

Área: ANA

Antibacterial Potential of Biogenic Silver Nanoparticles: Inhibition of *Staphylococcus aureus* and *Pseudomonas aeruginosa***Kathellen Pintado Esteves (PG)^{1*}, Suelen Lopes Lussanrriaga (IC)¹, Daniela Ramos (PQ)¹, Daiane Dias (PQ)¹****kathellenahs@gmail.com**¹ Federal University of Rio Grande (School of Chemistry and Food), Analytical Electro-Spectroscopy Laboratory (LEEA), Rio Grande, RS, BrazilKeywords: Biogenic synthesis; AgNPs; Bacteria; *Illicium verum*; In vitro assay**Highlights**Antibacterial Potential of Biogenic Silver Nanoparticles: Biogenic silver nanoparticles with *Illicium verum* exhibited antibacterial activity; sustainable, low-cost, and biocompatible**Resumo/Abstract**

This study evaluated the sustainable synthesis of biogenic silver nanoparticles (AgBNPs) mediated by *Illicium verum* extract and their antibacterial activity. Solutions with different silver nitrate (AgNO_3 : 0.01; 0.02; 0.04 mol L⁻¹) and extract (2% and 4%) concentrations were synthesized at 90 °C for 60 min, monitored by UV-vis spectroscopy, and tested against *Pseudomonas aeruginosa* and *Staphylococcus aureus* via the agar diffusion method. Against *P. aeruginosa*, (AgNO_3 0.02 mol L⁻¹ + 2% extract, unwashed) had an inhibition zone of 10 mm and absorbance of 10.14, while the washed condition had no inhibition and absorbance of 3.42. The AgBNPs prepared with 0.02 mol L⁻¹ and 4% extract(unwashed) had a 9 mm inhibition zone and absorbance of 16.8, contrasting with the washed AgBNPs, which presented no inhibition and absorbance of 8.54. The AgBNPs prepared with 0.04 mol L⁻¹ and 2% extract (unwashed) exhibited an 11 mm inhibition zone and an absorbance of 14.28, whereas the washed ones showed no inhibition and an absorbance of 1.00. The AgBNPs prepared with 0.04 mol L⁻¹ and 4% extract (unwashed) exhibited the best performance, with an 11 mm inhibition zone and an absorbance of 27.6, whereas the washed ones showed no inhibition and an absorbance of 2.58. The AgBNPs prepared with 0.01 mol L⁻¹(unwashed) had an 11 mm inhibition zone and absorbance of 3.57, while the washed ones showed no inhibition despite a similar absorbance of 3.36. AgNO_3 controls showed antibacterial activity: 0.04 mol L⁻¹ with a 12 mm inhibition zone, 0.02 mol L⁻¹ with 11 mm, and 0.01 mol L⁻¹with 12 mm. Isolated extracts (2% and 4%) showed no antibacterial effect. Against *S. aureus*, nanoparticles had no significant activity, while AgNO_3 showed inhibition zones of 9 mm (0.04 mol L⁻¹), 11 mm (0.02 mol L⁻¹), and 9 mm (0.01 mol L⁻¹). The positive control had inhibition zones of 22 mm against *S. aureus* and 11 mm against *P. aeruginosa*. Only unwashed nanoparticles showed notable antibacterial activity, especially when 0.04 mol L⁻¹ of AgNO_3 and 4% of extract were used, with an inhibition zone of 11 mm and an absorbance of 27.6). Washing markedly reduced activity, suggesting nanoparticle loss; further studies are needed to clarify the effects of this step and the mechanisms involved.

Agradecimentos/Acknowledgments

I thank the funding agencies for their financial support, essential to this work. I am also grateful to the Federal University of Rio Grande, Rio Grande do Sul (FURG) for institutional support and favorable research conditions. Special thanks to the Electro Spectro Analytical Laboratory (LEEA), which I am part of for guidance.