

***In vitro* and *in vivo* toxicity evaluation of silver nanoparticles stabilized with gum arabic**

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Due to its properties such as size, varied shape, high surface area and high bactericidal properties, silver nanoparticles (AgNP) have been widely used in several sectors of the industry: bandages; inside food coolers, to retard spoilage; in antimicrobial insoles, to prevent odors; in air purifiers; in surgical instruments and etc [1] [2]. Considering the range of applications a great concern in the academic field, mainly ecotoxicological, as the potential impacts and risks that AgNP can cause to the environment and human health has increased. During the synthesis of AgNP it is necessary to use stabilizing agents such as gum arabic (GA), which is an exudate of dried gum, edible, from the stems and branches of *Acacia senegal* and *A. seyal*, rich in soluble fiber not viscous. GA has broad industrial use as stabilizer, thickening agent and emulsifier [3]. Based on these considerations, this work aimed to verify and compare the toxicity level of two GA-stabilized AgNP samples (Sample 1: AgNP at 147 ppm concentration, approximately 25 nm in size; and Sample 2: AgNP at concentration of 174 ppm with approximate size of 75 nm) using *in vitro* and *in vivo* assays. The *in vitro* cytotoxicity test was performed according to ISO 10993-5 by the neutral red uptake method in cells of the NCTC-L929 line, to obtain the IC₅₀ (cytotoxicity index, which is the concentration of the substance causing it 50% mortality of exposed cells); and the *in vivo* acute ecotoxicity assay, according to the Brazilian standard ABNT NBR 12713, using *Daphnia similis* as the test organism to obtain EC₅₀ (effective concentration that causes immobility in 50% of exposed organisms). The results obtained for Sample 1 were IC₅₀ of 2.57 mg L⁻¹ and EC₅₀ of 4.40 µg L⁻¹; and Sample 2: IC₅₀ of 2.61 mg L⁻¹ and EC₅₀ of 6.55 µg L⁻¹. These results demonstrated that aquatic organisms are much more sensitive to AgNP than cells in culture, raising the importance of conducting further studies related to the adversities that these nanoparticles can cause to the environment and human health. In addition, it is necessary to verify the disposal of the same in the environment, since in Brazil there are still no legislation that quantifies the permissible limits for this disposal.

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References:

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