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# The critical interpretation on *Ashwagandha* (*Withania Somnifera*) and its physiological action over human body- A review study

**Pradeep Kumar[1*], Sunil P Nikhate[2], Vaidehi V Raole[3], Aparna Bagul[4], Ravi Pandya[5], Sujit Kumar[6]**

[1] PG Scholar, Department of Kriya Sharir, Parul Institute of Ayurveda, Vadodara, Gujarat, India
[2] Guide and Associate Professor, Department of Kriya Sharir, Parul Institute of Ayurveda, Vadodara, Gujarat, India
[3] Professor, Department of Kriya Sharir, Parul Institute of Ayurveda, Vadodara, Gujarat, India
[4] HOD and Associate Professor, Department of Swathyavritta, Parul Institute of Ayurveda, Vadodara, Gujarat, India
[5] Assistant Professor, Department of Kriya Sharir, Parul Institute of Ayurveda, Vadodara, Gujarat, India
[6] Assistant Professor, Department of Kriya Sharir, Vivek College of Ayurvedic Science and Hospital, Bijnor, Uttar Pradesh, India

**Abstract**
*Ashwagandha* is very valued herb of the Indian *Ayurvedic* system of medicine as a *Rasayana*. It is used for various kinds of disease processes and especially as a nervine tonic. Considering these facts many scientific studies were carried out and its adaptogenic / anti-stress activities. It has a Cognitive Enhancing Effect and has been shown to be helpful in children with memory disorders as well as elderly people with memory loss. It's also been shown to cope with neurodegenerative disorders like Parkinson's, Huntington's, and Alzheimer's. The medication has anti-inflammatory, anti-arthritic, cardio protective, anti-stress, tranquillizer-like sedative action, hypoglycaemic, and thyro-protective properties, and has been proven to be an important therapy for malignant growth in multiple organs.

**Keywords:** ashwagandha, neuroregenerative, anti-stress etc

## Introduction
*Ashwagandha (Withania somnifera*) is one of the most important herbs used for centuries as a Rasayana for its broad variety of health benefits in *Ayurveda* (the conventional form of medicine in India). *Rasayana* is a herbal or metallic preparation that encourages a youthful physical and mental state of health as well as pleasure. These forms of treatments are offered as tonics to young children, and are often taken to improve lifespan by the middle-aged and elderly.
*Ashwagandha* occupies the most influential position among the *ayurvedic Rasayana* plants. For more than 3000 years, *Ashwagandha (Withania somnifera*) has been an important herb in the *Ayurvedic* and indigenous medicinal systems. The plant's sources are categorised as *Rasayana*, i.e. possessing the potential to encourage wellbeing and survival by enhancing disease defence, halting the ageing process, revitalising the body in weakening environments, increasing the individual's ability to withstand adverse environmental influences, and developing a sense of mental well-being [1] It is used for a very long period of time without side effects for both age ranges of both sexes, and also during breastfeeding [2] The Withanolides, a category of steroidal lactones, are due to the pharmacological effects of the *Ashwagandha* roots [3] The leaves are used for the treatment of tumours and tubercular glands in *Ayurvedic* and *Unani* [4] A number of steroidal withanolide lactones have been isolated from *Withania somnifera* leaves [5] which have antibacterial, antifungal, and antitumor properties [6].

## Aim and Objective
To evaluate the effect on *Ashwagandha* on Human Body

## Method and materials
Materials on *Ashwagandha* is gathered from a number of sources, including Ayurvedic and modern books, authentic websites (PubMed, Medicinal Plants, etc.), authentic magazines, literature, manuscripts, *Sanskrit* Dictionary, *Shabdakosha*, and so on.

## Biochemical Constituent
Withanolides, steroidal lactones, have been discovered in *Ashwagandha*. The presence of these steroidal lactones is believed to be responsible for a lot of the pharmacological effects· [6] Moreover, 18 fatty acids, beta-sitesterol, polyphenols and phytosterols are produced by the roots. *Withanine*, *withananine*, *withananinine*, *pseudo-withanine*, *somnine*, *somniferine*, and *somniferinine* are among the alkaloids present in the root. Withanolides, like withaferin A, are present in the leaves of Indian chemotype plants [7].

## Steroidal Compound
Withaferin A, Withanolides G&D, sitoindosides IX&X, and withasomnine are some of these. These have been identified for standardisation as active markers [8, 9] the most important withanolide isolated from the leaves and dried roots of Withania somnifera is withaferin A, a steroidal lactone. Biologically active steroids is linked to anti-inflammatory function, a major component of which is withaferin A. Its activity is equivalent to that of sodium succinate hydrocortisone.

## Anti-Inflammatory Activity
Withaferin A has moderately strong anti-arthritic and anti-inflammatory function. Biologically active steroids, of

which Withaferin A is a major portion, have been linked to anti-inflammatory activity. It is as effective as the dose-to-dose hydrocortisone sodium succinate [10]. It was discovered to successfully suppress arthritic syndrome without having any side effects. The animals treated with Withaferin A demonstrated weight gain in arthritic syndrome, unlike hydrocortisone-treated animals that lost weight. Many animal models of inflammation, such as carrageenan-induced inflammation, cotton pellet granuloma, and adjuvant-induced arthritis, have demonstrated that asganda (Withania somnifera) has anti-inflammatory properties. Two inflammation models, respectively, the primary stage of adjuvant-induced arthritis and formaldehyde-induced arthritis, were carried out in comprehensive studies to examine the release of serum β-1 globulin during inflammation.

**Cardiovascular Activity**

According to the following research, *Withania somnifera* can be useful as a general tonic due to its beneficial effects on the cardiopulmonary system. In dogs and frogs, the impact of *Withania somnifera* on the cardiovascular and respiratory systems were explored [11]. There was a sustained hypotensive, bradycardia, and respiratory stimulant action of the alkaloids in pets. The study showed that the hypotensive effect was largely due to the activity of autonomic ganglion blocking and that the hypotension was mostly due to a depressant action on the higher cerebral centres.

**Impact on Neurodegenerative Disorders Including Parkinson's, Huntington's, and Alzheimer's**

According to the findings of neuropathological post-mortem tests of the brain of patients with Alzheimer's disease, neuritic atrophy and synaptic loss [12] are the main triggers of cognitive dysfunction [13]. Neurite atrophy has also been observed as a major part of the aetiology of patients with other neurodegenerative disorders such as Parkinson's disease, Huntington's disease, and Creutzfeldt-Jakob disease. Ashwagandha has been shown the studies to delay, interrupt, reverse, or prevent neuritic atrophy and synaptic loss. *Ashwagandha* can be used to treat Alzheimer's disease, Parkinson's disease, Huntington's disease, and other neurodegenerative diseases at any stage of the disease, even before a person has been diagnosed and is still experiencing mild forgetfulness [14].

**Effects of Gaba-Mimetic Drugs on Neurodegeneration and Neuroregeneration**

The GABA-mimetic activity of *Ashwagandha* root extract has been supported by behavioural studies. One of the etiopathological mechanisms in the pathophysiology of tardive dyskinesia is GABAergic neurodegeneration due to neuroleptic-induced excitotoxicity and oxidative stress [15, 16, 17] and GABA agonists have been shown to be effective in alleviating the symptoms of tardive dyskinesia. It's possible that *Ashwagandha* root extract's beneficial effect is due to its GABA mimetic activity. The constituents of *Ashwagandha*, as well as their metabolites, promote nerve growth.

**Interactions between Drugs**

When *Withania somnifera* is combined with a diazepam, it has an additive effect. When used in status epilepticus, the combination was able to reduce the effective dose of diazepam by a significant amount, providing complete protection with no subsequent mortality [18, 19].

**Discussion**

The plants pharmacological effects, such as antioxidant, anxiolytic, adaptogen, memory enhancer, antiparkinsonian, antivenom, and anti-inflammatory, have been thoroughly investigated. Immunomodulation, hypolipidemia, antibacterial activity, cardiovascular safety, sexual orientation, resistance, and dependency are among the other effects examined. Although the findings of this study are positive for the use of *Withania somnifera* as a multi-purpose therapeutic agent, the existing literature has many limitations. Though *Withania somnifera* has long been used successfully in *Ayurvedic medicine*, further clinical trials are required to confirm its medicinal application. It's also important to note that *Withania somnifera* extracts may have a modulating effect when offered in conjunction with other herbs or medications, rather than only being effective on their own.

Abortifacient, adaptogenic, alterative, analgesic, antiarthritic, antiasthmatic, antibiotic, antidyspeptic, anti-inflammatory, antimitotic, antiproliferative, antitumor, aphrodisiac, astringent, carminative, contraception, diuretic, emetic, febrifuge, fungicidal, hypnotic, immune-modulating, hypnotic [20, 21, 22, 23]. It also has the ability to be cytotoxic, chemopreventive, and radiosensitizing. Since *Ashwagandha* is used in Ayurvedic medicine in a way like ginseng is used in traditional Chinese medicine, some herbalists refer to it as Indian ginseng. The operation of the *Withania* extract was found to be nearly equivalent to that of the Panax ginseng extract in experiments. However, unlike Panax ginseng, Withania somnifera does not tend to cause ginseng-abuse syndrome, which is characterised by elevated blood pressure, water accumulation, muscle pain, and insomnia [24, 25, 26].

**Conclusion**

According to a comprehensive analysis of the literature, *Withania somnifera* is a major source of a number of pharmacologically and medicinally essential chemicals, including withaferins, sitoindosides, and other beneficial alkaloids. Thirteen positive alkaloids have been detected in Indian varieties. Apart from various amino acids and other normal plant constituents, withanolides are the most searched chemical constituents of *Withania somnifera*, with about 138 withanolides with both and side chain reported to date. *Withania somnifera* as a multi-purpose therapeutic agent, the existing literature has many limitations. Though *Withania somnifera* has long been used successfully in *Ayurvedic medicine*, further clinical trials are required to confirm its medicinal application.

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**Conflict of Interest:** Nil

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