

Silver Nanoparticles in Drinking Water Purification

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Abstract : Silver nanoparticles (AgNP) are known for their excellent antimicrobial agents, and thus can be used as alternative disinfectant agents. However, released silver nanoparticles is a threat to naturally occurring microorganisms. This paper exhibits information on the environmental fate, toxicological effects, and application of AgNP and the current estimate on the physicochemical and antimicrobial properties of AgNP in different aqueous solutions, as well as their application as alternative disinfectants in water-treatment systems. It also gives a better approximation and experimental data of AgNP's antimicrobial properties at different water chemistry conditions. A saturation-type fitting curve was established, showing the survival of bacteria under different water chemistry conditions as a function of the size of the nanoparticles. The results obtained show that silver nanoparticles in surface water, ground water, and brackish water are stable. The paper demonstrates the comparative study of AgNP-impregnated point-of-use ceramic water filters and ceramic filters impregnated with silver nitrate. It is observed that AgNP-impregnated ceramic water filters are more appropriate for this application due to the lesser amount of silver desorbed. Experimental data of the comparison of a polymer-based quaternary amine functionalized silsesquioxanes compound and AgNP are also tabulated and conclusions are analysed with the goal of optimizing. The simplicity of synthesis and application of Silver nanoparticles enables us to consider its effective modified version for the purification of water.

Keywords : disinfectant agent, purification of water, nano particles, water treatment

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