Biosynthesis of Silver Nanoparticles using *Mimosa Pudica* Plant root extract: Characterization, Antibacterial Activity and Electrochemical Detection of Dopamine

V. Sreenivasulu¹, N. Siva Kumar^{2,*}, M. Suguna³, M. Asif^{2,*}, Ebrahim H. Al-Ghurabi², Z. X. Huang¹, Z. Zhen¹

¹ Institute of Atmospheric Environmental Safety and Pollution Control, Jinan University, Huangpu Road West 601, Guangzhou 510632, China

² Department of Chemical Engineering, King Saud University, P.O. Box 800, Riyadh 11421, Saudi Arabia

³ Biopolymers and Thermo physical Laboratories, Department of Chemistry, Sri Venkateswara University, Tirupati – 517502, A.P., India.

*E-mail: shivanadavala@gmail.com, snadavala@ksu.edu.sa, masif@ksu.edu.sa

doi: 10.20964/2016.12.69

Received: 24 August 2016 / Accepted: 13 October 2016 / Published: 10 November 2016

In this paper, we report an environmentally friendly, fast and cost-effective method for the synthesis of silver nanoparticles using aqueous *Mimosa pudica* root extract as reducing and stabilizing agent. Synthesized silver nanoparticles were confirmed by analyzing the excitation of surface plasmon resonance (SPR) using UV-visible spectrophotometer peak at 430 nm. The presence of functional groups in the plant extracts were identified by FTIR analysis. Spherical shaped, crystalline in nature and 35-42.5 nm sized particles were recorded using TEM and XRD analysis. The surface morphology of the AgNPs was identified by using SEM while the energy-dispersive X-ray spectroscopy (EDAX) confirmed the presence of silver metal ion. The aqueous root extract of *M. pudica* exhibited significant antimicrobial activity against both gram positive (*B. subtilis*) and gram negative (*E. coli*, *P. aeruginosa*) microorganisms. Moreover, Cyclic Voltammetry (CV) results showed a substantial enhancement of peak current using synthesized AgNPs-assembled-glassy carbon electrode (GCE) as compared to bare-GCE. The present AgNPs-assembled-GCE displayed very high sensitivity and excellent linearity to the detection of dopamine (DA) which is a neurotransmitter released by the brain.

Keywords: Biosynthesis; *Mimosa pudica* root extract; Silver nanoparticles; Antibacterial activity; Dopamine; Cyclic Voltammetry.

[FULL TEXT](#)

© 2016 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).