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Abstract

Green synthesis, characterization and bioactivity of Ag-nanoparticles from algal polysaccharide of *Chnoospara minima* †

Lakshika Rangi Keerthirathna [1], Dinithi Peiris [1 *], Kalpa Samarakoon [2], Sameera Samarakoon, Rajitha Rathnayaka [2] and Narayana Sirimuthu [3]

[1] Department of Zoology, Faculty of Applied Sciences, University of Sri Jayewardenepura, Nugegoda, Sri Lanka
[2] Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, 90 Cumaratunga Munidasa Mawatha, Colombo, Sri Lanka
[3] Department of Chemistry, Faculty of Applied Sciences, University of Sri Jayewardenepura, Nugegoda, Sri Lanka
* Department of Zoology (Center for Biotechnology), Faculty of Applied Sciences, University of Sri Jayewardenepura, Nugegoda 10250, Sri Lanka
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Abstract: The synthesis of nanoparticles using biogenic material as a part of green chemistry is a recent attraction of nanotechnology. The current research aimed to test the cytotoxic efficacy of silver nanoparticles (Ag-NPs) synthesized by extract of polysaccharide from marine algae Chnoospora minima against Human Breast Cancer (MCF-7) Cells in vitro. The extracted polysaccharide was analyzed by Fourier-transform infrared spectroscopy (FTIR). Biosynthesized silver nanoparticles (Ag-NPs) were characterized using UV-spectrophotometry, dynamic light scattering (DLS), Zeta Potential, Scanning electron microscopy (SEM) and Energy Dispersive X-ray (EDX). We demonstrated the dose-dependent cytotoxic effect of biosynthesized Ag-NPs in Human Breast Cancer cells (MCF-7) using Sulferhodamine B assay (SRB assay). An absorption peak at 420 nm in UV–vis spectrum proven the formation of Ag-NPs; DSL analysis confirmed the formed particles are within the nano scale with Z-Average of 84 d.nm and Zeta potential was -18.5 mV. SEM imaging showed biosynthesized Ag-NPs have a spherical shape with low aggregation and the EDX spectrometers confirmed the presence of elemental silver signal of the biosynthesized Ag-NPs. SRB assay demonstrated that the green synthesized Ag-NPs inhibit proliferation of breast cancer cell lines (MCF-7). The innovation of the present study is that the green synthesis of NPs, which is simple and cost effective, provides stable nano-materials and can be an alternative for the large-scale synthesis of silver nanoparticles.

Keywords: Ag-NPs; Chnoospara minima; FT-IR; DLS; SEM; EDX; Cytotoxicity