



ADAPTOGENS

The ability to adapt to a given habitat is a distinctive feature of all living organisms. An individual who can adapt easily to any changing situation (physical, mental, microbial, chemical, etc.) such as long hours or stress at work, a bacterial infection, industrial pollution, or simply insufficient sleep is resistant to disease and stays healthy. Whereas someone with lower immunity and adaptive power falls sick easily. Adaptogenic agents can prevent disease and maintain good health. As adjuvant to other specific treatments, Adaptogens can also help in “altering the course of the disease”. Disease and normal wear and tear of the body cause the body to age leading ultimately to death. The term ‘Adaptogen’ was coined by the Russian scientist, Lazarev, only 50 years ago. But Indian physicians practicing Ayurveda recognized the contribution of Rejuvenating (Rasayana) Herbs 5000 years ago in revitalizing the human body and rewinding the aging process.

Herbal Adaptogens have been sold in all the major markets as modern nutraceuticals or traditional medicine but under the labels of “Anti-ageing”, “Antioxidants”, “Immunity Boosters”, “Anti-stress” formulas. To the best of our knowledge, the product category of ADAPTOGEN would have a clear USP over the other popular categories. After extensive search of the modern and traditional literature on this subject we are proud to present this range of Adaptogenic Herbs from India that can slow down the ageing process if consumed as per directions.

Asparagus adscendens

The origin of *Asparagus adscendens* locally famous as Safed Musli can be traced back in the oldest mountain ranges on the continent, the Aravalis from where it spread to the other sub-continent of India. About 4000 years ago Ashwini Kumars, the divine physician brothers, prepared the 'Chyawanprash' with one of the ingredients as *Asparagus adscendens* for 'Chyavan Rishi' who married at the age of 80 years. This goes well with the ayurvedic claim of Safed musli as rejuvenator. The dried roots of safed musli are used in Unani medicine as an aphrodisiac which arouses sexual desire.

Crude extract of *Asparagus adscendens* has been studied for adaptogenic activity in mice and rats using swimming performance test in rat, swimming stress induced ulceration test in rat, hypoxia, hypothermia and rota rod tests in mice. The crude extract of *Asparagus adscendens* exerted significant protection against stress induced changes. This strongly supported adaptogenic activity of *Asparagus adscendens* which was found to be comparable to that of *Panax pseudoginseng* a well established adaptogen.

Achyranthes aspera

Apamarg known to the research world as *Achyranthes aspera* traces its existence in manuscripts of Ayurveda and Chinese medicines. It is described in 'Nighantas' ancient Indian treatise as purgative, pungent, digestive, a remedy for inflammation of the internal organs, piles, itch, abdominal enlargements and enlarged cervical glands. The diuretic properties of this plant are well known to the India and European physicians.

The extract of *Achyranthes aspera* Linn. was found to enhance the induction of ovalbumin (OVA)-specific humoral antibody response in mice, on intraperitoneal injection of extract along with OVA. The antibody response was evaluated by passive cutaneous anaphylaxis (PCA) and ELISA for IgE and other classes or subclasses of antibodies, respectively. Furthermore, the plant extract was found to increase the induction of OVA-specific antibody response in a dose-dependent manner. A significant elevation of IgM, IgG1 and IgG3 antibodies was observed. The adjuvant property of the extract was further examined in different strains of mice and a significant elevation of the OVA-specific IgG antibody response in all strains tested was found. When the extracts of different parts of the herb were tested, the seed and root extracts appeared to exhibit relatively higher activity. These results confirm the immunostimulatory properties of *Achyranthes aspera*. In addition to this *achyranthes aspera* extract also decreases hepatic LPO suggesting a direct free radical scavenging activity of the extract. These actions collectively contribute to so called adaptogenic activity of this herb.

Andrographis paniculata

Andrographis paniculata, also known commonly as "King of Bitters," has been used for centuries in Asia to treat GI tract and upper respiratory infections, fever, herpes, sore throat, and a variety of other chronic and infectious diseases. In Traditional Chinese Medicine, *Andrographis* is an important "cold property" herb and has been used in fighting common cold, flu, and upper respiratory infections.

Andrographolides present in *Andrographis paniculata* are observed to be potential enhancers of immune system functions such as production of white blood cells which are the defense cells of our body, release of an antiviral factor called interferon, and also activity of the lymphatic system which is the seat of our defense system. A clinical trial supporting above fact is a phase I dose-escalating clinical trial of andrographolide from *Andrographis paniculata* in 13 HIV positive patients and five HIV uninfected, healthy volunteers. The results of this trial have shown that andrographolide inhibited HIV virus induced cell cycle dysregulation, leading to a rise in declined CD4(+) lymphocyte levels in HIV-1 infected individuals. These CD4(+) lymphocytes are also called as helper T cells assisting both B cells and cytotoxic T cells which are the two allied arms of our immune system contributing to humoral and cell mediated immunity respectively. The former being acting via production of antibodies against foreign antigens like bacteria and latter react by destroying foreign invaders directly like fungi, transplanted cells, cancer cells and viruses such as HIV. Due to rise in levels of these CD4 lymphocytes the progressive collapse of immune system in Aids patients as a result of HIV attack is improved and thus susceptibility to opportunistic infections is reduced. In another set of experiments *Andrographis paniculata* extract induced significant stimulation of antibody and delayed type hypersensitivity (DTH) response to sheep red blood cells (SRBC) in mice proving its immunostimulant potency.

Asparagus racemosus

Shatavari, botanically known as *Asparagus racemosus* is commonly found Indian Herb. It is believed that Shatavari taken during pregnancy can lead to the birth of a "super

baby” in terms of physical and mental abilities. Well-established pharmacological properties of *Asparagus racemosus* include immunostimulation, uterine relaxation, anticancer, antiulcer, and antimicrobial etc.

A series of experiments to evaluate the mechanisms of adaptogenic activity of *Asparagus racemosus* using various stress and immunostimulatory models are reported in the literature few of which are as cited below.

Biological stressors

Asparagus racemosus reduced mortality in immune suppressed mice or rats due to single or mixed abdominal infections induced using various pathogenic organisms. Observations attributed this effect to adaptogenic activity of these herbs, mediated through increase in white blood cell count and activation of phagocytic and killing capacities of polymorphonuclear cells and monocyte- macrophage system the potent arms of immune system.

Physical stressors

In another biological stress model involving cold immobilization studies, extract of *Asparagus racemosus* provided significant protection against stress-induced gastric mucosal damage.

Yet another stressor study demonstrates that the extract provide significant protection against cisplatin induced alterations in intestinal motility complying with definition of an adaptogen.

Chemical stressors

Asparagus racemosus have also been found to provide protection to a greater extent against leucopenia (decreased WBC count) and bone marrow suppression caused due to cyclophosphamide- a cytotoxic drug used in cancer chemotherapy.

Asparagus racemosus also reduced lung fibrosis induced by Bleomycin.

Thus studied proves that these plants are capable of protecting when exposed to a variety of stressors.

Centella asiatica

Originally a native of India, Indian perrywort botanically known as *Centella asiatica*, has been known long for its diverse medicinal potentialities. It has been well described by *Charaka* (one of the authorities on Ayurveda) as an “anti-aging herb” advocated for use in rejuvenation therapy. *Centella asiatica* is commonly mentioned as a Rasayana in Ayurveda, an ancient system of Indian medicine for various ailments including abdominal disorders. *Centella asiatica* also has a historical reputation for boosting mental activity and for helping a variety of systemic illnesses, such as high blood pressure, rheumatism, fever, and nervous disorders. In traditional African health it has been used for the treatment of leprosy, bronchitis, asthma, syphilis and wound healing. In India it has for the last 3,000 years of Ayurvedic medicine been used for wound healing, a mild diuretic, increasing concentration, alertness, as well as anti-anxiety and anti-stress.

Centella asiatica is regarded as one of the best psychotropic drugs. Six week treatment of patients of anxiety neurosis with *Centella asiatica* reduced anxiety levels and showed significant improvement in the mental fatigue rate and immediate memory span. In a double blind study of 57 children with an intelligence quotient score ranging between 90 and 110 significant improvement was observed in the intelligence quotient in children treated with a dose of 0.5 g/day of the power for one year. *Centella asiatica* has also exerted significant protection against ethanol-, aspirin-, cold-restraint stress- and pyloric ligation induced gastric ulcers in rats, may be due to strengthening of the mucosal defensive factors and reducing the damaging effects of free radicals. The results were comparable with those elicited by sucralfate. *Centella asiatica* is also reported to possess significant immunostimulant potency. These mechanisms collectively support adaptogenic activity of *Centella asiatica*.

Emblica officinalis

Emblica officinalis, a extensively available Indian herb has been used as valuable ingredient of various medicines in India and the Middle East from time immemorial. Shushrut, the great authority on Ayurveda, considers it the best of all acid fruits and most useful for health and in treating diseases. It is said that the ancient Sage Muni Chyawan rejuvenated himself in his late 70's and regained virility with its use.

In physical stress model involving cold immobilization studies, *Emblica officinalis* significantly reduced stress-induced leakage in gastric tissue and conferred protection against ulcers. *Emblica officinalis* was found to protect against pancreatitis induced by cerulein and also intraductal administration of bile, blood, trypsin. The major mechanism of action concluded is through prostaglandin release and antioxidative action.

Ocimum sanctum

Ocimum sanctum (holy basil) is a sacred plant, to which diverse array of medicinal properties are attributed in Ayurveda, the Indian system of medicine. It explores its existence as a Dravya rasayana, an important constituent of the ayurvedic concept of preventive medical care, aimed at improving the quality of life while promoting longevity. Its activity is proposed to reach therapeutic maxima, when the resistance of the body is diminished, as seen after prolonged illness or in old age or when the individual is subjected to prolonged illness or chronic stress. On the word of its adaptogenic potential *Ocimum sanctum* increases the resistance of the individual to diverse aversive assaults which threaten internal homeostasis of the body leading to a disease

Recently research has reported that extract of the leaves of the plant possess significant adaptogenic properties when tested against a battery of stress induced conditions. The antistress activity produced by the *Ocimum sanctum* extract was comparable to that of desipramine, an antidepressant drug. Pretreatment with the *Ocimum sanctum* extract brought back the stress-altered values to normal levels indicating its stress alleviating effect. In the Classical stress immobilization model *Ocimum sanctum* is proved to exert protective effect against stress-induced gastric ulcer. Immunostimulation activity of this plant is appeared to be mediated via both cellular and humoral arms of defence system of our body. In human studies *Ocimum sanctum* leaves have been observed to increase cell-mediated immune response. Another set of experiments have revealed that *Ocimum sanctum* leaf extract cause an increase in humoral immunologic response as represented by an increase in antibody

titre in both the Widal and sheep erythrocyte agglutination tests as well as by the cellular immunologic response represented by E-rosette formation and lymphocytosis. These immunostimulation potentialities contribute, in explaining the adaptogenic action of the plant. *Ocimum sanctum* leaves are also shown to exert antioxidant activity attributing to their flavonoids content. Additionally it is found to decrease stress induced increases in the cellular succinic dehydrogenase levels in liver and brain.

Thus holy basil is evolved as one of the adaptogen to help us in day to day life stresses leading healthy life.

Piper longum

Indian Long pepper another rasayana plant appearing in ancient medicinal literature is reputed in ayurveda to promote physical and mental health, improve defense mechanisms of the body and enhance longevity. It forms one of the ingredients of Ayurvedic formulation 'Trikatu' which serves as an essential ingredient of all the compound formulations of Ayurveda. *Piper longum* also enhances thermogenic response, or release of metabolic heat energy in the body. Nearly two-thirds of all traditional Ayurvedic formulas contain a special blend of ingredients, which includes long pepper for this purpose.

Scientific studies to evaluate adaptogenic properties of this herb have thrown sufficient light on the various mechanisms involved. Pippali rasayana (PR), an Ayurvedic herbal medicine, prepared from *Piper longum* (Pippali) and *Butea monosperma* (Palash), induced significant activation of macrophages as evidenced by increased macrophage migration index (MMI) and phagocytic activity. This proves that *Piper longum* enhances host resistance in accordance with its immunostimulation property. *Piper longum* have been also exert protection against stress induced gastric ulcers in various stress models like cold restraint stress, aspirin (200 mg/kg, 4 hr) and 4 hr pylorus ligation. The mechanism involved seemed to be the increased secretion of protective factors like mucin and decreased cell shedding. On the other hand Piperine one of the major principles of the *Piper longum* exerted a significant protection against tert-butyl hydroperoxide and carbon tetrachloride hepatotoxicity by reducing both in vitro and in vivo lipid peroxidation, enzymatic leakage of GPT and AP, and by preventing the depletion of GSH and total thiols in the intoxicated mice.

Owing to these evidences *Piper longum* emerges as an important Adaptogenic candidate.

Terminalia belerica

Another of the famous myrabolan fruits *Terminalia belerica* traditionally called as bibitaki, well reputed as rasayana in Ayurveda, is the best single herb for controlling Kapha. It is a powerful rejuvenative herb that nourishes the lungs, throat, voice, eyes and hair. It expels stones or other kapha-type accumulations in the digestive, urinary, and respiratory tracts. It is unique in being both laxative and astringent, so it purges the bowels, while simultaneously toning the tissues of the digestive tract. It provides strength to the tissues of the sense organs. It is one of the constituents of famous preparation "Triphala" which finds use in wide array of areas ranging from hair care, as laxative, in headache, leucorrhoea, liver diseases to gastro-intestinal complaints. The overall tonic effect of this fruit has been known for thousands of years in India and other Asian countries.

Recent research in the experimental world have proven this herb to be potent adaptogenic agent. The whole aqueous standardized extracts of Terminalia bellerica were administered orally to experimental animals, in a dose extrapolated from the human dose, following which they were exposed to a variety of biological, physical and chemical stressors. The observations greatly supported the fact that Terminalia bellerica significantly offers protection against these stressors. As further supporting in cisplatin model of adaptogenic activity Terminalia bellerica extract pretreatment led to normalization of alterations in GI motility caused by this chemical stressor. This again proves adaptogenic potential of this herb.

Tinospora cordifolia

Ayurveda refers to Tinospora cordifolia as 'Amrita' or the Nectar (of Immortality!). The term 'Amrita' is attributed to this drug in recognition of its ability to impart youthfulness, vitality and longevity. This is not an exaggerated claim by any means as there is ample clinical and animal evidence to support the claim of adaptogenic and immunomodulatory activities of Tinospora.

According to modern Ayurvedic pharmacology Adaptogens, produce an increase in the power of resistance against multiple (physical, chemical or biological) stressors. A series of experiments to evaluate the mechanisms of adaptogenic activity using various stress and immunostimulatory models are reported in the literature few of which are as cited below.

Biological stressors

Tinospora cordifolia reduced mortality in immune suppressed mice or rats due to single or mixed abdominal infections induced using various pathogenic organisms. Observations attributed this effect to adaptogenic activity of the herb, mediated through increase in white blood cell count and activation of phagocytic and killing capacities of polymorphonuclear cells and monocyte- macrophage system the potent arms of immune system.

Physical stressors

In another biological stress model involving cold immobilization studies, extracts Tinospora cordifolia provided significant protection against stress-induced gastric mucosal damage.

Yet another stressor study demonstrates that the extract provide significant protection against cisplatin induced alterations in intestinal motility complying with definition of an adaptogen.

Chemical stressors

Tinospora cordifolia have also been found to provide protection to a greater extent against leucopenia (decreased WBC count) and bone marrow suppression caused due to cyclophosphamide- a cytotoxic drug used in cancer chemotherapy.

Tinospora cordifolia administered concomitantly with the hepatotoxic agent, CCl₄ offered protection against hepatic damage caused by it. It also reduced lung fibrosis induced by Bleomycin.

Thus studies proves that *Tinospora cordifolia* are capable of protecting when exposed to a variety of stressors. Thus the herbal supplements are considered the most important tool of medicine in the new millennium.

Withania somnifera

Withania somnifera (Ashwagandha) has been used for thousands of years as a popular remedy for many conditions. Perhaps its main use, as described in Ayurvedic literature, is as a “rasayana” or rejuvenating drug. The word Ashwagandha indicates the equine (of horses) odor of the plant. Another name Avarada suggests the application of this plant for enhancing longevity.

Withania somnifera have been found to induce leucocytosis with predominant neutrophilia and protect against leucopenia (decreased WBC count) and bone marrow suppression caused due to cyclophosphamide. Administration of *Withania somnifera* root extract was also found to stimulate immunological activity in balb/c mice. The antistress properties of *Withania somnifera* have been investigated in a study using adult Wistar strain albino rats and cold-water swimming stress test. The results indicated that the drug treated animals show better stress tolerance

CONTACT US

Dr. Ilangoan Ramasamy, B.S. (Zoology), B.S.(Ag), M.S.(Ag), Ph.D. (Ag)

AgriInfoTech, Inc. 166 Lawrence Road, Salem NH-USA 03079

Ph: 603-894-7346, 603-781-9097

WWW.AGRIINFOTECH.COM