Review Article

# A Review on Anti – Asthmatic Herbs in Siddha Medicine

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**ABSTRACT**

Bronchial Asthma (BA) is characterized by chronic airway inflammation and increased airway hyper-responsiveness leading to cough, wheeze, chest tightness and dyspnoea. The incidence of bronchial asthma is increasing nowadays. The drugs like Bronchodilators, Anti inflammatory agents, Mast cell stabilizers, LT receptor antagonists are used for BA in all over the world. Current synthetic drugs used in asthma are unable to act at all stages of asthma. The use of medicinal plants becoming more popular due to the adverse effects of such allopathic drugs. Herbal preparations have been cited as the third most popular complementary treatment modality by British asthma sufferers. Many herbs are used for their, bronchodilator, mast cell stabilizer, and anti – inflammatory activity in Siddha System of medicine (Indian traditional medicine). Siddha system has better remedies for the treatment and management of Bronchial Asthma. This paper analysis the anti – asthmatic properties of the most commonly employed herbs in Siddha medicine. And an attempt to classify the pharmacological findings based on their possible mechanism of action reported. It also signifies the need for the development of herbal preparations containing various herbs acting at a particular site of the pathophysiological cascade of asthma for prophylaxis as well as for the treatment of asthma.

**Keywords:** Bronchial Asthma, Anti-Asthmatic herbs, Siddha medicine, Herbal medicine.

## INTRODUCTION

The World Health Organization recognizes asthma as a major health problem[1]. Bronchial Asthma is one of the major respiratory disorders in clinical practice which is caused by a combination of complex and incompletely understood environmental and genetic interactions[2]. It is characterized by chronic airway inflammation and increased hyper- responsiveness leading to cough, wheeze, chest tightness and dyspnoea[3].

The overall Burden of asthma in India is estimated at more than 15 Million patients[4]. However, India is a vast country with immense geographical, economical, racial, religious and Socio-political diversity. In a survey of more than 2000 individuals, asthma prevalence was 2.0% in women and about 3.65% in men[5]. The prevalence of current asthma was 11.9% in children. Boys had a significantly higher prevalence of current asthma as compared with girls (12.8% and 10.7%, respectively) [6]. Allergies in Childhood (ISAAC) have provided data on asthma prevalence in 6-7 and 13-14 year old Indian children[5]. The above findings indicate that the burden of bronchial asthma in Indian children is higher[7]. In chronic asthmatics, the aim is to prevent bronchospasm. Bronchodilators and anti inflammatory drugs are the two main classes of drugs used in asthma. Both prevention of inflammatory response and bronchial hyperactivity are important for the long term control of asthma[8].

India is known as the "Emporium of Medicinal plants" due to availability of several thousands of medicinal plants in the different bioclimatic zones[9]. Medicinal plants continue to provide valuable therapeutic agents, both in modern medicine and in traditional systems of medicine. It has fewer side effects than modern medicine. Medicinal plants are being used largely for the treatment of various respiratory disorders including Bronchial Asthma. Plants are the only economic source of a number of well-established and important drugs. Numbers of Siddha formulations are offered for the treatment of BA. And it has more anti – asthmatic herbs.

### *Boswellia serrata*

Extract of gum resin of B. serrata containing 60% acetyl 11-keto beta boswellic acid (AKBA) along with other constituents such as 11-keto beta-boswellic acid (KBA), acetyl betaboswellic acid and beta-boswellic acid has been evaluated for ant anaphylactic and mast cell stabilizing activity using passive paw anaphylaxis and compound 48/80 induced degranulation of mast cell methods. It was confirmed that alcohol extract of *B. serrata* has anti asthmatic property[11].

***Calotropis gigantean***

*Calotropis gigantea* has been reported to possess anti-inflammatory activity 14 Percent inhibition of paw edema volume was calculated and maximum effective dose was observed at 200 mg/kg. at different hour intervals it was found that effect of dose 200 mg/kg was maximum up to 24 h, further percent inhibition goes on decreasing. But still that percent inhibition in paw edema was significantly effective as compare to other doses. Whereas, in statistical analysis of paw edema volume it was observed that 200 mg/kg dose had significant effect comparable that with Dexamethasone. Here also observed that further increase in dose decreased activity. The effects of ethanol extract of roots *Calotropis gigantea* is evaluated by using various in vivo and in vitro animal models. The study shows that extract is effective against histamine induced contraction. Animal studies involve use of histamine induced bronchocontraction. The results of these studies indicated usefulness of ethanol extract of *calotropis gigantea* in asthma[12].

***Clerodendron phlomidis***

The anti-asthmatic activity of aqueous extract of *Clerodendron phlomidis* (AECP) is evaluated on *in vitro* and *in vivo* animal models. Histamine induced contraction in isolated goat tracheal chain showed that aqueous extract of *Clerodendron phlomidis* inhibited the contractile effect of histamine ($P<0.05$). A dose dependent contraction of goat tracheal chain is observed. Treatment with AECP (100 mgkg-1, *i.p.*) in mice (n=5) decreased blood eosinophilia by 68% while mast cells were protected 74% from degranulation as compared to control group. Also, AECP decreased capillary permeability by 63% in mice was evident from its effect on optical density of the dye. Thus, AECP showed antihistaminic, mast cell stabilizing and decreased capillary permeability effect and hence possesses potential role in the treatment of asthma[13].

***Vitex negundo***

Ethanolic extract (AE) and various fractions like petroleum ether (PF), aqueous (AF) and ethyl acetate (EAF) of leaves of *Vitex negundo* were prepared. The antiasthmatic activity of AE, PF, AF and EAF was evaluated by various experimental models like mast cell degranulation by compound 48/80, passive cutaneous anaphylaxis, and egg-albumin induced asthma. AE, EAF and AF treated animals showed significantly higher tidal volume. A significant protection of rat mesenteric mast cells from disruption caused by compound 48/80 was observed in animals treated with AE, EAF and AF of VN leaves. Animals treated with AE, EAF and AF of VN leaves showed significantly lower level of eosinophils as compared to untreated sensitized animals. The result of this study shows that the AE, EAF and AF of leaves of VN are found to be effective in various experimental models of asthma. Stabilization of mast cells, inhibitory effects on immediate hypersensitivity reactions and anti-eosinophilic activity appear to be involved in its mode of action[14].

***Solanum xanthocarpum***

*Solanum xanthocarpum* as a dried whole plant shown significant improvement in some respiratory diseases like bronchial asthma. The anti-asthmatic property of petroleum ether, ethanol (95%), water extract of flowers of Solanum xanthocarpum obtained by successive extraction on in-vitro and in-vivo animal models. Ethanolic (95%) extract (SXEX) shows promising result as relaxed the histamine precontracted isolated goat tracheal chain ($P<0.05$). A dose dependent contraction of goat tracheal chain is observed. Treatment with SXEX (100 mg/kg, i.p.) treatment significantly ($p< 0.05$) reduced milk induced eosinophilia (18.16±0.912), while mast cells were protected at a dose of (50 &100 mg/kg, i.p) by

74.39% and 78.26 % respectively by SXEX. Phytochemical screening showed presence of phyto sterols, alkaloids, flavonoids and steroids. The result suggest that the SXEX possess antihistaminic, mast cell stabilizing and decreased capillary permeability effect and hence possesses potential role in the treatment of asthma and allergic disorders[15].

***Piper longum***

An extract of the *Piper longum* fruits in milk reduced passive cutaneous anaphylaxis in rats and protected guinea pigs against antigen induced bronchospasm.

Relaxant activity was isolated from the fruit of *Piper longum.* The fruit decoction showed anti inflammatory activity against carrageenin induced rat paw edema. Alcoholic extract of the fruits of P. longum and its component piperine was studied for their immunomodulatory activity[16].

***Moringa oleifera***

The Anti-asthmatic activity of *Moringa Oleifera* Lam. root was studied against histamine and Ach induced bronchospasm in guinea pigs, against agonist induced contraction of Guinea pig ileum and against egg albumin induced rat peritoneal mast cell degranulation. Activity was also studied using bronchoalveolarlavaged (BAL) fluid of guinea pigs and by carrying out histopathology of egg albumin sensitized guinea pig lung. Treatment with M.Oleifera increased PreConvulsion Time of guinea pigs against histamine as well as Ach induced bronchospasm. M.Oleifera also showed dose dependent inhibition of agonist induced contraction on guinea pig ileum. Egg albumin induced mast cell degranulation was inhibited by M.Oleifera. Treatment with M.Oleifera for 15 days resulted in significant decrease in Total Leukocytes Count (TLC) as well as Differential Leukocytes Count (DLC) in BAL fluid. M.Oleifera shown bronchodilator activity, non-specific spasmolytic activity and mast cell stabilizing activities. Also it inhibits the migration of leukocytes on exposure to antigens, thus confirming its anti-asthmatics activity[17].

***Aerva lanata***

The antiasthmatic activity of ethanolic extract of the aerial parts of *Aerva lanata* were studied by using isolated adult goat tracheal tissue and adult albino mice of either sex. In isolated goat tracheal chain preparation, ethanolic extract inhibited the contraction produced by histamine in the tissue preparations. *Aerva lanata* showed a decreased contraction at a concentration of 100 micro grams per mille liter in goat tracheal chain preparation. The antiasthamatic activity determined by colonidine induced catalepsy in mice showed that chlorpheniramine maleata treated group significantly reversed the clonidine induced catalepsy in mice. The mast cell degranulation of mice using *Aerva lanata* at a dose of (60mg/kg) showed protection of 68.9%. The above study reported that the ethanolic extracts of the aerialparts of *Aerva lanata* exhibits significant dose dependent antiasthmatic activity in vitro and in- vivo animal models and supports the traditional claim of herb in the treatment of asthma[18].

***Mimosa pudica***

The antiasthmatic activity of aqueous extract of roots of *Mimosa pudica* is evaluated by using various models like Isolated Goat tracheal chain preparation, Clonidine-induced Mast cell degranulation, Histamine and Acetylcholine induced bronchospasm in guinea pigs. Histamine contracts the tracheo-bronchial muscle of guinea pig, goat, horse, dog and man. Goat tracheal chain is easier to handle and to prepare; it is also much more sensitive than guinea pig tracheal chain.

In the isolated goat tracheal chain preparation; there is right side shift of Dose Response Curve (DRC) of histamine in the presence of AEMP indicating antiasthmatic action. The prevention of mast cell degranulation process by the aqueous extract ($p < 0.01$) indicates a possible stabilizing effect on the biomembrane of mast cells, indicating mast cell stabilizing activity. AEMP Showed excellent protection in guinea pigs against the Histamine-induced bronchospasm and does not show any protection against Acetylcholine induced broncoconstriction. Thus the anti-asthmatic activity of *Mimosa pudica* can be attributed to bronchodilating, antihistaminic (H1-antagonist), mast cell stabilizing, suggestive of its potential in prophylaxis and management of asthma[18].

***Clerodendrum serratum***

The Ethanolic extract of roots of *Clerodendrum serratum*. was evaluated for antiasthmatic activity by employing in-vivo and in-vitro screening models in guinea pigs. Preliminary phytochemical screening revealed presence of Flavonoids,Saponins and Sterols. The results of the present study confirmed that the ethanolic extract of the roots of the plant produced significant dose-dependent antiasthamatic activity at 50,100 and 200mg/kg p.o[18].

**Commonly Used Anti-Asthmatic Herbs in Siddha Medicine**

| Botanical name | Family | Siddha Name | Part used | Uses in Siddha[10] | Ref. No |
|---|---|---|---|---|---|
| *Boswellia serrata* | Burseraceaea | Kundhirikkam | Gum resin | cough, bronchial asthma, fungal infections and scabies | 11 |
| *Calotropis gigantean* | Apocynaceae | Erukku | Roots | insect bites, worm infestations, inflammation of joints and constipation | 12 |
| *Clerodendrum phlomidis* | Lamiaceae | Thazhuthalai | Leaves | rhinitis, fever and polyps | 13 |
| *Vitex negundo* | Lamiaceae | Nochchi | Leaves | fever, headache, sinusitis, lymphadenopathy and spleenomegaly | 14 |
| *Solanum xanthocarpum* | Solanaceae | Kantakatri | Flower | asthma, dyspnoea, cough, fever and joint pains | 15 |
| *Piper longum* | Piperaceae | Thipili | Flower | cough, asthma, anorexia, anemia, headache and sinusitis | 16 |
| *Moringa oleifera* | Moringaceae | Murungai | Roots | indigestion, eye disease, anorexia | 17 |
| *Aerva lanata* | Amaranthaceae | Sirukanpeelai | Aerial parts | anemia, urolithiasis, burning Micturition and anuria | 18 |
| *Mimosa pudica* | Fabaceae | Thottarsinungi | Roots | diabetes and for skin diseases | 19 |
| *Clerodendrum serratum* | Fabaceae | Kanduparangi | Roots | bronchial asthma, fever, polyalgia rhinosinusitis | 20 |

## CONCLUSION

Siddha system is one of the unique systems of medicine in which a single herb is used for various diseases. Bronchial asthma is one of the most important respiratory disorders due to changes in life style and environment. The herbs described in this review will be a huge benefit to the society both in prophylaxis and in the treatment of Bronchial asthma.

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