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Biosynthesized Silver Nanoparticles by Aqueous Stem Extract of Entada spiralis and Screening of Their Biomedical Activity (Article)

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Abstract

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Silver nanoparticles (Ag-NPs) have been established as antibacterial nanoparticles and have been innovatively developed to overcome the occurrence of antibiotic resistance in the environment. In this study, an environmentally friendly and easy method of the biosynthesis of Ag-NPs plants, mediated by aqueous extract stem extract of Entada spiralis (E. spiralis), was successfully developed. The E. spiralis/Ag-NPs samples were characterized using spectroscopy and the microscopic technique of UV-visible (UV-vis), X-ray Diffraction (XRD), Field Emission Transmission Electron Microscope (FETEM), zeta potential, and Fourier Transform Infrared (FTIR) analyses. Surface Plasmon Resonance (SPR) absorption at 400–450 nm in the UV-vis spectra established the formation of E. spiralis/Ag-NPs. The crystalline structure of E. spiralis/Ag-NPs was displayed in the XRD analysis. The small size, around 18.49 ± 4.23 nm, and spherical shape of Ag-NPs with good distribution was observed in the FETEM image. The best physicochemical parameters on Ag-NPs biosynthesis using E. spiralis extract occurred at a moderate temperature (~52.0°C), 0.100 M of silver nitrate, 2.50 g of E. spiralis dosage and 600 min of stirring reaction time. The antibacterial activity was tested against Staphylococcus aureus, Enterococcus faecalis, Escherichia coli, and Proteus vulgaris using an antibacterial disk diffusion assay. Based on the results, it is evident that E. spiralis/Ag-NPs are susceptible to all the bacteria and has promising potential to be applied in both the industry and medical fields. © Copyright © 2020 Wan Mat Khalir, Shameli, Jazayeri, Othman, Che Jusoh and Hassan.

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antibacterial assay | biosynthesis | Entada spiralis | physicochemical parameters | silver nanoparticles

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