



Healing with Herbs

Herbal Therapies for Disease Prevention and Treatment

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Published, marketed, and distributed by:

Deep Science Publishing, 2025
USA | UK | India | Turkey
Reg. No. MH-33-0523625
www.deepscienceresearch.com
editor@deepscienceresearch.com
WhatsApp: +91 7977171947

ISBN: 978-93-7185-504-4

E-ISBN: 978-93-7185-486-3

<https://doi.org/10.70593/978-93-7185-486-3>

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Citation: Vaidya, G., Yadav, L., Nyola, N. K., & Kant, R. (Eds.). (2025). *Healing with Herbs: Herbal Therapies for Disease Prevention and Treatment*. Deep Science Publishing. <https://doi.org/10.70593/978-93-7185-486-3>

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Chapter 2: Bronchoprotective and Immunomodulatory Dynamics of *Ocimum sanctum* and *Glycyrrhiza glabra* in Respiratory Pathophysiology: Mechanistic Insights into Asthma and Chronic Bronchitis

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Abstract

Asthma and chronic bronchitis remain major global health challenges, characterized by airway inflammation, oxidative stress, immune dysregulation, and structural remodeling that compromise respiratory function. Despite significant therapeutic advances, conventional treatments are limited by adverse effects, incomplete symptom control, and lack of endotype-specific targeting. This has prompted growing interest in phytotherapeutics as adjuncts or alternatives. Among promising candidates, *Ocimum sanctum* (Tulsi) and *Glycyrrhiza glabra* (licorice) exhibit broad-spectrum pharmacological actions relevant to respiratory diseases. Tulsi demonstrates potent antioxidant and anti-inflammatory activities, along with bronchodilatory and immunomodulatory effects. Licorice regulates glucocorticoid metabolism through inhibition of 11 β -hydroxysteroid dehydrogenase, modulates cytokines such as IL-4, IL-5, and TNF- α , and exerts anti-allergic and antiviral activities that strengthen respiratory defense. Preclinical studies are suggestive of their roles in decreasing airway hyperresponsiveness, remodeling and mucus hypersecretion with early clinical experience hinting at symptomatic benefit. The potential synergistic effects observed between Tulsi and licorice in case of polyherbal formulations as well as traditional systems of medicine indicate the complementary nature of therapeutic use. Clinical perspectives include calls for standardized extracts, biomarker-driven clinical trials and integration within precision medicine paradigms with attention to safety from glycyrrhizin related mineralocorticoid effects. Taken together, this information places *O. sanctum* and *G. glabra* as potential adjuvants in the treatment of asthma and chronic bronchitis, that deserve prospective clinical validation.

Keywords

Asthma; Chronic bronchitis; *Ocimum sanctum*; *Glycyrrhiza glabra*; Phytotherapeutics; Bronchoprotection Immunomodulation Oxidative stress Precision medicine