CHAPTER N0.

31

Ethnobotanical Perspectives on Herbal Medicines for Respiratory Diseases

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ABSTRACT: Respiratory diseases rank high among international health concerns, causing a great abundance of asthma, bronchitis, influenza, and pneumonia, contributing significantly to disease, disability and death. In various settings, conventional therapy is effectively linked to side effects, cost and limited availability. This initiative increases attention toward ethnobotanical knowledge to prevent and manage respiratory disorders where local populations rely on medicinal plants. Ethnobotanical investigation emphasizes medicinal plants such as *Inula helenium*, *Rosmarinus officinalis*, *Zingiber officinale* and *Ocimum sanctum,* which contain active ingredients with bronchodilator, expectorant, anti-inflammatory, antimicrobial, antioxidant, and immunomodulatory properties. To improve respiratory function, these phytoconstituents exert their effects via various mechanisms, including the regulation of inflammatory cytokines, inhibition of bacterial growth, and reduction of oxidative stress. Traditional application evaluation has increased with modern pharmacological research, highlighting the therapeutic significance of plant-based medicine in respiratory healthcare. Moreover, the safety and toxicity of several therapeutic plants are among the most concerning issues, as such plants could be capable of causing poisonous, allergic, and/or drug-interaction reactions. To support this, the World Health Organization (WHO) has released guidelines, a focus on good agronomic and collecting practices (GACP), standardization, quality assurance, and post-marketing surveillance. In addition, the WHO also emphasizes the importance of traditional medicine in the modern health care system, especially in low-income areas with high prevalence of respiratory disease. In conclusion, traditional knowledge linked with modern scientific research may ultimately increase treatment results and increase therapeutic options for respiratory health care.
Keywords: Asthma, bronchitis, influenza, bronchodilator, expectorant

INTRODUCTION

Respiratory infections remain one of the leading health challenges worldwide, contributing significantly to sickness and death. Respiratory diseases are driven by multiple elements such as sudden infections (notably lower respiratory tract infections in young children), long-term conditions such as chronic obstructive pulmonary disease (COPD) and asthma, harmful environmental exposures like cigarette smoke, polluted air, and indoor biomass fuel use, as well as workplace hazards and the natural effects of an ageing population. Respiratory illnesses arise at a functional level when important functions, including ventilation, perfusion, diffusion, mucociliary clearance, or host defense, are disrupted by inflammation, structural remodeling, vascular disease, or infection (Bender et al., 2024). Asthma is a chronic inflammatory disorder causing repeated bouts of wheezing, coughing, chest tightness, and difficulty breathing. In 2019, about 262 million people were living with asthma, and it claimed roughly 461,000 lives (Kapri et al., 2023). Bronchitis refers to inflammation of the bronchial tubes, with an acute cough lasting two to three weeks (Kinkade and Long, 2016). Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, affected 10.8 million people in 2023, with 1.25 million deaths. Pneumonia infects the alveoli, causing inflammation and impaired gas exchange, affecting 450 million people and causing 4 million deaths annually (Ruuskanen et al., 2011). Influenza is a contagious viral illness affecting 5–15% of the global population annually, causing 3–5 million severe cases and 290,000–650,000 deaths (Hutchinson, 2018).

Global Prevalence of Respiratory Disorders

Worldwide, respiratory diseases are the leading cause of illness and death. According to the Global Burden of Respiratory Disease (2017) report, 545 million people are affected by chronic respiratory disorders (CRDs), including COPD, asthma, pneumoconiosis, and interstitial lung disease (Viegi et al., 2020). Acute respiratory infections (ARI) like pneumonia remain a significant risk, particularly among older adults and children (> 5 years old). According to the 2019 report, 4.0 million deaths were caused by chronic respiratory disorders (CRDs), while asthma is the most prevalent, with 262.4 million cases (Soriano et al., 2020). Pakistan is facing a serious public health issue of respiratory diseases in South Asia. Chronic respiratory disorders (CRDs) were ranked as the

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seventh leading cause of death, with nearly 82,757 deaths and DALYs increased by 47% (Fatima et al., 2024). Pediatric studies show pneumonia as the most prevalent illness among children, with bronchiolitis common in (1–5) ages (Ishaque et al., 2024). Most respiratory PICU admissions were due to pneumonia, poor diet, incomplete immunization, overcrowding and unacceptably high mortality of 14.3% major.

PATHOPHYSIOLOGY OF RESPIRATORY DISORDERS

The respiratory system is responsible for the exchange of gases (oxygen and carbon) between the Lungs and the external environment. It consists of numerous organs and structures, including the nose, pharynx, larynx, trachea, bronchi and lungs. The respiratory system pathophysiology explores both the normal functioning of its structures and the alterations occurring in various diseases. Respiratory diseases are caused when the essential processes of gaseous exchange are disrupted by infection, inflammation, allergies, or environmental risks by damaging the airway defenses, resulting in cough, dyspnea, and hypoxemia (Ball et al., 2022). In obstruction of the airways, as in asthma and chronic obstructive pulmonary disease (COPD), airflow limitation is brought about by a mix of smooth muscle constriction, swelling of the airway lining, excessive mucus and long-term structural changes referred to as airway remodeling. Asthma is determined by the hyperplastic immune response, which is usually associated with Th2 lymphocytes, and provokes eosinophilic inflammation, mast cell activation, and contraction of bronchial muscles. COPD, on the contrary, is characterized by ongoing neutrophil-dominated inflammation, protease-antiprotease imbalance and gradual alveolar wall destruction (emphysema), resulting in loss of lung elasticity and difficulty in expelling air during the breathing process (Barnes, 2016).

Respiratory system infection (pneumonia) disrupts the gas exchange process through the accumulation of fluid in the alveoli and inflammation. Streptococcus pneumonia (germ) induces the immune cells known as alveolar macrophages, which in turn activate a response that recruits neutrophils and lymphocytes in pneumonia (Brooks, 2020). The spread of the influenza virus is linked to vascular involvement, and the processes of inflammation help to accumulate lipids and can eventually lead to the development of cardiovascular complications in people. Its main route of transmission is through respiratory droplets and the virus infects the body by attaching hemagglutinin (HA) to sialic acid receptors of respiratory epithelial cells. The influenza viruses are A, B and C and only type A infects humans and is the most pathogenic. Newly formed virions destroy ciliated epithelial cells, disrupt the mucosinary clearance and make the host cells very vulnerable to subsequent bacterial infections after they have replicated in the nucleus of the host cell. Host immune response is characterized by the discharge of pro-inflammatory cytokines, interleukin-1, interleukin-6, tumor necrosis factor-alpha and interferons that cause systemic symptoms like fever, myalgia and general malaise. Extensive viral cytopathic effects in combination with dysregulated immune responses in severe cases may lead to alveolar destruction, viral pneumonia and development of acute respiratory distress syndrome (ARDS) (Iwasaki and Pillai, 2014; Short et al., 2014).

Ethnobotanical Value of Medicinal Plants

The ethnobotanical significance of medicinal plants lies in their application in folk medicine and their role as a source of contemporary medicine. Traditional knowledge was widespread, with people depending on botanical cures in remote areas for both routine and chronic illnesses. The Ayurvedic, Biomedicine, Unani and Chinese systems of medicine are especially useful in rural communities to cure a wide range of diseases (Fakih et al., 2022). Moreover, therapeutic applications of ethnobotanical, medicinal plants carry cultural and spiritual importance, and they are frequently used in rituals and belief systems to ensure physical and psychological health (Kumar et al., 2021).

MEDICINAL PLANTS USED IN RESPIRATORY DISEASES

Medicinal plants have a high level of phytochemical compounds, which are attributed to the therapeutic significance in the treatment of respiratory diseases. These plants have a broad spectrum of active constituents, including alkaloids, flavonoids, saponins, terpenes, glycosides, tannin, and phenolic acid. Each of them donates varied pharmacological effects that facilitate the functioning of the respiratory system. Due to such chemical diversity, plant-based metabolites are reported to have various biological activities, such as bronchodilator, expectorant, anti-inflammatory, antimicrobial, antioxidant, and immunomodulatory (Zhang et al., 2012). Ephedrine in Ephedra sinica had long been used due to its bronchodilator and sympathomimetic actions in asthma and bronchitis, but was considered very cardiotoxic, causing a ban or tight control in most countries (Al Dhamen et al., 2019). Conversely, flavonoids, which are abundant in respiratory plants such as Glycyrrhiza glabra (liquorice) and Camellia sinensis (green tea), have anti-inflammatory and antioxidant properties through free radical scavenging, cytokine regulation and inhibition of NF κB signaling (Panche et al., 2016). Therefore, the various phytochemical compounds of respiratory ethnomedicinal plants highlight synergistic correlation of their bioactive ingredients, which show the highest pharmacological potential as compared to single isolated bioactive ingredients. These ethnobotanical herbs not only substantiate their traditional applications due to clarifying chemical profiles but also create opportunities for new drug discoveries and the development of standardized phytopharmaceuticals for treating respiratory illness

Bronchodilator Effects of Medicinal Plants

Traditional medical systems or Alternative medicine (Ayurveda, Traditional Chinese medicine and Unani) have traditionally employed bronchodilator herbs to treat respiratory ailments by mechanisms that increase air flows and relax smooth muscles in the airway (Sun et al., 2021).

Bronchial asthma consists of common symptoms like inflammation, bronchoconstriction, and increased airway hyperresponsiveness, and is treated with various medicinal herbs with bronchodilator effects. Medicinal plants have been examined alongside conventional pharmacotherapy due to their phytoconstituents, flavonoids, alkaloids, terpenoids, and saponins, which affect smooth muscle tone in the airways and influence inflammatory mediators (Rajizadeh et al., 2024). A few examples of medicinal herbs are highlighted below. Similarly, in Ayurvedic and Unani therapy, *Adhatoda vasica* (Malabar nut) is used to treat Chronic bronchitis and asthma due to its bronchodilator and expectorant potential, which facilitates the relaxation of smooth muscles in the bronchi and enhances airway evacuation. Malabar nut has a β2-agonist property because it is rich in alkaloids like vasicine and vasicinone (Alamgeer et al., 2018). According to the report, *Bacopa monnieri* relaxes the pulmonary arteries, smooth bronchial muscle, and trachea by blocking calcium ions entering the cell membrane in experimental animals. Bacopa methanolic extracts have significant mast cell stabilizing properties (Al-Snafi, 2015).

Expectorant and Mucolytic effects of medicinal plants

Herbal remedies with expectorant and mucolytic properties play an important role in managing respiratory disorders such as productive cough, asthma, and bronchitis. Expectorants enhance bronchial secretions to promote mucus clearance, while mucolytics reduce sputum thickness and stickiness for easier expulsion. These uses have traditionally been documented as using many medicinal plants whose pharmacological action is still subject to scientific study. *Hedera helix* (ivy leaf) is an evidence-based expectorant; its saponins enhance mucociliary clearance, reduce mucus viscosity, and increase alveolar surfactant, showing clinical efficacy in asthma and bronchitis. *Zingiber officinale* (ginger) and *Ocimum sanctum* (Tulsi) exhibit mucolytic, expectorant, antibacterial, and anti-inflammatory effects. Together, these herbs support respiratory health and the therapeutic value of natural products in modern and traditional medicine (Byrski et al., 2025).

Anti-Inflammatory and Immunomodulatory Effects of Medicinal Plants

Medicinal products with anti-inflammatory and immunomodulatory properties are frequently used in traditional and modern medicine. According to research, their bioactive substances (flavonoids, alkaloids, saponins, terpenoids, and glycosides) act through mechanisms such as suppression of pro-inflammatory mediators and regulation of cytokines. A few examples of medicinal plants are highlighted below. *Acorus calamus* (Sweet Flag) is a semi-aquatic herb with antibacterial, spasmolytic, and sedative activities; its ethanolic rhizome extracts show anti-cellular and immunomodulatory effects by inhibiting human cell line growth, PBMC proliferation, and inflammatory mediators (NO, IL-2, TNF-α). *Aloe vera* (Ghee Kunwara), common in arid regions, exhibits burn- and wound-healing, immunomodulatory, and anti-inflammatory properties by reducing leukocyte adhesion, TNF-α and IL-6 levels, enhancing phagocytic activity, and promoting macrophage superoxide formation (Mukherjee et al., 2014).

Antimicrobial-Active Medicinal Herbs against Respiratory Infections

Phyto-herbs are a viable solution to many health problems, including respiratory infections, a leading cause of death from infectious diseases. Medicinal herbs contain bioactive ingredients with antimicrobial activity against pathogens causing respiratory infections. *Pelargonium sidoides* (umckaloabo), rich in phenolic compounds, coumarins, and tannins, has antibacterial, antiviral, and immunomodulatory properties. Meta-analyses and reviews show that standardized root extract reduces antibiotic use and has clinical evidence for treating acute respiratory infections, such as acute bronchitis (Kardos et al., 2022). Likewise, *Eucalyptus globulus* (*Tasmanian bluegum*) herb was extensively used, particularly in the medicine of Australian Aboriginal people. It contains crude oil that is rich in 1,8-cineole, which serves as an antimicrobial against Gram-positive and Gram-negative bacteria. 1,8-Cineole is an antiseptic and antispasmodic agent. It has been clinically demonstrated that the oil possesses significant antibacterial potential and kills respiratory pathogens (MRSA).(Hayat et al., 2015). Garlic (*Allium sativum*) medicinal plant is commonly considered a good spice and is commonly utilized in the treatment of most types of illnesses and physiological disorders. Clinical research has discovered that it can be used in respiratory health and may be prophylactic against respiratory infections related to viruses. Its organosulfur bioactive compound, specifically allicin, has a wide-ranging antibacterial and antiviral effect in vitro. Although clinical research might indicate that in some cases, there might be a preventive effect, issues of dosage, formulation, and patient are key factors to be considered (Rouf et al., 2020).

ETHNOPHARMACOLOGICAL EVIDENCE

Natural products have been the key in the treatment of respiratory ailments since antiquity, such as influenza, bronchitis, asthma, pneumonia, and persistent cough. Ethnopharmacology lays the foundation of scientific validation, which gives an insight into the traditional medicinal practices. Integration of indigenous knowledge with modern research has confirmed most of the traditional assertions with experimental studies and, in other instances, clinical trials, to connect historical and recent pharmacological findings (Amber et al., 2017). *Andrographis paniculata* is an interesting example of a traditionally used herb that has been demonstrated with current evidence and is commonly used in both Ayurvedic and Traditional Chinese Medicine (TCM) to treat fever and respiratory diseases. The use of ethnobotanical records has confirmed the use of CAM techniques, when recent randomized controlled trials have found it to be capable of lowering the severity and length of infection in the upper respiratory tract (Veldman et al., 2023). *Ocimum sanctum* (holy basil or Tulsi) herb has been applied to Ayurveda in the treatment of bronchitis, colds and coughs. The new literature has proven the effectiveness of the antiviral and antibacterial properties, and its immunomodulatory property that improves host defense mechanisms(Cohen, 2014).

Verbascum Thapsus (mullein) herb has also been shown to have an *in vitro* effect on influenza viruses and Streptococcus pyogenes, which further justifies its ethnomedical use as an antigen in respiratory diseases. Conventionally viewed as an expectorant and antimicrobial in traditional European folk medicine (Lone et al., 2024). The ethnopharmacological discoveries, which are supported by the pharmacological and clinical validation, enhance the scientific validity of the traditional herbal therapy. To ensure security and efficiency, future research should be done on standardized extraction, mechanistic research and extensive clinical research.

SYNERGISTIC HERBAL FORMULATIONS

Polyherbal Mixtures

The traditional medical systems, such as Ayurveda, Unani, and Traditional Chinese Medicine (TCM), focus on polyherbal formulations, a combination of several herbs to achieve a synergistic effect. In contrast to single-herb preparations (Table 1) the preparations enhance effectiveness, increase pharmacological effects, and decrease side effects. They are useful in the treatment of respiratory diseases as immunomodulatory, bronchodilator, and expectorant, and anti-inflammatory agents (Karole et al., 2019). Trikatu (polyherbal mixtures) is an Ayurveda combination that has been identified as a promising formulation in traditional Ayurveda-based medicine with claims of being mucolytic, anti-inflammatory, and an enhancer of bioavailability because of its various properties, including long pepper (*Piper longum*), black pepper (*Piper nigrum*), and ginger (*Zingiber officinale*). Sitopaladi churna, a widely used ingredient in traditional medicine, is composed of *Bambusa arundinacea* (bamboo manna), *Elettaria cardamomum* (cardamom), *Piper longum*, *Cinnamomum zeylanicum* (cinnamon), and *Saccharum officinarum* (sugar). The churna, which is normally called sitopaladi (polyherbal preparation), is usually used to treat disorders associated with phlegm, allergic rhinitis, and chronic cough due to its expectorant and sedative nature (Biharee et al., 2024). In Unani medicine employs formulations such as Sharbat Nazli, composed of *Adhatoda vasicai*, *Glycyrrhiza glabra*, and *Viola odorata*, are traditionally recommended to alleviate cough, soothe respiratory irritation, and exert anti-inflammatory benefits with mucolytic, bronchodilator, and demulcent properties. This formulation is particularly beneficial for respiratory health. Likewise, Joshanda, a popular decoction throughout South Asia, typically includes *Glycyrrhiza glabra* (liquorice), *Adhatoda vasica* (vasaka), *Althaea officinalis* (marshmallow), and *Hyssopus officinalis* (hyssop). Joshanda (herb) is usually selective in colds, influenza, bronchitis and chest congestion as it reduces airway inflammation and promotes expectoration (Abid et al., 2024). As a result, the traditional styles of respiratory condition treatment still heavily rely on polyherbal preparations. Their potential as add-ons to contemporary medicine is highlighted by the fact that they have a long history of safe use and are increasingly being proven scientifically.

Recent Research

The latest research into herbal mixtures is mainly related to the joint effects and not individual benefits in the management of respiratory disorders. *Ephedra Herba* (EH), *Schisandrae Fructus* (SF), *Platycodonis Radix* (PR), and *Ginseng Radix* (GR) were used in combination and tested and network pharmacologically in a 2024 study to determine the effect of the combination on respiratory tract inflammation, specifically in relation to persistent COVID symptoms. The results showed that this synergistic mixture had significant anti-inflammatory and regulated pro-inflammatory cytokines. Clinical Evidence from Ayurved: Tamaka Swasa (Bronchial Asthma) preparation: It is a polyherbal infusion of Ayurvedic herbs that showed a major decrease in symptoms of asthma in an open trial of 100 participants. Notably, no negative outcomes were found. Ayurvedic Rasayana Blend (Viral Respiratory Infections) preparation: A therapy formed by a triple formula (including Virofight, among others) underwent a pilot, randomized, open trial study. The combination showed immunomodulatory, antiviral, anti-inflammatory, antispasmodic, and antitussive properties (Kaur et al., 2024).

META-ECHINACEA ANALYSIS

Echinacea purpurea may reduce the reliance on antibiotics for otitis media and decrease both the frequency and duration of upper respiratory tract infections in children, as indicated by a meta-analysis conducted in 2025 on this subject, although safety data remains somewhat ambiguous.

In Silico and Computational Innovation

Additionally, graph neural network models have been developed to assess the interactions and compatibility of herbs in Traditional Chinese Medicine (TCM), particularly when utilized in combinations to address COVID-19. These artificial intelligence techniques demonstrate potential in the optimization of herbal synergy (Zeng and Jia, 2025).

Table 1. Summary of herbal formulation in respiratory conditions

Formula / Combination of Herbs	Study Type	Condition / Goal	Significant Results
Classical Ayurvedic decoction for Tamaka Swasa (Asthma)	Clinical trial (100 patients)	Bronchial asthma	significant symptom alleviation, enhanced lung function, and absence of side effects
Polyherbal blend (“Virofight” + adjuncts)	Pilot clinical trial	Viral respiratory diseases	Illustrated antiviral, antitussive, immunomodulatory and anti-inflammatory properties
Immunomodulator with Polyherbal Formulation	Clinical research in healthy individuals	Immunomodulation and respiratory modulation	Improved lung function (PEFR), reduced oxidative stress

Safety, Toxicity, And Regulatory Characteristics

Despite the common belief that herbal medicines are entirely safe because they are natural, there are concerns about their use for respiratory disorders. The safety and toxicity of several therapeutic plants are among the most concerning issues, as such plants could be capable of causing poisonous, allergic, and/or drug-interaction reactions. Considering the variation of plant species and geographic areas of origin, as well as harvest and extraction methods, the safety and effectiveness of most herbal remedies are hardly studied in comparison to synthetic drugs (Ekor, 2014). Additionally, potential toxicities include contaminants such as pesticides, adulteration, heavy metals, and microbial load. There are also possible herb-drug interactions with herbal medicines, particularly in people with chronic pulmonary disease who are chronic users of allopathic medicine. Intake of *Glycyrrhiza glabra*, also known as liquorice, is capable of interacting with corticosteroids, which are often prescribed for asthma and chronic obstructive pulmonary disease (COPD) and its excessive use may cause hypokalemia and hypertension (Alanazi et al., 2023).

Herbal Respiratory Remedies: Regulatory Guidelines

The regulation of herbal medications for respiratory conditions differs between nations, due to various cultural traditions and healthcare systems. Despite these differences, regulatory frameworks are intended to prevent the sale of contaminated products while also ensuring quality, safety, and efficacy. The World Health Organization (WHO) has released guidelines to support a focus on good agronomic and collecting practices (GACP), standardization, quality assurance, and post-marketing surveillance to ensure quality, safety, and effectiveness for public use. In 1994, herbal products were classified as dietary supplements under the Dietary Supplement Health and Education Act (DSHEA), which allows the sale of remedies like *Glycyrrhiza glabra* syrups or eucalyptus lozenges without prior approval, as long as they do not claim to treat diseases in the United States. The Food and Drug Administration (FDA) agency is responsible for labelling, safety, and adverse side effect monitoring, and banned herbal products that are high-risk to people (Wallace and Koturbash, 2025).

Similarly, in Europe, the European Medicines Agency (EMA) via the Herbal Medicinal Products (HMPC)regulates herbal medicines, classified as “traditional” and “well-established” products, and provides official monographs for respiratory herbs such as *Thymus vulgaris* and *Hedera helix*. Some countries, including Germany, follow rigorous Commission E assessments to ensure the safety of herbal products (Nguyen et al., 2025). Overall, rules and guidelines for herbal medicines nationally differ from each other; they all adhere to the same basic principles, which include verifying the safety, identification, and purity of herbal respiratory remedies, as well as ensuring correct labeling and implementing post-market surveillance (Petrović et al., 2022).

Implementing Herbal Remedies into Modern Healthcare

Herbal medicine is increasingly included in modern healthcare due to its therapeutic value, significance, culture and ability to meet medical needs. Traditionally, medicinal plants are gaining acceptance in modern evidence-based treatments, which have been used in respiratory disorders like asthma, bronchitis, and tuberculosis. This integration is driven by the increased global burden of respiratory illness and the requirement for natural remedies. It is necessary for safe, more affordable alternative or conventional medicine (Ekor, 2014). The WHO highlighted traditional medicine in its *Traditional Medicine Strategy 2014–2023*, urging 190 member states to establish scientific validation, research, and potentiation measures for herbal drugs (who.int). Herbal medicine is now mainstream in countries like China and India (Fakih et al., 2022). In China, dual practice of conventional medicine and TCM (e.g., Ephedra, Asarum) is widely used, with efficacy evaluated by the China National Medical Products Administration (NMPA) and other national agencies. In India, the Ministry of AYUSH regulates Ayurveda, Siddha, and Unani drugs, ensuring assimilation through quality control and clinical evidence. In the West, integration is slower but steady (SHAO and GUO, 2024). In Europe, ivy (Hedera helix) extracts and thyme (Thymus vulgaris) extracts in the form of phytopharmaceuticals are used extensively for the treatment of respiratory infections and are covered in monographs provided by the EMA. Indeed, Germany has been spearheading the adaptation of phytomedicines, through the utilization of the Commission E monographs, which give information on the efficacy, safety and indications (Lang et al., 2015). Consequently, the integration of herbal medicines into modern practice depends on balancing traditional knowledge with scientific validation, supported by regulations, pharmacovigilance, and clinical trials, particularly for respiratory diseases (Balekundri and Mannur, 2020).

CONCLUSION

In conclusion, the ethnobotanical knowledge of herbal therapy for respiratory disease mainly focuses on the enduring worth of medicinal herbs as both traditional and conventional therapeutics. A variety of phytochemicals, such as alkaloids, flavonoids, saponins, terpenes, and phenolics, are responsible for bronchodilator, expectorant, anti-inflammatory, antimicrobial, and immunomodulatory properties confirmed by scientific studies. However, herbal remedies use safely in modern healthcare, it is necessary to evaluate the safety, toxicity and standardization. If pharmacovigilance is strengthened, advancing clinical trials can work together, then these remedies can be utilized safely and efficiently. The traditional knowledge and modern drug science has proved to improve treatment options for respiratory disease and the opportunity to identify new, evidence-based plant-derived isolated medicines in the future.

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