

HYGIENIC ASSESSMENT AND WAYS TO OPTIMIZE WATER USE FOR RURAL AND URBAN POPULATIONS IN THE REPUBLIC OF UZBEKISTAN

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Key Words: *Household water treatment devices, drinking water, post-treatment of drinking water, risk assessment, integral assessment of drinking water, safety of drinking water.*

Summary: *The most accessible source of water is currently considered to be centralized water supply systems, which are used for preparing hot food, drinks, and for raw drinking purposes. The high quality of drinking water is achieved through integrated solutions, primarily involving the development and implementation of modern water treatment technologies, the application of social and hygienic monitoring, and an integral approach to assessing drinking water quality.*

Relevance of the problem: *Water is one of the most valuable natural resources for humans as it is irreplaceable. Every economic sector depends on water usage. Water is the source of all life on Earth; no water, no life.*

In certain cases, poor-quality drinking water can lead to epidemics. Water plays a crucial role in the spread of acute intestinal infections, helminth infestations, viral diseases, and major tropical transmissible diseases. The main reservoirs of pathogenic microorganisms, intestinal viruses, and helminth eggs in the environment are feces, household wastewater, and warm-blooded animals (cattle, domestic and wild animals).

Classic waterborne infectious disease epidemics are predominantly registered in countries with low living standards. However, localized outbreaks of intestinal infections are also reported in economically developed countries such as Europe and America.

Drinking water must meet physiological standards; its mineral content and microelement composition (fluoride, iodine, selenium, etc.) must align with the biological needs of the body. Additionally, water must be radiologically safe, containing a safe amount of natural radionuclides, with total radioactivity levels not exceeding hygienic norms.

In Uzbekistan and abroad, the physiological effects of iodine and fluoride as microelements causing endemic diseases—such as endemic goiter and fluorosis—have been extensively studied and hygienically evaluated. Theoretical and experimental research confirms that the water factor does not play a role in the development of endemic goiter, as the body's iodine requirements are mainly met through dietary intake. Iodine in drinking water typically serves as an indicator of the overall iodine content in the environment. Conversely, fluoride-related endemic fluorosis is strongly associated with high fluoride concentrations in drinking water. Significant endemic fluorosis zones exist worldwide, including in various regions of Uzbekistan, particularly in Fergana.

Urban, industrial, and agricultural wastewater treatment remains critical as millions rely on drinking water characterized by dangerous levels of contamination or chemical pollution. Contaminated water and poor sanitation contribute to diseases like cholera, diarrhea, dysentery, hepatitis A, typhoid, and poliomyelitis.

Conclusion:

Fluoride deficiency in drinking water is a significant etiological factor for dental caries, which leads to premature tooth loss and chronic infections affecting the heart and joints. The prevalence of dental caries is rising worldwide, especially in Uzbekistan's Fergana region and economically developed countries. The severity of dental caries has led to a surge in dental clinic visits, second only to general medical consultations. As a result, water fluoridation is increasingly recognized as an effective preventive measure globally and in Uzbekistan.

Climate change, increasing water scarcity, population growth, demographic shifts, and urbanization are already straining water supply systems. The presented research offers a novel scientific solution for the legal regulation of ensuring population access to drinking water of normative quality.

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