

Ultrasound-assisted biosynthesis of Ag nanoparticles using Juglans negia L. leaves extract; Evaluation of total phenols, flavonoids, antioxidant potential and antibacterial activity

Article type: Research Article

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Abstract: The present study aimed to synthesize silver nanoparticles (AgNPs) by using black walnut (*Juglans negia* L.) leaf extract from Iran through a rapidly and ecofriendly ultrasound-assisted method and stirring-assisted method. The synthesized AgNPs by two methods were characterized by different techniques such as Transmission Electron Microscopy (TEM), Scanning Electron Microscope (SEM), and UV–VIS Spectroscopy, FTIR, X-Ray Diffraction (XRD). The antimicrobial activities of both synthesized silver nanoparticles by two methods and also *Juglans negia* L. leaf extract were determined against four gram negative and two gram positive bacteria by well diffusion method and the Minimum Inhibitory Concentration test (MIC) and the results were comparable. The minimum inhibitory concentrations were achieved for biosynthesized AgNPs with assisted ultrasound method against two gram-negative bacteria *E. coli* and *S. typhimurium* (both 8mg/mL). However, total phenols and flavonoids content of *Juglans negia* L. leaves extract were also determined. Additionally, the antioxidant activity was evaluated based on 2,2-diphenyl-1-picryl-hydrazyl (DPPH). Total phenols were 78.82±6.83mg/g gallic acid equivalent, and total flavonoids were 446.23±2.32mg/g rutin equivalent, and antioxidant capacity was 127.26±0.04mg/g IC50.

Keywords: AgNPs biosynthesis, antimicrobial, black walnut; phenolic compounds, ultrasound-assisted, stirring-assisted, minimum inhibitory concentration test

DOI: 10.3233/MGC-210037

Journal: [Main Group Chemistry](https://content.iospress.com:443/journals/main-group-chemistry) (<https://content.iospress.com:443/journals/main-group-chemistry>), vol. 20, no. 3, pp. 279-293, 2021

Published: 05 October 2021

Price: EUR 27.50

