

## THE PHARMA INNOVATION

# Traditional And Medicinal Uses of Withania Somnifera

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Ashwagandha has long been considered as an excellent rejuvenator, a general health tonic and a cure for a number of health complaints. It is a sedative, diuretic, anti-inflammatory and generally respected for increasing energy, endurance, and acts as an-adaptogen that exerts a strong immunostimulatory and anti-stress agent. Ashwagandha is taken for treating cold and coughs, ulcers, emaciation, diabetes, conjunctivitis, epilepsy, insomnia, senile dementia, leprosy, Parkinson's disease, nervous disorders, rheumatism, arthritis, intestinal infections, bronchitis, asthma, impotence and a suppressant in HIV/AIDS patients. According to Indian Herbal System (Ayurveda), Ashwagandha is considered one of the most important herbs and the best adaptogenic. It contains constituents like cuseohygrine, anahygrine, tropine, and anaferine, glycosides, withanolide with starches and amino acid. Withanolide consists of steroidal molecules which is said to fight inflammation. Ashwagandha stimulates the immune system, combats inflammation, increases memory, and helps maintain general health and wellness. Ashwagandha is known to increase the production of bone marrow, semen, and acts anti-aging. Ashwagandha anti-tumor and anti-inflammatory agents are approved in several studies. Its steroidal is much higher than that of hydrocortisone which is a common treatment in cancer cases. Diseases like TB, chronic upper respiratory diseases and HIV have been added to the list of Ashwagandha due to its strong immunostimulatory activity, and it is recognized as a blood tonic, especially in gynecological disorders including anemia and irregular menstruation. Patients with anxiety can also benefit from Ashwagandha

*Keyword:* Ashwagandha, Sedative, Diuretic, Cognitive and Neurological Disorders

**INTRODUCTION:** Ashwagandha (*Withania somnifera*), also known as Indian ginseng, and as Indian Winter Cherry is an important ancient plant, the roots of which have been employed in Indian traditional systems of medicine, Ayurveda and Unani.

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It grows in dry parts in sub-tropical regions. Rajasthan, Punjab, Haryana, Uttar Pradesh, Gujarat, Maharashtra and Madhya Pradesh are the major Ashwagandha producing states of the country. The estimated production of Ashwagandha roots in India is more than 1500 tonnes and the annual requirement is about 7000 tonnes necessitating the increase in its cultivation and higher production. Ashwagandha, the Indian ginseng or winter cherry has been used as a quiet valuable herb in the Ayurvedic and indigenous

medical system for over 4000 years. The roots, leaves and fruits (berry) possess tremendous medicinal value. A famous Ayurvedic rejuvenative botanical used in many tonics and formulas, Ashwagandha is the best rejuvenative that helps maintain proper nourishment of the tissues, particularly muscle and bones, while supporting the proper function of the adrenals and reproductive system.



- Botanical Name : *Withania Somnifera*
- Family Name : Solanaceae
- Common Name : Withania, Winter Cherry, Indian Winter Cherry, Indian Ginseng, Ashwagandha
- Part Used : Roots, Leaves
- Habitat : Cultivated throughout drier parts of India.
- Product offered : Roots

The plant grows in dry and sub-tropical regions and is an erect branching low lying shrub reaching a height of about 1.50 m. It grows in dry parts in sub-tropical regions. Rajasthan, Punjab, Haryana, Uttar Pradesh, Gujarat, Maharashtra and Madhya Pradesh are the major Ashwagandha producing states of the country. In Madhya Pradesh alone it is cultivated in more than 5000 hectares. The estimated production of Ashwagandha roots in India is more than 1500 tonnes and the annual requirement is about 7000 tonnes

necessitating the increase in its cultivation and higher production.

#### Chemical Constituents:

The methanol, hexane and diethyl ether extracts from both leaves and roots of Ashwagandha were found. Alkaloid percentage in roots ranges from 0.13 to 0.31%. The roots of *Withania somnifera* are alterative, aphrodisiac, deobstruent, diuretic, narcotic, sedative and restorative in nature. The pharmacological activity of the root is attributed to the alkaloids and steroidal lactones. The total alkaloid content in the roots of Indian types has been reported to vary between 0.13 and 0.3, though much higher yields (up to 4.3 per cent) have been recorded elsewhere. Many bio-chemical heterogeneous alkaloids, including choline, tropanol, pseudotropin, cuscoygrine, 3-tigloyloxytropin, isopelletierine and several other steroidal lactones. Twelve alkaloids, 35 withanolides and several saponins have been isolated from the roots of the plant have been studied.

A saponin is a biologically active constituent known as withanolide containing a glucose molecule at carbon 27. Indian ginseng's pharmacological activity has been attributed to two main withanolides, withaferin A and withanolide D. Withaferin-A is therapeutically active withanolide reported to be present in leaves. In addition to alkaloids, the roots are reported to contain starch, reducing sugars, glycosides, dulcitol, withancil, an acid and a neutral compound. The amino acids reported from the roots include aspartic acid, glycine, tyrosine, alanine, glutamic acid and cysteine.

#### Description

It grows as a short shrub (35–75 cm) with a central stem from which branches extend radially in a star pattern (stellate) and covered with a dense mat of woolly hairs (tomentose). The flowers are small and green, while the ripe fruit is orange-red and has milk-coagulating properties. The plant's long, brown, tuberous roots are used for medicinal purposes.

### Climatic conditions for growth

*Withania somnifera* is grown as late rainy-season (kharif) crop. Semitropical areas receiving 500 to 750 mm rainfall are suitable for its cultivation as a rainfed crop. If one or two winter rains are received, then root development improves.<sup>1</sup>

The crop requires a relatively dry season during its growing period. It can tolerate a temperature range of 20 to 38°C and as low a temperature as 10°C. The plant grows from sea level to an altitude of 1500 meters.<sup>1</sup>

### Biochemical-properties

The biochemical composition of *Withania somnifera* has been widely studied and researched. Some 35 compounds had been analyzed in the laboratory.

- Alkaloids: About 13 alkaloids are known as Isopelletierine, Anaferine, Cuseohygrine, Anahygrine, Tropine etc.
- Somniferin: It is a bitter alkaloid with some hypnotic activity.
- Steroidal Lactones: Withanolides, Withanoferins.
- Saponins: These are with an additional acyl group (Sitoindoside VII and VIII).
- Withanolides With Carbon At 27th Position: Sitoindoside IX and X.
- Iron.

Others: resin, fat, coloring matters, a reducing sugar, phytosterol, Ipuranol and a mixture of saturated and unsaturated acids.

### Medicinal values

- This herb is considered an adaptogen which is a nontoxic herb that works on a nonspecific basis to normalize physiological function, working on the HPA axis and the neuroendocrine system.
- Ashwagandha is effective for insomnia but does not act as a sedative. Its rejuvenative and nervine properties produce energy which in turn help the body to settle and sleep. Thus it helps the body to address a stress related condition rather than masking it with sedatives. A

herb that rejuvenates the nervous system, erases insomnia and eases stress.

- Ashwagandha has also been shown to lower blood pressure and is highly effective in stopping the formation of stress induced ulcers.
- In arthritis, which involves joints that are painful, dry, swollen and inflamed, Ashwagandha would be the herb of choice.
- One of the special properties of Ashwagandha is that it will enhance ojas. Ojas is the most subtle, refined level of the physical body and is the end result of healthy food which is properly digested. It is responsible for a healthy immune system, physical strength, lustrous complexion, clarity of mind and sense of Well-being. It allows consciousness to flow within the body. With decreased ojas, we are less in touch with ourselves and more prone to diseases and having a feeling of disharmony. 'Ojakshaya' (decreased ojas) is a condition similar to AIDS/HIV
- Research on Ashwagandha has concluded that extracts of the plant has a direct spermatogenic influence on the seminiferous tubules of immature rats presumably by exerting a testosterone-like effect.
- Ashwagandha increases hemoglobin (red blood count) and hair melanin. It stabilizes blood sugar and lowers cholesterol.

### Ashwagandha for Weight Loss

Ashwagandha is a commonly used herb in Ayurvedic medicine. Through its adaptogenic effects Ashwagandha may help to encourage weight loss when used in combination with other weight loss enhancing supplements. An adaptogen is a substance which helps minimise stress related fluctuations in the diet. This ancient Ayurvedic herb is believed to be helpful for people who either overeat or under eat due to environmental stress. It may also help boost metabolism and eliminate irregularities in digestion.

Ashwagandha, which is also known as winter cherry or Indian ginseng, has natural antioxidants. Thus it may improve overall health and promote better fat burning. Besides, it shows natural anti-microbial effects and may improve immune function. The body enters a survival mode when immune function is compromised by pathogens. In such a condition fat burning is not a priority for the body, and weight loss comes to a standstill at least till the body fully recovers. So better immunity will only have a positive effect on weight loss.

As it helps reduce stress and build a weakened immune system, Ashwagandha can be a Godsend for people who want to lose weight but experience consistent fatigue or are often ill. It can also reduce inflammation which may be common in overweight people. Ashwagandha, being rich in iron, can help build red blood cells and improve blood circulation.

According to Brenda Watson and Leonard Smith, who have authored the book 'The Fiber35 Diet: Nature's Weight Loss Secret', Ashwagandha may help in stress related weight gain. Cortisol is a hormone produced by the adrenal glands. Over production of this hormone can lead to weight gain, muscle loss, nervous eating and anxiety. Cortisol is released in larger amounts during times of stress, and being a survival hormone it stimulates glucose production and triggers a hunger response in the brain. Weight gain due to excessive cortisol levels has a tendency to accumulate in the belly. According to the Life Extension Magazine article "Stress Reduction, Neural Protection and a Lot More from an Ancient Herb" by Dale Kiefer, Ashwagandha can naturally lower cortisol levels up to 26%. Because it is an adaptogenic herb, it helps support cortisol production and the adrenal glands.

Some studies have shown that Ashwagandha's adaptogen properties are especially powerful when it is used in synergistic combination with similar herbs. Watson and Smith suggest using a potent, standardized extraction of Ashwagandha root, along with the root of the herb eleuthero and

rholiola rosea, which are also adaptogens, for optimum effect in weight loss. Also, as Ashwagandha itself contains no stimulants, it can be a safe addition to supplements like green tea which stimulates weight loss.

### Useful preparations

- A paste of Ashwagandha leaves when applied on a local inflammation acts as anti-inflammatory.
- The herbal massage oil which includes Ashwagandha herb is useful in many conditions like paralysis, epilepsy, sleeplessness etc.
- The preparation of Ashwagandha which is processed with ghee, sugar and honey is a very good aphrodisiac and increases semen quantity, sperm count and mobility. It is effectively used in Erectile dysfunction, low libido and premature ejaculation.
- Ashwagandha churna when used regularly helps to improve the conditions like senile debility, rheumatism, in all cases of general debility, nervous exhaustion, brain-fag, low of memory, loss of muscular energy and spermatorrhoea. It increases body energy and vigor. It helps to rebuild the body system which is worn out due to chronic diseases like syphilis, rheumatism etc. It also replenishes the lowered energy of body due to over-work, mental exertion thus preventing early ageing.
- A good remedy to balance sweet cravings for vata can be prepared using Ashwagandha. Roast an ounce of Ashwagandha in ghee and add a tablespoon of date sugar. Store in a screw top glass jar in the refrigerator. This can be eaten in the morning about twenty minutes before breakfast, in the mid afternoon— if sweet cravings arise— and at bed time with a cup of hot milk.
- Ashwagandha when used regularly, is very useful in emaciated children. It increases body weight and body energy.

- Regular use of Ashwagandha helps to reduce blood sugar and cholesterol levels.
- Fine powder of Ashwagandha well mixed with oil is very use full in many skin conditions.
- Ashwagandha also acts as galactogogue and thickens and increases the nutritive value of the milk when given to nursing mothers.

### Side effects

Excessive doses of ashwagandha have been reported to cause abortions, so pregnant women should avoid this herb. Do not take this herb with other sedatives or anti-anxiety drugs. Large doses can cause diarrhea, stomach upset and vomiting.

### ASHWAGANDHA AS MEDICINAL HERB

Ashwagandha is considered to be one of the best rejuvenating agents in Ayurveda. Its roots, seeds and leaves are used in Ayurvedic and Unani medicines. Ashwagandha root drug finds an important place in treatment of rheumatic pain, inflammation of joints, nervous disorders and epilepsy. Dried roots are used as tonic for hiccup, cold, cough, female disorders, as a sedative, in care of senile debility, ulcers, etc. Leaves are applied for carbuncles, inflammation and swellings. Leaf juice is useful in conjunctivitis. Bark decoction is taken for asthma and applied locally to bed sores. Ashwagandha and its extracts are used in preparation of herbal tea, powders, tablets and syrups.

Ashwagandha has anti-inflammatory, anti-tumor, anti-stress, antioxidant, mind-boosting, immune-enhancing, and rejuvenating properties. Ashwagandha root has also been noted to have sex-enhancing properties. Ashwagandha is mentioned in the ancient Kama Sutra as an herb to be used for heightening sexual experience. Ashwagandha has the ability to restore sexual health and improve overall vitality while promoting a calm state of mind. A 2002 laboratory study indicates ashwagandha stimulates the growth of axons and dendrites. A 2001 study in rodents showed ashwagandha had memory boosting ability. A 2000 study with rodents showed ashwagandha to have anti-

anxiety and anti-depression effects.

The plant has been used as an aphrodisiac, liver tonic, anti-inflammatory agent, and more recently to treat asthma, ulcers, insomnia, and senile dementia. Clinical trials and animal research support the use of ashwagandha for anxiety, cognitive and neurological disorders, inflammation, and Parkinson's disease. Incorporation of ashwagandha in the diet may prevent or decrease the growth of tumors in human.

It helps in providing progressive, long lasting results for various health concerns like aging, anemia and slow growth, arthritis, fatigue, waning memory, sports fitness and stress-disorders. Pharmacological studies and research so far have indicated that Ashwagandha has anti-tumour, anti-stress, antioxidant boosting, haemopoietic and rejuvenating properties. It is also an exceptional nerve tonic and nourishes the nerves and improves nerve function to maintain calm during stressful conditions. It also nourishes crucial mind and body connection and psychological immune response.

### Ashwagandha Side Effects

Ashwagandha does not have any significant side effects reported in the medical literature. Safety in pregnancy has not been fully established for Ashwagandha.

### ASHWAGANDHA BENEFITS

Ashwagandha benefits all parts of the body and can be used as a tonic or in oral form. Several studies have shown that Ashwagandha is useful in addressing the following health problems:

- 1) Osteoarthritis: A study in 2008, scientists tested ashwagandha's effects on human cartilage and found that the herb may help protect against inflammation and cartilage damage associated with osteoarthritis.
- 2) Anxiety: In an animal-based study published in 2000, researchers found that ashwagandha had an anti-anxiety effect similar to that of lorazepam (a medication used to treat anxiety disorders). The herb also appeared to ease depression.
- 3) Type 2 Diabetes: Ashwagandha may help normalize high blood sugar and improve insulin

sensitivity, according to preliminary, animal-based research published in 2008.

4) Cancer:: : In a 2003 study, tests on human tumor cell lines revealed that ashwagandha may slow the growth of lung, breast, and colon cancer cells. Published in 2007, another study on human cells shows that ashwagandha may inhibit tumor growth without harming normal cells.

5) Anti-Oxidant: Ashwagandha used as an anti-oxidant, as studies have shown that it can eliminate free radicals from your immune system. Free radicals are the agents that cause the breakdown of your body's tissue, alternatively known as aging.

6).Provide energy: Studies show that supplementing with ashwagandha can provide the energy needed to get through long workouts while also allowing for maximum recovery and cell re-growth.

7) General tonic: Ashwagandha is a tonic, which increases sperm count and sexual potency. In the rural areas vegetable made out of this plant is given to tuberculosis patients. It also increases the iron content in the blood.

#### **ASHWAGANDHA EFFECTS ON THE BRAIN CHEMICALS:**

- GABA-mimetic activity having anxiolytic effect.
- Inhibiting Cholinesterase and thereby retaining Acetylcholine for longer time.
- Slowing down of tolerance of the analgesic effects of morphine.
- Induction of axon and dendrite outgrowth, there by resulting in neuritis regeneration and synaptic reconstruction.

#### **ASHWAGANDHA**

##### **IMMUNOSTIMULATORY EFFECT:**

- Immunity stimulating effect through Macrophages.
- Raised antibody titer against Bordetella pertussis strains (Combats Diphtheria).
- Protective effect in Cyclophosphamide induced myelosuppression.
- Beneficial in Ageing and Copper induced lipid peroxidation.

- Ashwagandha helping in Chronic Fatigue Syndrome.

#### **ASHWAGANDHA AS AN ADAPTOGENIC AND ANTI-STRESS AGENT:**

- Respected as Ginseng in Chronic stress models.
- Protective effect in stress induced neuronal degeneration.
- Helping to achieve better state to fight against stress.
- Prevents stress related ulcer.

#### **ASHWAGANDHA REJUVENATIVE AND REPRODUCTIVE ACTION:**

- Increases libido and sexual function.
- Supports female reproductive system, and increases ovarian weight and folliculogenesis.
- Ashwagandha is approved as a greatest rejuvenative herb in Indian Herbal System.
- Useful in treating arthritis, diabetes and hypertension.
- Ashwagandha is a potent inhibitor of angiogenesis and it is respected for its phytochemical

#### **ASHWAGANDHA IN CANCER PATIENTS:**

- Acts as anti-carcinogenic.
- Growth inhibitor of human tumor cell lines.
- Counteracting mutagenic effect.
- Ashwagandha possesses anti-proliferative agent.
- Respected as a natural source of potent radiosensitizer in chemotherapy.
- Recommended in Ascitic Sarcoma.
- Useful in Melanoma induced metastasis.
- Supports DMBA induced Squamous cell carcinoma.
- Enhances cellular immune response to mitogens.
- Reversing Paclitaxel induced Neutropenia.

### ASHWAGANDHA IN PARKINSON'S AND ALZHEIMER'S DISEASE:

- An L-dopa in an herbal formulation found in Ashwagandha.
- Enhances memory through cholinergic channels.
- Stabilizes mood, improves learning ability.

### ASHWAGANDHA AS A FREE RADICAL SCAVENGER & ANTIOXIDANT:

- Increases the three natural antioxidants in brain.
- Stimulates Immune system through Nitric oxide production in Macrophage.
- Dose dependent free radical scavenging and protective effect on DNA cleavage.
- It has a good effect in Iron overload and Lead toxicity.
- Prevents Neuroleptic induced extra pyramidal side effects.

### ASHWAGANDHA ON ANXIETY AND DEPRESSION:

- Ashwagandha is comparable to Bacopa Monnieri in anxiety and depression
- Anxiolytic effect comparable to Lorazepam.
- Antidepressant effect comparable to Imipramine.
- Found nontoxic in doses up to 100 mg per kg of body weight.
- As calming, anticonvulsant and antispasmodic effect.
- Able to stimulate endocrine glands.

### ASHWAGANDHA AS A CARDIOVASCULAR PROTECTOR

- Able to protect Cardiovascular system against ischemic and reperfusion injury.
- Beneficial in Focal ischemia.
- Supports anti-atherogenic activity in polyherbal formula.

- Possesses a mild hypoglycemic, diuretic and an anti-hypercholesterolemic agent.
- Supports Streptozotocin induced diabetes.
- Supportive in retinopathy.

### CONCLUSION

*Withania somnifera*, best known as ashwagandha has been used for centuries for the treatment of vivid health disorders. Multiple health benefits featured in this herbal supplement makes it as a perfect rejuvenator of physical and psychological health. As per research, this medicinal herb is mainly found in the regions of North America and India. Powerful antioxidant compounds enriched in this herb scavenges free radicals and reduces aging impact on person. Apart from consuming this extract, diet taken by person plays an important role in increasing the level of antioxidants in body. In order to obtain good level of antioxidants, it is advised to include surplus amount of fruits and vegetables in diet. Apples, berries, onions and carrots are some among the top listed food items enriched with antioxidant compounds

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