

Abstract

In a bid for green chemistry, a sustainable approach using *Annona muricata* aqueous extract was engaged as a reducing agent to synthesise bimetallic silver-cobalt nanoparticles (Ag-Co NPS). Hot extraction using distilled water was done on the locally sourced plant (leaf part). It was then screened for biomolecules present as geographical location affects phytochemical compositions. Phytoreduction reaction with nanoparticle formation rate was monitored with a UV–Vis spectrophotometer. Then, further characterisations were achieved by transmission electron microscopy (TEM), energy dispersive X-ray spectroscopy (EDX), Fourier-transform infrared (FTIR), and X-ray diffraction (XRD). The average particle size of 39.34 nm 9.21 nm was obtained. This study shows an interesting result, as the increase in Ag-Co NPs concentration did not significantly affect the flies' survival compared to the control. At $P < 0.05$, similar behaviour was observed in the locomotive assay of the model used. An antibacterial agent can also be developed, as revealed in the antimicrobial assay on *Staphylococcus aureus* (ATCC25923), *Streptococcus pneumoniae*, *Escherichia coli* (ATCC 25922), *Klebsiella* sp., and *Salmonella* sp. and a fungus strain: *Candida albicans*.

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