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Synthesis of silver nanoparticles from *Dicranopteris linearis* extract: Physicochemical, cytotoxic, and antimicrobial characterization

[Journal of King Saud University - Science](#) • Article • Open Access • 2025 • DOI: 10.25259/JKSUS_138_2025 [Zainal Abidin, Nur Hannah^a](#); [Taher, Muhammad^{a, b}](#) ; [Susanti, Deny^c](#); [Mohd Jailani, Muhammad Taufiq^a](#); [Khotib, Junaidi^d](#) ^a Department of Pharmaceutical Technology, Faculty of Pharmacy, International Islamic University Malaysia, Jalan Sultan Ahmad Shah, Pahang, Kuantan, 25200, Malaysia[Show all information](#)

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Abstract

Extracts from plants are rich in phytochemicals that can be used as biogenic reducing agents for the synthesis of Ag (silver) nanoparticles (AgNPs). In this research, we synthesized AgNPs using *Dicranopteris linearis* leaves extract and assessed their cytotoxicity and antimicrobial activities. The aqueous extract of *D. linearis* (DL) leaves was analyzed using liquid chromatography-mass spectrometry (LC-MS). The extracts served as reducing agents for silver nitrate, producing AgNPs-DL. The nanoparticles were characterized by UV-visible spectrophotometry, Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and dynamic light scattering (DLS), and cytotoxicity was assessed against human breast adenocarcinoma cells line (MCF-7) using the 3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide (MTT) assay. Antimicrobial activity was tested against four bacteria, such as *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, and *Staphylococcus aureus*, using the disc diffusion method. AgNPs-DL were successfully synthesized from *D. linearis* leaves extract. LC-MS/QTOF analysis revealed a diverse phytochemical profile, supporting the extract's role in nanoparticle synthesis. SEM analysis showed predominantly spherical formation of AgNPs with size of 279.3 nm in average. Cytotoxicity assay indicated low toxicity against MCF-7 cells. AgNPs-DL also demonstrated inhibitory activity against *E. coli*, *P. aeruginosa*, *B. subtilis*, and *S. aureus*. Phytochemicals in *D. linearis* leaves extract contribute to stabilization and reduction of silver ions, resulting in AgNPs with distinct physicochemical properties and notable bioactivity. © 2025 Journal of King Saud University – Science-Published by Scientific Scholar.

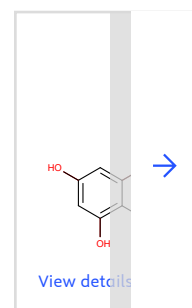
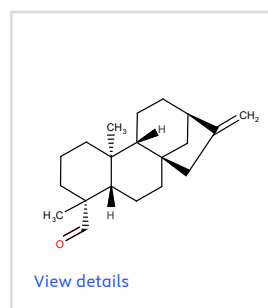
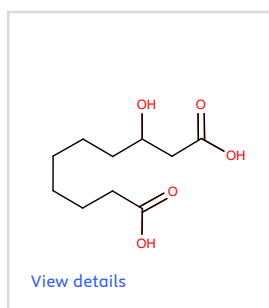
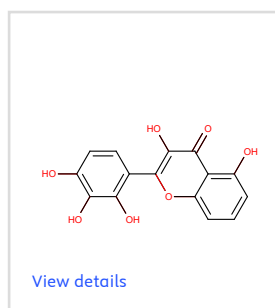
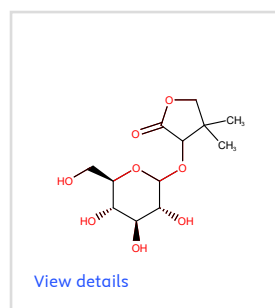
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Antimicrobial activity; Biogenic synthesis; Cytotoxicity; *Gleichenia linearis*; Resam

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Corresponding authors

Corresponding author M. Taher

Affiliation Department of Pharmaceutical Technology, Faculty of Pharmacy, International Islamic University Malaysia, Jalan Sultan Ahmad Shah, Pahang, Kuantan, 25200, Malaysia

Email address mtaher@iium.edu.my

Corresponding author J. Khotib

Affiliation Department of Pharmacy Practice, Faculty of Pharmacy, Airlangga University, Surabaya, 60115, Indonesia

Email address junaidi-k@ff.unair.ac.id

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Abstract

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