

A CRITICAL REVIEW OF ASHWAGANDHA (*WITHANIA SOMNIFERA* (L.) DUNAL.): AN AYURVEDIC HEALTH TONIC

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ABSTRACT

Ashwagandha (*Withania somnifera* L. Dunal) is a medicinal plant widely used in Ayurveda as a *Rasayana*. It is well described for its strength promoting, bulking and rejuvenating properties, in all the three major classical texts of Ayurveda collectively called as *Brihatryi*. In a number of Nighantus, the *Balya karma* (strength promoting action) and *Kshayahara* (to alleviate consumption) actions of Ashwagandha are mentioned. Now, the modern-day researchers in health sciences are also considering its pacifying effects in various diseases and has been established as general health promoting supplement through a number of experimental studies.

KEYWORDS: *Ashwagandha*, *Withania somnifera* (L.) Dunal, *Rasayana*, *Balya* and *Brihana*.

INTRODUCTION

Ashwagandha is a well-known Ayurvedic medicinal herb known for its *Rasayana* (rejuvenator) properties. In Ayurveda, it is used in treatment of various diseases, especially as a nervine tonic. Apart from Ayurvedic classical texts, many present-day experimental studies

have established its adaptogenic/anti-stress activities. Ashwagandha has also shown anti-tumor activity against Chinese hamster ovary (CHO) cell carcinoma.

Researchers in health sciences have been keenly engaged in establishing immuno-modulatory activity of medicinal herbs including Guduchi, Shatavari and Ashwagandha. An innovative industry-academia research project has been granted patent by the US patent office that has led to a new vaccine adjuvant extracted from Ashwagandha, which is used in Ayurveda as an immunity enhancer.^[1]

Talking about classical Ayurvedic texts, Ashwagandha is mentioned in the *Brihatryi* (Charak Samhita, Sushruta Samhita and Ashtangahridaya) majorly indicating its *Balya* (strength increasing), *Brihana* (increasing the body bulk) and *Rasayana* effects (rejuvenation).



Fig. 1: Ashwagandha (*Withania somnifera*).

Botanical name: *Withania somnifera* (L.) Dunal

Family: Solanaceae

The Latin species name '*somnifera*' means "sleep inducing".

TAXONOMICAL CLASSIFICATION

Kingdom: Plantae

Sub kingdom: Viridiaeplantae-green plants

Division: Angiospermae-flowering plants, angiosperms

Subdivision: Spermatophytina-spermatophytes, seed plants, phanerogams

Class: Magnoliopsida (Dicotyledons)

Order: Solanales

Family: Solanaceae-nightshades

Sub family: Solanoideae

Genus: *Withania*

Species: *somnifera*

CLASSICAL CLASSIFICATION

Table 1.1: Classical Classification of Ashwagandha.

Sr. No.	Name of <i>grantha</i>	Gana/varga
1.	Charak samhita	Balya, brimhaniya, Madhura skandhas
2.	Dhanwantri Nighantu	Guduchyaadi varga
3.	Shodhal Nighantu	Guduchyaadi varga
4.	Madanpal Nighantu	Abhayaadi varga
5.	Kaiyadev Nighantu	Aushadhi varga
6.	Bhavaprakash Nighantu	Guduchyaadi varga
7.	Raj Nighantu	Shataahvaadi varga
8.	Shaligram Nighantu	Guduchyaadi varga
9.	Priya Nighantu	Pippalyaadi varga
10.	Adarsha nighantu	Kantakaaryaadi varga
11.	Mahaushadhi Nighantu	Bilwaadi Nighantu

IMPORTANT SYNONYMS WITH THEIR ETYMOLOGY^[2]

Table No. 1.2: Synonyms of Ashwagandha with their interpretation.

Sr. No.	Synonym	Nirukti
1.	अश्वगन्धा	अश्वस्येव गन्धोऽस्याः, अथवा ऽश्वस्येव गन्ध उत्साहः (कामवेगः) यस्याः सेवेन सा । Root, the part used, emits horse's smell and it promotes sexual potency like that of horse.
2.	अश्वकन्दः	अश्वस्य गन्धयुक्तः, अश्वस्येव काम शक्तिप्रदः कन्दः मूलमस्याः । Root, the part used, emits horse's smell and it also promotes sexual potency like that of horse.
3.	अश्वावरोहकः	अश्वमवरोहयति अधःकरोति पुंस्त्व शक्तौ इति । As it promotes sexual potency like that of horse.
4.	कञ्चुका	कञ्चते बध्नाति शुक्रं दीप्तिकरञ्च, 'कचि दीप्ति बन्धनयोः' । It retains semen.
5.	कामरूपिणी	कामस्येव रूपं भवत्यस्याः । It also promotes complexion.
6.	गन्धपत्री	पत्राणामप्यश्वगन्धित्वात् । Because it's leaves also have a smell like that of a horse.
7.	पुत्रदा	पुत्रं ददाति शुक्रवर्धकत्वात् । It provides male progeny.
8.	बलदा	बलं ददाति, बलवर्धनीत्यर्थः । Promotes strength.
9.	मारुतघ्नी	मारुतं वातविकारं हन्ति ।

		Is useful in <i>Vatika</i> disorders.
10.	वराहकर्णी	वराहकर्णवत् पत्राण्यस्याः । It is the herb with leaves resembling a pig's ear.
11.	वृषा	वृषवत् शुक्रवर्धनी वाजीकरी च । It promotes sexual potency like that of horse.
12.	हयाह्वया	अश्वनाम्ना प्रख्याता । Because it provides horse's potency, it is known by the title of horse.

RASAPANCHAKA (AYURVEDIC PROPERTIES) OF ASHWAGANDHA^[3]

Rasa: *Katu, Tikta, Kshaya*

Guna: *Laghu, Snigdha*

Virya: *Ushna*

Vipaka: *Madhura*

Doshakarma: *Vata-kapha shamaka*

PANCHABHAUTIKA SANGHATANA

Table 1.3: Panchbhautic Sanghatana of Ashwagandha on The Basis of It's Rasapanchaka.

S.N.	Raspanchaka	Akasha	Vayu	Agni	Jala	Prithavi
1.	Katu	-	+	+	-	-
	Tikta	+	+	-	-	-
	Kshaya	-	+	-	-	+
2.	Laghu	+	+	+	-	-
	Snigdha	-	-	-	+	-
3.	Virya	Ushna	-	-	+	-
4.	Vipaka	Madhura	-	-	-	+
Total		2	4	3	2	2

According to the above table, *Vayu* and *Agni mahabhuta* are dominant in Ashwagandha followed by *Akasha*, *Prithavi* and *Jala mahabhuta*.

KARMA: It is *Balya, Rasayani, Shukrala, Veeryaprada* because of the *Madhur vipaka* dominance.^[4]

ROGAGHANTA: It is used for *Kshaya* (consumption), *Nidranasha* (insomnia), *Vatarakta* (inflammatory joint disease), *Sandhishoola* (joint pains), *Vajikara* (aphrodisiac), *Shukra vardhana* (increases semen in both quantity and quality), *Shwitra* (leucoderma), *Kasa* (cough), *Shopha* (inflammation), *Shawasa* (dyspnoea), *Vrana* (ulcers).^[5]

THERAPEUTIC USES

A. As *Rasayana*

1. Ashwagandha taken with milk, ghee, oil or tepid water for a fortnight promotes development of body.^[6]
2. Mandukaparni, Shankhapuṣpi, Ashvagandha and Shatavari should be used in order to promote intellect, life-span, stability and strength.^[7]
3. Ashwagandha powder along with powders of Safed musali and Vidarigandha taken with milk promotes strength.^[8]

B. Consumption

1. The powder of Ashwagandha, Tila and Maasha is taken with goat's ghee and honey.^[9]
2. One may take powder of Sharkara, Ashwagandha and Pippali mixed with ghee and honey.^[10]
4. One should take milk cooked with Ashwagandha which provides nourishment to the body. Or ghee obtained from that milk should be taken after adding sugar and followed by milk intake.^[11]
5. Ashwagandha, Yava and Punarnava should be used for rubbing externally.^[12]
6. Ghee extracted of the milk boiled with Ashwagandha is cooked with Sharkara, milk and meat along with the paste of *Jivaniya* drugs. It is useful in consumption and allied disorders.^[13]
7. Powder of Ashwagandha should be taken with decoction of Vasa.^[14]

C. Excessive emaciation

In case of excessive emaciation Ashwagandha root powder should be used.^[15]

D. Bronchial asthma

The *kshara* (alkali) of Ashwagandha should be taken with honey and ghee.^[16]

E. *Granthivisarpa*

The part should be sprinkled with hot decoction of leaves (of Eranda etc.) and cow's urine or warm paste of Ashwagandha root should be applied externally on the affected part.^[17]

F. *Urustambha*

The roots of Ashwagandha or Arka or Nimba or Devadaru are mixed with honey, mustard and ant-hill earth should be anointed thickly and applied as paste in *Urustambha*.^[18]

G. For conception in infertility

1. Milk processed with Ashwagandha should be taken by women, helps conception.^[19]
2. Powder of Ashwagandha in dose of 3-6gms when given in the beginning of menstrual cycle increases the chances of conception.^[20]

H. Arthritis

Ashwagandha whole plant juice in dose of 20-50ml helps in arthritis.^[21]

I. Lower backache

Powder of Ashwagandha should be taken with Sharkara and ghee.^[22]

J. Vatarakta

Decoction of Ashwagandha and Chopchini (*Smilax china*) should be taken.^[23]

K. Vataja Hridroga

Powder of Ashwagandha and Bibhitaka are mixed with jaggery and given with luke-warm water.^[24]

L. Nidranasha

Powder of Ashwagandha should be taken with ghee and sugar.^[25]

M. Vrana

Paste of Ashwagandha root is applied on non-healing ulcers.^[26]

N. Aphrodisiac

1. The root of Ashwagandha is used for its aphrodisiac action.^[27]
2. About half a drachm (2grams approx.) of Ashwagandha root powder taken with milk or clarified butter acts as an aphrodisiac.^[28]

O. Spermatorrhoea

Powder of Ashwagandha along with sugar, ghee, honey and pippali is to be given with milk and rice diet.^[29]

P. Seminal debility

1. Powder of Ashwagandha root mixed with honey and ghee in equal parts is recommended for seminal debility.^[30]

2. Compound decoction of Ashwagandha 3parts, *Ipomea* root 2parts and long pepper 4parts mixed with 5parts of honey is recommended in doses of half to one ounce in cow milk for seminal debility, consumption and nutrition of weak children.^[31]

PART USED: Root

VARIETIES^[32]

Wild (*vanya*) and cultivated (*gramya*) are the two varieties of the plant. The cultivated plant produce is marketed and used commonly in medicinal purpose especially for internal use. The wild plant roots possess sedative, diuretic and other properties and is preferred only for external use.

PLANT MORPHOLOGY^[33]

Ashwagandha is an erect 0.3-1.5mtrs. high under shrub with terete tomentose branches.

Leaves: 5-10 by 2.5-5cms. ovate, subacute, entire, more or less minutely pubescent. Base is acute, main nerves are about 6 in pair, stout, conspicuous and petioles 6-13mm long and tomentose.

Flowers: Greenish or lurid yellow. Usually, about 5 together in a sessile or nearly sessile umellate cymes. Pedicles 0-4mm long, calyx 5mm long and tomentose, corolla 8mm long, divided more than half way down. Filaments 3mm long, slender, glabrous, anthers are broadly elliptic and 1.25mm long. Ovary and style both are glabrous.

Fruit: Red berry, smooth, with 6mm diameter, enclosed in the inflated calyx. It is slightly 5 angled and softly pubescent outside.

Seeds: Yellow, somewhat scurfy and 2.5mm in diameter.

Roots: Long, tapering, light brown in colour and surmounted by a knotty crown, from which it springs several shrubby shoots.

Cultivation and Harvesting^[34]

The shrub is cultivated in villages around Manasa near Indore in Madhya Pradesh. This drug from Manasa is sold with the misleading suffix, Nagauri (area in Rajasthan). Cultivation at a lesser extent is also carried out near Arnod in Pratapgarh area of Rajasthan. The plant is cultivated in soils that are unsuited for other crops and requires little care and irrigation. Seeds are sown broadcast in the nursery just before the onset of rainy season. The plants flowering and fruiting occurs in December. Harvesting starts from January till March. The

entire plant is uprooted for roots. They are then transversely cut into smaller pieces for drying.

Phytoconstituents^[35]

Ashwagandha contains various non-nutritional chemicals, responsible for medicinal properties. More than 35 phytochemicals are isolated and identified in Ashwagandha. Main chemical constituents are alkaloids and steroidal lactone. Somniferine, somnine, somniferinine, withananine, pseudo-withanine, tropine, pseudo-tropine, 3-a-gloyloxytropane, cuscohygrine and anaferine are the alkaloids present in Ashwagandha, with withanine being the major one. The main steroidal lactones are withaferin A, withanolides A-Y, withasomniferin-A, withasomidienone, withasomniferols A-C, withanone.

Scientific Research on Ashwagandha

1. Adaptogenic/anti-stress effects

Ashwagandha is compared well with Siberian Ginseng (*Eleutherococcus senticosus*) and Chinese Ginseng (*Panax ginseng*) in its adaptogenic properties, and hence it is popularly known as Indian Ginseng.^[36]

An aqueous suspension of Ashwagandha root was administered at 100 mg/kg/oral dosage. The results indicated a significant increase in the plasma corticosterone level, phagocytic index and avidity index in rats subjected to cold swimming stress. In the rats pretreated with the drug, these parameters were near control values and an increase in the swimming time was observed. These results indicate that *Withania somnifera* used in the crude form is a potent anti-stress agent. The results of above studies lend support to the hypothesis of tonics, vitalizers and rejuvenators of Ayurveda which indicate clinical use of *Withania somnifera* in the prevention and treatment of many stress induced diseases like arteriosclerosis, premature ageing, arthritis, diabetes, hypertension and malignancy.^[37]

2. Anti-tumor effect on Chinese hamster ovary (CHO) cell carcinoma

Withania roots caused the inhibitory effect of about 49% on colony forming efficiency of CHO cells. It inhibits the cell growth and prevents the cell attachment. It induced long term growth inhibition of CHO cells which was dependent on the cell density and duration of Ashwagandha exposure.^[38] Oncologists, who plan to use the Ashwagandha as a synergize with conventional chemotherapy or radiation therapy, will be helped with this knowledge.

3. Cognition promoting effect

Ashwagandha is a well-known Ayurvedic Rasayana, and belongs to a sub-group of Rasayanas known as Medhyarasayanas. Medhya typically refers to the mind and mental/intellectual capacity. Thus, Medhya Rasayana like Ashwagandha, is used to promote intellect and memory. The cognition-promoting effect of Medhya Rasayanas is best seen in children with memory deficits, or when memory is compromised following head injury, or a prolonged illness and in old age.^[39]

4. Effect on neuro-degenerative disorders like Parkinson's and Alzheimer's disease

Glyco-withanolides, withaferin- A and sitoindosides VII–X isolated from the roots of Ashwagandha significantly reversed ibotenic acid induced cognitive defects in Alzheimer's disease model.^[40]

Pretreatment with Ashwagandha extract was found to prevent all the changes in antioxidant enzyme activities, catecholamine content, dopaminergic D2 receptor binding and tyrosine hydroxylase expression induced by 6-hydroxydopamine (6-OHDA) in rats (an animal model of Parkinson's disease) in a dose-dependent manner. Thus, these results suggest that Ashwagandha may be helpful in protecting the neuronal injury in Parkinson's disease.^[41]

5. GABA mimetic effect

Behavioral experiments have lent support to the GABA-mimetic activity of Ashwagandha root extract. GABAergic neurodegeneration due to neuroleptic-induced excitotoxicity and oxidative stress is one of the etiopathological mechanisms in the pathophysiology of tardive dyskinesia^[42] and GABA agonists are shown to be effective in ameliorating the symptoms of tardive dyskinesia. The beneficial effect of Ashwagandha root extract might be due to its GABA mimetic activity. Ashwagandha, its constituents and the metabolites of its constituents promote the growth of nerves after taking it for 7 days.

An intriguing study demonstrated that chronic oral administration of withanoside IV attenuated the axonal, dendritic and synaptic losses and memory deficits induced by amyloid peptide A β (25–35) in mice. After oral administration in mice, withanoside IV was metabolized into sominone, which induced marked recovery in neurites and synapses and also enhanced axonal and dendritic outgrowth and synaptogenesis. These effects were maintained for at least 7 days after discontinuing withanoside IV administration. This study

suggests that withanoside IV, and its metabolite, sominone, may have clinical usefulness as antidementia drugs.^[43]

Another team found that the methanol extract of Ashwagandha (5 mg/ml) significantly increased the percentage of cells with neurites in human neuroblastoma SK-N-SH cells. The effect of the extract was dose- and time-dependent. mRNA levels of the dendritic markers MAP2 and PSD-95 by RT-PCR were found to be markedly increased by treatment with the extract. Immunocytochemistry demonstrated the specific expression of MAP2 in neurites extended by the extract. These results suggest that the methanol extract of Ashwagandha promotes the formation of dendrites.^[44]

6. Anxiolytic effect

Ashwagandha also exhibited an antidepressant effect, comparable with that induced by imipramine, in two standard tests, the forced swim-induced 'behavioral despair' and 'learned helplessness' tests. The investigations support the use of Ashwagandha as a mood stabilizer in clinical conditions of anxiety and depression.^[45]

7. Effect on energy levels and mitochondrial health

The effect of Ashwagandha on glycosaminoglycan synthesis in the granulation tissue of carrageenin-induced air pouch granuloma was studied. Ashwagandha is shown to exert significant inhibitory effect on incorporation of ribosome -35S into the granulation tissue. The uncoupling effect on oxidative phosphorylation (ADP/O ratio reduction) was also observed in the mitochondria of granulation tissue. Further, Mg²⁺ dependent ATPase activity was found to be influenced by Ashwagandha. Ashwagandha also reduced the succinate dehydrogenase enzyme activity in the mitochondria of granulation tissue.^[46]

8. Anti-inflammatory effect

Withaferin A and 3-b-hydroxy-2,3-dihydrowithanolide F isolated from *Withania somnifera* show promising antibacterial, antitumoral, immunomodulating and anti-inflammatory properties.^[47]

9. Anti-arthritic effect

The powerful anti-arthritic properties of Ashwagandha are now widely accepted and documented; it is furthermore found to be effective as antipyretic as well as analgesic also.^[48]

Ashwagandha (1000 mg/kg/oral) produced significant analgesic activity for a rat experiencing heat analgesia induced by hot plate method. The peak analgesic effect of Ashwagandha was recorded as 78.03 percent at 2nd hour of administration. The involvement of pain mediators; prostaglandin and 5-hydroxytryptamine in analgesic activity of Ashwagandha was studied by pretreatment with paracetamol (100 mg/kg, Ip) and cyproheptadine (10 mg/kg, Ip). The analgesic activity of Ashwagandha was potentiated significantly by cyproheptadine, however, paracetamol failed to exhibit any significant change in its activity, suggesting the involvement of serotonin, but not prostaglandins in the analgesic activity of Ashwagandha.^[49]

CONCLUSION

Ashwagandha is used as a home remedy in India. It is considered as the best tonic for old people and children, and as aphrodisiac by young people. It is one of the best nervine tonics in Ayurveda which is the most ancient system of Medical Sciences. Ashwagandha has been described as a nervine tonic in Ayurveda and that is why it is a common ingredient of Ayurvedic tonics. Tonics, rejuvenators and vitalizers of Ayurveda appear to pacify diseases and induce immunity and longevity in the users. In Ayurvedic classical texts, it is praised for its property of increasing physical strength and surging male sexual potency; which can be well understood from its synonyms like *Balda*, *Ashwavrohaka*, *Kanchuka*, *Putrada* and *Vrisha*. The modern-day researchers in health sciences are considering the potential of Ashwagandha and calls it Indian Ginseng and it has shown promising effects in the above stated experimental studies, especially with its adaptogenic/anti-stress effect.

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