



## WITHANIA SOMNIFERA - THE ANTI STRESS HERB – A REVIEW

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### ABSTRACT

According to various surveys, the stress is the major problem for many diseases ranging from psychiatric disorders to endocrine disorders including diabetes mellitus, hypothyroidism, male sexual dysfunction, peptic ulcer, hypertension, ulcerative colitis etc. Today's life style was very frustrated due to busy schedule of even school going child up to old aged people. That's why medicine related to stress and psychosis has a huge market in the world. As modern medicine can provide some benefits & results but they are mixed and unsatisfactory. So the answer is hidden in Ayurveda i.e. Rasayana (Rejuvenation therapy). It is one of the eight branches of Ayurveda. Rasayana drugs are claimed to contribute in revitalising the tissues and even the psyche thereby maintaining the health of the human being. These are stated to possess rejuvenation power which enhance the Ojas of the body i.e. vitality.<sup>[1]</sup> It is similar to the modern concept of adaptogenic agents which gives the protection to the human physiological system against diverse stressor. Recent studies shows that the Ayurvedic herbs having adaptogens which could induce a state of non-specific increase of resistance to affect internal homeostasis. The adaptogens improve the response to stress and help the body to adapt by normalizing physiological processes in times of increased stress. Ashwagandha is one of the best medicinal herbs for that purpose & is compared well with Eleutherococcus senticosus (Siberian Ginseng), Panax Ginseng (Chinese/ Korean Ginseng) in its adaptogenic & antistress activity, hence popularly known as Indian ginseng. That's why we take a review of antistress activity of Ashwagandha (*Withania somnifera*).

**KEYWORDS:** Ashwagandha, *Withania somnifera*, Stress, Adaptogens.

### INTRODUCTION

Stress is simply a reaction to a stimulus that disturbs our physical or mental equilibrium. Acute stress can be exciting; it keeps us active & alert. But chronic stress can have detrimental effects on health. The Father of Stress Hans Selye made 2 observations, the body has a set of similar responses to a broad array of stressors & under certain conditions, the stressors will make you sick.<sup>[2]</sup> Within seconds of an acutely stressful event, norepinephrine is released from nerve endings in preparation for a rapid response & the adrenal glands release epinephrine & norepinephrine into the blood stream, resulting in the familiar fight or flight response. Within minutes of a stressful event (Possibly lasting for several hours) a much more complex interaction between the nervous & endocrine systems & other forms of internal communication occurs resulting in an intricate stress adaption response. During this time the adrenal glands release extra cortisol into the circulation. Under health consequences of chronic stress, the Natural Killer cell activity, Secretory IgA & Bifidobacteria +Lactobacilli were decrease while Enterobacteria, E. coli

& risk of myocardial infraction were increases.<sup>[3]</sup> So the objective of this paper is to review the research regarding antistress activity of Ashwagandha (*Withania somnifera* Dunal), a commonly used herb in Ayurvedic medicine. All this review is limited to published articles & on net available articles in English language. It is seen that Ashwagandha's antistress & anabolic activity was similar to Panax ginseng, in an animal model of chronic stress. *Withania somnifera* & Panax ginseng extracts decreases the number & severity of stress induced ulcers, reversed stress induced inhibition of male sexual behaviour & inhibited the adverse effects of stress on retention of learned tasks. Both reversed stress induced immune suppression, only *Withania* increased peritoneal macrophage activity. Also *Withania* appearing to stimulate stem cell proliferation & improve red blood cell, white blood cell & platelet parameters.<sup>[4]</sup> With an abundance of antioxidants, iron, amino acids & other phytochemicals, it's no surprise that studies suggest Ashwagandha has medicinal properties that can directly & indirectly prevent & treat a number of diseases. Ashwagandha in Sanskrit means 'smelling like a horse',

probably originating from the odour of its fresh root which resembles that of a sweaty horse. It is well known antistress herb.<sup>[5]</sup> To evaluate the antistress effects of *Withania somnifera*, an alcoholic extract from roots & seeds dissolved in normal saline was given (100mg/kg intra peritoneal as a single dose) to 20-25 g mice in a swimming performance test in water at 28°-30° C. It is seen that the extracts approximately double the swimming time when compared to control.<sup>[6]</sup> Researchers using *Withania somnifera*, discovered the animals given the herb an hour before the foot shock, experienced a significantly reduced level of stress. Its function is to be decrease neuron activity & inhibit nerve cells from over firing. This produces calming effect. Excessive neuronal activity can lead to restlessness & insomnia, but GABA inhibits the number of nerves cells that the fire in brain & helps to induce sleep, uplift mood & reduce anxiety.<sup>[7]</sup> The Ayurvedic text describe a set of rejuvenative measures to impart biological sustenance to the bodily tissues called 'Rasayana' act as micronutrients, specific to brain tissue are called 'Medhya Rasayana' which retard brain aging & help in regeneration of neural tissues besides producing antistress & memory enhancing effect.<sup>[8]</sup> Stress, as a major cardiovascular risk factor leads activation of sympathoadrenal & hypothalamic pituitary adrenal (HPA) axis & causes oxidative stress induced changes & provide cardio protection in ischemic rats similar to the properties ascribed to adaptogens.<sup>[9]</sup> The extensive studies on the biological model of animals for the antistress properties of Ashwagandha have shown to be effective in increasing the stamina (physical endurance) & preventing stress induced gastric ulcer. These results indicate that *Withania somnifera* used in the crude form is a potent anti-stress agent. This indicates clinical use of *Withania somnifera* in the prevention & treatment of many stress induced diseases like arteriosclerosis, premature ageing, arthritis, diabetes, hypertension & malignancy.<sup>[10]</sup> Two new glycowithanolides, sitoindoside IX (1) & sitoindoside X (2), isolated from *Withania somnifera* Dunal, were evaluated for their immunomodulatory & CNS effects like antistress, memory & learning in laboratory animals, because the plant extract was used by practitioners of the Indian system of medicine for similar purpose. Both these compounds (50- 200mg/kg) produced significant anti stress activity in albino mice & rats, augmented learning acquisition & memory retention in both young & old rats.<sup>[11]</sup> Anti-stress activity associated with glycosides (sitoindosides VII & VIII) present in this plant was reported to the usefulness of Ashwagandha as an anti-stress adaptogen. Administered orally (50- 200mg/kg orally) both sitoindosides IX & X compounds also produced significant anti-stress activity in albino mice & rats. They also augmented learning, acquisition & memory retention in both young & old rats.<sup>[12]</sup> The study conducted by Archana et al in 1998 for evaluating the anti-stressor properties using adult wistar strain albino rats & cold water swimming stress test. They concluded that it appears so induced a state of non-specifically

increased resistance (SNIR) during stress.<sup>[13]</sup> The major biochemical constituents of Ashwagandha root are steroidal alkaloids & steroidal lactones in a class of constituents called Withanolides. The withanolides serve as important hormone precursors that can convert into human physiologic hormone as needed. When there is an excess of a certain hormone, the plant based hormone precursor occupies cell membrane receptor sites so the actual hormone can't attach & exert its effect as happened in stress with serum cortisol. It also contains flavonoids & many active ingredients of the withanolide class. Numerous studies over the past two decades indicate that it has antistress & rejuvenating properties.<sup>[14]</sup> Ashwagandha is an immunomodulatory agent & have been shown to possess antistress activity. One has conducted research at BHU, Varanasi, India show *Withania somnifera* that many of the elements of Ashwagandha are antioxidants. A scholar from university of Leipzig looked at the effects of Ashwagandha on the neurotransmitters of the brain. Ashwagandha lead to more acetylcholine receptor activity concluded that the increase of activity in that particular neurotransmitter could account for the increase in cognitive ability & memory that is attributed to Ashwagandha.<sup>[15]</sup> Ashwagandha has been use within Ayurvedic & indigenous medical system for over 3000 years. Both preclinical & clinical studies demonstrate the use of Ashwagandha for anxiety, neurological disorders, therapeutically as an adaptogen in nervous exhaustion, insomnia, debility due to stress. Since GABA agonism has been linked to anxiolysis, the extracts of *Withania somnifera* may have beneficial effects in anxiety & related disorders. A double blind placebo control study in patients with ICD-10 anxiety disorders, 6 weeks treatment with ethanolic extract of *Withania somnifera* showed anxiolytic activity over placebo. It concludes that *Withania somnifera* has useful anxiolytic potential.<sup>[16]</sup> *Withania somnifera* has historically been used in Asia for treating stress related health conditions. One of the scholars was randomly assigned the participants to *Withania somnifera* extract (125mg QD, 125mg BID or 250mg BID) or placebo groups. He found that between days 0 & 60, the *Withania somnifera* extract 125mg QD group decreased significantly more than placebo for mean mHAM-A score, serum cortisol, serum C-reactive protein, pulse rate & blood pressure & increased significantly for mean serum DHEAS & haemoglobin.<sup>[17]</sup> 'Medhya Rasayanas' retard brain aging & help in regeneration of neural tissues besides producing antistress, adaptogenic & memory enhancing effects. Young can be advocated to use Medhya Rasayana regularly as the period for the administration of Rasayana is effectively in young & middle age groups. However Medhya Rasayana can be effectively used in stress, delaying the deteriorating aspects of 'Jara'.<sup>[18]</sup> It has been shown to slow, stop reverse & remove neurotic atrophy & synaptic loss, the main cause for neurodegenerative disorders including Alzheimer's & dementia as confirmed by several clinical studies. These effects maintain for at least 7 days after discontinuing

withanoside IV administration which reflects the clinical usefulness of withanoside IV & its metabolite, sominone in the treatment & management of Alzheimer's & dementia. On the same way we can use this theory for stress induced diseases. Hypothalamic – Pituitary - Adrenal influences in neurological aging. This HPA axis is an endocrine closed loop system that controls the secretion of stress hormones (glucocorticoids). Due to the decreased ability to handle stress & increased activation of the HPA axis associated with adaptogenic properties may be beneficial. Besides the presence of other potential sources of antioxidant compound such as polyphenols, flavonoids & alkaloids, vitamin-C can attribute to the antioxidant efficacy of Withania somnifera as In-vitro exposure of goat blood to 1, 4-dioxane & TCE can alter the biochemical parameters, induce oxidative imbalance by reducing antioxidant dioxane / TCE induced oxidative stress.

### RESULTS AND OBSERVATIONS

Studies indicate that the Ashwagandha (*Withania somnifera* Dunal) possess antistress property. It also appears to exert a positive influence on the endocrine, cardiopulmonary & CNS. Toxicity studies reveal that Ashwagandha appears to be a safe compound.

### DISCUSSION AND CONCLUSION

The results of research articles are very encouraging & indicate that this herb should be studied more extensively to confirm these results & reveal other potential therapeutic effects. According to Guna Karma of Ashwagandha, due to Snigdha Guna (Unctuous), Balya (Tonic) and Vaya-Sthapana (Anti-aging) properties of Ashwagandha, it directly acts as Rasayana. It will break the pathology and help to maintain the strength of the body to stand during stress. Also Ashwagandha supports sound sleep and antistress effect due to alkaloids and glycosides which can affect elements of the central nervous system and immune system.] An important active principle of *Withania somnifera* is Withaferin-A, have been shown to possess a remarkable range of therapeutic properties i.e. antistress, antioxidant, immunomodulatory.

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