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Anti-Inflammatory and Wound-Healing Medicinal Plants of Uzbekistan and Central Asia: An Ethnopharmacological Review

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ABSTRACT: Chronic wounds and inflammatory skin conditions remain a substantial clinical burden worldwide, and limitations of conventional anti-inflammatory and wound-care agents, including antimicrobial resistance and adverse effects, have renewed interest in plant-based alternatives. Uzbekistan and the wider Central Asian region host one of the richest reservoirs of medicinal flora globally, with several hundred documented medicinal plant species used in traditional practice for skin disorders, yet this ethnopharmacological knowledge remains comparatively underrepresented in the international literature. This review synthesizes current evidence on the anti-inflammatory and wound-healing properties of medicinal plants traditionally used in Uzbekistan and Central Asia, focusing on *Plantago major*, *Glycyrrhiza glabra*, *Artemisia terrae-albae*, and *Hypericum perforatum*. For each species, we summarize the traditional ethnobotanical use, the principal bioactive phytoconstituents identified to date, and the pharmacological evidence supporting activity through mechanisms such as nuclear factor kappa B pathway inhibition, pro-inflammatory cytokine suppression, matrix metalloproteinase modulation, and antioxidant enzyme enhancement. A recurring finding is that extract concentration critically determines outcome, with excessively high concentrations of flavonoid-rich extracts paradoxically reducing healing efficacy. Overall, the reviewed species demonstrate consistent, mechanistically plausible activity, supporting their potential as sources for

standardized phytotherapeutic formulations, while highlighting the need for region-specific pharmacological and clinical validation of Central Asian plant populations.

INTRODUCTION

The flora of Central Asia is exceptionally rich, comprising an estimated 9,800 species of vascular plants, with Uzbekistan alone accounting for more than 4,500 species and a high degree of local endemism (Khojimatov et al., 2020). Approximately 600 medicinal plant species have been documented in Uzbekistan for the treatment of a wide range of conditions, many of which continue to be used both industrially and by local traditional healers known as tabibs (Khojimatov et al., 2020). Despite this rich tradition, ethnopharmacological research emerging from Central Asia remains comparatively underrepresented in the international scientific literature relative to other major centers of plant biodiversity (Castro et al., 2024).

Inflammatory skin conditions are highly prevalent, affecting up to 43% of the adult population in Europe according to the European Academy of Dermatology and Venereology, and are frequently accompanied by chronic inflammation and impaired skin barrier function (Bolatkzyz et al., 2025). Conventional pharmacological management of inflammation and impaired wound healing is limited by adverse effects, cost, and the growing threat of antimicrobial resistance (Bolatkzyz et al., 2025), which has renewed scientific and clinical interest in plant-derived anti-inflammatory and wound-healing agents.

Several medicinal plant species used traditionally across Central Asia for the management of dermatitis, eczema, burns, and wounds have begun to receive renewed pharmacological attention over the past several years. The objective of this review is to synthesize current ethnobotanical and pharmacological evidence on four such species, *Plantago major*, *Glycyrrhiza glabra*, *Artemisia terrae-albae*, and *Hypericum perforatum*, with particular attention to their documented bioactive constituents and the mechanistic basis of their anti-inflammatory and wound-healing properties.

METHODS

A narrative literature review was conducted using PubMed, ScienceDirect, and Google Scholar to identify studies published predominantly between 2020 and 2026 concerning the ethnobotanical use, phytochemistry, and pharmacological anti-inflammatory or wound-healing activity of *Plantago major*, *Glycyrrhiza glabra*, *Artemisia terrae-albae*, and *Hypericum perforatum*, with particular emphasis on studies relevant to or conducted within Central Asia. Search terms combined each plant's scientific name with terms including “wound healing,” “anti-inflammatory,” “Uzbekistan,” and “Central Asia.” Reference lists of identified articles were additionally screened for further relevant sources. Only peer-reviewed original research articles and reviews with verifiable bibliographic details were included.

RESULTS

Plantago major

Plantago major (Plantaginaceae) is among the most widely documented wound-healing plants in the traditional medicine of Europe, Russia, and Central Asia, where its leaves are traditionally applied as decoctions, infusions, and topical ointments for wounds, burns, ulcers, and skin irritations (Bolatkzyz et al., 2025). The principal bioactive constituent is aucubin, an iridoid glycoside shown to inhibit pro-inflammatory cytokine production and promote tissue regeneration (Bolatkzyz et al., 2025). A recent investigation of the related subspecies *Plantago major* subsp. *intermedia*, using acetic acid-induced capillary permeability and linear incision/circular excision wound models, confirmed in vivo anti-inflammatory activity and accelerated wound closure attributable to an 80% ethanolic extract and its major isolated iridoid constituents (Bacanak et al., 2026).

Glycyrrhiza glabra

Glycyrrhiza glabra (Fabaceae), or licorice, is a well-documented medicinal plant across Central Asian and broader Asian traditional medicine, with principal bioactive constituents including the triterpenoid saponin glycyrrhizin and associated flavonoids (Tarazi et al., 2025). In a murine model of second-degree thermal burns, topical hydrogels containing 5% licorice root extract achieved complete wound closure in 87.5% of animals by day 19, compared with 50.0% at 10%, 37.5% at 20%, and 25.0% in the sodium alginate control ($p = 0.008$), with higher concentrations paradoxically showing worse histopathological outcomes attributed to pro-oxidant flavonoid activity at elevated doses (Tarazi et al., 2025). In a separate study, flavonoid-rich fractions of *G. glabra* root, alone and combined with *Sophora japonica* leaf extract, significantly accelerated wound contraction,

with molecular docking confirming binding of major constituents to glycogen synthase kinase 3-beta, matrix metalloproteinase-8, and inducible nitric oxide synthase (Aly et al., 2023).

Artemisia terrae-albae

Artemisia terrae-albae (Asteraceae) is used in the traditional medicine of Central Asia and Eastern Europe for inflammatory skin conditions including dermatitis, eczema, psoriasis, and wounds and burns (Bolatkzy et al., 2025). Ethnobotanical studies conducted specifically in Kazakhstan and Uzbekistan confirm the continued, widespread traditional use of *A. terrae-albae* in decoctions, infusions, and topical extract preparations (Bolatkzy et al., 2025).

Hypericum perforatum

Hypericum perforatum (Hypericaceae), commonly known as St. John's wort, has traditionally been used for treating wounds, burns, sunburn, and skin irritation across a broad geographic range that includes Central Asia (Farasati Far et al., 2024). A comprehensive review of *H. perforatum* phytoconstituents identified antioxidant, antimicrobial, anti-inflammatory, and anti-angiogenic mechanisms underlying its dermatological and wound-healing applications (Farasati Far et al., 2024).

DISCUSSION

The species reviewed here, *Plantago major*, *Glycyrrhiza glabra*, *Artemisia terrae-albae*, and *Hypericum perforatum*, illustrate a consistent pattern across Central Asian ethnopharmacology: traditional topical use for wounds, burns, and inflammatory skin conditions is increasingly corroborated by mechanistic pharmacological evidence, most commonly converging on suppression of inflammatory signaling, inhibition of pro-inflammatory cytokine release, modulation of oxidative stress markers, and, in the case of *Glycyrrhiza glabra*, direct binding to matrix metalloproteinase and nitric oxide synthase targets relevant to tissue regeneration (Aly et al., 2023).

A notable and clinically important finding is that phytoconstituent concentration substantially influences therapeutic outcome. The dose-dependent reduction in wound-healing efficacy observed with higher-concentration licorice hydrogels (Tarazi et al., 2025) underscores that traditional dosing practices, refined empirically over generations of use, may encode meaningful information about optimal therapeutic concentration ranges. A further limitation is that much of the mechanistic evidence reviewed here derives from plant populations studied outside Central Asia proper (e.g., Turkish *Plantago major* subsp. *intermedia* or Greek-sourced *Glycyrrhiza glabra*), rather than from Uzbek or Kazakh plant material directly, underscoring the need for region-specific compositional and pharmacological studies of Central Asian plant populations in future research.

Limitations of the current evidence base include the predominance of animal and in vitro models over randomized clinical trials specific to these species, heterogeneity in extraction methods and formulation types across studies, and, for *Artemisia terrae-albae* specifically, a relative scarcity of dedicated mechanistic pharmacological studies compared with the ethnobotanical documentation of its traditional use.

CONCLUSION

Medicinal plants traditionally used across Uzbekistan and Central Asia for inflammatory skin conditions and wound care, including *Plantago major*, *Glycyrrhiza glabra*, *Artemisia terrae-albae*, and *Hypericum perforatum*, are supported by a growing, mechanistically coherent body of pharmacological evidence, predominantly implicating anti-inflammatory signaling pathway modulation and antioxidant activity as shared mechanisms of action. These findings support the continued traditional use of these species and their potential as candidates for standardized, quality-controlled phytotherapeutic formulations. Future research should prioritize pharmacological and phytochemical characterization of plant material sourced directly from Uzbek and wider Central Asian populations, together with well-designed clinical trials.

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Conflict of Interest

The authors declare no conflict of interest.

REFERENCES

- [1] Aly, S.H., Elissawy, A.M., Mahmoud, A.M.A., El-Tokhy, F.S., Abdel Mageed, S.S., Almahli, H., Al-Rashood, S.T., Binjubair, F.A., El Hassab, M.A., Eldehna, W.M., Singab, A.B., 2023. Synergistic effect of *Sophora japonica* and *Glycyrrhiza glabra* flavonoid-rich fractions on wound healing: in vivo and molecular docking studies. *Molecules* 28, 2994.
- [2] Bacanak, H., Dogan, Z., Küpeli, E., Nagatsu, A., Saracoglu, I., 2026. Phytochemical investigation and evaluation of anti-inflammatory and wound healing activities of *Plantago major* subsp. *intermedia* (Gilib.) Lange. *BMC Complementary Medicine and Therapies* 26, 212.
- [3] Bolatkyzy, N., Shepilov, D., Turmanov, R., Berillo, D., Vassilina, T., Ibragimova, N., Berganayeva, G., Dyusebaeva, M., 2025. Medicinal plants for skin disorders: phytochemistry and pharmacological insights. *Molecules* 30, 3281.
- [4] Castro, A.H.F., Malm, A., Berillo, D., 2024. Editorial: Central Asian medicinal plants and fungi as sources of biologically active extracts and metabolites. *Frontiers in Pharmacology* 15, 1520143.
- [5] Farasati Far, B., Gouranmohit, G., Naimi-Jamal, M.R., Neysani, E., El-Nashar, H.A.S., El-Shazly, M., Khoshnevisan, K., 2024. The potential role of *Hypericum perforatum* in wound healing: a literature review on the phytochemicals, pharmacological approaches, and mechanistic perspectives. *Phytotherapy Research* 38, 3271-3295.
- [6] Khojimatov, O.K., Khamraeva, D.T., Khujanov, A.N., Bussmann, R.W., 2020. An overview of ethnomedicinal plants of Uzbekistan. *Ethnobotany Research and Applications* 20, 1-19.
- [7] Tarazi, E., Statha, D., Barda, C., Sfiniadakis, I., Vitsos, A., Rallis, M.C., 2025. Healing efficacy of *Glycyrrhiza glabra* extract hydrogels in experimental second-degree burns. *Gels* 11, 834.