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Green synthesis of Silver nanoparticles using *Givotia moluccana* leaf extract and evaluation of their antimicrobial activity

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ABSTRACT

Present study reported a simple and green synthesis of silver nanoparticles (AgNPs) synthesized via rapid bio-reduction method. An aqueous extract of *Givotia moluccana* (*G.moluccana*) plant was serving as reducing and stabilizing agent. An aqueous extract was found to comprise significantly high amounts of secondary metabolites like phenolics, flavonoids, proteins and reducing sugar etc., which are responsible for reducing and capping agents. The synthesized AgNPs were characterized by UV-Visible spectroscopy, FTIR, XRD, FESEM and HRTEM with SAED pattern. Particle size distribution was measured by dynamic light scattering (DLS). Further, thermal analysis of nanoparticles were studied using TGA. Synthesized AgNPs exhibited antimicrobial activity against both gram positive and gram negative bacteria.

Key Words: Biomaterials, Nanoparticles, Silver, *Givotia moluccana*, Antimicrobial activity.

1. Introduction

Plant extract mediated synthesis of metal nanoparticles is a rapid, economical and flexible method, which is suitable for large scale production. In recent years, synthesis of silver nanoparticles (AgNPs) has been attracted considerable significant attention by many researchers, due to their remarkable applications in various fields such as batteries [1], catalysts [2] and cancer therapy etc., [3]. Particularly, AgNPs are essential for potential applications in bio-medical, anti-bacterial, anti-fungal and anti-viral field. AgNPs inhibit the cell division resulting in damage to cell envelope and cellular contents of the organism [4]. Preparation of AgNPs can be done through various methods which include thermal decomposition [5], laser ablation [6], electrochemical [7] and chemical reduction etc., [8]. Most of these methods are costlier and also involve the use of toxic chemicals which lead to environmental and biological risks and required high energy during the synthesis process. Synthesis of nanoparticles through employing the bio-resources like plant materials, microorganisms proves to be very possible, cost-effective and eco-friendly alternate. Synthesis of AgNPs have also been reported by using extracts of plants such as *Euphorbia helioscopia*

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