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Review

Exploring the healing potential of medicinal plants in the therapy of chronic obstructive pulmonary disease (COPD)

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Abstract

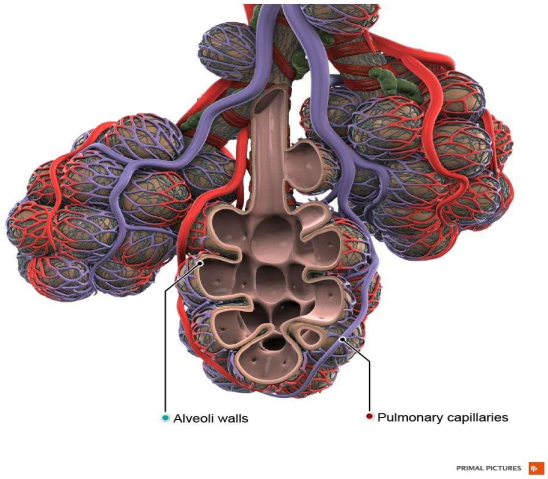
A group of lung conditions known as chronic obstructive pulmonary disease (COPD) includes emphysema, asthma, and chronic bronchitis. It is generally accepted that prolonged smoking is the primary cause of emphysema. Damage to the walls of the lung's air sacs, or alveoli, is known as emphysema. Natural substances with anti-inflammatory and antioxidant properties have been shown to effectively treat or shield the lung against this illness. The purpose of this research is to conduct a thorough review of natural substances that are useful in the treatment of pulmonary emphysema.

Keywords: Medicinal plants, Chronic obstructive pulmonary disease, Emphysema, Constituent, Flavonoid.

INTRODUCTON

Chronic obstructive pulmonary disease (COPD) is a common lung disease that causes restricted airflow and breathing problems. It is also sometimes referred to as emphysema or chronic bronchitis. When a person has COPD, their lungs can become damaged or clogged with phlegm. The most common causes of COPD are smoking and air pollution. People who have COPD are more likely to have other health problems. Although there is no cure for COPD, symptoms can be improved with avoidance of smoking and pollution, vaccinations to prevent infections, medication and pulmonary rehabilitation. As COPD progresses, daily tasks like dressing and walking become more challenging. Although COPD cannot be cured, it can be avoided and managed.[1,2] Emphysema and chronic bronchitis are the two most prevalent forms of COPD and are considered the classic COPD phenotypes. Expanded airspaces (alveoli) with disintegrated walls that cause irreversible harm to lung tissue are known as emphysema. [3,4] A productive cough that lasts for at least three months per year for two years is considered chronic bronchitis. When neither of these disorders is classified as COPD, they can coexist without limiting airflow. Emphysema is simply one of the many structural disorders that can restrict airflow or, in a sizable percentage of cases, present without airflow limitation. Although airway restriction is not necessarily the outcome of chronic bronchitis, young individuals who smoke have a higher chance of getting COPD.[5,6] Emphysema and chronic bronchitis were often frequently included in diagnoses of COPD; however, the GOLD report criteria do not

include these terms. Although there is frequently overlap between emphysema and chronic bronchitis, these two conditions continue to be the most common phenotypes of COPD; other phenotypes have also been identified. In certain people, asthma and COPD may coexist and even merge. Chronic low-grade systemic inflammation is linked to COPD.[7,8]



NATURAL PLANTS USED IN THE TREATMENT OF COPD

ALLIUM SATIVUM

Garlic is a type of onion belonging to the Alliaceae family. It is commonly known as "garlic" or "garlic sauce". Garlic is used as a spice or condiment in many dishes around the world. It is found in many different regions of the world, including East Asia, South Asia, Southeast Asian, Middle East, Northern Africa, Southern Europe, and some parts of Central America.Garlic contains compounds that are sulphur-containing. These compounds include: Alliin, Ajoene, Dylosulfide, Dithiin, S-allyl Cysteine, Enzymes, Vitamin B, Proteins, Saponins, Flavonoids, Maillard reaction products, Phytoalexin, Allicin, No sulphur compounds, γ-Pyrone skeleton Structure, Anti-arrhythmic effects, Antimicrobial effects, Anti-tumour effects, Antithrombotic effects, Inhibition, DNA binding, Neutrophotrophoid effects, Neurotrophic effects. A mixture of herbs with the active ingredient A. sitivum L. decreased the respiratory rate with recurrent obstructions of the airways. Allium sativum aqueous bulb extract has been shown to stimulate both the alpha- and beta-adrenergic receptors with a greater sensitivity to the beta than to the alpha. The affinity of different species of Allium for adrenergic receptors (Alpha1, Alpha2, Beta1,and Beta2) has recently been reported.[9,10]



CURCUMIN LONGA

Curcuma longa L., commonly known as turmeric, is a perennial herb that belongs to the Zingiberaceae (ginger) family. It has a long history of use in Ayurvedic medicine for treating inflammatory diseases. This plant and its components have been utilized in the treatment of a wide range of ailments, such as neurodegenerative diseases, cardiovascular diseases, diabetes, bronchitis, and asthma. Additionally, previous research has highlighted the broncho dilatory and preventive properties of turmeric and its constituents in relation to respiratory diseases. Curcumin has the potential to impact the inflammatory response by reducing the activity of enzymes linked to inflammation, including COX-2, lipoxygenase, and iNOS. In addition, curcumin exhibited immunomodulatory properties by suppressing the production of tumor necrosis factor-alpha (TNF-α), macrophage inflammatory protein 2 (MIP-2), and interleukin 6 (IL-6). It also decreased neutrophil accumulation in bronchoalveolar lavage

(BAL) fluid and reduced pulmonary myeloperoxidase levels and the wet/dry weight ratio in mice with lipopolysaccharide (LPS)-induced acute lung injury.[11]



EUCALYPTYUS GLOBULUS

Eucalyptus essential oil is frequently utilized as an expectorant to alleviate upper respiratory tract infections and inflammation, as well as a decongestant and treatment for various inflammatory ailments. Studies have shown that this essential oil has unique anti-inflammatory and anti-oxidative characteristics[12].



GLYCYRRHIZA GLABRA

Glycyrrhiza glabra (family Fabaceae), also known as liquorice, is a herbaceous perennial that has been used as a medicine. For thousands of years, it has been used as a flavouring agent in dishes and medicinal cures. Since ancient times, people have used liquorice root to treat coughs all across the world. Glycyrrhizin, glycyrrhetinic acid, flavonoids, isoflavonoids, and chalcones are among the active chemicals found in it. Because of their steroid-like properties, glycyrrhizin and glycyrrhetinic acid are powerful inhibitors of cortisol metabolism. This plant's root has been used to treat coughs, colds, asthma, and COPD. Triterpene glycoside glycyrrhizin is one of the main active ingredients that comes from the G. glabra plant. Isoliquiritigenina flavonoid that was separated from the roots of G. glabra relaxed the smooth muscle of the guinea pigs' trachea both in vitro and in vivo. Both in-vivo and invitro tests have been conducted to examine the effects of licorice root flavonoid, liquiritigenin, and glycyrrhetinic acid on asthma.[13,14,15]



CONCLUSION

Furthermore, apart from the aforementioned plants, there are several other plants that possess broncho dilatory, relaxant, anti-cholinergic, antitussive, anti-spasmodic, and mucociliary clearance properties. These plants could also be taken into account for the same purpose. Numerous traditional medicinal practices utilize crude plant extracts and have proven to be effective in treating various chronic illnesses. These crude extracts, in their original form, could also be standardized for COPD treatment. It is possible that the synergistic effects of other constituents present in these extracts make them more effective than their isolated counterparts. Ancient literature from traditional systems of medicine, such as Ayurveda and Siddha of India, can be surveyed to explore plants with therapeutic potential for respiratory obstructive diseases, including COPD. Medicinal plants are crucial resources for alternative medicine, as they have yielded numerous potent drugs for various human disorders, including respiratory diseases, derived from plant origin.

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