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SUMMARIZED CAVITATIONAL IMPACT OF WATER TREATMENT FROM MICROORGANISMS AND ORGANIC COMPOUND

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It was investigated the effectivity of the influence of cavitational treatment on the dynamics of microbial inactivation process of surface water with the sample of bacterial types of Diplococcus, Pseudomonas fluorescens, Bacillus cereus, Sarcina lutea.

Methodology. Has been investigated the effectivity of the influence of cavitational treatment on the dynamics of microbial inactivation process of surface water with the sample of bacterial types of Diplococcus, Pseudomonas fluorescens, Bacillus cereus, Sarcina lutea [1,2]. An effect of the gas of different nature (argon, helium, oxygen and carbon dioxide), bubbled into the area of cavitational treatment, was investigated on the level of water purification quality from organic and biological contaminants. Cultivation of the studied microorganisms has been carried out by deep-water method. The content of organic compounds was determined by chemical consumption of oxygen. Cavitation in the reaction mixture was created by ultrasonic generator UZDN-2T with magnetostrictor immersed in a certain volume of water with an initial known value of microbial number and chemical consumption of oxygen.

Results. It was found that the curves of dependence change of the microbial number versus time and chemical consumption of oxygen became linear in semi-logarithmic coordinates. Thus, to describe the kinetic of the process of water disinfection and destruction of organic compounds in cavitational conditions, the kinetic equations of the first order was applied. It was calculated the effective rate constants of bacterial disinfection and the effective rate constants of the destruction of organic compounds. Also, the levels of disinfection and water purification in the presence of the investigated gases were calculated. Sonochemical dependence of effective rate constant of microorganism destruction on the duration of treatment, the type of microorganism, and the nature of bubbled gas was confirmed. It was found the reasonability of argon bubbling during cavitational water purification from microorganisms and organic compounds. The highest effectiveness was obtained under the simultaneous action of argon and cavitation during water disinfection from these types of bacteria and mentioned above. It was found for the first time the physicochemical action of cavitation on the process of organic compound and microorganism destruction in the water, depending on the nature of babbled gas. The effective rate constant of microorganism disinfection depends on the size of their cells, notably, faster and more complete destruction was observed for bacteria with larger size. Practical value is the next: experimental studies confirmed the reasonability of gas bubbling into cavitational medium that allows the use of this method in water purification technologies and water treatment.

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