Wound healing effect of *Salvia greggii's* extract grown in Jordan

By

Baraa Shahin Al hajjaj

Supervisor

Alaa Mahmoud Hammad

Co-supervisor

Nour Hassan Aboalhaija

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Abstract

Wounds are a major cause of skin infections, and cutaneous wound healing is separated into four stages: coagulation, inflammation, proliferation, and remodeling. Natural products contribute to more than half of all wound healing medications used today. *Salvia greggii* (autumn sage) is a perennial, herbaceous shrub that blooms from spring to autumn. This plant is widely utilized in traditional medicine. This study investigates the role of *S. greggii* extracts in wound healing by examining their phytochemical properties, scratch assays, and *in vivo*. Since it is rich in bioactive compounds such as tannins, flavonones, and phenolic acids.

The aerial parts of *S. greggii* were collected and five different extracts (soxhlet extraction has been used to generate chloroform, ethyl acetate, and methanol, and maceration for ethanol

extract) were prepared to determine their phenolic content by using the Folin test. Flavonoid content was measured using the calorimetry method, which relies on the formation of acid-stable complexes. and their antioxidants were measured by the DPPH assay. Then, a cell viability assay using the Resazurin dye method was done. After that, the best two extracts (methanol and chloroform) were chosen and submitted to scratch assays using Gingival Fibroblast Human (HGF). Next, an evaluation of *in vivo* wound healing via creating an excision wound on rats for 14 days.

Among the extracts, the methanol extract exhibited the highest flavonoid content and phenol content (44.3471 ± 12.583 and 247.7911 ± 4.20 µg/mL, respectively). The ethyl acetate extract demonstrated the most potent antioxidant activity with an IC50 value of 544.96 ± 15.10 µg/mL. Liquid chromatography-mass spectrometry (LC-MS) was used to analyze the methanol extract and determine its components. The major phytochemicals identified in the methanol extract included benzoic acid, rosmarinic acid, chlorogenic acid, saponarin, and ferulic acid. Cell viability assays conducted on human gingival fibroblasts (HGF) indicated that both methanol extract at 25 µg/mL and chloroform extract at 10 and 25 µg/mL significantly enhanced cell viability. Furthermore, scratched cells in the assay were allowed to recover by methanol extract over 90% compared to the untreated (control) cells. Evaluation of *in vivo* wound healing provided significant evidence of the wound reconstruction ability of methanol *S. greggii* extracts, as it reduced the wound size by 97.85%. Histological analysis revealed re-epithelialization, fibrosis, and sub-epidermal cells in the animals' regenerated tissue.

Keywords: Wound healing, *S. greggii,* anti-inflammation, flavonoid, extraction, scratch assay.