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Flavonoids and hydrolyzable tannins determination in silver nanoparticles obtained with the aqueous extract of chilca plant (*Baccharis latifolia*)

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Plants contain a considerable amount of active principles, such as flavonoids and polyphenols, which promote the reduction of metal ions, thus making it possible to obtain metallic nanoparticles by means of a green chemical reaction. Ecuador is one of the most biodiverse countries in the world since it contains 10% of plant species in just 0.2% of the global territory. In this study, silver nanoparticles (Agnosy) were synthesized

with the aqueous extract of "chilca" plant (*Baccharis latifolia*), a native species to Ecuador. Synthesis optimization was conducted with an experimental design approach using a multilevel factorial design using Statgraphics software[®]. Optimal conditions were obtained using 20mL of AgNO₃ 1.54mM, 1.29mL of plant extract, pH 8, and by heating for 49 s in a microwave at 700W. Silver nanoparticles obtained are spherical and dispersed with an average size of 6.51±3.27nm as measured by TEM. The Z-average calculated from DLS data was 9.03±0.92nm. XRD confirmed the reduction of Ag⁺¹ to Ag⁰ and the formation of semi-crystalline AgNPs. Flavonoid content measured by UV-Vis spectroscopy was 328.12mg/L expressed as quercetin in the extract and 250.13mg/L in the colloidal solution. Hydrolyzable

tannin content was 66.26 and 52.50mg/L expressed as gallic acid in the extract and AgNPs solution, respectively. The decrease of each secondary metabolite confirms the reduction of silver ions in the reaction and suggests that both flavonoids and hydrolyzable tannins act as reducing agents in the formation of silver nanoparticles.

Biography

Fernanda Pilaquinga obtained her bachelor's degree in Chemical Sciences with a minor in Analytical Chemistry at the Pontifical Catholic University of Ecuador. She has a master's degree in Chemical Science and Technology from the University of Balearic Islands (UIB) in Spain. She is studying her Ph. D. at UIB focusing on applications of silver and iron nanoparticles. She participates in Nanochemistry, Nanotoxicology, and Computational Chemistry research projects carried out in Ecuador, Spain, and Chile. She represents Ecuador in the International Network "Jose Roberto Leite" of Outreach and Training in Nanotechnology, NANODYF. Currently, she is an Adjunct Lecturer at the School of Chemical Sciences, Pontifical Catholic University of Ecuador.

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