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A Study On Role Of Medicinal Plants For Respiratory Disorders

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ABSTRACT

Asthma is a respiratory condition in which the airways constrict and narrow, often as a result of a "cause" such as exposure to an allergen.Exercise, cool weather, or mental discomfort are also factors to consider. Many plants have been noted to be helpful in the treatment of various respiratory diseases, including asthma, in conventional systems of medicine. In the treatment of asthma, the herbs have demonstrated promising effects in bronchodilation, mast cell stabilisation, anti-anaphylactic, anti-inflammatory, anti-spasmodic, anti-allergic, immunomodulatory, and inhibition of mediators including leukotrienes, lipoxygenase, cyclooxygenase, platelet stimulating, phosphodiesterase, and cytokine. Medicinal plants and natural goods have been increasingly popular in the last two decades all over the world. Asthma affect about 300 million people worldwide and it has been estimated that a further 100 million will be affected by 2025. The aim of this article is to include a study of antiasthmatic medicinal plants, including their active chemical constituents and potential mechanisms of action.

KEY WORDS Respiratory diseases, Asthma, Medicinal plants

INTRODUCTION

RESPIRATORY SYSTEM

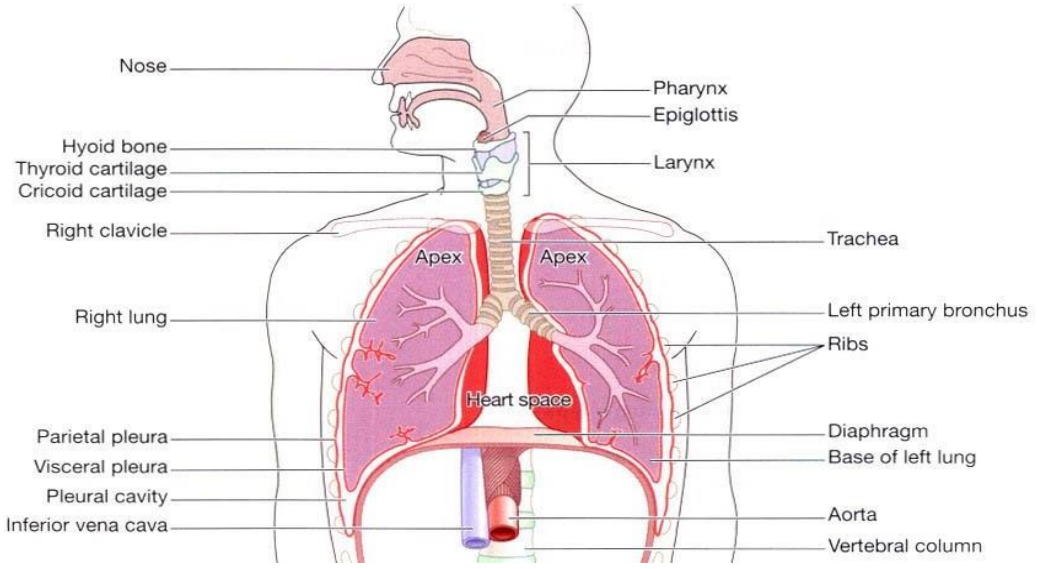
The chemical activity that keeps the body in a state of homeostasis requires energy. The bulk of this energy comes from chemical reactions, which can only take place in an oxygen-rich atmosphere (O2). The most important waste Carbon dioxide is produced as a result of these reactions (CO2). The

respiratory system is responsible for allowing oxygen from the atmosphere to penetrate the body and for the expulsion of carbon dioxide.

The state of the ambient air entering the body varies greatly depending on the external atmosphere, for example, it can be dry, cold, and dusty, or it can be moist and hot. The air breathed in is warmed or cooled to body temperature as it travels through the air passages to enter the lungs, moistened to become coated with water vapors, and 'cleaned' as dust particles adhere to the mucus that covers the lining membrane. These gases are transported between the lungsandthebody'scellsthroughthebloodstream.Externalrespirationistheexchangeofgases

between the blood and the lungs, while internal respiration is the exchange of gases between the blood and the cells. The organs of the respiratory system are:[1]

- Nose
- Pharynx
- Larynx
- Trachea
- Two bronchi (one bronchus to eachlung)
- Bronchioles and smaller air passages
- Two lungs and their coverings, thepleura



HUMAN RESPIRATORY SYSTEM

Waugh Anne, Ross and Wilson, Anatomy and physiology in Health and illness, 2001, 9th, 240

The **upper respiratory tract** is made up of three organs: the nose, pharynx, and larynx, which are all situated outside the chest cavity.

Nasal cavity: Dust particles are trapped within the nose by the sticky mucous membrane covering the nasal cavity, and tiny hairs called cilia help carry them to the nose so they can be sneezed or blown out

Sinuses: These air-filled gaps on either side of the nose tend to lighten the skull.

Food and air both pass through the **pharynx** before reaching their intended destinations. Language is also influenced by the pharynx.

The **larynx** is essential for human speech.

The organs of the **lower respiratory tract** are found within the chest cavity and include the trachea, lungs, and all segments of the bronchial tree (including the alveoli).

The **trachea** is the primary airway to the lungs and is situated just below the larynx.

Lungs: The lungs are one of the main organs in the body. They're in charge of oxygenating capillaries and exhaling carbon dioxide.

Bronchi: The bronchi branch from the trachea into each lung, forming a complex network of passages that provide air to the lungs.

The main respiratory muscle, the **diaphragm**, contracts and relaxes to allow oxygen into the lungs.

Adults usually breathe at a rate of 12 to 20 times per minute. Strenuous exercise raises the breath rate to 45 breaths per minute on average. [2]

The adult right lung weighs between 375 and 550 grammas (on average 450 grammas) and is divided into three lobes by two fissures: upper, middle, and lower lobes. The mass of the 325 to 450 gm (average 400 gm) is the normal adult left lung weight. It is divided into two lobes by a fissure—the upper and lower lobes, while the middle lobe is represented by lingual. The lungs' airways are formed by the trachea's division into right and left main bronchi, which continue to divide and subdivide until they reach the alveolar sacs.

Aspirated foreign matter is more likely to pass down to the right lung rather than the left since the right main bronchus is more vertical. The walls of the trachea, main bronchi, and their branchings have cartilage, smooth muscle, and mucous glands, while the bronchioles have smooth muscle but no

cartilage or mucous glands. There are roughly 8 divisions between the trachea bifurcation and the smallest bronchi.[3]

RESPIRATORY DISORDERS

Respiratory illness, also known as respiratory disease, refers to a group of pathogenic disorders that impair living organisms' ability to breathe.

Airway diseases, lung tissue diseases, and lung circulation diseases are the three major forms of respiratory disease. The tubes that bring oxygen and other gases into and out of the lungs are affected by airway diseases. The passageways are normally narrowed or blocked as a result of airway diseases. Lung tissue diseases influence on the structure of the lungs, causing scarring and inflammation. As a consequence, breathing becomes difficult. When the blood vessels in the lungs become clogged, inflamed, or scarred, lung circulation diseases develop. These diseases affect the lungs' ability to absorb oxygen and contain carbon dioxide, as well as the heart's ability to function. A moderate respiratory illness is the common cold. Bacterial pneumonia, lung cancer, and pulmonary embolism are among the more severe or life-threatening respiratory diseases. Asthma, Bronchiectasis ,chronic obstructive pulmonary disease (COPD), influenza, pulmonary hypertension, and tuberculosis are some of the other diseases that can damage the lungs. Respiratory failure may be caused by certain lungdiseases.

ASTHMA

Asthma is derived from the Greek word asthma, which means "to breathe hard." It is characterized as a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, including mast cells, eosinophils, T-lymphocytes, neutrophils, and epithelial cells, according to the National Institute of Health, which causes repeated episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or early in the morning. Inflammatory cells and mediators interact in a complex way to induce asthma.[4,5] Accordingtovariousresearchreports,airwayhyperresponsivenessplaysanimportantroleinthe pathogenesis of asthma, and the degree of airway hyper responsiveness is generally related to the clinical intensity of asthma.[6]Extrinsic asthma, in which an asthmatic episode is triggered by a type I hypersensitive reaction caused by exposure to an extrinsic antigen, and intrinsic asthma, in which the triggering mechanisms are non-immune and triggers that have little or no effect in normal subjects can cause bronchospasm, are the two types of asthma.[7] Herbal approacheshave regained their popularity, for the treatment of asthma, with their efficacy and safety aspectsbeing supported by controlled

clinicalstudies[8]

PATHOPHYSIOLOGY OF ASTHMA

An invasion of bacteria into the bronchial tubes is a pathological feature of bronchial asthma. eosinophils into the submucosa of the airway Eosinophil activation causes the secretion of a number of highly charged cytotoxic cationic proteins, including major basic protein, which is thought to play a key role in the disease's etiology by causing damage to the airway epithelium.

Asthma is characterised by the production of acute and chronic inflammation in the airways, which results in increased vascular permeability, edema, and airway smooth muscle contraction.[9] Lung hyperinflation, smooth muscle hypertrophy, lamina reticularis thickening, mucosal edema, epithelial cell sloughing, cilia cell disruption, and mucus gland hyper secretion are all signs of asthmatic airway pathology.[10] Patients who have died as a result of asthma have a significant rise in the thickness of the airway wall in the bronchial tree, which is partially due to smooth musclehypertrophy.[11]

MEDICINAL PLANTS USED IN THE TREATMENT OF ASTHMA

Despite the vast number of medications available for the treatment of asthma, the relief they provide is mostly symptomatic and transient. Furthermore, the drugs' side effects are somewhat concerning. A recent shift in the global trend from synthetic to herbal medicine, which we may term a "Return to Nature," has occurred. For millennia, medicinal plants have been used as a source of medicinal agents for the prevention of diseases and illnesses, and they are highly regarded around the world.[13] A significant number of medicinal plants have been clinically proven to have antiasthmatic properties and have been used for the treatment of asthma in the K

Major Medicinal Plants having anti-asthmatic properties

Allium cepa [14,15], Acorus calamus, Boswellia serrata, [16], Curcuma longa,[17], Cassia sophera[18], Eucalyptus globules,[19] Glycyrrhiza glabra,[20,21] Inula racemosa[22], Piper betel Linn[23], Moringa oleifera[24], Picorrhiza kurroa,[25] Lipidum sativum[26] Myrica esculenta Buch. Ham.[27], Piper nigrum[28] Tamarandusindica[29]

Table 1 Provides a quick overview of the plant that is anti-asthmatic

SR.NO	NAME OF THE PLANT	FAMILY	PART USED	CHEMICAL CONSTITUENT	MECHANISM OF ACTION
1.	Allium cepa	Liliaceae	Bulb	Quercetin, Allinase, Allicin	1.Mast cell stabilizer 2.Lipoxygenase inhibitor
2	Acorus calamus	Araceae	Rhizome	Asarone, alkaloids, flavonoids,	Inhibits action of histamine, acetylcholine and 5-HT
3	Boswellia serrata	Burseraceae	Root	Boswellin, Boswellic acid	Inhibits leukotriene biosynthesis
4	Curcuma longa	Zingiberaceae	Rhizome	Curcuminoids	Inhibits histamine release
5	Cassia sophera	Caesalpiniaceae	Leaves	Flavonoids, glycosides	1.Bronchodilator 2.Antihistaminic 3. Antiallergic
6	Eucalyptusg lobules	Myrtaceae	Leaves	Volatile oil	Anti-inflammatory
7	Glycyrrhizagl abra	Leguminosae	Root	Glycyrrhizinic acid	1.Antihistaminic 2.Antiallergic

8	Inula racemosa	Asteraceae	Roots	Inulin, sesquiterpene lactonealantolactone	Antihistaminic
9	Piper betel Linn	Piperaceae	Leaves	Eugenol, Chavibetol, Chavicol	Mast cell stabilizing activity
10	Moringa oleifera	Morangaceae	Seed	Tannins, steroids, triterpenoids, flavonoids, alkaloids, saponins	Antihistaminic
11	Picorrhiza kurroa	Scrophulareaceae	Roots	Picorrhizin	Antihistaminic
12	Lipidum sativum	Cruciferae	Seeds	Alkaloids, Flavonoids	Bronchodilator
13	Myrica esculenta Buch. Ham	Myricaceae	Bark	Myricetin, Glycosides	Mast cellstabilizer
14	Piper nigrum	Piperaceae	dried parts and fruits	Phenolics, various derivatives of lignans, terpenes, chalcones, flavonoid,	Anti-inflammatory
15	Tamarandus indica	Caesalpiniaceae	leaves	Flavone, Glycosides	1. Brochodialator 2. Antihistaminic 3.Antiinflammatory

The frequency and severity of the patient's symptoms determine the pharmacological treatment of asthma. Infrequent attacks can be treated by handling each one as it happens, but more severe attacks necessitate the use of preventive therapy.

CONCLUSION

While several synthetic medications are used to treat asthma, they are not absolutely safe to use over time. Our nation has been endowed by nature. India has been dubbed the "Medicinal Garden of the

World" due to its abundance of medicinal plants. The role of herbal medicine in the treatment of asthma is undeniable, according to scientifically researched and exhaustive studies presented in Indian and foreignjournals.

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