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# ANTICHOLINERGIC HERBS FEATURED IN SIDDHA SYSTEM OF MEDICINE - A REVIEW

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## ABSTRACT

Globally Tamil language is one of the longest surviving classical languages. The Antiquated system of medicine i.e. Siddha system of Medicine is widespread in Tamil Nadu; South India is based on Tamil. Nowadays a better perception of causes of asthma is coming from the international differentiation of asthma prevalence. Airway hyperresponsiveness is a crucial feature of asthma; this is an exaggerated bronchoconstriction response, usually to different stimuli. There are a variety of mechanisms leading to airway hyperresponsiveness. Numerous plants and mushrooms exhibit anticholinergic properties. Anticholinergic properties are found Solanaceae family saw particularly in *Atropa belladonna* (deadly nightshade), *Datura stramonium*, and other datura species and *Hyoscyamus niger*, *Pimpinella anisum*, *Lycium barbarum*, and *Mandragora officinarum*. One such plant is *Datura stramonium* (Solanaceae), used frequently as an anti-asthmatic treatment. Siddha system of medicine is used to treat dog bites, deep ulcers, tumors, and anti-dote. The powder of dried leaf about 32mg or 100mg is given for asthma else inhaling the smoke of the dried leaves relieves the congestion and expectoration of phlegm. The flower of the plant is smoked by asthmatics. Belladonna is a powerful drug and a valuable antidote to poisoning by opium, muscarine, etc. A powder made of half drachm of henbane seeds and 1 drachm of poppy seeds is given with honey and water for coughs, asthma, gout, and hiccup. These herbs possess anticholinergic constituents that are used in the treatment of asthma.

Thus all of the herbs possess effective anticholinergic effects, especially in asthma and COPD patients.

**KEYWORDS:** Siddha, Bronchial Asthma, *iraipu*, Anticholinergic herbs, Solanaceae, Umbelliferae, Atropine, Hyoscyamine.

## BRONCHIAL ASTHMA

### INTRODUCTION

Globally Tamil language is one of the longest surviving classical languages. The Antiquated system of medicine i.e. Siddha system of Medicine is widespread in Tamil Nadu; South India is based on Tamil.[1] Worldwide bronchial asthma is a prevalent one. It occurs at all ages but nearly 50% of cases develop before the age of 10 years. In an adult, both sexes are affected equally but in children, there is a 2:1 male-female ratio.[2] The GINA program recommends a management program based on the best available scientific evidence to provide effective medications for asthma tailored to local health care systems and resources.[3] Nowadays a better perception of causes of asthma is coming from the international differentiation of asthma prevalence, especially those from the European Community Respiratory Health Survey of asthma in adults and the International Study of Asthma and Childhood allergies. These numerous exposures in utero, and are reflected in various perinatal factors measured at birth and exposures in the younger days of life that may make the infant more susceptible to the subsequent development of asthma. World-wide the particular issues are now the focus of an intensive research effort, and the next few years are likely to see amazing advances in our comprehension of the causes of asthma.[4]

Airway hyperresponsiveness is a crucial feature of asthma; this is an exaggerated broncho-constrictor response, usually to different stimuli. There are a variety of mechanisms leading to airway hyperresponsiveness[5], which may be relieved spontaneously or by therapy.[2a] Present therapies in asthma the insufficiency of adequate needs, due to adverse effects hence patients are seeking complementary and alternative medicine to treat their asthma Siddha and other Indian literature mention the use of plants in various human ailments.[6] Asthma is most likely transmitted by multiple genes, with some variation of locus heterogeneity and polygenic inheritance leading to asthma expression being multifaceted. Disease progress is due to the strike of atopic or IgE over specific antigens or pollutants, which can contribute to the disease. Research has shown that asthma was closely related to the total IgE serum level.[7]

Th2 lymphocytes play an essential where they produce a series of interleukins (IL-4, IL-5, IL-13) and GM-CSF, that aid in transmission with other cells and sustain inflammation. IL-3 and IL-5 help eosinophils and basophils to live. IL-13 is attributed to remodeling, fibrosis, and hyperplasia.[8]

In The Siddha system of Medicine *iraipu* described as congestion of chest with any cause, and there is a difficult in inhaling and exhaling. It is hard to exhale that produces sound of the musical instruments like kuzhal (similar to wind instrument), veena (a string instrument), etc., and phlegm in the chest doesn't come out even though an effort is put.[9]

## ANTICHOLINERGICS

Cholinergic actions on smooth muscle cause bronchial muscles to constrict; asthmatics are highly sensitive which develops bronchospasm, dyspnea, and precipitation of an attack of bronchial asthma.[10] Standard terms of anticholinergic drugs are restricted to those which block actions of Ach on autonomic effectors and in the CNS exerted through muscarinic receptors. Atropine, the prototype drug of this class, is highly selective for muscarinic receptors. The particular action of atropine can simply be demonstrated on a piece of guinea pig ileum where Ach-induced contractions are blocked without affecting those elicited by histamine, 5-HT, or other spasmogens.[11] Atropine is obtained from Atropa belladonna and scopolamine from *hyoscyamus niger* and the atropine derivatives are used in bronchial asthma and chronic obstructive pulmonary disease.[10a]

| Peripheral Effects | Potential Medical Complications |
|---|---|
| Decreased salivation | Dental caries, ulceration of gums and buccal mucosa |
| Decreased bronchial secretions | Mucous plugging of small airways in patients with asthma or bronchitis |
| Decreased sweating | Hyperthermia |
| Increased pupil size | Photophobia, precipitation of acute narrow angle glaucoma |
| Inhibition of accommodation | Blurred vision, especially when reading small print |
| Increased heart rate | Angina, myocardial infarction |
| Difficulty urinating | Bladder distention, urinary retention |
| Decreased gastrointestinal motility | Constipation |

[a]Based on The American Psychiatric Press Textbook[4] and McEvoy.[5]

A Large number of herbs exhibit anticholinergic properties. The foremost of these are the members of the Solanaceae family. Of the anticholinergic plants, the genera *Datura* and *Hyoscyamus* produce hyoscyamine (atropine) *Atropa*. Other members of this group produce scopolamine. Anticholinergic properties are found in *Atropa belladonna* (deadly nightshade), *Datura stramonium, Datura arborea, Datura candida, Datura suaveolens, Datura meteloides* other *Datura* species, and *Hyoscyamus niger, Mandragora officinarum* and *Lycium barbarum*[12], and *Pimpinella anisum.*[19]

## ANTICHOLINERGIC HERBS

### *Datura* species

This plant exists in different species eminent by prefixes denoting the color of the flowers-white, purple, etc. These species grow commonly in unused places throughout India from Kashmir to Malabar.[13] One such plant is *Datura stramonium* (Solanaceae), used frequently as an anti-asthmatic treatment. The diversity of alkaloids present in those herbs including atropine and scopolamine can cause anticholinergic poisoning if taken in large doses. Atropine and scopolamine act on the muscarinic receptors by blocking them (particularly the M (2) receptors) on airway smooth muscle and submucosal gland cells in the lungs.[14]

Smoking of the dried leaves and stem (10-20 grains) to begin with, subsequently increased to 30 grains) in a pipe or cigarettes is found to relieve spasmodic asthma and kindred affections. When the leaves fail seeds can be tried. During the before-time attack, it has greater chances of success. “Dried leaves and seeds of *D.stramonium* are used in the British and the U.S. Pharmacopeias as antispasmodic hence conditions like asthma, whooping, etc.” An excellent plan for the asthmatic is to take on the habit of smoking the drug finally at night whether an attack is intimidating or not.[13a]

The Tamil name is *Umattai* and its action is emetic, antispasmodic, and anodyne, narcotic. In Siddha system of medicine is used to treat dog bites, deep ulcers, tumors, and anti-dote. The powder of dried leaf about 32mg or 100mg is given for asthma else inhaling the smoke of the dried leaves relieves the congestion of the lungs and expectoration of phlegm.[15] The flower of the plant is smoked by asthmatics.[16]

### *Atropa Bellodana*

Plenty of these herbs spread in the Himalayan ranges increasing from Shimla to Kashmir and are found wild in Kunawar. An unlimited supply of the root can be obtained from the

northern Himalayas. It is also obtainable from the hilly regions of India.[13b] Indian belladonna root contains a higher portion of alkaloid atropine and hyoscyamine than the European varieties. Entire parts of the plant contain the alkaloids such as atropine, hyoscine, and scopolamine, making it poisonous and hallucinogenic (Zárate, el Jaber-Vazdekis, Medina, & Ravelo, 2006). The biggest concentration of alkaloids is found in ripe fruits and fresh leaves.

Belladonna is a powerful drug and a worthy antidote to poisoning by opium, muscarine, etc. Extract of belladonna is used in the external application for relieving pain, and internally for inspecting excessive perspiration in consumption, for the relief of coughs, and used for other purposes.[13c]

*Atropa belladonna* is classified under the family Solanaceae and fills out in crude barren lands. It is endemic in areas of the Mediterranean countries (including Greece), countries in Western Europe, and from this zone to the Himalayas, and it passed it to initiate even in North America (Lee, 2007).

***Hyoscyamus niger***

Grows as wild throughout the Himalayan range at altitudes of 8000 to 11000 feet and in Kashmir. It grows abundantly in India, especially in Madhya Pradesh, Bangladesh, Srilanka, and northern parts of Africa. Dried and fresh leaves, flowering tops, and flowers with branches are used. Leaves contain hyoscyamine, hyoscine, scopolamine, hyosciprin, choline, and fatty oil (obtained from destructive distillation). Total alkaloids from the aerial parts contained hyoscyamine, hyoscine, skimmianine, apoatropine, tropine, etc.[17] Seeds are intoxicating, narcotic, anodyne, digestive, astringent, and anthelmintic. Leaves and hyoscyamine are sedative, anodyne, antispasmodic, stimulant, and mydriatic in effect. It has a peculiarly sedative effect particularly beneficial in irritable affections of the lungs, bowels, and genito-urinary organs such as cystitis, etc. A powder made of half drachm of henbane seeds and 1 drachm of poppy seeds is given with honey and water for coughs, asthma, gout, and hiccup.[13d]

The Tamil name of *Hyoscyamus niger* is *Kurosani omam*. The actions are hypnotic, sedative, anodyne, antispasmodic, and mild-diuretic. In the Siddha aspect, it is used for various ailments such as dental diseases, gynecological disorders, asthma, psychological, memory,

and heart-related diseases. It is given in irritable affections on the lungs, intestines, and lower abdomen.[15a]

***Pimpinella anisum***

This is grown in all parts of India, especially in the Northern parts of UP, Punjab, and Orissa but cultivated in Persia and mainly a native of Egypt.[13e] Fruit yields an essential oil, which is known as the oil of anise-seed (oleum anisi) and consists of anethole or anise camphor 80p.c. anise aldehyde, and methyl-chavicol. Oil is a stimulant, expectorant like all volatile oils. Anise water or 'Arak Badian' is also similarly used by Hakims and is an anti-spasmodic. It is useful in bowel complaints as well as in bronchial catarrh, especially among children after the acute stage has passed away.[13f]

The Tamil name is *perunchiragam, sompu, venchirakam*. It is given for vaginal diseases, stomach pain, fever, indigestion, cough, liver diseases, asthma, sinusitis, soreness of the throat *Sombu Theeneer* (extraction by distillation) given dosage is 15ml- 20ml.[14b] This extraction is given particularly for asthmatic patients.[18] The potent relaxant (bronchodilatory) effect of *Foeniculum vulgare* corresponding to the tracheal chains of a guinea pig is studied i.e. the $b_2$-adrenergic stimulatory and/or histamine $H_1$ blocking property of the plant may contribute to the bronchodilatory effect of ethanol extract. The results also suggest a stimulatory property of essential oil on histamine $H_1$ and /or an inhibitory effect on $b_2$-adrenergic receptors. However, the relaxant effect of this plant is not due to its inhibitory property on muscarinic receptors.[19]

***Mandraora officinalum***

It is found in North India, Central Asia, and South Europe. It contains the basic substance isomeric with hyoscyamine i.e. pseudohyoscyamine, known as mandragorine. It is sedative, anesthetic, poisonous, narcotic, and cholagogue. Root bark and leaves are local anesthetics and applied to painful swellings. It resembles belladonna, but is weaker.[13g]

***Lycium barbarum***

It belongs to the family Solanaceae. Leaves contain HCN.[13h]

## CONCLUSION

Standard terms of anticholinergic drugs are restricted to those which block actions of Ach on autonomic effectors and in the CNS exerted through muscarinic receptors. Atropine, the

prototype drug of this class, is highly selective for muscarinic receptors. The particular action of atropine can simply be demonstrated on a piece of guinea pig ileum where Ach-induced contractions are blocked without affecting those elicited by histamine, 5-HT, or other spasmogens. Atropine is obtained from *Atropa belladonna* and scopolamine from hyoscyamus niger and the atropine derivatives are used in bronchial asthma and chronic obstructive pulmonary disease. Thus all of the herbs possess effective anticholinergic i.e. antimuscarinic properties which cause bronchodilatation and reduce airway resistance, especially in asthma and COPD patients.

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