

BIOGENIC SILVER NANOPARTICLES AS SELECTIVE SENSORS FOR COPPER (II) AND LEAD (II) IONS

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Pollution is an undesirable change in general and specific features of the environment; it can be physical, chemical or biological, and takes place in the air, water and soil. Heavy metals are some of the biggest polluters of water and one of the most dangerous because the excessive presence of metals in the body acidified the blood; so early detection and to look for the best way in order to eliminate them is essential. ⁽¹⁾

The detection of heavy metal ions is a growing and important subject of study in recent years but many forms of metals detection use organic solvents that pollute even more the water; therefore, it is important to seek an alternative and sustainable route, as it is the use of biogenic silver nanoparticles. ⁽²⁾ In this work, an ecofriendly method is used for the synthesis of noble metal nanoparticles. We report the synthesis of silver nanoparticles obtained by a biological method, employing *Camellia sinensis* (green tea) aqueous extract as a reducing and capping agent. These nanoparticles are used as sensor for metal ions because of the preferential binds to the phenolic groups of the extract with the ions. ⁽¹⁾

Characterizations of the nanostructures include UV-Vis spectroscopy, TEM and HRTEM in order to confirm the shape, size and crystalline structure of the silver nanoparticles. The application of these nanoparticles as sensors for Cu²⁺ and Pb²⁺ ions was carried out by taking an amount of the AgNPs solution and mixed in a test tube containing a known concentration of Cu²⁺ and Pb²⁺ ions. The result is the naked-eyed (solution color changes), plasmonic⁽³⁾ and luminescent detection of the interaction of these metals with Ag NP's, was achieved, and followed by UV-Vis spectrophotometry and spectrofluorescence, respectively.

Keywords: silver nanoparticles, biosynthesis, Cu²⁺, Pb²⁺, ions, naked-eyed sensors.

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