

Physicochemical characterization and pharmacological evaluation of *Grewia multiflora* leaf extracts: In vitro and in vivo assessment of antimicrobial and antidiabetic potentials.

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ABSTRACT

Grewia multiflora Juss. leaves were evaluated for physicochemical characteristics, antimicrobial activity, and antidiabetic potential using in vitro assays and an HFD-STZ-induced diabetic rat model. Leaf extracts prepared with water, n-hexane, methanol, and ethyl acetate were characterized for physicochemical properties, antibacterial activity (disc diffusion and minimum inhibitory concentration), and in vitro antidiabetic effects, including α -glucosidase inhibition, glucose uptake, and GLUT4 translocation. Methanol and ethyl acetate extracts showed higher total phenolic content (9.21% and 6.92% w/w, respectively) and significant antibacterial activity against *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, and *Staphylococcus aureus* (MIC: 31.25–250 μ g/mL; $p < 0.001$), while antifungal activity was weak. In vitro assays demonstrated dose-dependent α -glucosidase inhibition ($IC_{50} = 526.43 \mu$ g/mL), enhanced glucose uptake, and moderate translocation of GLUT4. In vivo, HFD-STZ-induced diabetic rats exhibited hyperglycemia, impaired glucose tolerance, weight loss, and elevated hepatic markers, which were significantly ameliorated by *G. multiflora* treatment (200–400 mg/kg) in a dose-dependent manner. These findings indicate that *G. multiflora* leaves possess notable antibacterial activity and moderate antidiabetic and hepatoprotective effects, supporting their therapeutic potential in diabetes management.

Keywords: Antimicrobial, diabetic, ethnopharmacology, *Grewia multiflora*, in vivo, α -glucosidase inhibition