

## Review article

# Knowledge of Traditional Indian Medicinal Plants for the Management of COPD

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## Abstract

Millions of individuals throughout the globe suffer from chronic obstructive pulmonary disease (COPD), which is on the rise. Both disorders now have treatment options that focus on symptom relief, improving patient quality of life, and delaying the advancement of the disease rather than trying to cure the underlying problem. Anti-inflammatory treatments, bronchodilators, and inhaled corticosteroids are among the treatment options accessible to patients. Treatments for illness symptoms and exacerbations are beneficial, although there are still limits. Therefore, alternative medicines are desperately needed. This disease's relative prevalence is rising despite increased research efforts to find new treatments. The present study's goal was to conduct a comprehensive evaluation of the efficacy of traditional medicinal plants that are utilised to treat obstructive lung illnesses, either via traditional methods or through commercial formulations. It is thus recommended that these COPD medicinal plants be documented and that viable formulations and Indian medicinal plants be explored on a priority basis to alleviate the present crisis and prevent future crises.

**Keywords:** Bronchitis, Chronic obstructive pulmonary disease, COPD, Lung disease, Traditional Medicinal Plants.

## Introduction

COPD is the most common form of chronic obstructive pulmonary illness.<sup>1</sup> Free radical and oxidising agents are found in the smoking tar and the gas phase of cigarette smoke, both of which may induce oxidative stress and COPD in humans.<sup>2,3</sup> Because of the raised number of activated macrophages in the lungs, COPD is linked to more T lymphocytes (especially CD8+ cytotoxic T cells) and neutrophils. In addition, there are several negative effects of traditional medications, making them unsuitable. As a result, there has been a significant push for

safer and potentially effective alternative medicines. The oldest and most widely used medicine for treating a broad range of human problems is derived from medicinal plants.<sup>4,5,6</sup> Several plants have been suggested as efficacious in numerous places.<sup>7,8,9,10,11,12,13</sup> The traditional medications are ineffective and have a slew of negative side effects. As a result, there has been a strong push for safer and potentially effective alternative medicines. Medicinal plants are the world's oldest and most widely used kind of medicine for treating a variety of human illnesses.<sup>14,15,16,17,18</sup>

We've included several plants in this assessment because of their effectiveness in treating COPD-related illnesses, including bronchitis and emphysema. At some point, we've also spoken about how plant-derived compounds and crude extracts may modulate molecular components engaged directly or indirectly in COPD aetiology.<sup>4,5,6</sup>

### Methods

COPD, Chronic obstructive pulmonary disease, Lung illness, and Traditional Medicinal Plants were searched in PubMed and Medline electronic databases. It was assumed that the papers selected would provide validity to this review's claim. Those articles that met the inclusion criteria were completely screened out.

### Overview of Chronic Obstructive Pulmonary Disease

COPD is caused by inhaling irritants and toxins over a prolonged period, resulting in chronic inflammation of the airways and injury to the alveolar tissues of the lungs. Chronic bronchiolitis, chronic bronchitis, and emphysema are among the disorders that may arise due to this exposure. Chronic bronchitis is

linked with mucus-secreting gland hyperplasia, submucosal inflammatory cell infiltration, large airways enlargement, peribronchiolar fibrosis, edoema, and increased smooth muscle. Chronic bronchiolitis is defined as an inflammatory response in the respiratory bronchioles over an extended period. It is difficult to diagnose clinically, but it may be detected by testing the tiny airways with less than 2 mm.<sup>15</sup> Emphysema is characterised by the degeneration of the expansion of airspaces, alveolar walls, and the lack of elastic recoil.<sup>15,20</sup> COPD is related to an increased number of leukocytes (especially macrophages, neutrophils, The<sup>17</sup> lymphocytes and CD8-T), fibroblasts in different areas, and airway epithelial cells of the lungs in the cases listed above. Following activation by chronic irritants or toxins, these inflammatory cells release a variety of mediators such as interleukin (IL)-8, leukotriene (LT) B4, interferon-beta (INF-beta), tumour necrosis factor-beta (TNF-beta), transforming growth factor-beta (TGF-beta), CXC and chemokines such as CC (cysteine-cysteine). In addition, some other processes, such as anti-proteinases in the lungs and imbalance of proteinases, have a role in the pathophysiology of chronic obstructive pulmonary disease.<sup>6,21</sup>

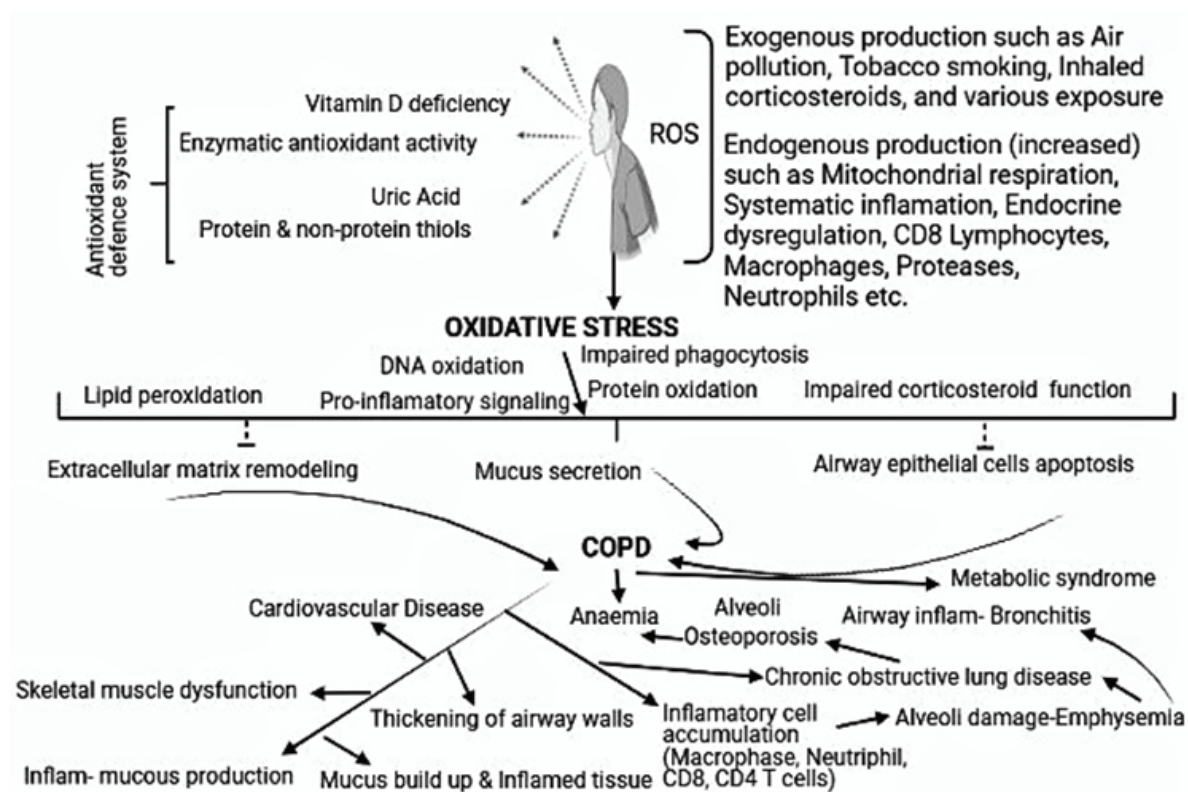


Fig.1: Overview of Chronic Obstructive Pulmonary Disease (The figure was created with the assistance of the Biorender.com programme).

## Plants with medicinal properties and chronic obstructive pulmonary disease

Patients with COPD often have significant comorbidities, including cardiovascular disease, metabolic disease, and renal dysfunction. For this reason, it is critical to examine the safety profile of existing and innovative medicines thoroughly.

Safe and effective treatments for COPD, including those derived from plant-based medications, are being developed, providing an alternative and appealing answer. The following part provides an overview of some of the traditional medicinal plants that have been recorded in COPD patients during the previous years.

Alternative medicine relies on medicinal plants as one of its primary sources of resources, and numerous powerful medications for a wide range of human problems, including respiratory infections, have been discovered to be produced from plant sources. In addition, plants with therapeutic potential for obstructive pulmonary illnesses, such as COPD, may be found through studying ancient texts from traditional medical systems such as Ayurveda and Siddha in India, and Traditional Chinese Medicine (TCM) in China, among others. Because of the synergistic effects of the other ingredients, these crude extracts as a whole might be standardised for COPD treatment, and they could be more effective than their separate constituents.

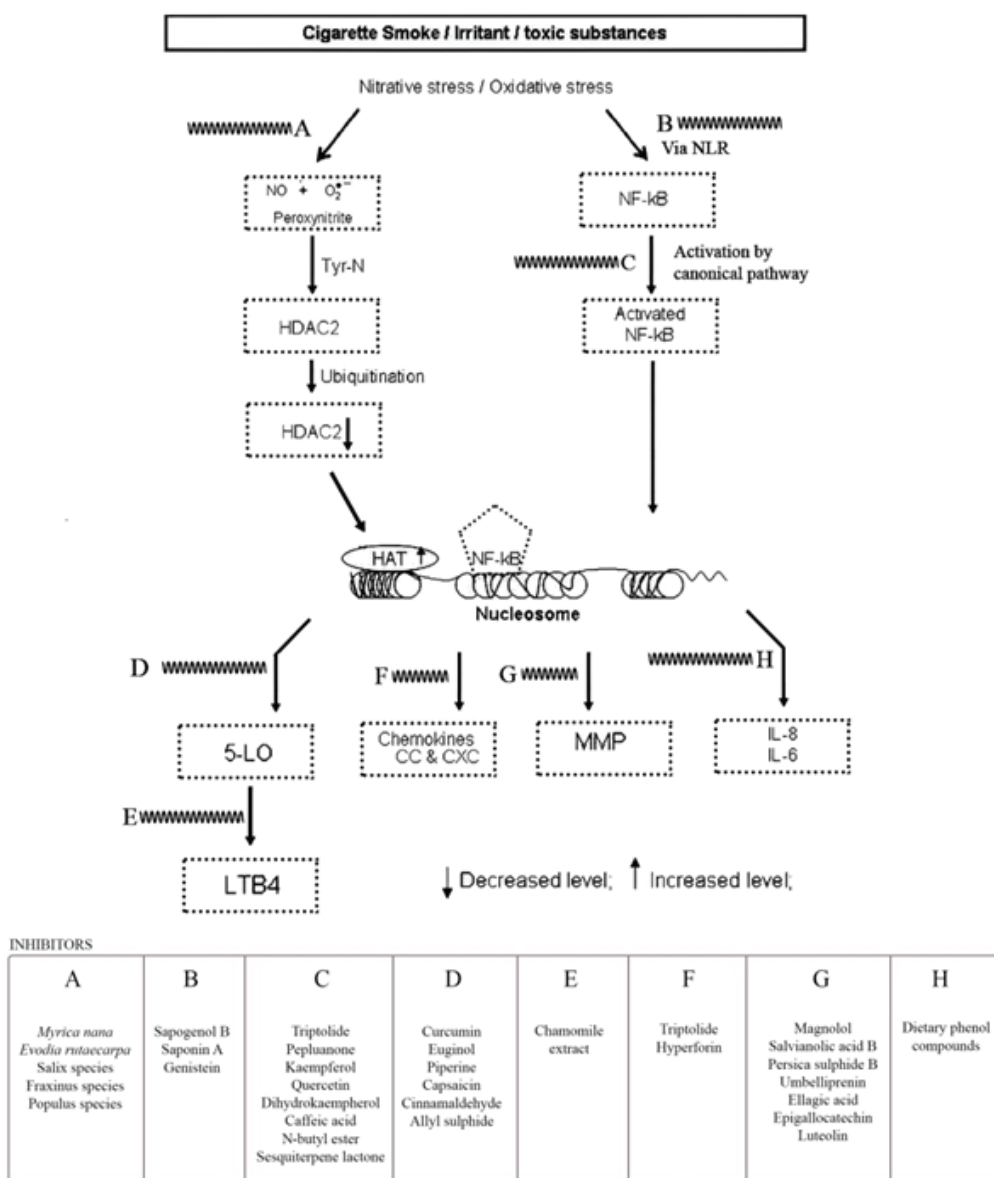


Fig.2.The molecular processes involved in COPD development and their regulation by plant compounds are being noticed.

Table1. Medicinal plants that are effective for COPD patients.

Common	Botanical name	Family	Disease conditions	Parts used
Pepper <sup>22,23</sup>	<i>Piper longum</i> L.	Piperaceae	Bronchitis and Cough	Fruit
Tulsi <sup>24</sup>	<i>Ocimum sanctum</i> L.	Lamiaceae	Bronchitis	Leaves
Indian gooseberry <sup>23,25,26,27</sup>	<i>Emblica officinalis</i> L.	Euphorbiaceae	bronchitis	Fruits and seeds
Indian acalypha <sup>23</sup>	<i>Acalypha indica</i> L.	Euphorbiaceae	Bronchitis	Leaves
Onion <sup>28</sup>	<i>Allium cepa</i> L.	Liliaceae	Cough and Bronchitis	Bulb
Indian belladonna <sup>23</sup>	<i>Atropa acuminata</i> L.	Solanaceae	whooping cough	Root
Indian olibanum <sup>23</sup>	<i>Boswellia serrata</i> Roxb.	Buceaceae	Bronchitis and cough	Oil
Chestnut <sup>29,30,31,32</sup>	<i>Castanea folium</i> L.	Fabaceae	Whooping cough, Bronchitis	Leaf
Indian borage <sup>23</sup>	<i>Coleus amboinicus</i> Lour	Laminaceae	Cough, bronchitis	Leaves
Banmethi <sup>33</sup>	<i>Melilotus indica</i> L.	Fabaceae	Bronchitis	Seeds
Wild quinine <sup>34</sup>	<i>Parthenium integrifolium</i> L.	Asteraceae	Bronchitis	Roots
Kantakari <sup>23</sup>	<i>Solanum xanthocarpum</i>	Solanaceae	Bronchitis	Fruits
Ginger <sup>35,36,37,38</sup>	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Bronchitis	Rhizome
Gum arabic tree <sup>28</sup>	<i>Acacia arabica</i>	Leguminosae	inflammation, cough	Leaves
Gritokumari <sup>37,38,39,40</sup>	<i>Aloe vera</i> (L.) Burm.f.	Asphodelaceae	Common cold	Leaves

## Discussion and Conclusion

When the plant-based medication was added to standard COPD therapy, much improvement in lung function was found. Furthermore, the great majority of the publications included in this study were published in a randomised, double-blind, peer-reviewed journal, demonstrating that a growing number of research organisations are starting to consider plant-based medications as significant COPD therapy, contrary to Indian tradition. For preventive or adjuvant usage in these difficult

times, Indian Traditional Medicines have an enormous potential due to long-standing community use, historical references and scientific proof of their safety and therapeutic effectiveness. To stimulate research into herbal medications for COPD, the Indian government's AYUSH ministry has periodically issued advice based on the strength and proof of these systems of medicine. As a result, herbal therapies like these may relieve COPD symptoms until a clinically tested medicine becomes available. To produce a lead chemical

against COPD, research organisations should prioritise the medicinal plant species presented in this study and classified for their preclinical and clinical exploration.

Herbal medications' ability to cure chronic obstructive pulmonary disease has not been proven beyond a shadow of a doubt. Unfortunately, randomized clinical studies aren't producing much data right now, and what there is has flaws. Nevertheless, thoroughly planned research is necessary to light the popularity of herbal medication among patients with COPD, chronic obstructive pulmonary disease.

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