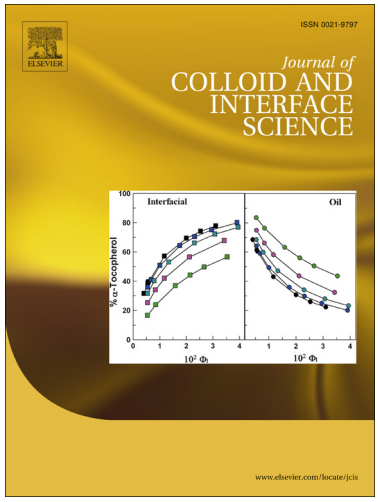

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Impact of solution chemistry on the properties and bactericidal activity of silver nanoparticles decorated on superabsorbent cryogels

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Abstract

This study investigated the effects of dissolved organic matter (DOM) and various electrolytes commonly found in environmental aqueous matrices on the physicochemical properties and bactericidal efficacy of silver nanoparticles (AgNPs), which are immobilized on cryogels (or PSA/AgNP cryogel). The AgNPs in the PSA/AgNP cryogel that were exposed to different media underwent morphological transformation in terms of particle size and structure. In addition, the presence of DOM and electrolytes increased the release of dissolved Ag. The biological uptake of Ag species (determined as the total Ag in exposed cells) increased in the presence of DOM, but decreased in the presence of electrolytes. The presence of electrolytes did not result in any significant reduction in the bactericidal activity. Although an initial increase of the DOM to 2.5 mg-C L^{-1} attenuated the bactericidal efficacy of the immobilized AgNPs, an increase in the DOM concentration beyond 5 mg-C L^{-1}