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USAGE OF HERBAL MEDICINE IN PULMONARY TUBERCULOSIS CASES

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Abstract. *Pulmonary tuberculosis (TB) remains a major global health challenge, particularly in low- and middle-income countries. Despite the effectiveness of standard anti-tubercular therapy (ATT), limitations such as drug resistance, long treatment duration, toxicity, and poor patient compliance necessitate alternative or complementary therapeutic strategies. Herbal medicine, a cornerstone of traditional medicine systems, has emerged as a promising adjunct in TB management. This review explores the pharmacological potential of medicinal plants with antimycobacterial, immunomodulatory, and anti-inflammatory properties. Key herbs, their active constituents, and mechanisms of action are discussed. Integration of herbal medicine in TB treatment may enhance therapeutic efficacy, reduce adverse effects, and improve patient outcomes, though more clinical trials are required to validate efficacy and safety.*

Keywords: *Pulmonary tuberculosis, herbal medicine, phytotherapy, Mycobacterium tuberculosis, immunomodulation, antimicrobial plants, drug resistance, traditional medicine.*

Introduction

Pulmonary tuberculosis, caused by Mycobacterium tuberculosis, continues to be a public health burden, with over 10 million new cases and 1.3 million deaths globally each year (WHO, 2023). Standard treatment involves a multidrug regimen over 6–9 months, which can lead to side effects such as hepatotoxicity, gastrointestinal distress, and patient non-adherence. The emergence of multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB) further complicates treatment outcomes.

Herbal medicine, widely used in Ayurvedic, Chinese, African, and Unani systems, offers a vast pharmacopeia of plants with antimicrobial, anti-inflammatory, and immune-boosting properties. Several herbs have shown in vitro and in vivo efficacy against M. tuberculosis, suggesting their potential as supportive therapy alongside conventional treatment.

Discussion

1. Rationale for Herbal Medicine in TB

The need for complementary therapies in TB is driven by:

- Drug toxicity and side effects of ATT.
- Rising resistance to first-line and second-line drugs.
- Immunosuppression in patients with HIV co-infection.
- Inaccessibility of drugs in remote areas.

Herbal remedies may reduce these limitations by enhancing host immunity, reducing inflammation, protecting the liver, and exerting direct antimicrobial activity.

2. Key Medicinal Plants with Anti-TB Activity

a) Curcuma longa (Turmeric)

- Active compound: Curcumin

• Mechanism: Inhibits mycobacterial growth by disrupting cell wall synthesis; anti-inflammatory and antioxidant properties

• Research: Studies show synergistic effects with isoniazid and rifampicin.

b) Nigella sativa (Black seed)

• Active compound: Thymoquinone

• Mechanism: Enhances phagocytic activity and modulates cytokine release

• Use: Boosts host immune response; hepatoprotective during ATT

c) Withania somnifera (Ashwagandha)

• Mechanism: Immunostimulant; helps mitigate fatigue and stress associated with long-term therapy

• Benefit: Can improve general health and immunity in TB patients

d) Ocimum sanctum (Holy Basil)

• Properties: Antibacterial, anti-inflammatory, and adaptogenic

• Studies: In vitro studies show inhibition of M. tuberculosis H37Rv strain

e) Allium sativum (Garlic)

• Active compound: Allicin

• Activity: Bacteriostatic and bactericidal effects; known for respiratory health benefits

• Use: Often employed in folk remedies for chronic cough and infection

3. Immunomodulatory Effects of Herbal Medicines

Many herbs not only act directly on pathogens but also enhance host immune responses:

• Stimulation of macrophages and natural killer (NK) cells

• Upregulation of Th1 cytokines (e.g., IL-12, IFN-γ)

• Reduction of pro-inflammatory cytokines (e.g., TNF-α, IL-6), helping to manage TB-induced lung damage.

For instance, Tinospora cordifolia and Andrographis paniculata have shown promising immunomodulatory effects in TB models.

4. Clinical and Preclinical Evidence

Some herbal formulations, such as Ayush-64 (India) and Lianhua Qingwen (China), have been studied for respiratory infections, including TB. However, the majority of the current evidence is preclinical. A few small-scale clinical studies indicate that adding herbal extracts to ATT improves sputum conversion rates, reduces liver toxicity, and enhances appetite and energy levels.

5. Challenges and Considerations

• Lack of standardized dosages and formulations

• Potential herb-drug interactions with ATT

• Limited clinical trials proving efficacy and safety

• Regulatory concerns regarding quality control

Standardization, pharmacokinetics, and toxicity studies are essential before integrating herbal medicines widely into TB programs.

Conclusion

Herbal medicine holds significant promise as a complementary approach in the management of pulmonary tuberculosis. Plants with immunomodulatory, hepatoprotective, and

direct antimycobacterial properties can potentially improve treatment outcomes and patient quality of life. While preliminary studies are encouraging, rigorous clinical trials, regulatory frameworks, and integration with conventional healthcare systems are necessary to fully realize their potential in TB care.

REFERENCES

1. World Health Organization. (2023). Global Tuberculosis Report 2023. WHO Press.
2. Awasthi, D., et al. (2017). “Antimycobacterial activity of curcumin against drug resistant Mycobacterium tuberculosis strains.” Phytotherapy Research, 31(5), 779–787.
3. Salem, M. L. (2005). “Immunomodulatory and therapeutic properties of the Nigella sativa L. seed.” International Immunopharmacology, 5(13-14), 1749–1770.
4. Gupta, A., & Mishra, A. (2012). “Therapeutic uses of Withania somnifera (Ashwagandha) with a note on withanolides and its pharmacological actions.” Asian Journal of Pharmaceutical and Clinical Research, 5(1), 1–8.
5. Bhattacharya, A., et al. (2001). “Protective effect of Ocimum sanctum on 3-methylcholanthrene, 7,12-dimethylbenz(a)anthracene and aflatoxin B1 induced peroxidation in liver.” Indian Journal of Experimental Biology, 39, 1313–1315.
6. Kumar, A., et al. (2020). “Herbal approaches in tuberculosis: A review.” Journal of Herbal Medicine, 21, 100324.
7. Singh, S., & Sharma, R. (2021). “Integrative approach using traditional medicine for management of tuberculosis: The Indian scenario.” Frontiers in Pharmacology, 12, 648675.