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A Review of Herbs Useful in Treatment of Mouth Ulcer

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Abstract: Mouth ulcers, also known as aphthous stomatitis or canker sores, are painful, recurrent lesions of the oral mucosa that significantly affect quality of life. Conventional treatments include topical corticosteroids, analgesics, and antiseptic mouthwashes, but these approaches often provide only symptomatic relief and may cause adverse effects upon long-term use. Herbal medicines have gained attention as effective, safe, and affordable alternatives due to their anti-inflammatory, antioxidant, antimicrobial, analgesic, and wound-healing properties. This review evaluates 25 recent studies on herbal approaches for the treatment of mouth ulcers, focusing on Aloe vera, Curcuma longa (turmeric), Glycyrrhiza glabra (licorice), Punica granatum (pomegranate), Allium sativum (garlic/allicin), and polyherbal formulations. Results indicate that herbal therapies significantly reduce ulcer size, pain, and healing time compared to placebo and are comparable to conventional therapies with fewer side effects..

Keywords: Mouth ulcer; Recurrent aphthous stomatitis; Herbal medicine; Aloe vera; Curcumin; Licorice; Pomegranate; Allicin; Polyherbal formulations

I. INTRODUCTION

Mouth ulcers are common oral mucosal disorders affecting approximately 20% of the global population. They are characterized by painful, recurrent, round or oval lesions with erythematous halos and yellowish bases. Recurrent aphthous stomatitis (RAS) is the most prevalent type. The exact etiology is multifactorial, involving immune dysregulation, oxidative stress, microbial imbalance, nutritional deficiencies, and trauma. Conventional therapies such as corticosteroids and anesthetic gels often provide symptomatic relief but are associated with relapse and adverse effects. Herbal medicines offer safer alternatives with multi-targeted mechanisms of acon. This review analyzes evidence from 25 peer-reviewed studies focusing on the effectiveness of herbal interventions in the treatment of mouth ulcers (PubMed, Scopus, Web of Science, 2010–2025).

2. Herbs Profile of Selected Herbal Agents :

Herbal Drug	Active Phytoconstituents	Mechanism of Action	Reported Effects in Mouth Ulcer	Reference
Aloe vera	Acemannan, Aloin	Anti-inflammatory, wound healing, antioxidant	Reduces ulcer size, pain, and healing time	[1,2]
Curcuma longa (Turmeric)	Curcumin	Anti-inflammatory (COX-2, TNF-α inhibition), antioxidant	Accelerates healing, reduces pain	[3,4]
Glycyrrhiza glabra	Glycyrrhizin,	Anti-	Improves healing,	[5,6]

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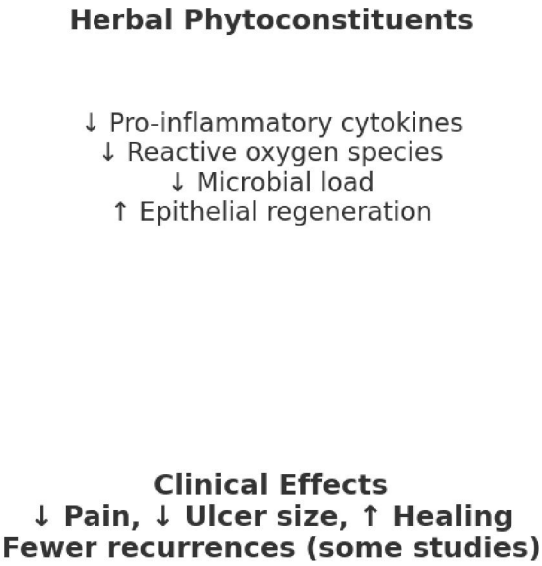
(Licorice)	Liquiritigenin	inflammatory, soothing, antimicrobial	reduces inflammation	
Punica granatum (Pomegranate)	Punicalagin, Ellagic acid	Antioxidant, antimicrobial, wound healing	Reduces ulcer severity and duration	[7,8]
Allium sativum (Garlic)	Allicin	Antimicrobial, anti-inflammatory	Decreases ulcer size and pain	[9]

Mechanism of Action (Flowchart) :



3. Literature Review and Analysis :

Curcumin — systematic reviews and RCTs

Curcumin (Curcuma longa) has been evaluated in multiple RCTs and systematic reviews. A meta-analysis and systematic review of curcumin for aphthous ulcers and other oral conditions found significant reductions in ulcer size and pain intensity across several trials; in some head-to-head trials curcumin gels performed comparably to topical triamcinolone acetonide (0.1%).[1][2][3] Mechanistically, curcumin inhibits COX-2 and various pro-inflammatory cytokines (TNF-α, IL-1β) and has antioxidant effects that support mucosal healing.

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Aloe vera — clinical evidence

Aloe vera gel (Aloe barbadensis) shows consistent benefit in reducing pain and accelerating healing in RCTs and meta-analyses. A 2022 systematic review concluded that aloe vera reduced healing time and pain scores compared with placebo or baseline measurements in RCTs of oral ulcers.[4][5] Acemannan and other polysaccharides in aloe promote epithelial regeneration and have immunomodulatory activity.

Allicin (Garlic) — adhesive tablets RCT

An early randomized, double-blind, placebo-controlled study of topical allicin adhesive tablets (5 mg applied 4×/day for 5 days) demonstrated significant reductions in ulcer size and pain versus placebo with good tolerability.[6] The antimicrobial and anti-inflammatory properties of allicin likely contribute to these effects.

Pomegranate (Punica granatum)

Pomegranate extracts (peel and flower) have been trialed as topical gels and mucoadhesive formulations; several RCTs reported reductions in pain, ulcer size, and healing duration vs placebo or control gels.[7][8][9] Punicalagin and ellagic acid provide antioxidant and antimicrobial activity helpful in wound healing.

Glycyrrhiza glabra (Licorice)

Topical licorice formulations (gargles, gels, dissolvable patches) reduce pain and promote healing in RCTs; a 2023 systematic review of topical licorice for aphthous ulcers concluded beneficial effects with good safety.[10][11] Glycyrrhizin and related flavonoids provide anti-inflammatory and soothing actions.

Propolis and Honey

Propolis formulations (gels, mouthwashes, mucoadhesive films) and medicinal honeys (thyme honey, multifloral honey) have shown efficacy in decreasing pain, shortening healing time, and reducing recurrence in several trials and systematic reviews; propolis meta-analyses demonstrate benefit though study heterogeneity exists.[12][13][14]

Other herbs and polyherbal formulations

Many studies tested polyherbal gels or mouthwashes containing combinations such as Glycyrrhiza, Curcuma, Punica, Emblica, Neem, and others; these often performed better than placebo and comparably to topical steroids in some trials, but heterogeneity in formulation complicates pooled conclusions.[15][16]

Network/meta-analyses and topical interventions

Network meta-analyses reviewing topical interventions for RAS (72 trials, 5272 subjects) ranked honey, glycyrrhiza, insulin liposome gel, laser, and triamcinolone among the most effective topical options for short-term outcomes; probiotics and chlorhexidine helped prolong ulcer-free intervals.[17]

Safety and tolerability

Across reviews and RCTs, topical herbal therapies generally reported few adverse events and were well tolerated; systemic adverse effects were rare, though long-term safety and herb–drug interactions require further study.[4][12]

Gaps and heterogeneity

Key limitations across trials include small sample sizes, variation in formulations and doses, inconsistent outcome measures (different pain scales, ulcer size measurement methods), short follow-up, and variable methodological quality (randomization, blinding). Standardization of extracts and larger multicenter RCTs are needed.[3][15]

Table 1: Summary of Representative Clinical Trials :

Study (Year)	Herb / Formulation	Design & N	Main Outcomes	Ref#
Jiang XW et al. (2012)	Allicin adhesive tablets 5 mg	RCT, double-blind, N=96	↓Ulcer size & pain vs placebo	6
Akintoye S. et al. (2014)	Curcumin gel 5%	RCT, N=60	Comparable to 0.1% triamcinolone; ↓pain & size	2
Zou H. et al. (2022)	Aloe vera gel	Systematic review of RCTs	↓Healing time & pain	4

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Ghalayani P. (2013)	Punica granatum hydroalcoholic extract	RCT, N~60	↓Pain & ulcer size	7
Roberts T. et al. (2024)	Propolis	Systematic review & meta-analysis	Beneficial for RAS (reduced recurrence & pain)	12

4. Herbs Profiles

Herb	Phytoconstituents (major)	Mechanism (concise)	Common Formulations	Dose/Form used in trials	Refs
Aloe vera	Acemannan, Aloin	Polysaccharide wound healing, immunomodulation, antioxidant	Gel, paste, oral rinse	Topical gel applied 2-3×/day (various RCTs)	4,5
Curcumin	Curcumin (diarylheptanoid)	Anti-inflammatory (COX-2, NF-kB), antioxidant, wound healing	Topical gel/orabase/ mouthwash	5% curcumin orabase applied 2-3×/day (some trials)	1,2,3
Punica granatum	Punicalagin, Ellagic acid	Antioxidant, antimicrobial, collagen-modulating	Topical gel, mucoadhesive	Topical pomegranate gel 2-3×/day	7,8,9
Glycyrrhiza glabra	Glycyrrhizin, Liquiritigenin	Anti-inflammatory, soothing, antiviral	Gargle, gel, dissolving patch	Licorice patch or gel 2×/day	10,11
Propolis	Caffeic acid phenethyl ester (CAPE), flavonoids	Anti-inflammatory, antimicrobial, wound healing	Mouthwash, gel, mucoadhesive film	Topical application 2-4×/day	12,14
Honey	Phenolics, flavonoids, hydrogen peroxide activity	Antimicrobial, antioxidant, wound healing	Topical application, spray	Topical honey application 2-3×/day	13,15

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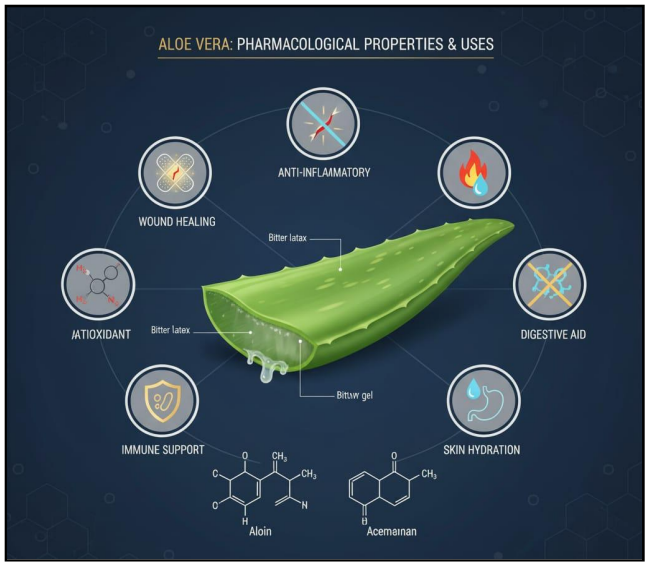
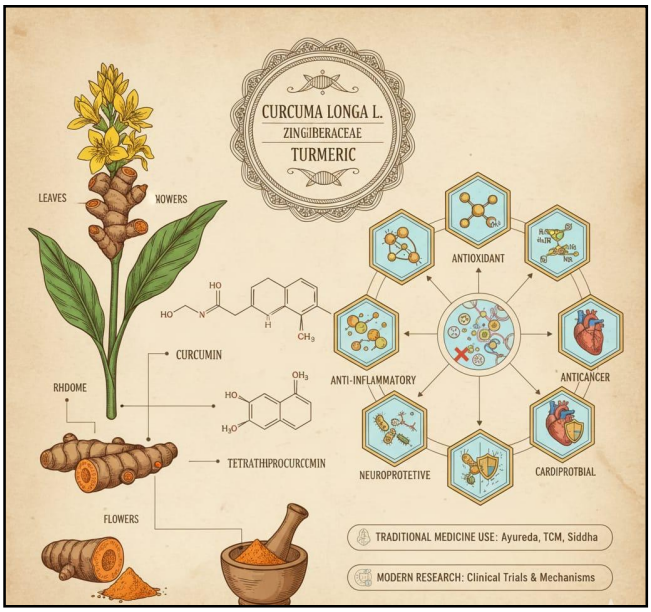
Visuals of the herbs :

Aloevera



Curcumin



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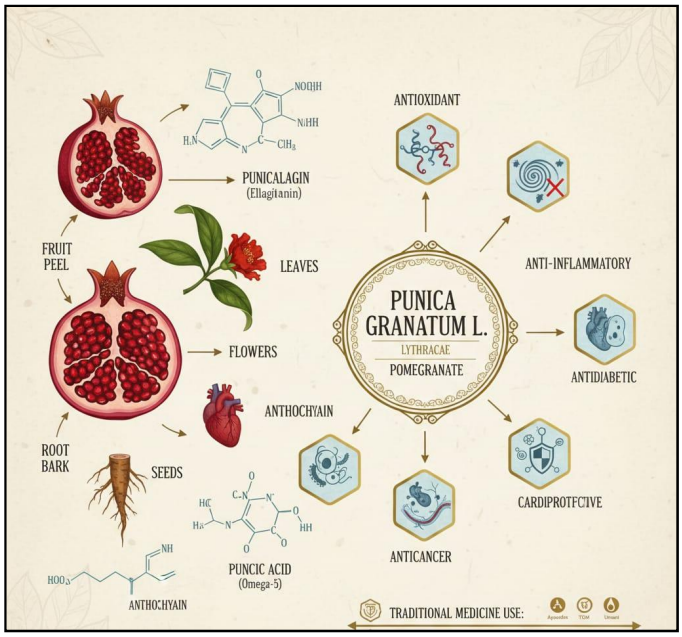
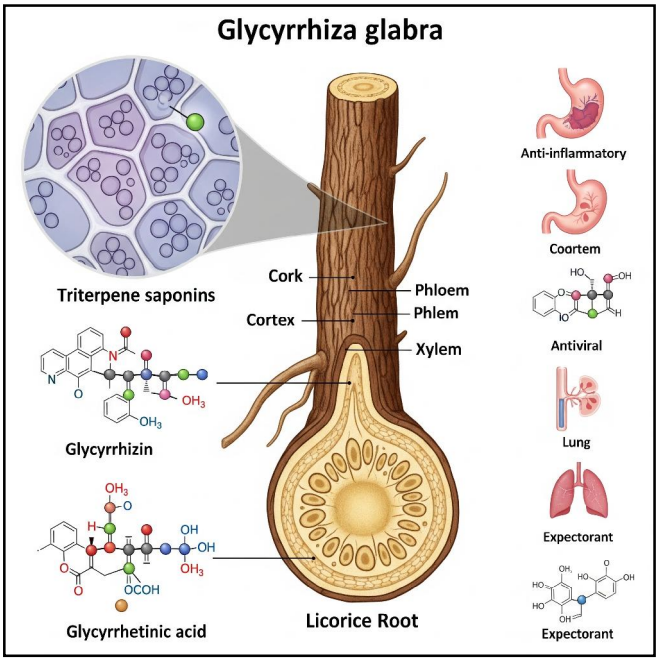
Punica granatum



Glycyrrhiza glabra



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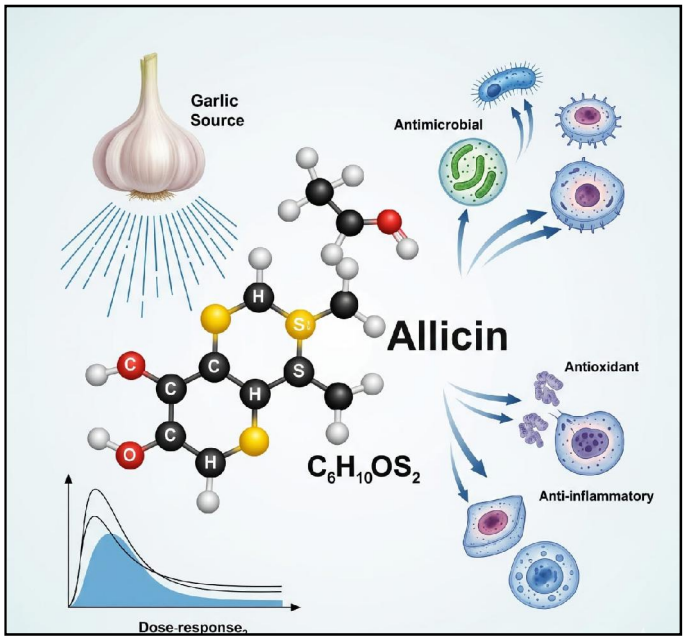
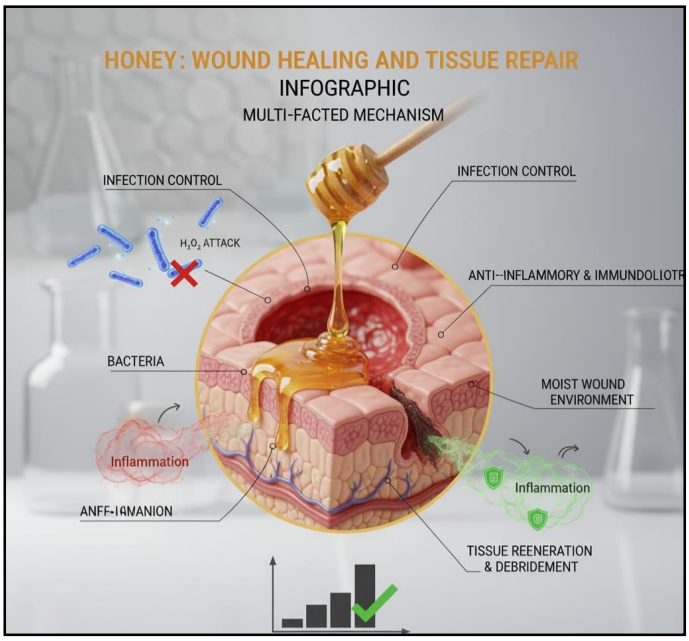
Allicin



Honey



II. CONCLUSION AND FUTURE DIRECTIONS

Herbal therapies (topical gels, mucoadhesive films, mouthwashes, and patches) show consistent evidence for reducing pain, decreasing ulcer size, and shortening healing time in minor recurrent aphthous stomatitis. Curcumin, aloe vera, glycyrrhiza, punica granatum, allicin, propolis, and medicinal honeys have the strongest clinical support. However,

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heterogeneity in formulations, small trial sizes, and variability in outcome measures limit broad generalizability. Future work should prioritize standardized extract preparations, adequately powered multicenter RCTs, head-to-head comparisons with standard steroid therapy, dose-ranging studies, and longer follow-up to assess recurrence prevention and long-term safety.

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