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DRINKING WATER SAFETY – ONE OF THE MAIN COMPONENTS OF ECOLOGICAL SAFETY OF THE POPULATION OF UKRAINE

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It is considered highly effective, cost-effective natural method of water purification. The results of the research and the advantages of the proposed water treatment technology, which is characterized by flexibility and high efficiency with respect to different types of pollution and can be used for decolouration and lightening the reagentless water for drinking purposes. Summarizes the scientific approaches to the analysis of contemporary problems of water supply and indicated measures to address them. *Keywords:* effective water supply, safety, quality of drinking water, water purification, bio-explanatory filter.

Безпека питного водопостачання – одна з головних складових екологічної безпеки населення України. Туровська Г.І., Богданенко О.В., Туровська А.О. Розглянуто високоефективний, економічно вигідний метод очищення природної води. Наведено результати досліджень та переваги запропонованої технології водоочищення.яка характеризується універсальністю та високою ефективністю відносно різних видів забруднень і може застосовуватися для безреагентного знебарвлення та прояснення води для питних цілей. Узагальнено наукові підходи до аналізу сучасних проблем водопостачання. *Ключові слова:* ефективне водозабезпечення, безпека, якість питної води, водоочищення, біопрояснювальний фільтр.

Безопасность питьевого водоснабжения – одна из главных составляющих экологической безопасности населения Украины. Туровская Г.И., Богданенко А.В., Туровская А.О. Рассмотрено высокоэффективный, экономически выгодный метод очистки природной воды. Приведены результаты исследований и преимущества предлагаемой технологии водоочистки, которая характеризуется универсальностью и высокой эффективностью в отношении различных видов загрязнений и может применяться для безреагентного обесцвечивания и осветления воды для питьевых целей. Обобщены научные подходы к анализу современных проблем водоснабжения и указаны меры по их решению. *Ключевые слова:* эффективное водоснабжение, безопасность, качество питьевой воды, водоочистка, биопрояснювальний фильтр.

A significant share among the problems of mankind is occupied by ecological ones. Because of their global nature in the last quarter of the 20th century, they are now widespread almost everywhere, in particular, relevant for Ukraine. In connection with the deterioration of the ecological situation, the main problems of ecology are the conditions for providing the population with water, its quality and the possibilities for improvement. Until recently, these problems were not so acute due to the relative purity of natural water supply sources

and their sufficient quantity. But in the last decades the situation has changed. The increase in risk and the reduction in safety for water supply systems are due, first, to a sharp deterioration in the quality of natural waters due to microbial, chemical and radioactive contamination, and, secondly, by a significant decrease in water supplies.

Also urgent is the issue of the protective function of the existing technology of potable water purification in relation to pathogenic viruses and bacteria. The urgency of this issue is due, first of all, to the high incidence of viral hepatitis A in Ukraine, the waterway of which is the trigger mechanism of the epidemic process. This makes effective water supply of the population a leading problem of modern hygiene. The urgency of this provision is also established at the international level, therefore the task of "ensuring the safety of drinking water and sanitation" has been attributed by the World Health Organization to important problems that require immediate resolution in the coming years, and determines the relevance and importance of research in this area.

Formulation of the problem

The paradigm of "greening" water policy, especially in the field of drinking water supply, which is approved in Western Europe, is also crucial for Ukraine. The right of citizens of Ukraine to the ecologically clean natural habitat and the satisfaction of physiological and domestic needs in water is enshrined in Ukrainian legislation [1, 2]. In this regard, the safety of drinking water supply has become one of the main components of the overall environmental safety of the population of Ukraine. At the same time, the normative provision of centralized water supply, aimed at meeting the high requirements for water quality, should cover not only technical and economic, but also environmental factors.

By current standards [3-5] drinking water must be safe epidemiologically and radiation, harmless chemical composition and have favorable organoleptic properties. At the same time, the content of impurities in water, as well as microbiological indicators should not exceed the standards established by regulatory documents. This is very important, because the constant consumption of inferior water shortens the life of a person for 5-10 years and contributes to the development of many severe chronic diseases.

Consequently, in conditions of sharp deterioration of the condition of drinking water supply sources, the drinking water and water of reservoirs play a leading role in the spread of many bacterial and viral infections. Therefore, the development of highly effective, economically profitable methods of purifying natural water is the most urgent task of hygienic science and technology of water purification.

The realities of the development of modern water supply in Ukraine make it necessary to improve existing scientific approaches to this issue. Taking this into account, it is advisable to develop and use new filtering materials, as well as new "alternative" methods and methods of preparing drinking water as the most economically viable and environmentally appropriate.

Results of the study

The problem of drinking water supply to the country's population is given considerable attention. A large number

of experimental and epidemiological studies indicate undoubtedly the negative impact of water pollutants on the health of the population [6-8]. Great contribution to the solution of the water supply problem at the state level was made by A.V. Yatsyk, A.M. Tugai, V.I. Melnik, A.K. Zapolsky and other scientists. The issue of providing drinking water to individual regions was investigated by: M. A. Safonov, Orlov V.A., A.F. Kiselev, V.D. Rud, N.V. Yanko and others.

However, many aspects of this problem still require further research and practical application. In particular, the issues related to providing the population with quality drinking water have not been sufficiently solved, which determined the relevance of the study.

The purpose of the work is to increase the degree of purification of natural waters, it is one of the promising directions of intensification of the processes of improving the quality of natural waters in conditions when the sources have suffered great anthropogenic impact and generalization of scientific approaches to the analysis of modern water supply problems and the formation of measures for their solution.

The method of immobilized organisms on "inert" carriers refers to promising methods of intensifying surface water purification processes without significant capital expenditures. The main advantages of this method in comparison with physical and chemical are, first of all, ecological purity and reduction of energy costs, a significant reduction in the number of maintenance personnel and ease of maintenance. This method is characterized by universality and high efficiency in relation to various types of pollution.

An assessment of the current scientific and technical level of the surface water purification field on clarifying filters and the use of natural biocenoses immobilized on media with a developed surface confirmed the feasibility of creating and investigating water purification bio-clarifier filters for which Ukrainian patents have been issued.

Due to the microorganisms being fixed to the carrier in water and the presence of bacteria of various destructive activity and sensitivity in the biocenosis of bacteria, stable water purification is provided, with significant changes in the composition of the contaminants in it. Fixed microorganisms carry out a variety of microbiological transformations of organic substances.

The results of the conducted studies made it possible to reveal some features of the process of biological purification of natural waters. A significant effect of water purification according to Permanganate oxidation (32.85 … 50.12%) is established, which indicates a sufficiently high level of extraction of organic substances. Approximately the same degree of pollution reduction can be achieved with the use of coagulation treatment of water. However, biological treatment removes a significant portion of ammonium compounds, nitrites and nitrates, and is not achieved with coagulation. A sufficiently high effect of removal of ammonium nitrogen (92.23 … 96.77%) indicates that the nitrification process is taking place, and this confirms the high degree of extraction of oxidizing organic substances. Determination of biochemical consumption of purified water oxygen showed that its value did not exceed 2.5 mg O_2 / dm^3. So, in the purified water there are only important difficult oxidizing organic matter in acceptable concentrations.

When filtering the water, it is noted that the quantitative content of bacteria decreases sharply, that is, the biogeneity of water decreases. It is this method of extracting bacterial cells from water that has great advantages in comparison with chemical methods of water sterilization (chlorination). A considerable number of ions of multivalent metals with a high adhesion-coagulating potential was also found in the carrier zone.

Thus, the use of the proposed purification technology, unlike traditional, significantly increases the efficiency and reliability of water treatment of surface waters with significant economic effect.

Of course, the problem of providing the population with quality drinking water in sufficient quantities is complex. According to the strategy of optimization of drinking water safety management should be based on the following tasks:

– ensuring the sanitary-epidemiological safety of water;

– ecological and hygienic justification for new solutions aimed at ensuring safety and harmlessness of water at the stages of its processing and delivery to the consumer;

– monitoring the effectiveness of the measures taken to assess their impact on the morbidity caused by the "water factor".

Real optimization of water quality is possible only if these tasks are carried out in a complex manner, and they provide for the implementation of the concept of "risk management" in the production of drinking water and the plan for ensuring the safety of drinking water [1; 9].

Conclusions

The safety of drinking water is an important place. The lack of reliable methods for the specific prevention of many viral and bacterial infections transmitted by water entails the hygiene of water and water supply, sanitary protection of reservoirs and water treatment technology, the need to develop highly effective, cost-effective methods for purifying natural water.

In analyzing the production of potable water and assessing the effectiveness of innovations in water supply, the foundation should be the "concept of risks", and for optimization of water supply – the possibility of real and legally developing domestic approaches; to improve modern equipment, which is responsible for the quality control of drinking water; apply the experience of other states in the creation and use of new filter materials, as well as new "alternative" methods and methods of preparing drinking water.

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