Biosynthesis of silver nanoparticles using Artocarpus elasticus stem bark extract

ABSTRACT

Background: Green approach in synthesizing metal nanoparticles has gain new interest from the researchers as metal nanoparticles were widely applied in medical equipment and household products. The use of plants in the synthesis of nanoparticles emerges as a cost effective and eco-friendly approach. A green synthetic route for the production of stable silver nanoparticles (Ag-NPs) by using aqueous silver nitrate as metal precursor and *Artocarpus elasticus* stem bark extract act both as reductant and stabilizer is being reported for the first time. **Results:** The resultant Ag-NPs were characterized by UV–vis spectroscopy, powder X-Ray diffraction, transmission electron microscopy (TEM), scanning electron microscopy (SEM), and Fourier-transform infra-red (FT-IR). The morphological study by TEM and SEM shows resultant Ag-NPs in spherical form with an average size of 5.81 ± 3.80, 6.95 ± 5.50, 12.39 ± 9.51, and 19.74 ± 9.70 nm at 3, 6, 24, and 48 h. Powder X-ray diffraction showed that the particles are crystalline in nature, with a face-centered cubic structure. The FT-IR spectrum shows prominent peaks appeared corresponds to different functional groups involved in synthesizing Ag-NPs. **Conclusions:** Ag-NPs were synthesized using a simple and biosynthetic method by using methanolic extract of *A. elasticus* under room temperature, at different reaction time. The diameters of the biosynthesis Ag-NPs depended on the time of reaction. Thus, with the increase of reaction time in the room temperature the size of Ag-NPs increases. From the results obtained in this effort, one can affirm that *A. elasticus* can play an important role in the bioreduction and stabilization of silver ions to Ag-NPs.

Keyword: Biosynthesis; Artocarpus elasticus; Silver nanoparticles; Stem bark; Transmission electron microscopy