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Natural Relief for Allergies: An Overview

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ABSTRACT

An allergy is an overreaction of the immune system to a substance called an antigen, something that is foreign to the body but otherwise harmless (e.g., pollen from grasses and flowers, etc.). In an allergic individual, the harmless antigen becomes an allergen (a substance that initiates an allergic reaction). The symptoms of allergic reactions may include sneezing, watery eyes and nasal congestion, as in hay fever and allergic rhinitis; a rash, upset stomach and itchy swellings on the skin (hives), as with some food or drug allergies; or spasms within the lungs that interfere with breathing, as in allergic asthma. According to a latest study conducted in the United States, "Allergies affect around 20% of Americans while asthma affects an estimated 17 million people in the U.S. alone". Allergy or hypersensitivity is a reaction of our immune system in response our body's contact with harmful allergens. In the present review an attempt has been made to explore different herbal plants individual or in combination (*Scutellaria baicalensis*, *Picrorhiza kurroa*, *Echinacea*, *Aller-7* etc) having anti-allergic properties, useful in the treatment of allergic conditions.

KEY WORDS: Allergy, *Scutellaria baicalensis*, *Picrorhiza kurroa*, *Aller-7*, *Echinacea*, Anti-allergy

INTRODUCTION AND MECHANISM INVOLVED IN ALLERGY

The term Allergy is of Greek origin and means "abnormal response". An allergen is a non-parasitic antigen capable of stimulating a type-I hypersensitivity reaction in atopic individuals (1). In most humans there is a significant increase in IgE responses only as a defense against parasitic infections. However, in some individuals there is a significant increase in IgE response against common environmental antigens. This hereditary predisposition is called atopy. In atopic individuals, non-parasitic antigens stimulate inappropriate IgE production, leading to type I hypersensitivity. Sensitivities vary from one person to another and it is possible to be allergic to an extraordinary range of substances. Dust, pollen and pet dander are all common allergens, but it is possible to be allergic to anything from chlorine to perfume. Food allergies are not as common as food sensitivity, but some foods such as peanuts, seafood and shellfish are the cause of serious allergies in many people. Officially, the Food and Drug Administration does recognize eight foods as being common for allergic reactions in a large segment of the sensitive population, which includes, peanuts, tree nuts, eggs, milk, shellfish, fish, wheat and their derivatives, soy and their derivatives, and sulphites (chemical based, often found in flavors and colors in foods) at 10ppm and over. It should be noted that other countries, due to differences in genetic profiles of its citizens and different levels of exposure to different foods, the "official" allergen list will change. Canada recognizes all eight of the allergens recognized by the U.S, and also recognizes sesame seeds (2). An allergic reaction can be caused by any form of direct contact with the allergen; eating or drinking a food you are sensitive to intake, breathing in pollen, perfume or pet dander (inhalation), or brushing your body against an allergy-causing plant (direct contact, generally resulting in hives). Other common causes of serious allergy are wasp, fire ant and bee stings, penicillin,

and latex. An extremely serious form of an allergic reaction, which can kill in mere minutes, is called anaphylaxis. One form of treatment is the administration of sterile *epinephrine* to the person experiencing anaphylaxis, which suppresses the body's overreaction to the food ingested, and allows for time to be transported to a medical facility.

Allergy testing is gaining in importance today because many peoples suffer from annoying allergy symptoms that result in doctor's visits and trips to the pharmacy. These symptoms are characterized by runny nose, fatigue, headaches, postnasal drip, sneezing, watery eyes, stomach upset, diarrhea, lethargy, breathing trouble, hives, itchiness, and anaphylaxis. Symptoms can occur during specific seasons, such as pollen season, or they can occur throughout the entire year, as with those induced by dust mites and dust. Considering the physical suffering, lost productivity at work, and tremendous health care cost caused by allergies, it is prudent for sufferers to identify their allergens through allergy testing. There are many types of testing methods for allergens such as foods, vitamins, chemicals, pollens, dust mites, and animal dander. Each method has its own advantages and limitations. Though many consider medicine to be an exact science, in reality, the accuracy of these allergy tests many times depends on the skill of the doctors and lab technicians that perform them. Let's take a look at some of the more common types of tests commonly performed by physicians today. The body's immune defenses may be grouped into two broad areas: nonspecific and specific. These defenses provide ones with their immunity; the ability to overcome the effects of certain harmful microorganisms (e.g., bacteria, viruses). Non-specific defenses include certain mechanical and chemical factors in the skin and mucous membranes of the body (such as in the lungs), which are involved in combating the initial attempt of a microbe to invade. The specific defenses involve the production of antibodies by certain organs of the immune

system, including the thymus gland, bone marrow, the spleen, lymph nodes and the lymphatic system in general.

Special white blood cells called macrophages are part of the non-specific immune defenses. Macrophages are not found in the bloodstream but at locations where body organs interface with the environment or the bloodstream, such as in the lungs, spleen, bone marrow and liver. Macrophages have special jobs including identifying foreign invaders (such as pollen or bacteria) and helping to determine if they are good guys or bad guys. If the macrophages decide the foreign invader is a harmful microbe, then they may devour it. If the macrophages wrongly identify harmless antigens as bad guys, they set in motion inflammatory processes, including the activation of mast cells. Mast cells are found in connective tissues, and their contents (e.g., histamines, leukotrienes) along with those of basophils (mast cells' counterparts in the blood), are responsible for the symptoms of allergy. The anti-allergy medicines can be consumed in form of syrups, tablets, powder and drops. When consumed, these anti allergic drugs support the immune system and improve its overall resistance against allergens. Although this is a very simplified explanation, and the allergic process involves other immune cells and activities, this should provide sufficient background to proceed into a discussion of natural substances for allergy relief.

ECHINACEA (PURPLE CONEFLOWER)

Scientific Names: *Echinacea angustifolia*; Family: Compositae
Echinacea is an herb most commonly associated with treating or preventing the common cold and other respiratory infections. However, a review of scientific literature published between 1980 and 2003 revealed Echinacea is one of the most common herbs used to treat upper respiratory tract allergies (3). These applications are valid considering Echinacea has been shown to promote innate immune response (4). It is important to note the popular misconception that Echinacea should only be used for a limited period of time; otherwise it will cease its effectiveness. This misconception was based upon misinterpretations of a specific study on Echinacea which demonstrated decreased immune activity after about 10 days (5). However, if the study is carefully read, it is clear that the Echinacea was only administered for five days, after which point it was discontinued. Only when it was discontinued did immune activity begin to decline; and even then it still remained elevated above normal for a few days (6). The constituents of Echinacea include essential oil, polysaccharides, polyacetylenes, betain, glycoside, sesquiterpenes and caryophyllene. It also contains copper, iron, tannins, protein, fatty acids and vitamins A, C, and E. Echinacea is a popular herbal remedy in the central US, an area to which it is indigenous. The plant was used in traditional medicine by the American Indians and quickly adopted by the settlers. During the 1800s, claims for the curative properties of the plant ranged from a blood purifier to a treatment for dizziness and rattlesnake bites. During the early part of the twenty century, extracts of the plant were used as anti-infectives; however, the use of these products fell out of favor after the discovery of modern antibiotics. The

plant and its extracts continue to be used topically for wound-healing action and internally to stimulate the immune system. Most of the research during the past ten years has focused on the immunostimulant properties of this plant. There are at least nine species of Echinacea. The ones most commonly studied are *E. purpurea*, *E. pallida*, and *E. angustifolia*. Echinacea is native to Kansas, Nebraska, and Missouri. *E. angustifolia* is a perennial herb with narrow leaves and a stout stem that grows to 90 cm in height. The plant terminates in a single, colorful flower head. The plant imparts a pungent, acrid taste when chewed and causes tingling of the lips and tongue. Echinacea appears to be useful in moderating the symptoms of the common cold, flu, and sore throat. It is thought that this activity is provided by certain polysaccharides, flavonoids, and isobutylamides (7).

There is some evidence that Echinacea (*Purpurea and Pallida Species*) is effective in shortening the duration of symptoms of URIs, including the common cold, but it has not been shown to be effective as a preventative. Variable doses and preparations were used in the studies that make specific dosing recommendations difficult. The dosing range for *E. pallida* root is 6 to 9 mL/day and *E. purpurea* leaf is approximately 900 mg/day. Because echinacea may be an immunostimulant, it should not be taken for more than 8 consecutive weeks. Usually 7 to 14 days is sufficient.

STINGING NETTLES HERB

Scientific Name: *Urtica dioica* L.; Family: Urticaceae

This plant is known for its stinging properties. However, it has been used in traditional medicine as a diuretic, antispasmodic, expectorant, and treatment for asthma. The juice has been purported to stimulate hair growth when applied to the scalp. Extracts of the leaves have been used topically for the treatment of rheumatic disorders. The tender tips of young nettles have been used as a cooked pot herb in salads. Nettles are perennial plants native to Europe and found throughout the US and parts of Canada. This plant has an erect stalk and stands up to 0.9 m. It has dark green serrated leaves that grow opposite each other along the stalk. The plant flowers from June to September. The leaves contain bristles that transmit irritating principles upon contact. The fruit of nettles is a small, oval, yellow-brown seed approximately 1 mm wide.

Proven as a diuretic, nettles are being investigated as treatment for hay fever and irrigation of the urinary tract. A decoction of the plant is good for diarrhea. A decoction of the root is recommended for external use on the scalp for loss of hair. The fresh leaves have sometimes been used as a Rubefacient, but severe irritation and blistering can result. Nettle can also be eaten as a vegetable, but old plants must be thoroughly cooked to be safe. Young plants in the spring can be used for salad or as a vegetable. In a double blind, randomized study of 98 individuals with allergic rhinitis, 300 mg of freeze-dried stinging nettles was rated significantly higher than placebo in reducing allergic symptoms after taking it for one week (8-9). Two to three 300 mg nettle leaf capsules or tablets or 2 to 4 ml tincture can be taken three times per day for to reduce allergies during allergy season.

BUTTERBUR

Scientific Name: *Petasites Hybridus*; Family: Asteraceae
Butterbur, also called Horsehoof, Donnhove, and Coughwort, is a traditional herbal remedy employed around the world in the treatment of coughs and respiratory problems. Butterbur's genus name *Petasites* is derived from the Latin word *Petasus*, meaning "hat". Some were said to have worn the leaves in this manner. In 1652, herbalist *Nicholas Culpeper* documented the use of butterbur root to treat plague and fevers by axtucing sweat. Traditionally, the antispasmodic actions of the plant have been used to treat asthma, cough, and GI disorders. Butterbur is a perennial shrub, cultivated throughout Europe and North and West Asia, which can grow to three feet tall. It prefers damp areas, such as near rivers and streams. Its distinctive pink-lilac flowers grow on large spikes at the stem ends. The leaves are large and heart-shaped and used along with the root of the plant. Microscopic analysis of butterbur's pollen grains has been reported as well as examination of epidermal cells and stomata parts. Anatomical and morphological features of the plant's leaves also have been described.

Butterbur has traditionally been used for its antispasmodic and analgesic properties to aid in treatment of asthma, cough, and gastrointestinal disorders. It has also been used for urinary tract disorders, bronchial ailments, cramping, and migraines. As a proprietary extract called Ze 339, the herb butterbur has been shown to be clinically efficient in the treatment of allergic rhinitis (hay fever) (10). Research has demonstrated butterbur is effective in reducing allergic symptoms, as well as significantly reducing histamine and leukotrienes levels after only five days of use (11). The clinical efficacy of butterbur extract was compared with an established antihistamine drug (Cetirizine) in a double-blind study to evaluate its effectiveness in the treatment of allergic rhinitis (12). Butterbur was equally as effective as the drug for this purpose, but without the sedative effects of the antihistamine.

SHAKHOTAKA

Scientific Name: *Streblus asper* L.; Family: Moraceae
Streblus asper is a well known ethnomedicinal plant which is also used in Ayurveda (13-17) and found in tropical countries, such as India, Sri Lanka, Malaysia, the Philippines and Thailand. In India it is known by its several vernacular names, the most commonly used ones being Shakhotaka (Sanskrit), Siora (Hindi), Sheora (Bengali) and Piray (Tamil). It is used traditionally in leprosy, piles, diarrhea, dysentery, elephantiasis (18) and cancer (19) It is a rigid shrub or gnarled tree; branchlets tomentose or pubescent. Leaves are 2 to 4 inch, rigid, elliptic, rhomboid, ovate or obovate, irregularly toothed; petiole 1/12 inch. It is found in the drier parts of India, from Rohilkund, eastward and southwards to Travancore, Penang and the Andaman Islands (20).

Streblus asper is a rich source of cardiac glycosides. *Reichstein and co-workers* (21-24) are isolated more than 20 cardiac glycosides from the root bark of *S. asper* and were able to structurally characterize 15 such compounds, mainly as a result of the application of degradative techniques, namely kamloside, asperoside, strebloside, indroside,

cannodimemoside, strophalloside, strophanolloside, 16-O-acetylglucogitomethoside, glucogitodimethoside, glucokamloside, sarmethoside and glucostrebloside. The volatile oil from fresh leaves of *S. asper* was obtained in 0.005% yield as a brown liquid. The major constituents of the volatile oil were phytol (45.1%), a-farnesene (6.4%), trans-farnesyl acetate (5.8%), caryophyllene (4.9%) and trans-trans-a-farnesene (2.0%). The other constituents were a-copaene, b-elemene, caryophyllene, geranyl acetone, germacrene, d-cadinene, caryophyllene oxide and 8-heptadecene (25). Several workers have reported the different biological activities of *Streblus asper* in various in vitro and in vivo test models. Different parts of this plant have been found to exhibit cardiotonic, antifilarial, and anticancer, antimicrobial, anti-allergic and antimalarial activities. *Streblus asper* showed promising anti-allergic activity in experimental models. Anti-PCA (passive cutaneous anaphylaxis) and mast cell stabilizing activity of *Streblus asper* were investigated in mice and rats (26).

CHAMOMILE

Scientific Name: *Matricaria chamomilla* L.; Family: Asteraceae

Chamomile is an annual herb found in southern Europe and northern Asia. It grows along roadsides and fields. The plant produces a round, furrowed, and branched stem which grows one to two feet in height. The leaves are pale green, incised, and sessile, with thread-shaped leaflets. The flower heads consists of yellow disk flowers and white petal-shaped ray flowers that are bent downward to make the disk flowers more prominent. The medicinal part is the flower. Known since Roman times for their medicinal properties, the plants have been used as antispasmodics and sedatives in the folk treatment of digestive and rheumatic disorders. Teas have been used to treat parasitic worm infections and as a hair tint and conditioner. The volatile oil has been used to flavor cigarette tobacco.

Research has found chamomile components with these effects and anti-allergic activity. Speeds healing of skin ulcers, wounds, or burns. Soothes and relaxes at bedtime. Chamomile is often taken three to four times daily between meals as a tea. Common alternatives are to use 2 to 3 grams of the herb in tablet or capsule form or 4 to 6 ml of tincture three times per day between meals. Standardized extracts containing 1% apigenin and 0.5% volatile oils may also be used. One to two capsules containing 300 to 400 mg of extract may be taken three times daily. Topical creams or ointments can be applied to the affected area three to four times daily. A 2006 review of the medical literature reported a number of beneficial effects of chamomile in *in vitro* and animal tests but added that more human clinical trials are needed before firm conclusions can be drawn (27).

BAIKAL SCULLCAP/GOLDEN ROOT

Scientific Name: *Scutellaria baicalensis*; Family: Lamiaceae
Scutellaria baicalensis, a mint family member, is grown in China and Russia. The root of this plant is used in traditional Chinese herbal medicines and has been the focus of most scientific studies on skullcap. The root of Chinese skullcap contains a flavonoid substance, baicalin that has been shown

to have protective actions on the liver. Anti-allergy actions and the inhibition of bacteria and viruses in test tube studies have been documented with Chinese scullcap. Studies suggest that Chinese scullcap may help people with acute lung, intestinal, and liver infections, as well as hay fever and hypertension.

Baikal Scullcap, is an herb used in combinations in traditional Chinese medicine to treat allergies and has been documented in research as such to treat allergic rhinitis (28). In vitro, anti-allergy actions have been documented with *Scutellaria* (29). In addition, *Scutellaria* has been shown to have an immunomodulating effect on certain cells in allergic individuals (30). Antiallergenic components of *Scutellaria* have been shown to inhibit the release of inflammatory leukotrienes (31). Components of *Scutellaria* have also been shown to reduce allergic contractions in the lungs of sensitized animals. Scullcap is typically recommended as a tea made from 3 to 9 grams of the dried root. Fluid extract is used in the amount of 1 to 4 ml three times per day.

ALLER-7

Aller-7 is a patent-pending unique blend of seven standardized herbal extracts clinically tested to promote a healthy immune system and normal breathing. Aller-7 is the result of more than 10 years of research and is the most extensively researched all-natural product that can minimize the body's response to seasonal as well as perennial airborne allergies. The development of Aller-7 started with screening more than 50 plants possessing the most promising immune-enhancing properties and applying modern techniques of investigational science. Numerous combinations of extracts were prepared and tested. In the end, one formula stood out above all others, a unique combination of seven standardized herbal extracts that ultimately was called Aller-7. Although the seven herbal components of Aller-7 have long been used to promote health, detailed safety and pharmacological studies were conducted prior to clinically testing the formula in humans (32-34).

Aller-7, a botanical formula consisting of seven medicinal plant extracts (*P. emblica*, *T. chebula*, *T. Bellerica*, *A. lebbeck*, *P. nigrum*, *Z. officinale* and *P. longum*) was developed to help counter the common symptoms of hay fever such as sneezing, running nose, itchy and watery eyes. Research has demonstrated the ability of Aller-7 to intervene in key processes that underlie the allergic response. It exhibits potent antihistaminic, anti-inflammatory, anti-spasmodic (bronchial artery relaxation) and antioxidant activity, as well as the capacity to stabilize histamine-releasing mast cells. Broad spectrum safety has also been shown. Double blind, placebo-controlled studies were subsequently conducted to assess its effectiveness. In a study of 42 subjects, nasal symptom scores significantly improved over a three-month period in those receiving Aller-7. Finally, a multi-center clinical trial involving 545 patients was conducted for a 12 weeks period. Compared to those in the placebo group, patients taking Aller-7 experienced significant improvement in nasal congestion, sneezing, runny nose, and peak nasal flow rate and mucociliary clearance. These clinical findings support the safety and effectiveness of Aller-

7 (35). It should be noted that this herbal preparation is best used chronically rather than acutely. It should also be taken in doses consistent with the clinical studies. One should take 660 mg twice daily for six to 12 weeks, then 330 mg twice daily thereafter.

Aller-7 works by modifying the allergic response. For example, one of the first steps in the allergic response is an allergen, such as pollen, coming into contact with a specific cell in the body's immune system called an "antigen presenting cell." This contact in turn triggers the release of compounds known as interleukins. These interleukins then send a message that activates other white blood cells to release allergic antibodies that bind to the allergen and then attaches themselves to mast cells causing the release of inflammatory mediators such as histamine.

TETRANDRINE (TET)

Tetrandrine was isolated from the root of *Stephania tetrandra* S Moore, belongs to bisbenzylisoquinoline alkaloids, which was recognized to possess anti-inflammatory, antiallergic, antioxidant, antifibrogenetic activities, as well as immunomodulation and inhibition of platelet aggregation. Throughout the past several decades, a number of studies have demonstrated that Tetrandrine could improve the pulmonary function and structure via different mechanisms, including the modification of calcium metabolism in many cell types. Among the bisbenzylisoquinoline alkaloids, Tet was particularly noted for its effect on experimental silicosis and allergic models. In China, Tet has been used to treat patients with silicosis as a new anti-silicosis drug. In addition, the clinical results to date with tetrandrine in asthma and pulmonary hypertension have created exciting thoughts and opened new opportunities for its therapeutic use (36).

Tetrandrine has a broad-spectrum of inhibitory activity on type I-IV allergic reaction and allergic mediators (37). Tetrandrine inhibited type I allergy, such as passive cutaneous anaphylaxis in rats, allergic contraction of isolated ileum, trachea and lung strips in sensitized guinea pigs, and by aerosol protected against antigen-induced increase of lung resistance (R_L) and decrease of dynamic lung compliance (C_{dyn}) in sensitized rats. In the study using the murine model of allergic conjunctivitis induced by ragweed pollen, Tetrandrine significantly reduced conjunctival eosinophil infiltration and the number of intact and degranulating mast cells, similar to topical antiallergic drugs, such as cromolyn and nedocromil (38). Tet greatly inhibited the release of allergic mediators induced by antigen or anaphylaxis of Slow Reaction Substance (SRS-A) in lung of sensitized guinea pig (37).

WOMAN'S-TONGUE TREE

Scientific Name: *Albizia lebbeck* (L.) Benth; Family: Fabaceae

Albizia lebbeck (L) Benth is a moderate to large deciduous tree that reaches 30 m in height in rain forests. The tree develops a straight bole when grown in dense forests, but is spreading and low branching in the open. Unless coppiced frequently, trees will annually produce an abundance of seed from papery pods about 20 cm long and 3 cm wide. Common names such as "woman's tongue" and "rattle pod" derive from

the noise of pods shaking in the wind. Foliage is pale green when young and gray-green at maturity, and consists of 2 to 4 pairs of pinnate 50 to 100 mm long with 3-11 pairs of leaflets up to 50 mm long. Flowers are cream colored, hemispheric pompons.

The species is native to India, Burma and the Andaman Island and naturalized in many other tropical and subtropical areas (39). In these regions *A. lebbbeck*, also known as "Siris" or "Indian Siris", grows in a wide range of climates, covering an annual rainfall range of 600 - 2500 mm. However, it also has been grown successfully in areas with an annual rainfall as low as 400 mm. It grows in Himalayan valleys up to 1600 inch. The species is adapted to a wide range of soil types, from acid soils to alkaline and saline conditions (40). Three main saponins named albiziasaponins A, B and C were isolated from the bark of *Albizia lebbbeck* and their structures were established through spectral analyses. These may be responsible for the antiallergic properties of *Albizia lebbbeck* (41).

PARIJATAK /NIGHT JASMINE

Scientific Name: *Nyctanthes arbortristis* L.; Family: Oleaceae
N. arbortristis is a shrub or small tree up to 10m heights with gray or greenish rough bark with stiff whitish hairs; young branches sharply quadrangular. Leaves are opposite, 5 to 10 by 2.5 to 6.3 cm, ovate, acute or acuminate, entire or with a few large distant teeth, short bulbous hairs rounded or slightly cuneate; main nerves few, conspicuous beneath; petiol 6cm long, hairy. Flowers are small, delightfully fragrant, sessile in pedunculate bracteate fascicles of 3 to 5; peduncles 4 angled, slender, hairy, auxiliary and solitary and in terminal short trichotomous chymes; bracts broadly ovate or suborbicular, 6 to 10 mm long, apiculate, hairy on both sides; Calyx 6 to 8 mm long, narrowly campanulate, hairy outside, glabrous inside, truncate or obscurely toothed or lobed, ciliated. Corolla globose rather more than 13 mm long; tube 6 to 8 mm long, orange colored, about equaling the limb; lobes white, unequally obcordate, cuneate. Fruits are acapsule of 1 to 2 cm diameter, long and broad, obcordate or nearly orbicular, compressed, 2 celled, separating into 2 flat 1-seeded carpels, reticularly veined, glabrous. Seeds are exalbuminous, testa thick; the outer layer of large transparent cells and heavily vascularised (42-46).

Alcohol extracts of different parts of the traditionally used Indian medicinal plant *Nyctanthus arbortristist* are reported to possess antiallergic activity. Arbortristoside A and C were isolated from this plant and tested for anti-passive cutaneous anaphylaxis (PCA) and mast cell stabilizing activity. Both compounds demonstrated significant anti-PCA and mast cell stabilizing activity in rats, which is comparable with that of disodium cromoglycate (47).

THE CREAT/ KALMEGHA

Scientific Name: *Andrographis paniculata*; Family: Acanthaceae

Andrographis paniculata, the Kalmegh of Ayurveda is an erect annual herb extremely bitter in taste in each and every part of the plant body. The plant is known in north-eastern India as 'Maha-tita', literally 'king of bitters' and known by various vernacular names. It is also known as 'Bhui-neem', since the

plant, though much smaller in size, shows similar appearance and has bitter taste as that of Neem (*Azadirachta indica*). In Malaysia, it is known as 'Hempedu Bumi' literally means 'bile of earth' since it is one of the most bitter plant that are used in traditional medicine. In Tamil it is called as 'Sirunangai' or 'Siriyangai'. The genus *Andrographis* consists of 28 species of small annual shrubs essentially distributed in tropical Asia. Only a few species are medicinal, of which *A. paniculata* is the most popular. It grows erect to a height of 30 to 110 cm in moist shady places with glabrous leaves and white flowers with rose-purple spots on the petals. Stem dark green, 0.3 to 1.0 m in height, 2 to 6 mm in diameter, quadrangular with longitudinal furrows and wings on the angles of the younger parts, slightly enlarged at the nodes; leaves glabrous, up to 8.0 cm long and 2.5 cm broad, lanceolate, pinnate; flowers small, in lax spreading axillary and terminal racemes or panicles; capsules linear-oblong, acute at both ends, 1.9 cm x 0.3 cm; seeds numerous, sub quadrate, yellowish brown.

Andrographis paniculata is widely used in traditional remedies in India in a number of clinical conditions including allergic manifestations Andrographolide, the major constituent of the extract is implicated towards its pharmacological activity. A study has been conducted on the cellular processes and targets modulated by andrographolide treatment in human cancer and immune cells. Andrographolide, a diterpene lactone, isolated from *Andrographis paniculata* significantly decreased degranulation of mast cells of rats and reduced the liberation of histamine from the cells when tested in vitro at concentration of 30, 100 and 300ug/ml. Moreover, andrographolide was found to produce an increase in delayed hypersensitivity in mice (48). Another diterpenes, neoadrographolide, were found to possess significant anti-allergic activity comparable to disodium cromoglycate when tested in the experimental models of passive cutaneous anaphylaxis and mast cell degranulation in rats (49).

DEODAR

Scientific Name: *Cedrus deodara*; Family: Pinaceae

It is widely grown as an ornamental tree, much planted in parks and large gardens for its drooping foliage. General cultivation is limited to areas with mild winters, with trees frequently killed by temperatures below about -25°C, limiting it to hardiness zones 8 and warmer for reliable growth (50). It is commonly grown in western Europe (north to Scotland), in the Mediterranean region, around the Black Sea, in southern and central China, on the west coast of North America as far north as Vancouver, British Columbia, and in the southeastern United States from Texas to Virginia. It is worshipped as a divine tree in the Indian subcontinent, particularly in Kashmir and Punjab villages, as the name deodar, a Sanskrit word, (*devdar*), which means, "divine wood".

It is a large evergreen coniferous tree reaching 40 to 50 m tall, exceptionally 60 m, with a trunk up to 3 m diameter. It has a conic crown with level branches and drooping branchlets. The leaves are needle-like, mostly 2.5 to 5 cm long, occasionally up to 7 cm long, slender (1 mm thick), borne singly on long shoots, and in dense clusters of 20 to 30 on short shoots; they vary from bright green to glaucous blue-green in colour. The female cones are barrel-shaped, 7

to 13 cm long and 5 to 9 cm broad, and disintegrate when mature (in 12 months) to release the winged seeds. The male cones are 4 to 6 cm long, and shed their pollen in autumn (51). Himachalol, a sesquiterpene alcohol, derived from the hexane soluble extract of the wood of *Cedrus deodara* (52), were found to possess significant anti-allergic activity comparable to disodium cromoglycate when tested in the experimental models of passive cutaneous anaphylaxis and mast cell degranulation in rats.

PICRORHIZA

Scientific Name: *Picrorhiza kurroa*; Family: Scrophulariaceae
It is found at the height of 7 to 14 thousand feet. In India it is found in Himachal Pradesh and Kashmir. It is small, perennial shrub. The rhizome is hard and is about 6 to 10 inch long. Leaves are 2 to 4 inch long, having a circular shape and sharp apex. Flower stalk is 2 to 4 inch long that bears white or purple flowers. Fruit is half inch long and is oval in shape. The plant flowers in summer and fruits in rains. *Picrorhiza kurroa* is a well-known herb in Ayurvedic medicine, used traditionally to treat disorders of the liver and upper respiratory tract, as well as other disorders (53). Research on bronchial obstruction has shown that constituents of picrorhiza prevented allergen- and platelet activating factor-induced bronchial obstruction when given to guinea pigs; and other research shows that picrorhiza inhibited histamine release (54).

Picroliv, a standardised iridoid glycoside fraction from the root and rhizome of *Picrorhiza kurroa* at a dose of 25 mg kg⁻¹p.o. inhibited passive cutaneous anaphylaxis in mice (82%) and rats (50-85%) and protected mast cells from degranulation (60-80%) in a concentration-dependant manner. Its effect was also studied in sensitized guinea pig ileum preparation *in vitro* and in normal guinea pigs *in vivo*. There was inhibition of the Schultz-Dale response in sensitized guinea pig ileum, but the bronchospasm induced by histamine could not be antagonized or prevented by *Picroliv*, indicating the absence of a direct post-synaptic histamine receptor blocking activity (55). It is interesting to note that picrorhiza has also been shown to have immunomodulating properties, which may be another mechanism by which it is beneficial for allergies (56-57).

HEAVENLY BAMBOO/SACRED BAMBOO

Scientific Name: *Nandina domestica*; Family: Berberidaceae
It is a suckering shrub in the Barberry family; it is a monotypic genus, with this species as its only member. It is native to eastern Asia from the Himalaya east to Japan. Despite the common name, it is not a bamboo at all. It is an erect shrub growing to 2 m tall, with numerous, usually unbranched stems growing from the roots. The leaves are evergreen (sometimes deciduous in colder areas), 50 to 100 cm long, bi- to tri-pinnately compound, with the individual leaflets 4 to 11 cm long and 1.5 to 3 cm broad. The young leaves in spring are brightly coloured pink to red before turning green; old leaves turn red or purple again before falling. The flowers are white, borne in early summer in conical clusters held well above the foliage. The fruit is a bright red berry 5 to 10 mm diameter, ripening in late autumn and often persisting through the winter. The berries are poisonous containing nandine. The birds are not affected and will disperse the seeds through

their droppings. It can be fatal if ingested. All parts of the plant contain a poisonous substance hydrocyanic acid. It is widely grown in gardens as an ornamental plant; over 60 cultivars have been named in Japan, where the species is particularly popular. It has become naturalised in parts of eastern South America. In the Southeastern United States it is considered by many as a pest due to its invasive nature. Some even refer to it as Nandina Megalomania or Hitler Bamboo for its unbridled aggression toward other plants, its propensity to conquer the entire yard without provocation, and its seeming immortality.

The roots and stems are antitussive, astringent, febrifuge, stomachic and tonic. A decoction is used in the treatment of fever in influenza, acute bronchitis, whooping cough, indigestion, acute gastro-enteritis, and tooth abscess, pain in the bones and muscles and traumatic injuries. It is especially useful in the treatment of children's coughs (58). There is a danger that an overdose can cause respiratory paralysis. A decoction of the leaves is tonic and the fruit is febrifuge and tonic. The root is anti-rheumatic (59).

CONCLUSION

Plants have played a significant role in human life for thousands of years, and have served humans well as valuable components of seasonings, beverages, cosmetics, dyes, and medicines. The consumption of herbal is helpful in maintaining and promoting health, particularly in consideration of their beneficial impact to public health. Charlemagne was correct when he said "an herb is a friend of physicians and the praise of cooks" (60). Any or all of the aforementioned natural substances may help to provide the users with significant relief from their allergic symptoms. It may be possible to find most or all of the herbs in a single product, although it may be necessary to combine products to create an effective supplementation program.

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