's economic potential and the level of its use. The strategic goal always considers the corporate information system, which becomes an important and necessary part of enterprise management as a whole [5].

Results.

The managers of the companies are constantly intending to form strategies that will increase revenue and allow their organization to operate more effectively, bringing in higher profits. They should choose from a wide range of strategic alternatives while coping with human resources and limited finances. Strategic management is a creative process that starts with the business owner having a vision of what he wants the organization to achieve in the next year and over the next four, five years. Strategies are the actions taken to turn the vision into reality. The following strategic management is suggested to enhance the economic potential of industrial enterprises:

Growth

The managers should actively monitor industry trends and learn markets that are emerging from new prospective customer groups. Implementing strategies for producing additional products or services for existing consumers is another way to grow the company. Managers should constantly look for new products or services to offer consumers, as well as look for new channels of distribution for current goods and services.

Control of Expense

The manager's ability to manage expenses plays an important role in whether the business succeeds or fails. Strategic planning helps to review the company's operations to find ways of saving money. Finding suppliers or lower-cost vendors is one strategy. Training employees also save costs; when they become more experienced, more is accomplished with the same labor expenditures. Strategic planning involves managers prioritizing marketing expenditures, so dollars are spent where they result in the greatest sales increase.

Long-Range

Managers tend to focus a lot on short-term issues and challenges. Even with these pressing problems, the manager should set aside time for long-range strategy development. Growth and improvement occur only if the organization continually evolves. Goals such as implementing modern technologies or entering international markets can require executing an extensive series of steps.

Management of Risks

Managers should deal with an ever-changing business environment, which puts the goals of the company at risk. Unexpected swings in the economy can be the reason for reducing revenues or increased costs. Managing risks involves strategies in place to cope with challenges that arise. Reacting quickly to changes is vital.

Advantage of Competitiveness

Industrial enterprises build a competitive advantage by offering goods that provide more efficient solutions to consumer's problems, and do more benefits than their competitors. It is critical to form strategies for achieving target customers. Effective communications strategies require delivering a message to the marketplace that allocates the organization as superior in the minds of potential customers [6].

The fundamental principle of any enterprise is the continuity of activity, which can be ensured by the presence and optimal growth of the economic potential of the enterprise. Therefore, managers face a very difficult task, to ensure the growth of economic potential. In this regard, an objective assessment of the economic potential and the use of reserves will make it possible to effectively manage the enterprise.

Entrepreneurial business requires, on the one hand, an increase in ownership, and on the other hand, ensuring the stability of the financial situation. Thus, for a modern enterprise, analyzing and rational use of the economic potential is an important step in ensuring the sustainable strategic development of the enterprise [7].

Conclusion.

Today, the only correct option for the behavior of a modern industrial enterprise is to achieve effective functioning in a strategic aspect and continuous development in the external and internal environment of the company. And this requires the development and implementation of a comprehensive multidimensional analysis, considering the individual characteristics of the company with appropriate personnel, financial and technical support. Only under this condition industrial enterprises can count on the effectiveness of the strategic and operational management decisions made in relation to the economic potential.

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TITLE: A COMPARATIVE ANALYSIS OF ENGLISH AND RUSSIAN TERMINOLOGY IN EDUCATION

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ABSTRACT

Education systems around the world employ specific terminologies to describe various aspects of teaching and learning. This article aims to explore the characteristics, similarities, and differences between English and Russian terminology in the field of education. By examining key concepts and terms used in both languages, we can gain insights into the unique linguistic features and cultural influences that shape educational discourse in each context.

Key words: *Education, culture, terminology, letters, sound, discourse, language*

ANNOTATSIYA

Dunyo bo‘ylab ta’lim tizimlari o‘qitish va o‘qitishning turli jihatlarini tavsiflash uchun maxsus atamalardan foydalanadi. Ushbu maqola ta’lim sohasidagi ingliz va rus terminologiyasi o‘rtasidagi xususiyatlar, o‘xshashlik va farqlarni o‘rganishga qaratilgan. Ikkala tilda qo‘llaniladigan asosiy tushuncha va atamalarni o‘rganish orqali biz har bir kontekstda ta’lim nutqini shakllantiradigan o‘ziga xos lingvistik xususiyatlar va madaniy ta’sirlar haqida tushunchaga ega bo‘lishimiz mumkin.

Kalit so‘zlar*: Ta’lim, madaniyat, terminologiya, harflar, tovush, nutq, til.*

АННОТАЦИЯ

Системы образования по всему миру используют специальные термины для описания различных аспектов преподавания и обучения. Данная статья направлена на изучение характеристик, сходств и различий между английской и русской терминологией в сфере образования. Изучая ключевые понятия и термины, используемые в обоих языках, мы можем получить представление об уникальных языковых особенностях и культурных влияниях, которые формируют образовательный дискурс в каждом контексте.

Ключевые слова*: образование, культура, терминология, буквы, звук, дискурс, язык.*

INTRODUCTION

Language plays an important role in education, and the terminology used in educational contexts can vary widely depending on the language and the cultural context. The study of educational terminology in English and Russian has been the subject of much research in recent years, as educators and translators seek to improve the accuracy and consistency of educational language.

One of the main challenges in translating educational terminology from English into Russian is the structural and semantic differences between the two languages. For example, Russian has a highly inflected system of grammatical cases, which can affect the way in which educational terms are formed and used. In addition, the cultural context of education in Russia is different from that in English-speaking countries, which can affect the way in which terms are understood and used

LITERATURE AND METHODOLOGY

Henson (1996) stated that any research field requires attention to the vocabulary and definitions relevant to that field in order to be studied and understood. One area of particular interest in the study of educational terminology is the field of educational psychology. Many terms in this field are highly technical and may not have direct equivalents in Russian. For example, the term "metacognition" refers to the ability to think about one's own thinking, and there may be no direct equivalent term in Russian. Translators and educators must therefore work to develop new terms that accurately convey the meaning of these technical terms in both languages. Cummins (2001) commented that minority languages and minority language bilingualism have been undervalued and excluded from education for decades as a result of the influence of societal power systems. However, the value messages can potentially have an impact on both educators and researchers that they interact. English and Russian are two distinct languages with different structures, grammar rules, and vocabulary. This means that educational terminology in English and Russian can differ significantly. For example, in English, the term "curriculum" refers to the set of courses, activities, and materials that make up a particular educational program, while in Russian, the equivalent term "учебный план" (uchebnyy plan) refers specifically to the plan of study for a particular subject or course. Baker (2006) statedESL phrases has changed and developed over the course of academic history to reflect ELLs and the process of language acquisition more accurately.

RESULTS

When translating educational terminology from English into Russian, one of the main challenges is to find appropriate equivalents for terms that may not have a direct translation. For example, the English term "assessment" refers to the process of

evaluating student learning, while the Russian equivalent "оценка" (otsenka) has a broader meaning that can also include grading and evaluation of other types of performance.

Another strategy is to develop new terms that accurately convey the meaning of technical or specialized terms in both languages. This is particularly important in fields such as educational psychology, where many terms may not have direct equivalents in Russian. For example, the English term "metacognition" refers to the ability to think about one's own thinking, and there may be no direct equivalent term in Russian. Translators and educators may need to develop new terms or use descriptive phrases to accurately convey the meaning of such technical terms.

English –Russian equivalent

Pedogogy	**педагогика**
Psycology	**Психология**
Education	**Образование**
School	**школа**
Curriculum	**учебный план**
Lesson plan	**план урока**
Grade	**оценка**
Student	**студент**
Teacher	**учитель**
Timetable	**Расписание**

To address these challenges, researchers have proposed a range of strategies for translating educational terminology from English into Russian. These strategies include using glossaries and dictionaries to standardize the terminology, developing new terms that are more appropriate for the Russian context, and using parallel texts to ensure consistency in translation.

DISCUSSION

Characteristics of English Terminology in Education:

English, as a global language, has a vast vocabulary related to education. Some common characteristics of English terminology in education include:

a) Influence of Latin and Greek: English borrows extensively from Latin and Greek, resulting in numerous technical terms. For instance, terms like "pedagogy" (pedagogika) and "psychology" (psikhologiya) have similar roots in both languages.

b) Flexibility and Adaptability: English allows for the creation of new terms by combining existing words, making it flexible and adaptable to evolving educational concepts. Examples include "blended learning," "e-learning," and "STEM education."

c) Clarity and Precision: English terminology often emphasizes clarity and precision, with terms conveying specific meanings. For instance, terms like "curriculum,"

"assessment," and "pedagogical strategies" have precise definitions and usage in educational contexts.

2. Characteristics of Russian Terminology in Education:

Russian terminology in education also possesses unique characteristics, reflecting the language's history and cultural influences:

a) Cyrillic Alphabet: Russian uses the Cyrillic alphabet, which has its own distinct letters and sounds. This impacts the spelling and pronunciation of educational terms. For example, "education" is "obrazovanie" (образование) in Russian.

b) Influence of Slavic Roots: Russian terminology is often rooted in Slavic etymology, distinguishing it from languages with Latin or Greek influences. Terms like "shkola" (школа) for "school" and "universitet" (университет) for "university" exemplify this.

c) Emphasis on Collectivism: Russian terminology may emphasize collective aspects, reflecting the cultural emphasis on collaboration and communal learning. Terms like "kolektiv" (коллектив) for "class group" or "teamwork" (sotrudnichestvo) highlight this emphasis.

3. Similarities between English and Russian Terminology in Education:

Despite their linguistic and cultural differences, English and Russian terminologies in education share some similarities:

a) Core Concepts: Both languages share core concepts such as "teacher" (uchitel/учитель), "student" (student/студент), "education" (obrazovanie/образование), and "learning" (uchenie/учение), which reflect the universal nature of education.

b) Global Influence: English terminologies, due to the global dominance of the English language, have influenced Russian educational discourse. Terms like "lesson" (urok/урок) and "diploma" (diplom/диплом) have been adopted from English.

c) International Collaboration: With increasing international collaboration in education, terms like "curriculum," "assessment," and "research" have been adopted in both English and Russian contexts, facilitating communication between educators globally.

4. Differences between English and Russian Terminology in Education:
English and Russian terminologies also exhibit notable differences:

a) Grammatical Structure: The grammatical structure of both languages affects the formation and usage of educational terms. English often relies on word order, while Russian employs case endings and noun declensions for differentiation.

b) Cultural Nuances: Educational terminology is influenced by cultural contexts. English terminology may emphasize individual.

CONCLUSION

In conclusion, the educational terminology used in Russian-Uzbek reflects the historical and cultural influences. While there is still a significant use of loanwords from English, there is also a growing push to use more native Russian terms in education. Educational terminology in English and Russian can differ significantly due to differences in language structure, grammar rules, and cultural context. Translators and educators must work to develop strategies for accurately translating and standardizing educational terminology to ensure that it is consistent and accurate across different texts and contexts.

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FIZIK TA'LIMNING AYRIM MUAMMOLARIGA DOIR MULOHAZALAR

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ANNOTATSIYA

Maqolada umumiy o'rta ta'lim maktablarining 7-11 sinflarida fizika predmetining o'qitilishidagi va fizika darsliklaridagi ayrim metodik kamchilliklar o'rganilib, ularni bartaraf etishning ayrim xususiy jihatlari bayon etilgan.

Tayanch so'zlar va iboralar: *fizika, litsey, texnikum, oliy ta'lim, jarayonlar, uzviylik, uzviylashtirilgan, modda tuzulishi, molekulyar fizika, termodinamika, molekulyar –kinetik nazariya, metodik muammolar, anketalar.*

ABSTRACT

The article presents the results of studying some methodological shortcomings in teaching the subject of physics and physics textbooks in grades 7-11 of secondary schools and outlines some features of their elimination.

Key words and phrases: *physics, lyceum, technical school, higher education, processes, continuity, continuity, structure of matter, molecular physics, thermodynamics, molecular kinetic theory, methodological tasks, questionnaires.*

KIRISH.

Fizik ta'limning eng katta muammolaridan biri umumta'lim maktablarida uning asoslarini samarali o'qitish masalasidir. Umumta'lim maktablarida o'qitiladigan fizika asoslari(predmeti), fizik ta'limning alifbosi bo'lib, ta'lim tizimining keyingi, o'rta maxsus(litsey, texnikumlar) va oliy ta'lim bosqichlarida fizikadan beriladigan bilimlarga asos bo'la oladi. Ammo o'quvchilarning fizika predmetini yaxshi bilmasliklari, asosiy tushunchalar, jarayonlar va ularning sodir bo'lish mexanizmlarining moxiyatlarini chuqur tushinib yetmaganliklari, keyingi bosqichlarda oladigan bilimlarining sifatiga salbiy ta'sir ko'rsatmoqda. Ayniqsa modda tuzulishi, molekulyar fizika va termodinamika asoslarining maktablarda o'qitilishi bunga yaqqol misol bo'la oladi. Ikkinchi tamondan fizik ta'limda uzviylikning bajarilmasligi ham shunday qator metodik muammolarni kelib chiqishiga sabab bo'lib keladi. Uzviylashtirilgan fizik ta'lim tizimini qat'iy tashkil qilish bunday muammolarni xal etish imkonini beradi. Garchi bu masala keying 20 yil davomida,

aniqrog‘i 2010 yilning 1-iyulida sobiq OO‘MTV va HTV larining aloxida qo‘shma buyrug‘i bilan qonunlashtirilgan bo‘lsada, umumta’lim maktablarida o‘tiladigan mavzularning metodik muammolariga bag‘ishlangan tadqiqotlar deyarli o‘tkazilmay qolib ketmoqda. Ayrim sanoqli-lokal o‘quv maskanlaridagina hususiy metodik tadqiqot ishlar olib borilmoqda xolos[1].

Bunday metodik muammolarni hal etishning dolzarbligi bu boradagi uslubiy tadqiqotlarning kamligi bilangina emas, balki dars soatlarining kamligi(7-11 sinflarda atiga 2 soatdan), 6-sinfdan fizikaning chiqarib yuborilishi, uchinchi tamondan modda tuzulishi, molekulyar fizika va termodinamika asoslarini o‘qitishning metodik jihatdan og‘irligi bilan ham belgilanadi. Darsliklardagi mavzular matnlari shunday tuzulganki, ularning biror satrida termodinamika tushunchasini, uning mazmun - moxiyatini ochib beraoladigan ta’riflar va izoxlar ketirilmaydi. O‘tiladigan mavzular esa o‘rta darajadagi termodinamik tushunchalar va xodisalarni formal izoxlashdan iborat xolos. Natijada o‘quvchilarda xodisalarning fizik moxiyati haqidagi tasavvurlar umuman xosil bo‘lmaydi. Bundan tashqari modda tuzulishi haqidagi muloxazalarni izoxlashda ham qator kamchilliklar uchraydi[2].

ADABIYOTLAR TAXLILI, NATIJA.

Modda tuzulishi va termodinamik tushunchalarning, umuman olganda ularning bog‘liqligi haqidagi muloxazalarni izoxlashga ham deyarli to‘xtalmaydi. Termodinamikaning fenomenologik nazariya ekanligi, undan moddalarning mikroskopik xossalarini o‘rganishda qanday qilib, qay darajada foydalanilishi haqidagi fikrlar ham tushuntirilmaydi. Molekulyar –kinetik nazariya va termodinamika fanlarining farqi, ularning tadqiqot metodlarining metodologik va metodik farqlari haqidagi faktlar-ta’riflar esa mutlaqo keltirilmaydi. O‘quvchilar fizikani nima uchun o‘rganishni boshlaganlarini anglab ulgurmasidanoq unga bo‘lgan qiziqishlari susayadi. Bu kamchilliklar esa albatta o‘quvchilarning termodinamik va molekulyar –kinetik nazariyalarning qonunlarini o‘rganishlarida qiyinchilik tug‘diradi. Bundan tashqari aynan shu kamchilliklar ularning fizikaning keyingi bosqichlarini o‘rganishlarida katta qiyinchiliklarga olib keladi va o‘quvchilarning fizikaga bo‘lgan qiziqishlari asta-sekin susaya boradi va ularda “fizika juda murakkab, tushunib bo‘lmaydigan fan ekan”-degan fikrning shakllanishiga sabab bo‘ladi.

Shularni hisobga olib, ushbu maqolada modda tuzulishi haqidagi dastlabki muloxazalar va termodinamika asoslariga bag‘ishlangan mavzularni va laboratoriya ishlarini bajarish uslubiyatini o‘rganishga bag‘ishlangan ayrim xususiy metodik muloxazalarni o‘rtoqlashishni maqsad qilib olindi. Barcha metodik va metodologik muloxazalarda, xulosalarni chiqarishda olingan anketalardagi o‘quvchilar va maktablarning fizika va matematika fanlari o‘qituvchilarining e’tirof va fikrlari, ommalashgan metodik manbalardagi g‘oyalar asos qilib olindi[3-10].

Maqola mavzusiga bag‘ishlangan masalalar aslida yuqorida keltirilgan ikki sobiq vazirliklarning nufuzli kommissiyasi tamonidan o‘sha yillariyoq mukammal darajada o‘rganildi va tegishli xulosalar chiqarilib, ularning natijalari uzviylashtirilgan davlat ta’lim standartlarining yaratilishiga olib keldi. Lekin ta’lim ijrochilari-metodist o‘qituvchilar tamonidan, qo‘yilgan vazifalarga haligacha qoniqarli, ijobiy va samarali takliflar, real tadqiqotlar xulosalari berilganicha yo‘q. Dars soatlarining kamligi, darslik va o‘quv qo‘llanmalaridagi kamchilliklar, laboratoriya jihozlarining yetarli emasligi kabi kamchilliklar ham shular jumlasidandir.

MUHOKAMA VA XULOSA

Xususiy metodik tadqiqotlar haqida faqatgina ayrim ta’lim muassasalari(ADU,NamDU,SamDU,TDPU)ning mutaxassislarigina dastlabki tadqiqotlar natijalari haqidagi fikrlarini bayon qilmoqdalar xolos. Bunday xolat esa, bu boradagi uslubiy tadqiqotlarni keng miqyosda olib borishni talab etadi.

Maqolani tayyorlash jarayonida umumta’lim maktablarining oddiy sinflari uchun chiqarilgan darsliklarda tanlangan mavzuning mazmuni va bayon qilinishi bilan, umumta’lim maktablarining aniq fanlar chuqurlashtirib o‘tiladigan sinflari(bular ham qisqartirildi) uchun chiqarilgan darsliklaridagi shu mavzularning mazmuni va bayon qilinishi o‘rganilib, qiyosiy taxlillar o‘tkazildi. O‘ndan ortiq maktablarning 7-11 sinf o‘quvchilari o‘rtasida bu muammoga bag‘ishlangan suxbatlar, savol-javoblar o‘tkazildi va anketalar olindi va ularning natijalari taxlil qilindi. O‘quvchilarning ko‘pchiligida aniq fanlarga, ayniqsa fizikaga bo‘lgan qiziqishlari juda kuchli, ammo ularning ko‘pchiligi fizika(matematika) fanini(predmetini) “qiyin fan”- deb anketalarda e’tirof etganliklari kuzatildi.

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ТЕХНОЛОГИЯ СУШКИ СЕМЯН ПОДСОЛНЕЧНИКА, РАПСА И КУНЖУТА

И.Мурадов
КИЭИ к.т.н

АННОТАЦИЯ.

Данным статье показано сроки временного хранения и режимы вентилирования установлены соответствующими инструкциями. При наличии семян подсолнечника, различающихся по масличности, формируют партии семян по группам масличности

АННОТАЦИЯ.

Ушбу статияда ёгли ургуларни вактинча саклаш тартиби ва инструкцияси кунеабокар уруги мисолида курсатилган.

***Ключывие слова**: высокомасличного, влажности, свежесформираванных, самосогревание, хранения, переработку, прямоточных и рециркуляционных,*

Свежеубранные семена подсолнечника отличаются очень низкой стойкостью при хранении, особенно при высокой влажности, температуре и засоренности. При хранении семян химическим изменениям в первую очередь подвергаются жиры, а затем белковые вещества.

Семена высокомасличного подсолнечника надежно хранятся, если влажность их не превышает 7%, а температура снижена до 10 °С и ниже. При влажности выше критической и температуре 20...25 °С, характерной для свежесформированных партий семян подсолнечника, в насыпи семян начинается бурное развитие микроорганизмов, интенсивно идут гидролитические и окислительные процессы, что приводит к быстрому ухудшению качества семян подсолнечника как масличного сырья. Даже несколько часов хранения свежеубранных семян высокомасличного подсолнечника влажностью выше критической приводит к массовому самосогреванию и порче, что делает невозможным получение масла высоких сортов.

Самосогревание подсолнечника развивается очень быстро и приводит к полной порче семян, возрастанию кислотного числа масла до 30...35 мг КОН на 1 г жира. Среди причин самосогревания - засоренность (при хранении в одних и тех же условиях влажность органической примеси почти в 2 раза выше

влажности семян), а также наличие микроорганизмов в семенной массе, преимущественно неспорообразующих эпифитных бактерий и плесневых грибов [2].

При поступлении в короткие сроки большого количества влажного и сырого подсолнечника, высушить его в потоке не всегда представляется возможным. В связи с этим целесообразно применять различные способы повышения стойкости свежеубранных семян подсолнечника, среди них - активное вентилирование. Сроки временного хранения и режимы вентилирования установлены соответствующими инструкциями. При наличии семян подсолнечника, различающихся по масличности, формируют партии семян по группам масличности. Примерные сроки стойкого хранения семян высокомасличного подсолнечника в зависимости от их влажности и температуры, предложенные Кубанским филиалом ВНИИЗ [3], приведены в табл. 1.1.

На длительное хранение до переработки следует закладывать семена подсолнечника с засоренностью не выше 2 %, просушенные до критической влажности (6...7 %) и охлажденные до низких положительных температур. Продолжительность хранения при таких условиях составляет 3...6 мес., если температура просушенных семян перед закладкой на хранение или в течение первых 15 суток хранения снижена до 0...10 °С. Семена подсолнечника влажностью ниже 12%, ожидающие сушку, можно временно разместить в складах, оборудованных установками для активного вентилирования, а с влажностью выше 12 % необходимо сушить немедленно.

Таблица 1.1

Сроки стойкого хранения семян высокомасличного подсолнечника в зависимости от их влажности и температуры

Приблизительные сроки стойкой сохранности семян подсолнечника, месяцы				
Влажность семян, %	Температура воздуха, °С			
	20	10	1	-10
8	1,5	4,5	Более 6	Более 6
10	0	3,0	Те же	Те же
12	0	1,5	5	Те же

продолжение

14	0	0,5	3,3	Те же
16	0	0	2	Те же
18	0	0	1,3	6
20	0	0	0,5	4,5
22	0	0	0	3
24	0	0	0	2

Семена подсолнечника, идущие на переработку, сушат, как правило, до влажности 7-8 %, а предназначенные для длительного хранения - до 6-7 %. Перед подачей семян в сушилку их необходимо очистить от крупных примесей в ворохоочистителе или в сепараторе со следующим набором сит: приемное - с отверстиями Ø16...20 мм, сортировочное - с отверстиями Ø10...12 мм, разгрузочное - с отверстиями 0 10...12 мм и подсевное-с отверстиями размером 2,5х20 мм. Легкие примеси отделяют в пневмосепарирующих каналах воздушным потоком со скоростью 4...6 м/с.

Режимы сушки семян подсолнечника зависят от их начальной влажности и способа сушки и регламентируются инструкцией по сушке [4]. Высшие предельные значения температуры сушильного агента и нагрева семян подсолнечника при различных способах сушки в шахтных прямоточных и рециркуляционных сушилках приведены в табл. 1.2.

Таблица 1.2

Высшие предельные значения температуры сушильного агента и нагрева семян подсолнечника при различных способах сушки в шахтных прямоточных и рециркуляционных сушилках

Режимы сушки семян подсолнечника в шахтных прямопотоковых сушилках					
Начальная влажность семян, %	Пропуск семян через сушилку	Предельные температуры, °С			
		нагрев семян	сушильного агента в режиме сушки		
			Одноступенчатом	двухступенчатом	
				первая зона	вторая зона
До 15		55	120	120	135
До 20		55	115	115	130

продолжение

Более 20	Первый	55	110	110	125
	Второй	55	115	115	130

Режимы сушки семян подсолнечника в рециркуляционных сушилках (с нагревом семян в камерах с падающим слоем)		
Начальная влажность семян, %	Предельные температуры, °С	
	нагрев семян	сушильного агента в камере нагрева
До 15	55	250
До 20	55	220
Более 20	50	200

Примечание. В рециркуляционных сушилках с каскадным нагревателем (сушилки А1-УЗМ, А1-УСШ и реконструированные ДСП-32-ОТ с комплектом У1-УКЗ-50) температура агента сушилки на входе в нагреватель не должна превышать 200°С.

Режимы сушки семян подсолнечника в шахтных рециркуляционных сушилках без дополнительных приспособлений для нагрева семян				
Начальная влажность семян, %	Предельные температуры, °С			
	нагрева семян	сушильного агента при режиме сушки		
		одноступенчатом	двухступенчатом	
			первая зона	вторая зона
До 20	55	125	120	135
Более 20	55	120	110	125

Технологическая ценность семян подсолнечника определяется его масличностью. Поэтому важно сохранить количество и качество масла. В процессе сушки может происходить либо синтез, либо распад жировых компонентов. Направленность этих превращений зависит от влажности семян, от температуры и продолжительности их нагрева. При оптимальных режимах сушки содержание масла в семенах подсолнечника увеличивается. В масло переходят сопутствующие ему вещества, содержащиеся в семенах: фосфатиты, каротиноиды, стеролы, воскообразные вещества. К ним также, относятся изменение веществ маслосодержащих семян в процессе сушки [5].

Поскольку при указанных режимах семена [6] подсолнечника можно сушить в сушилках различных типов, рассмотрим кратко их особенности.

ЛИТЕРАТУРА

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IMPORTANCE OF PLANT BODY STRUCTURE IN DEFENSE OF HIGHER PLANTS AGAINST FUNGAL AND BACTERIAL DISEASES (MECHANICAL IMMUNITY)

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ABSTRACT: *In the article, the importance of the structure of plant organs in the plant's immune system, by which properties they increase resistance to bacterial and fungal diseases are shown with the help of various examples.*

Keywords: *Mechanical immunity, cuticle, wax, stomata, arrangement of stems.*

INDRODUCTION: It is known that unlike animals, plants grow steadily in one place, and because of this, they face many difficulties during ontogeny. For example, as soon as seeds begin to germinate, viruses, microorganisms, fungi, insects, soil nematodes and other pests begin to attack them. Later, herbivorous animals will join them. That is why a number of physiological-biochemical and anatomo-morphological changes occurred in plants during their evolutionary development. These changes are aimed at protecting plants from pests or scaring them away. For a long time, when studying the phenomenon of plant diseases, scientists focused not on the study of plants, but on the study of plant disease-causing parasites. However, plants themselves mechanisms that prevent parasites from entering the tissues, and neutralize them if they do enter has a system. Each plant has an anti-parasitic system due to the unique structure of its leaves, stems, roots and other organs. By studying these properties of plants, it is possible to increase the resistance of fruits and vegetables used in agriculture to bacterial and fungal diseases and to create new resistant varieties. Plant immunity means preventing the entry of pathogens from the outside into the plant's body, or protecting the plant from damage by special cells when something foreign enters the tissue, and the plant maintains its integrity.

LITERATURE ANALYSIS AND METHODOLOGY: Due to the fact that there are many factors that harm organisms and lead to their destruction mechanisms of protection against them are not limited to metabolic changes, but also morphological changes. It should be mentioned that most plants, like humans and animals, have

"innate immunity" to pathogens. Examples of this are cell walls and outer shells of plants. The structure of the plant organs and the mechanical properties of the plant include all aspects of plant resistance, they cannot parasitize the plant tissues and harm the plant. Such resistance is called mechanical or passive immunity.

This type of resistance covers a wide range, the reason for which the bacteria penetrates the tissues and is attributed to the specific properties of the plant organs. For example: rapid growth of the cuticle, waxy coating, rapid growth, hair growth, etc.

According to scientists, apple varieties with a thick cuticle and waxy layer (for example: Titovka, Strumilovka) are less damaged by Fusculadium (Trebimsky, 1912). The different degrees of cloves damage by Zorawer (Sorauer) are related to the thickness of the cuticle layer of the stems (Appel, 1915). Appel found that the wax coating is an main factor in the resistance of some raspberry cultivars to the mushroom Coniothrium. At the same time, the wax layer acts in two ways: in part, it makes it difficult for hyphae to penetrate into plant tissues, and in part it acts indirectly, contributing to rapid drying in foliage and stems and thereby the death of fungal spores. Resistant to leaf rust and yellow rust, the Blue Stem variety stands out among soft wheats with a strong wax coating on leaves and stems.

That macrospore sclerosis, which affects corn, usually develops on leaf blades with a more delicate parenchyma and does not affect leaf sheaths with a long epidermis. Potato cultivars differ sharply in the thickness of the tuber bark: Kreitz (Kreitz, 1907) and Appel (Appel, 1915) found that as the tuber bark thickened, resistance to Phytophtora, Fusarium and bacterial diseases increased accordingly, although Phytophtora infestans and Fusarium could penetrate under favorable conditions and through the cortical layer.

Leaf wilting and hairy leaves are considered one of the main factors in plant defense against parasites, and Fyoks found that the parasite Oidopsis tawrica easily penetrates the mesophyll of esperest and develops only on the surface of the most strongly developed Pholomis leaves. This condition was found only in the strongly developed leaves of the plant, and was not observed in the wilted leaves.

Pietsch (Appel, 1915) found that some of the remontant carnations are resistant to Peronospora due to the peculiarities in the structure of the stomata, which in this case are arranged in such a way that they do not allow hyphae to penetrate them.The most resistant of all wheats to brown, yellow and linear rust, einkorns also have the smallest stomata. The length of stomata, on average, according to our measurements, in Triticum monococcum var. flavenscens is 44.8 microns, while common affected common wheat averages about 60 microns.Varieties of potatoes differ sharply in the structure of lentils on tubers. The structural features of these lenticels in different varieties are an essential factor in resistance to fungi such as Oospora scabies, whose

hyphae penetrate the tissues through the lenticels and cause a common potato disease - tuber scab.

According to Appel's observations, potato cultivars with flat, smooth leaves and a flattened bush shape retain moisture longer after rains and therefore suffer more from Phytophthora infestans potato disease than cultivars with small pubescent leaves. Foliar infection in potatoes is caused by wind-borne conidia; conidia adhere to the surface of leaves and release zoospores in drops of water; zoospores swim for some time in water, then lose their flagella and germinate, penetrating stomata with hyphae. After heavy rains, according to Appel's observations, the leaves of some varieties dry up after half an hour, while others remain moist for several hours. Quickly drying varieties are just less affected than slow drying ones. Stewart [Stuart, 1906] in America, based on a study of 115 varieties of potatoes, came to the conclusion that the most resistant to Phytophtora infestans and other fungal diseases are varieties with raised stems, little branching, with small pubescent foliage; On the contrary, varieties that are characterized by a strongly branched and flattened bush with large smooth foliage are affected.

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AMARANTHUS O‘SIMLIGINI YETISHTIRISH TEXNOLOGIYASI

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Abstract. *At present, planting and growing universal plants with high yield, water saving, adaptability to various factors of climate change, marketable in the world market, medicinal and high biomass is the demand of the time. At the same time, one of the important issues is to find types of crops that give a high yield in a short period of time for efficient use of irrigated land. One such valuable plant is amaranthus.*

Due to its high productivity and valuable chemical composition, the amaranth plant is currently used in the world as food, fodder, siderate crops and is important for obtaining biologically active substances.

Key words. *Amaranthus, plant, medicinal, food, fodder, seed, variety, agrotechnology of cultivation, blue mass, animal husbandry.*

BMTning oziq-ovqat bo‘yicha ekspertlari amarantni mavjud madaniy o‘simliklar orasida inson va jamiyat taraqqiyoti uchun eng foydali jihatlari, asosiysi iqtisodiy tomondan katta daromad keltirishi o‘rganilib, XXI asr o‘simligi deb e’lon qilindi.

AQSh olimlarining tadqiqotlariga ko‘ra, amarant oqsili biologik qiymati bo‘yicha 100 balli baholash tizimida – 75 ballni, bug‘doy oqsili - 56,9, soya donlari - 68, sigir suti – 72,2 ball bilan baholandi.

Amarant o‘simligining taqalishi. MDH davlatlarida XX asrning 30-50 yillarida asosan Ukraina va Shimoliy Kavkazda yem-xashak ekini sifatida ekilgan.

Shu kunlarda dorivor o‘simliklarni ko‘paytirish va undan tibbiyotda foydalanishga hukumatimiz e’tibori yuqori bo‘lib, bu ro‘yxatga amarant o‘simligini kiritish mumkin. Asr o‘simligi deb tan olingan bu giyoh tabiatdagi

noyob shifobaxsh o‘simliklar sarasiga kirib, u inson organizmini sog‘lamlashtiruvchi, himoyalovchi xususiyatlarga egadir.

Amarant – Amaranthus oilasiga mansub bo‘lib, bu oila oltmishdan ortiq turlarni o‘z ichiga oladi. Vatani Janubiy Amerikada uni 8000 yildan beri urug‘ uchun yetishtirilib kelinadi.

Amarant Janubiy Amerikadan Shimoliy Amerikaga, Hindistonga va u yerdan Osiyo mamlakatlari bo‘ylab dunyoga keng tarqalgan.

Hozir Hindiston va Xitoyda amarantning juda ko‘p xillari mavjud bo‘lib, bu o‘lkalar amarantning ikkilamchi vatani hisoblanadi. Bu mamlakatlarda amarant o‘simligidan mahalliy tabobatda, milliy taomlarda va sanoatda keng foydalaniladi.

Amarantning eng qimmatli va shifobaxsh qismi – bu uning urug‘idir. So‘nggi yillarda o‘tkazilgan tadqiqotlarning ko‘rsatishicha, amarant doni oqsil, aminokislotalar, vitaminlar, makro va mikroelementlar, biologik aktiv moddalar, lipidlarning sifat tarkibi bo‘yicha asosiy an’anaviy oziq-ovqat ekinlaridan ustun turadi.

Amarant donidan moy olish va qo‘llash ham hozirgi paytda tibbiyotda dolzarb vazifalardan biri hisoblanadi. Amarant urug‘ining lipid tarkibi muvozanatlashgan moy kislotalari, biologik aktiv moddalar, o‘simliklarda kam uchraydigan skvalen, tokoferol, sterol, fosfolipidlar ko‘pligi bilan boshqa an’anaviy moyli o‘simliklardan farq qiladi.

Amarant doni tarkibidagi biologik faol moddalar miqdorini to‘liq saqlab qolgan holda chiqindisiz texnologiyalar asosida un ishlab chiqarish novvoychilik sohasi xom-ashyo bazasini boyitish, non pishiriqlari, qandolatchilik assortimentlarini ko‘paytirish hamda ularning biologik qiymatini oshirishda muhim o‘rin tutadi.

Urug‘ining rangi oq, qaymoq rangli, jigarrang, kulrang va qora rang bo‘lishi mumkin. Sabzavot amaranti poyasi va rangli bargining nisbatan nafisligi, o‘ziga xos mazasi bilan boshqa turlardan ajralib turadi. Asosan yosh poyalari va vitaminlarga boy barglari iste’mol qilinadi.

Amarant moyi tarkibida yuqori terapevtik, turli xil o‘smalarga qarshi va bakteritsid effektga ega bo‘lgan skvalen moddasini 10% gacha saqlaydi. Skvalenning vazifasi proliferativ jarayonlarni muvozanatlashtirish bo‘lib, nafaqat hujayraning ichki konsentratsiyasi, balki uning fermentlar faolligiga ta’siri hamda o‘z molekulalarini sintezlash katalizatsiyasi va barcha faol izoprenoidlarning umumiy o‘tmishdoshlari biogeneziga asoslangan.

Amarant moyi ushbu qimmatbaho moddaning qayta tiklanadigan muqobil manbasi hisoblanadi. Amarant moyining qo‘llanilish sohasi nafaqat oziq-ovqat sanoatini, balki parfyumeriya-kosmetika, farmasevtika sanoati hamda tibbiyotning turli sohalarini ham keng qamrab oladi.

Amarant moyi me’da va ichak yaralarini davolash xususiyatiga ega bo‘lib, teri kasalliklari, qirqilgan yaralarni bitishini tezlashtirish uchun va nur kasalligi bilan og‘rigan bemorlarni davolashda qo‘llaniladi. Uning moyi oblepixa moyidan qolishmaydi va bir qator kasalliklarni davolashda ishlatilib kelinmoqda. Amarantning urug‘i tibbiyotda rak kasalligidan hosil bo‘lgan xavfli o‘smalar o‘sishini oldini olish va so‘rilib ketishiga yordam beradi.

Amarant issiqsevar va yorug‘sevar o‘simlik hisoblanadi.

Amarant o‘simligi o‘suv davrining dastlabki bosqichida juda sekin rivojlanadi. Keyinchalik uning o‘sishi va rivojlanishi jadallashib boradi. Amarant o‘simligi oziq moddalarga juda talabchan bo‘lganligi uchun nazorat variantida uning o‘sishi va rivojlanishi juda sust bo‘ldi.

Amarant qisqa kun o‘simligi hisoblanadi. Lekin tajribada amarantning vegetatsiya davri davomiyligi bahorda va kuzda ekilganda deyarli bir xil bo‘ldi. Odatda qisqa kun o‘simliklari kun qisqarishi bilan vegetatsiya davri ham qisqarib pishishi tezlashadi. Lekin amarant haroratga juda talabchan o‘simlik hisoblanganligi uchun kuzda havoning sovib borishi uning pishishini sekinlashtirgan bo‘lishi mumkin.

O‘suv davri ertapishar navlarida 80-90 kunni, o‘rtapishar navlari 100-110 kun, kechpishar navlari 120-125 kungacha bo‘ladi. Mahalliy sharoitda barcha belgilangan agrotexnik tadbirlar o‘z vaqtida smfatli qilib o‘tkazilganda 70-75 kunda ham to‘liq pishib yetilib don olishi kuzatilgan.

Amarant guli mayda gulli to‘pgul, pushti, to‘q pushti, qizil va to‘q qizil bo‘lganligi va xo‘roz tojini eslatganligi uchun xalqimiz orasida «gultojixo‘roz» nomi bilan ataladi. Amarant bir yillik o‘simlik bo‘lib, turli yo‘nalishlarda jumladan: sabzavot, donli,manzarali va ozuqa ekinlari sifatida yetishtiriladi.Uning barglari choy qilib ichilganda inson immunetini oshishiga katta foyda beradi.

Sabzavot amaranti asosan Sharq mamlakatlarida juda keng tarqalgan bo‘lib, ko‘kat sabzavotlar sifatida kundalik oziq-ovqatlar ratsioniga kiritilgan. Uning urug‘lari tibbiyotdan tashqari qandolatchilikning turli yo‘nalishlarida ham keng foydalaniladi.

Hindiston, Pokiston, Nepal va Xitoyda donli va sabzavot amarantlari urug‘laridan shirin makkajo‘hori doni bilan qo‘shib bo‘tqa tayyorlanadi.Chorva uchun ozuqa sifatida baland bo‘yli turlari ekiladi.

Amarant oqsili boshqa ozuqa ekinlariga nisbatan aminokislotalarga yaxshi to‘yinganligi bilan ajralib turadi. Ekspertlarning baholashiga ko‘ra, amarant oqsili sifat jadvali (shkalasi) bo‘yicha qabul qilingan 75 birlikka tengdir.

Amarant ko‘k massa uchun gullash va urug‘ining mumpishish davrida yig‘ib olinadi. Chunki bu davrda o‘simlikning poyasi, barglari vitaminlarga boy bo‘ladi. Ekologik sharoitdan kelib chiqqan holda amarantdan o‘suv davri davomida bir necha marta hosil olish mumkin. Urug‘i tarkibidagi oqsil moddasi organizmga tushganda yengil hazm bo‘lishi uning to‘yimli ozuqa ekanligini bildiradi.

Respublikamizda asosan yem-xashak ekini sifatida ekila boshlandi. Oldinlari uning baxmaldek tovlanib turgan gullarining uzoq vaqt davomida o‘z maftunkorligini saqlab qolishi, tashqi ta’sirlarga chidamliligi va suvsizlikda bir necha oylar davomida yashay olish xususiyati uchun faqat manzarali o‘simlik sifatida ekilgan. Balki shu xususiyati uchun ham amarantga – o‘lmas gul nomi berilgandir.

O‘simlikning shifobaxsh xususiyatlari respublikamiz tibbiyot xodimlari tomonidan yetarlicha o‘rganilmagan va ilmiy asoslanmagan bo‘lsa-da biroq, qadimdan milliy tabobatimizda keng foydalanilganligi haqida ma’lumotlar mavjud.

Tarixdan ma’lumki bobomiz Ibn Sino tig‘dan olgan jarohat va yaralarni, teri (qizamiq, qizilcha) kasalliklarini tuzatishda, og‘iz bo‘shlig‘idagi badbuy hidlarni va boshqa kasalliklar davolashda amarantdan keng foydalangan.

Oziq-ovqat maxsulotlari tarkibiga qo‘shilgan amarant urug‘i va barglari shifobaxsh oziqa xisoblanib keng ko‘lamdan foydalinmoqda.ular asosan yurak –kon tomir kasalliklari bilan og‘rigan bemorlar ozuqasiga qo‘shilsa maqsadga muvofiq keladi.

O‘simlikshunoslik ilmiy-tadqiqot institutida amarantning xorij va mahalliy nav-namunalarning urug‘lari, qimmatli xo‘jalik belgilari bo‘yicha o‘rganilmoqda. O‘ziga xos xususiyatlarga ega bo‘lgan ushbu amarant namunalarining har biri seleksiyaning turli yo‘nalishlari uchun qimmatli manba hisoblanadi va seleksiya maskanlariga taqdim etiladi.

Amarantni ekishni barqaror iliq ob-havoda (aprel-may oylarida), tuproqning urug‘ tushgan chuqurligi 10-12 gradusgacha qizigan paytda o‘tkazish tavsiya qilinganligi sababali xozirda yetilayotgan xozildan ko‘zlar kuvanib turibdi

O‘simliklarni bo‘yi 10-15 sm ga yetganda qator oralarini ishlash bilan birga ularning rivojlanishini tezlashtirish maqsadida gektar hisobiga 40 kg dan azot va 20 kg dan kaliy o‘g‘iti berib, 5-6 sm chuqurlikda yumshatiladi. -Ikkinchi oziqlantirish o‘simlikning bo‘yi 30-35 sm ga yetganda gektariga 30 kg dan azotli va fosforli o‘g‘itlar

bilan oziqlantiriladi. O‘simlikni oziqlantirish albatta sug‘orishdan oldin amalga oshirilishi lozim. O‘simlik oziqlantirilgandan va sug‘orilgandan keyin uning o‘sishi va rivojlanishi tezlashadi. Oxirgi oziqlantirishni uning bo‘yi 70-80 sm ga yetganda azotli va kaliyli o‘g‘itlar berish bilan tugallanadi. Mavsum davomida amarantni tuproq iqlim sharoitidan kelib chiqqan holda asosan 3-4 marta va hatto 6-7 marta sug‘oriladi va gektariga 95-105 kg azot, 70 kg fosfor, 50 kg kaliy o‘g‘iti bilan oziqlantiriladi.

AMARANT UCHUN YERNI EKISHGA TAYYORLASH VA EKISH

Mamlakatimizda donli amarantning o‘sishi, rivojlanishi, hosildorligiga turli xil omillarning ta’siri haqida ma’lumotlar endilikda shakllanib bormoqda. Ushbu o‘simlik turli xil navlarining o‘sishi, rivojlanishi va hosildorligi, tup soni qalinligi va ekish chuqurligi va muddatlarining o‘simlik mahsuldorligiga ta’siri, mineral o‘g‘itlarning yem-xashak va don uchun ekilgan amarantning hosildorligiga ta’siri bo‘yicha Rossiya va boshqa chet mamlakatlar turli xil tuproq iqlim sharoitlarida bir qancha tadqiqotlar o‘tkazilgan va yetishtirish texnologiyalari ishlab chiqilgan.

Amarant ekish maqsadi va navning agrobiologik xususiyatlariga, shuningdek, tuproq iqlim sharoitiga qarab, 60x15, 60x10, 60x8, 70x15, 70x10,70x8 sxemalarida bahorda asosiy va g‘alladan keyin takroriy ekin sifatida ekiladi.

Amarant o‘simligining urug‘ sarfi juda ham kam bo‘lib, gektariga 0,5-1,5 kg ni, don hosildorligi o‘rtacha 40-60 s/ga ni, don uchun ekiladigan navlarida bundan ham yuqori bo‘ladi. Amarant urug‘lari tuproq harorati 10–12 darajani tashkil qilganda 1–1,5 sm chuqurlikka ekiladi.

Manzarali amarant namunalaridan avval ko‘chat tayyorlab, so‘ng doimiy joyga o‘tqazish maqsadga muvofiqdir. Chorva uchun ozuqa sifatida yetishtirishda 1 ga maydondagi urug‘ sarfini tuproq, iqlim sharoitini hisobga olgan holda urug‘ sarfini gektariga 2 kg.gacha yetkazish mumkin.

Amarant o‘simligi ekiladigan maydonlar kuzda 25-35 sm chuqurlikda haydab qo‘yiladi. Yer haydash oldidan organik va mineral o‘g‘itlar bilan oziqlantiriladi. Erta bahorda yerlar tekislanib, begona o‘tlardan tozalanadi. Amarantni ekishni barqaror iliq ob-havoda (aprel-may oylarida) hamda g‘alladan bo‘shagan maydonlarda ekish tavsiya qilinadi. O‘simlik yer tanlamaydi -- sho‘r bosgan, suvsiz va tog‘ oldi hududlarda ham yaxshi o‘sadi.

O‘simlikni ekishda sharoit va muddatlarni to‘g‘ri belgilash urug‘larning qiyg‘os unib chiqishini ta’minlovchi omil bo‘lib hisoblanadi. Shuni ko‘zda tutish lozimki, urug‘ tushgan tuproqda uning unib chiqishi uchun issiqlikdan tashqari uning urug‘i qattiq parda bilan qoplanganligi bois,yetarli miqdorda namlik bo‘lishi kerak. Shuning uchun uni optimal muddatlarda ekilmasa yoki tuproqning yuza (4 sm gacha) qatlami qurib qolgan bo‘lsa, unda quruq iqlimli mintaqalarda maysalarning unib chiqishi kafolatlanmasligini hisobga olib, o‘nib chiqqunga qadar sabzi va piyoz singar nam saqlashlik talab etiladi.va

Amarantni ekish usullarini tanlash hosil miqdoriga va uning rivojlanishiga ijobiy ta’sir etuvchi omillardan hisoblanadi. Amarantni qator oralari yumshatiladigan ekin turlari kabi, qator oralari 30, 45, 60 sm egatlarga, urug‘ olish uchun ekiladigan maydonlarda esa 70 sm.li egatlar olib ekilishi ma’qul.

Qator oralari 60 sm kenglikda bo‘lganda amarantni gektariga o‘rtacha 1-2 kg urug‘ ekish tavsiya qilinadi. Agar qator oralari 45 sm.dan egat olinib ekilsa o‘simlikning ekish normasi 10-15% ga ko‘payadi. Urug‘larni ekishda namlangan g‘alvirdan o‘tkazilgan qum, chirigan go‘ng, superfosfat va boshqa mahsulotlardan urug‘ni to‘ldiruvchi sifatida ular 1: 10 yoki 1: 5 nisbatda foydalaniladi.

Amarant ekilgan maydonlarda qoldirilgan ko‘chatlar gektaridan 600-700 s, mahalliy sharoitda amarant bo‘yi ayrim navlarida 2-2,5 marta ortib, ko‘k massa miqdori keskin ortishi kuzatildi. Shunga ko‘ra don hosildorligi 1-1,5 va hatto 3-4 tonnaga yetishi va undan ham ortishi mumkin

Amarant o‘simligini parvarish qilish murakkab jarayon bo‘lmasdan barcha ekib o‘stiriladigan o‘simliklarning agrotexnikasiga o‘xshash. O‘simlikni ekishdan keyin yerni yumshatish, begona o‘tlardan tozalash kerak. Ayniqsa, har qanday tuproqqa ham bahor oylarida qatqaloq hosil bo‘lishi mumkin va maysalarning paydo bo‘lishini, ularning rivojlanishini tenglashtiradi. Shuning uchun qatqaloqni ekishdan 4-6 kun keyin yengil yumshatgichlar yordamida ishlash kerak.

Hozirda qator xo‘jaliklarda amarant ekib undan sifatli va mo‘l hosil olish uchun tuproq va nav xususiyatiga qarab 60-70-90 sxemada ekilmoqda.Jami sof holda 200kg azot, 150 kg fosfor, 100 kg kaliy hamda 20-30 tn organik o‘g‘it ishlatiladi. Ekish bilan 300 kg ammafos, 50 kg kaliy, 150 kg karbamid beriladi. Ekishda sabzavot seyalkalari bo‘lmasa bakalashkadan foydalanish mumkin. Bunda har 10-12 sm oraliqda 5-6 tagacha urug‘ tushishi mo‘ljal qilinib bakalashka teshiladi.

Ekilgan urug‘ni zararkunandalar yeb ketmasligi uchun aldamchi zaharli xo‘rak tayyorlanadi. Buning uchun 60 kg kunjara, 2 litr paxta yog‘i 250 gramm karate yoki otello super bilan aralashtirib 2 soat dimlanadi. Shundan so‘ngshomdan keyin ekin ustiga sepiladi. Sepish har 5 kunda takrorlanib 3 marta o‘tkaziladi.

O‘nib chiqqandan so‘ng qalin joylari yaganalanadi. Intensiv usulda plyonka tortilib har 10 sm da bakalashka bilan ekilib aldamchi yem sepiladi. Xuddi shu yo‘l bilan mo‘l hosil olishmoqda.

Dastlabki 2-3 haftada asosiy e’tiborni maysalar unib chiqqandan keyin begona o‘tlarni yo‘qotish qator oralarini yumshatish va yagana qilishga qaratmoq kerak.

O‘simliklarni bo‘yi 10-15 sm ga yetganda qator oralarini ishlash bilan birga ularning rivojlanishini tezlashtirish maqsadida gektar hisobiga 40 kg.dan azot va 20 kg.dan kaliy o‘g‘iti berib, 5-6 sm chuqurlikda kultivatsiya o‘tkaziladi.

Ikkinchi oziqlantirish o‘simlikning bo‘yi 30-35 sm ga yetganda gektariga 30 kg.dan azotli va fosforli o‘g‘itlar bilan oziqlantiriladi. O‘simlikni oziqlantirish albatta sug‘orishdan oldin amalga oshirilishi lozim. O‘simlik oziqlantirilgandan va sug‘orilgandan keyin uning o‘sishi va rivojlanishi tezlashadi.

Oxirgi oziqlantirishni uning bo‘yi 70-80 sm ga yetganda azotli va kaliyli o‘g‘itlar berish bilan tugallanadi. Mavsum davomida amarantni 6-7 marta sug‘oriladi.

Amarant o‘simligini yashil massasini gullash fazasidan urug‘larning sutli-mumli yetilish fazasiga yetguncha o‘rila boshlanadi. Iyul oyigacha amarant o‘simligini 2-3 marta o‘rib olinadi. Bu esa iyul oyining oxiriga kelib ildiz tizimidan yangi o‘t o‘sib chiqishini ta’minlaydi. Amarantning yashil massasida oqsil modasi ko‘p bo‘lganligi uchun chorvachilikda silos va boshqa oziqalarni ishlab chiqarishda ko‘proq ishlatiladi.

Amarantning o‘sishi, rivojlanishiga organik va mineral o‘g‘itlarning ta’siri, tuproq unumdorligiga reaksiyasi, sug‘orish tizimi O‘zbekiston sharoitida kam o‘rganilgan.

Ushbu qimmatbaho o‘simlikning respublikamizda turli tuproq-iqlim sharoitlarida o‘sishi, rivojlanishi va hosildorligiga har xil omillarning ta’siri ilmiy muassasalar tadqiqotchilari tomonidan tadqiqotlar o‘tkazilmoqda.

Amarant takroriy ekin sifatida ekilganda ham uning o‘sishi va rivojlanishiga mineral va organik o‘g‘itlarning ta’siri ushbu o‘simlik asosiy ekin sifatida ekilgan kabi bo‘ldi.

Mineral o‘g‘itlarning go‘ng bilan birgalikda qo‘llanilishi o‘simlikning o‘sishi va rivojlanishini maksimal darajaga yetkazdi.

Organik va mineral o‘g‘itlarning qo‘llanilishi amarantning o‘suv davri davomiyligiga ham ijobiy ta’sir qiladi. Oziq moddalarning yetishmaganligi sababli amarantning vegetatsiya davri uzayadi va aksincha,

mineral o‘g‘itlar qo‘llanilib tuproq oziq rejimining yaxshilanishi amarant vegetatsiya davrining qisqarishiga olib keladi. Bu ayniqsa go‘ng mineral o‘g‘itlar bilan birgalikda qo‘llanilgan variantlarda yaqqol ko‘rinadi.

Tajribada mineral va organik o‘g‘itlarning qo‘llanilishi donli amarantning don va biomassa hosildorligiga ham ijobiy ta’sir qildi. Takroriy ekilgan donli amarant pishib yetilgandan so‘ng uni darrov yig‘ishtirib olinadi.

XULOSA

Qimmatbaho universal o‘simlik – donli amarantning o‘sishi, rivojlanishi, hosildorligi va biomassa hosil qilishiga mineral va organik o‘g‘itlarning ta’siri O‘zbekiston sharoitida asosiy va takroriy ekin sifatida o‘rganilgan. Amarant doni xalq xo‘jaligining turli xil tarmoqlarida, jumladan, oziq–ovqat, farmasevtika sohalarida hozirda keng foydalaniladi.

Tajriba natijalarining ko‘rsatishicha, amarantning bir qator navlarida O‘zbekiston sharoitida asosiy va takroriy ekin sifatida ekib yetishtirish mumkin. Donli amarant yetishtirishda mineral o‘g‘itlarni organik o‘g‘itlar bilan birgalikda qo‘llash yuqori miqdorda don va biomassa olish imkoniyatini beradi. Amarant o‘simligi tuproq unumdorligi va oziq moddalarga juda ham talabchan bo‘lib, o‘g‘it me’yori gektariga N200-250, P150, K200 va 30 t go‘ng bilan birga oziqlantirish yaxshi samara beradi.

Chorvachilikda talablar darajasida parvarishlanganda ayrim navlari 300 tonnagacha ko‘k massa berishi bilan bir qatorda, chorvaning barcha turlarida salomatligiga ijobiy ta’sir ko‘rsatib, mahsuldorligini, ayniqsa sutini keskin oshiradi, o‘sish-rivojlanishini sezilarli darajada tezlashtiradi. Amarant bilan boqilgan chorva mollarining go‘shti va suti shifobaxsh hisoblanadi. Shu bois, xorijda amarant bilan yetishtirilgan chorva mahsulotlarining narx ancha baland belgilanib do‘konlarda amarant go‘shti, amarant suti deb yozib qo‘yiladi.

Amarant yetishtirishda o‘simlik tomonidan o‘zlashtirilgan oziq moddalarning katta qismi biomassa bilan yana qaytib tuproqqa tushadi. Ushbu biomassa tuproq tarkibidagi organik modda miqdorini oshirishda muhim ahamiyatga ega. Bundan tashqari amarantni takroriy siderat va yem-xashak ekini sifatida o‘rganish muhim hisoblanadi. Respublika aholisining ko‘payib borishi, qishloq xo‘jalik mutaxassislari oldiga oziq-ovqat mahsulotlarini ko‘plab yetishtirish vazifasini qo‘ydi.

Amarant o‘simligini ko‘paytirish, undan xalq xo‘jaligining deyarli barcha jabxalarida foydalagnish shu kunning eng dolzarb masalalridan biridir. Tanasi va bargidan chorvachilikda, bargidan va donidan oziq-ovqat tayyorlashda, moyidan tibbiyotning o‘nlab sohalarida qo‘llash yuqori imkoniyatdir. Hosildorligi bug‘doy bilan bir hilligi va daromati esa o‘nlab marta ko‘pligi fermerlar uchun yangi daromat manbaidir.

Amarantni O‘zbekistonda yetishtirish yurtimizda qimmatbaho dorivor mahsulotlarni arzon narxda o‘zimizda yetishtirish, siderat va serhosil yem-xashak ekin turi bilan boyitish, qishloq xo‘jaligi va farmasevtika sohalarida yangi yo‘nalishlarni ochish, asosiysi anchagina horib qolgan tuprog‘imiz tabiiy unumdorligini oshirish imkoniyatini yaratadi.

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