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A Review of Indigenous Herbal Anti Allergic Drugs

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Abstract

Allergy is one of the most common conditions that affect human population with diverse manifestations. Allergic diseases such as asthma, allergic rhinitis, atopic dermatitis and food allergy afflict up to 20% of the human population in most countries. The prevalence of allergic diseases like Asthma has risen during past 30 years despite an improvement in the general health of the population. The drugs used for allergy in modern medicine are antihistaminics, decongestants, mast cell stabilizer, anticholinergics, leukotriene receptor antagonists and corticosteroids. However, these medicines give only symptomatic relief and most of the time these are associated with untoward effects like sedation, dry mouth and immunosuppression. Ayurvedic herbs can provide the better alternative as a safe and effective management to the conventional therapy in various aspects. The antiallergic, bronchodilator, anti tussive, mucolytic, adaptogenic, anti-inflammatory, antioxidant, immunomudulatory, and anxiolytic activities of the individual drugs have been clinically and experimentally proved by various scholars from time to time. This article reviews the anti-allergic properties of the commonly used medicinal plants.

Keywords

Allergy, Anti-histamines, Mast cell stabilizers, Adaptogenic, Medicinal plants

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INTRODUCTION

Allergic diseases are common illnesses that have increasing in prevalence. The term allergy was first coined in 1906 by Von Pirquet, means, altered "state of reactivity" to the common environmental antigens". In India prevalence of Respiratory allergic disorders in school going children has been reported between 5-20%in different geographic region. Male to female ratio % is 64:36. In affluent societies 20-40% of children suffer from respiratory allergies. The prevalence of allergy and asthma has risen in the recent years despite an improvement in the general health of the population[1].

In the past thirty years, allergic diseases such as asthma, allergic rhinitis, atopic dermatitis, and food allergy afflict up to 20% of the human population in most countries[2].

Allergy essentially means as abnormal response of an individual to an extraneous (or sometimes intrinsic) exposure. Pharmacological management of allergic diseases includes antiallergic medication and immunotherapy for specific allergens, most commonly antihistamines, anticholinergics and topical corticosteroids[3]. The treatment modalities, in the modern medicine for allergic disorders give only symptomatic relief and most of the time these are associated with untoward effects like sedation, dry mouth and immunosuppression[4]. So, there is always a need of safe and effective treatment regimen, which can provide relief as well as cure to allergic patients without any side effects.

India has an ancient history of the use of plants in the indigenous systems of medicine dating back to over 5000 years. Ayurvedic herbs mentioned in the management of *pratishyaya, shwasa, kasa, shotha* and skin conditions like *Seetpitta, Udarda, Vicharchika* etc. can provide the better alternative to the conventional therapy in various aspects and without any side effects. The antiallergic, bronchodilator, anti tussive, mucolytic, adaptogenic, anti inflammatory, antioxidant, immunomudulatory, and anxiolytic activities of the individual drugs have been clinically and experimentally proved time to time

Details of reviewed data of some selected plants are listed below.

***Albizzia lebbeck* (*Shirish*)**

Shirish (*Albizzia lebbeck*) shows bronchodilator, mast cell membrane stabilizing effect, cromoglycate-like action on the mast cells and inhibit the early processes of sensitization and synthesis of reaginic-type antibodies[5,6]. The decoction of *A.lebbeck* stem bark was found to be effective against bronchospasm induced by histaminic acid phosphate and shown to exert di-sodium cromoglycate like action on mast cells. A considerable fall of TLC ($p>0.01$), Eosinophil count ($p>0.001$), ESR ($p>0.01$) and increase in the level of PEFR ($p<0.001$) were observed. The effects of treatment based on the subjective parameters were highly significant[7]. Aqueous extract of both stem bark and flowers was found to significantly reduced ($P<0.01$) bronchospasm[8].

Clerodendron serrate m (Bharangi)

The antihistaminic and bronchodilator activity of the *Clerodendron serratum* extract is reported [9]. It was found to accord protection to sensitized guinea pigs against histamine as well as antigen (egg albumin). Responses are to a greater extent and for longer period as compared to the control[10].

Curcuma longa (Haridra)

Anti asthmatic property of curcumin, a natural product from the rhizomes of *Curcuma longa* has been tested in the guinea pig models of airway hyper responsiveness. Guinea pigs were treated with curcumin during sensitization (to examine preventive effect) and after developing impaired airway features (to examine therapeutic effect). The results demonstrate that curcumin is effective in improving the impaired airways features[11]. Curcumin inhibited systemic anaphylaxis in vitro and immunoglobulin E (IgE) mediated passive cutaneous anaphylactoid response in vivo. Curcumin has an ability to inhibit nonspecific and specific mast cell-dependent allergic reactions[12]. Antioxidant and anti-inflammatory activities of curcumins I-III from *Curcuma longa* were assessed experimentally. The results were significant[13].

Emblica officinalis (Amalaki)

The anti-tussive activity of *Emblica officinalis* was tested in conscious cats by mechanical stimulation of the laryngopharyngeal and tracheobronchial mucus areas of airways[14]. The inhibitory activity of the *P. emblica* leaf extracts against human polymorphonuclear leukocyte (PMN) and platelet functions was studied. The results show that the leaves have inhibitory activity on PMNs and

platelets, which confirm its anti-inflammatory and antipyretic properties[15]. *E. officinalis* displays pronounced adaptogenic properties and has been shown to be active in vivo against free radical damage induced during stress. *Emblica officinalis* is stated as one of the highest naturally occurring sources of vitamin C. The antioxidant effect of *Amalaki* is significantly greater than that of vitamin C alone[16].

Glycyrrhiza glabra (Yashtimadhu)

Scientific studies shown that when glycyrihzin was administered to animal, have shown to inhibit experimentally induced allergenic reactions[17]. BALB/C mice were sensitized by ip and aerosol of ovalbumin (Ova) checked for the early airway response (EAR) and late asthamatic response (LAR) by monitoring specific airway conductance. *Glycyrrhiza glabra* (10 mg/kg/ body wt.) was fed to sensitized mice and measured ova-induced EAR and LAR. At the end of experiment, the animals were sacrified and measured OVA specific serum IgE levels. The feeding of glycyrrhiza glabra inhibited significantly both EAR as well as LAR as compared to vehicle treated sensitized mice. OVA specific serum IgE levels were also reduced significantly[18]. Antispasmodic activity was exhibited by flavonoid components of Glycyrrhiza root[19]. *Glycyrrhiza* exhibits expectorant action. This action is produced due to a reflex expectorant action from the GIT mediated by embryonic neural link between membranes of GIT and respiratory track[20]. Researchers believe it is due to the steroid like structure of GA, which produces a cortisol like effect that inhibits inflammation. Intraperitoneal treatment was found to enhance total white blood cells (WBC) count to 114.9-18%. It remarkably inhibited delayed type hypersensitivity reaction[21].

Hedychium spicatum (Shati)

The powdered rhizome given in divided doses of 10gm to 25 patients with recurrent paroxysmal attacks of dyspnoea for 4 weeks (Br.asthma) completely relieved dyspnoea, cough and restlessness in all patients. The ronchi completely disappeared in 36% of the patients. The mean R/R was reduced by 25% and the vital capacity increased by 20%. The mean absolute count decreased by 55.6%[22]. In clinical study of patients of tropical pulmonary eosinophilia, were treated with the powder of *H.spicatum* in the dose of 6 gm b.i.d. After 4 weeks of treatment, the eosionophil count was reduced by 60.54%[23]. Investigation of the biological activity of

rhizomes indicates that they possess anti-inflammatory and analgesic activity[24].

Inula racemosa (Pushkaramula)

Alcoholic extract of root of *Inula racemosa* was studied for its anti allergic effect in 10 experimental models to type I hypersensitivity, in albino rats. *I. racemosa* showed significant protection against egg albumin induced PLA. The seven days drug treatment schedule showed greater protection than disease- sodium cromoglycate[25]. Anti-inflammatory activity of sesquiterpenoids ilicic acid and inuviscolide, isolated from *Inula viscosa* was examined on cell degranulation, leukoterine biosynthesis, neurogenic drive and glucocorticoid like interaction. The action was potent[26].

Ocimum sanctum (Tulsi)

The ethanolic extract (50%) of fresh leaves, volatile oils (from fresh leaves) and fixed oil (from seeds) has shown anti asthmatic activity and significantly protected guinea pigs against histamine and acetylcholine induced preconvulsive dyspnoea[27]. Aqueous and methanolic extract of *O.sanctum* posses significant antitussive activity and AE showed a higher activity than the ME[28]. A standardized extract of fresh leaves of *Ocimum sanctum* (50 and 100mg/kg P.O.) adminstered for 5 days prior to induction of ischemic reperfusion reversed the depletion of superoxide dismutase, catalase and glutathione peroxidase and the increase in lipid peroxidation induced in heart by oxidative stress. The results confirm the antioxidant activity of *O. sanctum*[29]. A methanol extract and an aqueous suspension of *Ocimum sanctum* inhibited acute as well as chronic inflammation in rats as tested by carrageenan- induced pedal oedema and croton oil induced granuloma and exudates. Both the extract and suspension showed analgesic activity. Both preparations reduced typhoid paratyphoid A/B vaccine induced pyrexia[30]. *Ocimum sanctum* seed oil is Mast cell stabilizer, possess immunomodulatory potential and antioxidant and cyclooxygenase inhibitory properties and can inhibit enhancement of the vascular and capillary permeability and leukocyte migration after inflammatory stimulus[31,32,33].

Piper longum (Pippali)

Anti allergic activity of the fruit of *P.longum* has been studied. It effectively reduced passive cutaneous anaphylaxis in rats and protected guinea pigs against antigen-induced bronchospasm, a 30% protection of mast cells was observed in in-vitro study.

(Jennings, K,et al;1978) It exhibits protection against anaphylaxis and protected guinea pigs against antigen induced bronchospasm[34].

Solanum xanthocarpum (Kantakari)

The clinical efficacy of two herbs *S.xanthocarpum* and *S.trilobatum* in a dose of 800 mg TDS for 8 days was investigated in mild to moderate bronchial asthma. Their effect was compared with standard bronchodilator drugs Salbutamol(4mg) and Deriphyline(200 mg). The respiratory function was assessed by measuring the PEFR. Improvement in lung function was assessed by physical examination (ronchi and crepitations). Both drugs produced a progressive improvement in the ventilatory function of individuals over 3 days. The response to these herbs can be considered to be equivalent to that of Deriphylline but less than Salbutamol[35]. Ethanolic (95%) extract of flowers of S. xanthocarpum possess antihistaminic, mast cell stabilizing and decreased capillary permeability effect and hence possesses potential role in the treatment of asthma and allergic disorders[36].

Tephrosia purpurea (Sharpunkha)

The extract of the Ariel parts of *Tephrosia purpurea* administer orally at doses of 50,100 and 200 mg/kg, significantly reduced an elevated WBC count in response to antigen challenge in sensitized mice. The extract also significantly inhibited eosinophil infilteration. The inhibitory effect of ethanolic extract of *T. purpurea* on late phase allergy could be attributed to the inhibition of leukotrine synthesis[37]. Spasmolytic activity of herbal drugs isolated from *Tephrosia purpurea* on guinea pigs was investigated. *Sharpunkha* causes relaxation in the isolated guinea pig trachea. It did not interact with acetylcholine but it inhibited the contractile action of histamine on isolated tracheal rings. The results clearly showed the spasmolytic activity of the drug[38].

Tinospora cordifolia* (*Guduchi)

Tinospora cordifolia was found to have effective antihistaminic and mast cell stabilizer property[39]. The efficacy of *T. cordifolia* (TC) extract in patients of allergic rhinitis was assessed. 100% relief was reported from sneezing, in 69% from nasal discharge, in 61% from nasal obstruction and 71% from nasal pruritis[40]. It has been observed that during *T. cordifolia* treatment, the frequency of attacks has been considerably reduced in all asthmatics. Most of the patients felt improved, sense of well-being and improvement of appetite, reducing

the requirement of bronchodilators, including corticosteroids[41]. The active principles of *T.cordifolia* were found to possess anticomplimentary and immunomodulatory activities. Syringin (TC-4) and cardiol (TC-7) inhibit the in-vitro immunohaemolysis of antibody coated sheep erythrocytes by guinea pig serum. Humoral and cell mediated immunity were also dose independently enhanced[42].

Tylophora indica (Arkapatri)

The anti-allergic effect of *Tylophora indica* was compared with that of disodium cromoglycate on perfused rat lung in sensitized rats by observing the changes in the volume of the perfusate per minute. The rate of flow increased from 7.65 to 19.55 ml/min ($P<0.05$). The action of Tylophora indica may be due to direct bronchodilator property and membrane stabilizing and immuno-suppressive effects[43]. Weak preliminary evidence hints that tylophora might have anti-inflammatory, antiallergic, and antispasmodic actions. The major constituent in *Tylophora* is the alkaloid tylophorine. Laboratory research has shown this isolated plant extract exerts a strong anti-inflammatory action. Test tube studies suggest that tylophorine is able to interfere with the action of mast cells, which are key components in the process of inflammation[44].

Zingiber officinale (Shunthi)

The scientific study proved that the rhizome of *Zingiber officinale* has got significant antihistaminic property[45]. Anti-inflammatory activity in Carrageenin – induced rat paw oedema has been shown. The active principles gingerol and dihydrogingerdione and gingerdione were shown to be potent inhibitors of prostaglandin synthesis confirming the mechanism of anti-inflammatory effect[46].

CONCLUSION

Chronic bronchial asthma diseases, bronchial hyper responsiveness etc. are the leading health problem in worldwide. As from above explanation, it is proved that many Indigenous herbs have anti-allergic activity. All the medicinal plants discussed in this review have shown significant potential anti histaminic activity and mast cell stabilizing activity. So, medicinal herbs with cost effectiveness, high value, easy availability and least side effects give an opportunity for explore and expect for better cure of allergic diseases.

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