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Bactericidal effect of nanosilver synthesized with *Neolitsea cassia* mucilaginous extract

Sachinthani Rajika Warnasooriya MSc
Lecturer, Department of Limnology and Water Technology, Faculty of Fisheries and Marine Sciences and Technology, University of Ruhuna, Matara, Sri Lanka (Orcid:0000-0002-7403-6626)

Hewa Bandulage Asanthi PhD
Professor, Department of Limnology and Water Technology, Faculty of Fisheries and Marine Sciences and Technology, University of Ruhuna, Matara, Sri Lanka (Orcid:0000-0001-5534-8395)

Asanka Dilup Jayasinghe PhD
Head, Department of Limnology and Water Technology, Faculty of Fisheries and Marine Sciences and Technology, University of Ruhuna, Matara, Sri Lanka (Orcid:0000-0002-7528-7718) (corresponding author: asanka@fish.ruh.ac.lk)

Erandi Prasadika Kodithuwakku BSc Hons
Lecturer, Department of Limnology and Water Technology, Faculty of Fisheries and Marine Sciences and Technology, University of Ruhuna, Matara, Sri Lanka (Orcid:0000-0003-0297-9315)

This study focused on green synthesis of silver nanoparticles using mucilaginous leaf extracts of *Neolitsea cassia* and demonstrating the bactericidal effect of the product against Staphylococcus aureus and *Escherichia coli*, which are common in polluted water. A concentration series of silver nitrate was subjected to four treatments by mixing with separate (a) aqueous and (b) 80% methanol extracts of N. cassia leaves in (c) atmospheric and (d) nitrogen gaseous environments, for comparison. A linear increment of the dry weight of silver nanoparticles was observed with increasing silver nitrate concentration ($r = 0.99$, $p = 0$), resulting in higher yields from 80% methanol extracts in an atmospheric environment. As characterized by surface plasmon resonance absorption, energy-dispersive X-ray spectroscopy and scanning electron microscopy, quasi-spherical crystalline silver nanoparticles of 11.7 nm average diameter were synthesized. The disk diffusion method showed that the growth of E. coli and S. aureus in culture media was increasingly inhibited with increasing nanoparticle concentration ($r = 0.95$, $p = 0$ and $r = 0.93$, $p = 0$, respectively). It was concluded that 80% methanol extract in an atmospheric environment was the most productive way to green-synthesize silver nanoparticles from the mucilaginous sap of *N. cassia*.

Keywords: crystallography/crystal structure/diffraction (X-ray, neutron, electron)/electron microscopy/infrared (R, FTIR)/nanostructures/UN
SDG 6: Clean water and sanitation