

МЕДИЦИНА, ПЕДАГОГИКА И ТЕХНОЛОГИЯ: ТЕОРИЯ И ПРАКТИКА

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THE ROLE OF SUSTAINABLE DEVELOPMENT CONCEPTS IN TEACHING THE SUBJECT OF BIOGENIC ELEMENTS

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Annotation. The following article discusses the role and importance of the concept of sustainable development in teaching the topic of biogenic elements in the 8th chemistry lesson. It is not surprising that this article is a solution to some of the current problems.

Key words: biogenic elements, actual problem, integration of sciences, ecology, carbon, nitrogen, phosphorus, iodine.

INTRODUCTION

The Strategy of Actions for the Further Development of the Republic of Uzbekistan set as a priority task “in-depth teaching of important and high-demand subjects such as chemistry, mathematics, physics, biology, and computer science”. Currently, a number of works are being carried out to further improve the content of teaching chemistry. Among them, in order to improve the system of teaching chemistry and increase its diversity, it is important to study it based on the needs of the time, current and global problems, and life experiences.

In accordance with the instructions of the President of the Republic of Uzbekistan Sh. Mirziyoyev, in the context of the increasing globalization of environmental problems, special attention should be paid to involving these institutions of civil society in environmental protection, adapting to climate change, improving ecological culture, forming ecological awareness of youth, ensuring the continuity of environmental education in educational institutions, and improving ecological culture.

LITERATURE REVIEW AND METHODS

"Bioelement" is a short, capacious and well-founded term that has been introduced into scientific use. The particle "bio" in the title is not an abbreviation of the terms "biotic", "biogenic" or "biological", that is, "bio." in the sense of "related to living". By its essence, the bioelement composition is the composition of bioelements

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in the body, which is characterized by the constancy and dynamic balance of the composition of individual bioelements relative to each other (bioelement homeostasis).

Diselement (bioelement) is a violation of the bioelement composition of the body (excess, deficiency, bioelement imbalance). Diselement is one of the manifestations of the disease - a life disorder with damage to the structure or functions of the body under the influence of external and internal factors. Almost all chronic diseases are the cause, manifestation or consequence of diselementoses.

The definition of bioelementology is as follows: Bioelementology is a scientific and practical direction that studies the composition, content, relationships and interaction of elements in living organisms. In bioelementology, medical elementology and veterinary bioelementology are distinguished as the main directions. Medical elementology is a section of bioelementology that studies the composition, relationships and interaction of elements in the human body in normal and pathological conditions. The task of medical elementology is to prevent violations of the bioelement composition of the human body and develop methods for correcting them in advanced pathological conditions (diselements).

98% of the earth's crust is composed mainly of 8 elements: O, Si, Al, Fe, Ca, Na, K, Mn. Although all of them have become part of living matter in the process of evolution, carbon has remained the main element of life.

99.1% of plant tissues are composed of the elements O, C, H, Na, K, Ca, Si.

99.4% of the human body is composed of H, O, C, n, Ca. All of them are called macrobiogenic elements.

10 elements that are found in a living organism in an amount of less than 0.01%: Fe, Mn, Co, Cu, Mo, Zn, F, Br, I, B are called microbiogenic elements. They are considered essential for life. Microbiogenic elements are also called microelements, they help in the formation of sugars, starch, proteins, various nucleic acids, vitamins, enzymes. They ensure good growth of plants in fertile soils, increased productivity, adaptation to drought and cold conditions, and resistance to various diseases. Iron-containing "ferrostimulators" I.R. Askarov and Sh. Invented by M. Kyrgyzov, it was put into practice as a biologically active substance that positively affects plant growth.

Manganese, copper, molybdenum and boron are important for the process of photosynthesis, growth and ripening of seeds in plants. They also increase resistance to the harmful effects of the external environment (lack of moisture in the soil,

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increased or decreased temperature), and provide resistance to a number of bacterial and fungal diseases (hemp bacteriosis, beet root rot, gray spot in cereals).

Hydrogen atoms are the most common type of atom in the human body, and since hydrogen atoms are light, they make up 10% of the mass. Hydrogen is the main component of water and organic compound molecules. Nitrogen is an element that makes up 3.3% of the body mass. Nitrogen is mainly found in proteins and nucleic acids.

Calcium is an element that makes up 1.5% of body mass. Calcium is mainly used to build bones and teeth. One of the main functions of calcium is to play an important role in muscle contraction and metabolism. The daily requirement of calcium is from 800 mg to 1500 mg, depending on age.

Phosphorus makes up 1% of body mass. Like calcium, phosphorus is a major component of bone tissue and the nucleus of cells and tissues of the nervous system. Phosphorus plays an important role in the metabolism of proteins, fats and carbohydrates.

Potassium makes up 0.2-0.4% of body mass. Potassium is an important element for the normal functioning of the cardiovascular system. Potassium is the main cation and positively charged ion for the human body.

Sulfur is found in some amino acids and proteins. Therefore, it makes up 0.2-0.3% of body mass.

Sodium, like potassium, is a positively charged ion. Sodium regulates the balance of electrolytes in the body. Sodium makes up 0.1-0.2% of body weight.

The importance of boron in increasing the yield of peas, beans, alfalfa, sugar beets, hemp, melon crops and berries has been proven in numerous experiments.

Calcium is an important biogenic element in the human body, 99% of all calcium in the body is found in the bones, and about 1% in the blood and lymph. Calcium deficiency causes a number of diseases. In medicine, medicinal substances prepared on the basis of calcium chloride, calcium gluconate are widely used. The food additive "ascalcium" is effectively used to increase the body's defenses in patients with bone, blood, tumor and other diseases.

Copper plays a major role in increasing grain yield in drained marshy lands, sandy loams, and copper-poor soils, in skin pigmentation, and in the absorption of Fe.

Manganese is a key element in the production of urine in living organisms in the cultivation of sugar beets and wheat. It is also of great importance in the production

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of vitamin C. Manganese significantly increases the yield of berries and cereals. For example, the yield of strawberries increases by up to 30 centners per hectare, and the yield of wheat by 3-4 centners. If cotton seeds are soaked with manganese salts before planting, the yield increases by up to 2 centners per hectare. It accelerates the growth of cotton, tobacco, and sugar beets.

Cobalt is of great importance in the synthesis of hemoglobin, is an important element in the metabolism of DNA and amino acids. Co, along with increasing grape yield, helps to increase the sugar content of the fruit. Co, when used in combination with mineral fertilizers Mn, Zn, B, Cu, accelerates the development of the vine and increases the yield by 3-4 centners per hectare.

Zinc is important for the formation of CO₂ in the body and the assimilation of proteins. Due to zinc deficiency, cereals, vegetables and corn are susceptible to diseases. The tips of the stems turn pale, the plant weakens, as a result of which the yield decreases sharply. It causes a serious disease in citrus fruits, namely, the leaves turn pale and the plant dries out. Zinc is also of great importance for peach, apricot and walnut trees.

Molybdenum plays a role in nitrogen absorption and oxidation-reduction processes in the body. Molybdenum microfertilizers increase the yield of sugar beet by 20% and flax by 25%.

Waste from bulb manufacturing plants is a valuable molybdenum microfertilizer. When this waste is used in appropriate quantities in combination with mineral fertilizers, the yield of winter wheat increases by 37%, and the yield of cotton by up to 7 centners per hectare.

Fluorine is one of the elements that is essential for the formation and growth of bone tissue in living organisms. Teeth begin to shine when the amount of fluorine in them decreases.

Bromine is one of the elements responsible for the normal functioning of the higher nervous system.

Iodine is an element necessary for the normal growth and sexual maturation of organisms. In recent years, new elements such as Li, Al, Ti, V, Cr, Ni, Se, Sr, As, Cd, Sn, Ba, W have been added to the list of microelements. Information about their essential role and place in the life of living organisms is being carefully studied by world scientists.

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The technology for separating precious metals such as gold, platinum, molybdenum, tungsten from waste was developed by Professor Kh.T. Sharipov and put into practice in the metallurgical industry.

At a time when the biosphere is increasingly polluted with various compounds, we need to deeply understand that the natural concentrations of metals and non-metals - microelement deposits are changing and redistributing, which is one of the factors affecting living nature.

It has now been established that about 300 out of more than 500,000 species of plants and about 200 out of more than a million species of animals need microelements. If this deficiency is not eliminated, it is possible to observe the disappearance of an entire species, the balance in nature is disturbed. Therefore, scientists around the world are conducting tireless research on microelements and their role in the life of living organisms and are achieving initial positive results. This is exactly what we mean by sustainable development, that is, education aimed at the moderate use and restoration of all micro and macroelements.

In 1935, the French chemist M. Chevrel identified and described creatine in muscle, and a little later creatinine, similar in composition to it. The composition of skeletal muscles, lactic acid and its accumulation during skeletal movement were determined by the German chemist Y. Liebig. In 1839, it was determined that protein, fat and carbohydrates, which are the main components of plants and animals, are included in food.

The scientific research work of Professor S.P. Kostichev of St. Petersburg University on anaerobic metabolism of carbohydrates and plant respiration, played an important role in the development of biochemistry, in particular physiological chemistry. The chromatography method developed by Professor M.S. Swet of Warsaw University is still used today. The student knows well from the process of botany, plant physiology, biochemistry lessons and the processes of conducting scientific research that K.A. Temiryazev's work on photosynthesis is of great importance for the development of biochemistry, especially physiological chemistry. K.A. Temiryazev's students V.I. Palladin studied the problem of biological oxidation, D.P. Pryanishnikov studied nitrogen metabolism in plants, and V.S. Butkevich created the science of biochemistry, the theory of protein and protein metabolism in plants, which made a great contribution to the development of this science.

DISCUSSION

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The link between biogenic elements and sustainable development is ecologically and economically important. Biogenic elements (carbon, nitrogen, phosphorus, etc.) ensure the continuity of life in nature and the functioning of ecosystems. These elements play an important role in ecological systems and are the main components necessary for optimizing resource management, that is, achieving sustainable development.

Sustainable development is development aimed at the efficient use of natural resources, environmental protection and ensuring socio-economic equality. Biogenic elements are one of the main components of sustainable ecological systems, and their distribution and circulation affect the successful implementation of sustainable development.

The presence of sufficient amounts of Nitrogen, Potassium and Phosphorus in the soil leads to an increase in plant biomass. Currently, due to the cheapness of KCl, NH_4NO_3 fertilizers, they are used in large quantities for the rapid ripening of plant fruits and rapid plant growth. This is certainly the goal of all our farmers, but the improper use of phosphorus, potassium and nitrogen fertilizers can lead to deplorable situations. For example, an increase in the amount of excess nitrogen, potassium and phosphorus can lead to a deterioration in the composition of plant and agricultural products, and the entry of these elements into water bodies is harmful to ecosystems, leading to water pollution, an increase in eutrophication and dead zones, and the loss of various biological diversity. Excessive use of fertilizers can significantly increase the acidity level, create saturation with macroelements or change it to such an extent that the soil loses its sensitivity and absorbability to various nutrients. Excessive application of fertilizers can flow into the area below the root zone and reach the groundwater, leading to groundwater pollution. Their rational management and maintenance of their balance are important for sustainable ecological and economic development.

Therefore, the relationship between biogenic elements and sustainable development requires the development of strategies aimed at improving the living environment and ensuring social well-being through the sustainable management of natural resources.

RESULTS

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When the topic of sustainable development and biogenic elements is taught, students learn to use resources wisely. This increases their responsibility for environmental safety and environmental protection. By teaching this topic, awareness of the need for sustainable development in society increases. Students show themselves as active participants in solving various environmental and social issues. Teaching about biogenic elements and sustainable development can stimulate scientific research and innovation. Students and researchers work on the development of new technologies and the efficient use of existing resources. Familiarity with biogenic elements, understanding their importance for the body, increases attention to people's health. This contributes to the sustainable development of the health system.

Training in these areas also helps to make the educational process modern and relevant. This, in turn, will help future generations make the right decisions and ensure sustainable development.

CONCLUSIONS

The concept of sustainable development is now considered a major goal not only from an environmental, but also from a social and economic perspective. It is very important for students to understand the basic principles of sustainable development and how it will affect them in the future. Through education on sustainable development, students understand the main ideas such as saving natural resources, developing renewable energy sources, ensuring social justice.

Biogenic elements - these are chemical elements necessary for biological life (for example, carbon, nitrogen, oxygen, phosphorus) - play a major role in introducing students to natural science and ecology. Understanding that they are elements necessary for the normal functioning of the organism encourages students to preserve the environment and ecological equality.

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