

ASHWAGANDHA: A CRITICAL REVIEW OF ITS DRAVYAGUNA AND THERAPEUTIC INDICATIONS IN CLASSICAL AYURVEDA

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Article Received on 05 Sept. 2026,
Article Revised on 25 Sept. 2026,
Article Published on 01 Oct. 2026,

<https://doi.org/10.5281/zenodo.23118631>

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How to cite this Article: Dr. Binita Debnath*. (2026). Ashwagandha: A Critical Review of its Dravyaguna and Therapeutic Indications in Classical Ayurveda. World Journal of Pharmaceutical Research, 15(19), 1073-1090. This work is licensed under Creative Commons Attribution 4.0 International license.

ABSTRACT

Ashwagandha (*Withania somnifera* Dunal.), commonly known as Indian ginseng, is one of the most important medicinal plants described in Ayurveda and is classified in the Charak samhita of **Balya and Brimhaniya varga**. It is extensively mentioned in classical Ayurvedic texts for promoting strength, vitality, longevity, and resistance to disease. The present drug review focuses on the Ayurvedic pharmacological and therapeutic attributes of Ashwagandha based on classical literature. According to Ayurveda, Ashwagandha possesses **tikta and kasaya Rasa, laghu and Snigdha Guna, Ushna Virya, and Madhura Vipaka**, and is primarily **Vata-Kapha shamaka**. It is attributed with important properties such as **Balya, Brimhana, Rasayana, Vrishya, Medhya, and Nidrajanana**. The drug is traditionally used in various formulations,

including **Ashwagandha Churna, Ashwagandharishta, and Ashwagandha Ghrita**. The review also highlights its classical synonyms, botanical identification, parts used, therapeutic indications, dosage, and formulations, along with an overview of its modern pharmacological relevance. Ashwagandha represents an important bridge between traditional Ayurvedic concepts of **Rasayana therapy** and contemporary interest in anti oxidant, anti cancerous, immunomodulatory, anti-inflammatory, and neuroprotective effects. A systematic review of its classical and modern pharmacological aspects may help in understanding its therapeutic potential and provide a scientific basis for its continued clinical application in Ayurveda.

INTRODUCTION

In India, Rig-Veda (written between 3500-1600 B.C.) have earliest references of use of plants as medicine and later the properties and therapeutic uses of medicinal plant were recorded in Ayurveda. *Withania somnifera* (L.) Dunal is an important medicinal plant and used in Ayurvedic medicines for the treatment of many diseases and it is also used in other parts of world Ashwagandha (*Withania somnifera* (L.) Dunal) is an important medicinal plant widely used in the traditional system of **Ayurveda**. It belongs to the family **Solanaceae** and is commonly known as **Ashwagandha**, **Indian ginseng**, or **Winter cherry**. The roots are its main useful part.

The botanical name *Withania somnifera* is derived from the Latin *somnifera*, meaning “sleep-inducing,” reflecting its traditional association with relaxation and sleep. The plant contains several biologically active constituents, particularly **withanolides**, along with alkaloids, sitoindosides, and other phytochemicals. Modern pharmacological research has investigated Ashwagandha for antioxidant, anti-inflammatory, adaptogenic, neuroprotective, and other potential activities. Because of its extensive traditional use and growing scientific interest, Ashwagandha has become an important subject for **Ayurvedic drug review and pharmacological research**. A systematic review can therefore consider its classical Ayurvedic properties, botanical identity, phytochemical constituents, therapeutic indications, dosage forms, and evidence from modern studies. **Ashwagandha** (*Withania somnifera* (L.) Dunal) is one of the most widely used medicinal plants in Ayurveda. Also known as ‘Indian ginseng’ or ‘Winter cherry’, this plant of the **Solanaceae** family has been traditionally used for a range of health problems. It is a perennial shrub that can grow in wastelands, cultivated fields and open grounds and can be found throughout India. The use of this plant for medicinal purposes has a long history in India, with its earliest reference being in the Rig Veda and subsequently in the foundational Ayurvedic texts detailing its properties and therapeutic uses. Ashwagandha has remained an important part of the traditional Ayurvedic system and is now being studied under the modern scientific domain.

The name *Withania somnifera* comes from the latin word *somnifera*, meaning “Sleep Inducing”, reflecting its traditional association with Relaxation and Sleep. The plant contains several biologically active constituents, particularly **withanolides**, along with alkaloids, sitoindosides, and other phytochemicals, with studies showing their antioxidant, anti-inflammatory, adaptogenic, neuroprotective and other health promoting effects.

Because of its extensive traditional use and growing scientific interest, Ashwagandha has become an important subject for **Ayurvedic drug review and pharmacological research**. A systematic review can therefore consider its classical Ayurvedic properties, botanical identity, phytochemical constituents, therapeutic indications, dosage forms, and evidence from modern studies.

Etimology of aswagandha

“Ashwasyeva gandho asyah “Ashwasyeva gandha utsaaha yasyaah sevanena saa!

It has smell like those of horse It provides horse's potency.

Botanical Name *Withania somnifera* Dunal

Taxonomy

- ❖ **Kingdom** : Plantae
- ❖ **Subkingdom** : Tracheobionta
- ❖ **Superdivision** : Spermatophyta
- ❖ **Division** : Magnoliophyta
- ❖ **Subclass** : Magnoliopsida
- ❖ **Order** : Solanales
- ❖ **Family** : Solanaceae
- ❖ **Genus** : Withania
- ❖ **Species** : *Withania somnifera*.

Classical Names

Ashwagandha, Varahakarni, Varada, Balada, Kushthagandhini, Hayahvaya, Turgagandha, Vajigandha.

Vernacular Names

- ❖ **Eng.**- Winter cherry.
- ❖ **Hindi**- Asgandh, Punir.
- ❖ **Beng.**- Ashvaganda,
- ❖ **Kak**-muj
- ❖ **Guj.**- Ghodakun, Ghoda, Asoda, Asan
- ❖ **Kan.**- Viremaddinagaddi, Kiremallinagida, Yiremaddinagadde.
- ❖ **Mal.**- Amukkuram.
- ❖ **Mar.**- Askandha, Tilli, Asvagandha, Kanchuki.

- ❖ **Punj.-** Asgand, Isgand, Ak, Aksan, Vaman, Nagauri.
- ❖ **Raj.-** Chirpotan.
- ❖ **Tam.-** Amukkira, Amukkirakkilangu, Amulang kalung, Aswagandhi
- ❖ **Tel.-** Vajigandha, Pennirugadda, Pulivendramu, Penneru.
- ❖ **Arab.-** Kaknajehindi.
- ❖ **Oriya-** Asua-ganaha.
- ❖ **Pers.-** Kaknajehindi, Mebernanbarari.
- ❖ **Urdu-** Asgandanagaor.

Historical Background

A. VEDAS: There is no direct reference about Ashwagandha in vedas. But numerous claims about *Withania somnifera* as a twin to the wondrous root jangida, whose praise were sung in the vedas. The root jangida is frequently mentioned in atharva veda, and is considered second in importance to soma.

B. SAMHITHAS: Ashwagandha is one of the main drugs of Ayurveda classics.

(i) **Paippalada Samhita:** Ashwagandha root juice is given as nasya to achieve conception.

(ii) **Charaka Samhita:** Acharya Charaka included Ashwagandha under Balyadasaimani group and Brimhaneeya group (suthra sthana 4 thchapter Shadvirechanashatashritheeyam). It is included in Moolasava yoni (suthra sthana 25th chapter yajjapurusheeyam). Acharya considered decoction of Ashwagandha along with other drugs in virechana group (vimana sthana 8th chapter Rogabhishakjitheeyam), Ashwagandha can be used for udwardhana in case of kandu, pidaka and koda (suthra sthana 3rd chapter Aragwadheeyam). Acharya also considered it as an ingredient of Vajeekarana ghrtam (vajeekarana pada 1st chapter Samyogasharamooleeyam). The Siddhi sthana 9th chapter Trimarmeeyasiddhi stated the use of Ashwagandha in the treatment of Sirakampa.

(iii) **Susrutha Samhitha:** Mentioned it in the treatment of karshya in the 25th chapter of suthra sthana (Doshadhatumala Kshayavrdhhi Vijnaniya). Oil cooked with Ashwagandha, drugs of jeevaneeya gana etc is used for anointing that helps growth of the earlobe. It is also used for Utsaadana in vrana. In the 39th chapter of suthra sthana Samsodhana samsamaniya it is mentioned as urdhwabaghahara dravya. Susrutha also mentioned Ashwagandha in the context of treatment of Kaphaja visarpa.

(iv) **Ashtangasangraha:** Ashwagandha churna was suggested for abhyanga in pediatric cases. Acharya mentioned it as an ingredient of Bala taila in 4th chapter of sareera sthana, Garbha Vyapath Adhyaya, which is highly beneficial for diseases of women in peurperum. It is an ingredient of sukumara ghrta. Ashwagandha is mentioned in Kalpa sthana as an ingredient of Erandamoolaadi basthi which is lekhaana and deepana. Acharya mentioned it as an ingredient of anuvaasana basthi kalpa which is used in the cure of all vaata diseases (4th chapter Kalpa sthana).

(v) **Ashtanga Hrdaya:** contained similar explanations like Astanga Sangraha. Acharya mentioned it as an ingredient of Bala taila in 2nd chapter of sareera sthana, It is an ingredient of sukumaara ghrta in the treatment of Vidradhi and Vrddhi. Ashwagandha is also mentioned in Kalpa sthana in Ashtanga Hrdaya like Ashtanga Samgraha. Like Ashtangasangraha Ashwagandha is mentioned in as having srothoshodhana properties.

(vi) **Vrnda Madhava:** Milk processed with ashwagandha and added with milk should be taken by women in proper time. It helps conception. In Balashosa ghee is cooked with one-fourth paste of Ashwagandha and ten times milk. It promotes development of body.

(vii) **Chakradutta:** He mentioned Ashwagandha in udararoga chikitsa. Devadaru, sobhanjana and apamarga pounded with cow's urine, if taken alleviates severe udara roga, krimi and shopha. He has mentioned grtham with Ashwagandha in Vatavyadhi chikitsa. In yoni Vyapath chikitsa he has mentioned Ashwagandha in the treatment of Vandhyatwa. Also in rasayanadhikara he has stated the use of Ashwagandha for half a month with grtha, taila, hot water etc for dehapushti.

(viii) **Vangasena Samhitha:** Stated it as a substitute of Jeevaneeya gana drugs Kakoli and Ksheera Kakoli in Maha Kalyana ghrtam. Vangasena in 28th chapter Vatavyadhi mentioned to take Ashwagandha along with guduchi and maricha pounded with warm water.

(ix) **Sharangdhara:** Brihat Trayi did not emphasize Ashwagandha as vrisya in their works. It is Sarngdhara who highlighted the sukrala property of Ashwagandha along with musali and shatavari (Pradhama Khanda 4th chapter Dipanapachana Adhyaya). He mentioned it as ingredient of much yoga like Maharasnaadi, Ashwagandhadi choornam, Kamadeva ghrtam, Maha narayana taila, Shatavari taila, Dhatura taila, Madana Kamadeva etc.^[23]

❖ **Nighantu** Ashwagandha is also mentioned in other books like Siddha Bhesaja Manimaala Vaidya Manorama, Bhaishajya ratnavali and yogaratnakara. Ashwagandha is mentioned in all Nighantus. Kaiyadeva Nighantu mentioned it under Oushadi Varga.

➤ **Madanapala Nighantu-** mentioned it under Abhayaadi varga. According to Raja Nighantu it is in Shatahvavarga. According to Dhanwanthari Nighantu it is mentioned in guduchyadi varga. Bhavaprakasha also mentioned it in Guduchyadi varga. As per Nighantu Adarsha it comes in Kandakaryadi varga and Shodhala Nighantu, like Dhanwanthari Nighantu mentioned it in Guduchyadi varga. In literature we do not come across the description regarding two kinds of Ashwagandha. But in Nighantu commentaries two types of Ashwagandha are mentioned: Withania somnifera and Withania ashwagandha. The cultivated variety which is thin lean is mainly brought from Nagori district of Madhya Pradesh which is called Nagouri Ashwagandha;^[24]

Namarupa gyana of aswagandha

१. अश्वगन्धा (भा०)-अश्वस्येव गन्धो ऽस्याः, अथवा ऽश्वस्येवगन्ध उत्साहः (कामवेगः) यस्याः सेवेन सा २. अश्वकन्दः (नि०)-अश्वस्य गन्धयुक्तः, अश्वस्येव कामशक्तिप्रदः कन्दः मूलमस्याः ।
३. अश्ववरोहकः (सो०)-अश्वमवरोहयति अधःकरोति पुंस्त्व।
४. कञ्चुका (ध०)-कञ्चते बध्नाति शुक्रं दीप्तिकरञ्च, 'कचि दीप्ति बन्धनयोः ।
५. कामरूपिणी (रा०)-कामस्येव रूपं भवत्यस्याः ।
६. गन्धपत्री (रा०)-पत्राणामप्यश्वगन्धित्वात् ।
७. पुत्रदा (नि०)-पुत्रं ददाति शुक्रवर्धकत्वात् ।
८. बलदा (भा०)-बलं ददाति, बलवर्धनीत्यर्थः ।
९. मारुतघ्नी (सो०)-मारुतं वातविकारं हन्ति ।
१०. वराहकर्णी (भा०)-वराहकर्णवत् पत्राण्यस्याः ।
११. वृषा (कै०)-वृषवत् शुक्रवर्धनी वाजीकरी च ।
१२. हयाह्वया (भा०)-अश्वनाम्ना प्रख्याता ।

Aśvagandhā (Withania somnifera Linn. Dunal) is a herb with leaves resembling pig's ears (varahakarṇi) and having smell like that of horse (gandhapatri). Root, the part used, also emits horse's smell (aśvakanda), promotes sexual potency like that of horse (aśvagandhā, aśvāvarohikā, viṣā), provides male progeny (putradā) and retains semen (kañcukā). It also promotes complexion (kāmarūpiṇi), strength (baladā) and is useful in vātika disorders

(mārutaghni). Because of providing horse's potency, it is known by the title of horse (hayāhvayā).

Interpretation of Synonyms

- ❖ **Ashwagandha, Hayagandha** - root, part used, also emits horse's smell Ashwavarohaka,
- ❖ **Vrishā**, - it is vrishya in nature Balada,
- ❖ **Balya**- promote strength
- ❖ **Elaparni**- leaves having shape of ela
- ❖ **Gandhapatri**- having smell like that of horse
- ❖ **Gokarna**- Herb with leaves resembling shape of cow's ear
- ❖ **Hayapriya**- favourite of horses
- ❖ **Hayahvaya**- provides horse potency
- ❖ **Kaamaroopini**- it increases libido
- ❖ **Kancuka**- retains semen
- ❖ **Kushtagandhini**- has smell of plant Kushta
- ❖ **Marutaghni**- useful in vatika disorders
- ❖ **Pita**- having yellow colour Putrada- provides male progeny
- ❖ **Pushtida**- it is nourishing
- ❖ **Thuragi**- it has smell of hoarse.

Reference of Synonyms from various Nighantus.

SYNONYMS	BHA. NI	MA. NI	DHA. NI	KAI. NI	SHO. NI	RAJ. NI
Ashwagandha	-	-	+	+	+	+
Ashwavarohaka	-	+	+	+	+	-
Balada	+	-	-	-	-	+
Balya	-	+	+	+	+	+
Elaparni	-	-	-	-	+	-
Gokarna	-	+	-	+	-	-
Gandhapatri	-	-	-	-	-	+
Hayagandha	-	-	-	+	-	+
Hayapriya	-	-	-	-	-	+
Varahakarni	+	+	+	+	+	+
Kamarupini	-	-	-	-	+	+
Kanjuka	-	-	+	-	-	-
Kushtagandhini	+	-	-	-	+	-
Marutaghni	-	-	-	-	+	-
Pivara	-	-	-	-	+	+
Pita	-	-	-	+	-	-
Pushtida	-	-	-	-	-	+
Thuragi	-	+	+	+	+	+
Vajigandha	-	-	+	-	-	+

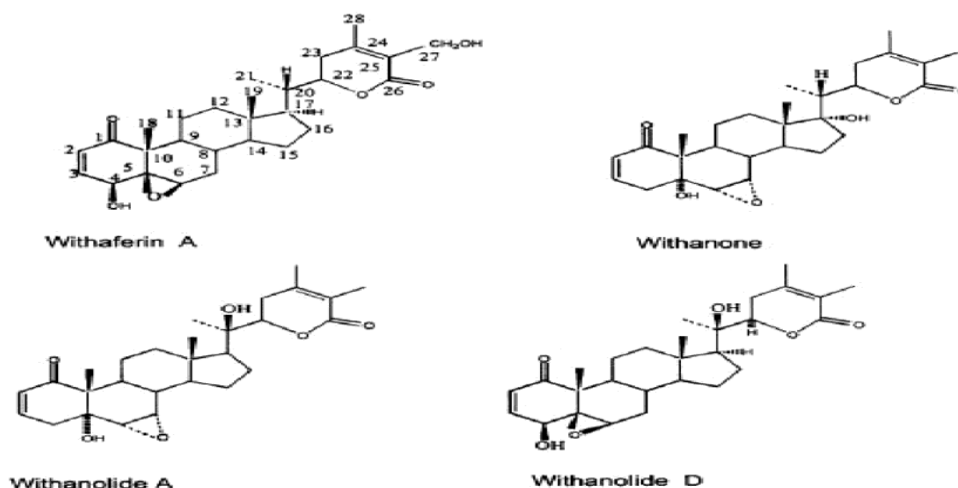
Action and uses

The roots are astringent, bitter, acrid, alexipharmic, somniferous, thermogenic, stimulant, aphrodisiac, diuretic, deobstruent and tonic. They are useful in leucoderma, constipation, insomnia, lumbar pain, nervous disorders, asthma, cardiac disorders, psoriasis, consumption, ulcers, carbuncles, scabies, marasmus of children, senile debility. Leaves are bitter and recommended in fever, painful swellings, inflammation of eye, syphilitic sores, haemorrhoids, tumours, tuberculous glands. Seeds are reported to be diuretic, hypnotic and are employed to coagulate milk. Ayurvedic properties Rasa - Tikta, Katu, Madhura Guna - Laghu, Snigdha Veerya - Ushna Vipaka - Madhura Doshaghnata - Kaphavatashamaka Rogaghnata Galaganda, Granthishotha, Daurbalya, Vatavyadhi, Urustambha, Murchchha, Bhrama, Anidra, Udaravikara, Krimi, Raktabharadhikya, Raktavikara, Shotha, Kasa, Shwasa, Shukradaurbalya, Pradara, Yonishoola, Mootraghata, Shvitra, Kushtha, Kshaya, Balashosha, Shosha Karma Shothahara, Vedanasthapana, Mastishkashamaka, Deepana, Anulomana, Shoolaprashmana, Krimighna, Raktashodhaka, Kaphaghna, Shwasahara, Vajikarana, Garbhashayashothahara, Yonishoolahara, Mootrala, Kushthaghna, Balya, Brinhana, Rasayana.

Chemical constituents

Withanolide along with withaferin A and dihydrowithaferin A2 (seeds); visamine (plant); anaferin, characterised as bis (2-piperidylmethyl) ketone, isopelletierine HCl, tropine, pseudotropine, 3a-tigloyloxytropine, cuscohygrine, dl- isopelletierine, anahygrine, hygrine, a pyrazole alkaloid withasomnine, C-28 steroid lactone characterised as 5, 20 a- dihydroxy- 6a, 7a-epoxy-1-oxowitha-2, 24-dienolide (withanolide), withanol, nicotine, somniferine, somniferinine withanine, withananine, pseudowithanine, sucrose, B- sitosterol, choline (root); steroidal lactone of withanolide series ie. withanolide N (17 a, 27- dihydroxy-1-oxo-20R-22R, - witha- 2, 5, 14, 24tetraenolide) and withanolide O (4 B, 17 a- dihydroxy- 1- oxo- 20R-22Rwitha- 2, 5, 8 (14), 24- tetraenolide), withanolide D and traces of withanolide G, 27-hydroxywithanolide D, 14 Q- hydroxy- withanolide D, 17 ahydroxywithanolide D, withanolide P & S and withanolide Q & R, somnitol, glucose, withanone, nitrogen free compounds- Al, A2, A3, A4 & A5, withaferin A with its dihydro derivative, withaferin characterised as 2, 3dihydro- 3- methoxywithaferin A, withaferin A isomer- 27 deoxy-14hydroxy- withaferin A, steroidal lactones of withanolides E, F, G, H, I, J, K, L and M and are characterised as 14 a, 17 B, 20 a- trihydroxy, 56-, 60epoxy- 1- oxo- 175, 205, 22R- witha-

2,24-dienolide (withanolide E), 14 a, 17B, 200- trihydroxy-1-oxo-175,205,22R-witha- 2, 5, 24- trienolide.^[28]



Chemical Constituents Present In Aswagandha

Different Species of Genus Withania

Twenty-three known *Withania* species are widely distributed in the drier parts of tropical and subtropical countries of the world, ranging from Canary Islands, Mediterranean region and Northern Africa to Southwest Asia.^[36-38] The Genus *Withania* is further organized into groups including.

W. martiana, *W. melanocystis*, *W. micrantha*, *W. microphysalis*, *W. mollis*, *W. monifera*, *W. morisonii*, *W. mucronata*, *W. novo-friburgensis*, *W. novofriburgensis*, *W. obtusifolia*, *W. organifolia*, *W. orinocensis*, *W. peruviana*, *W. picta*, *W. picta* var. *parvifolia*, *W. picta* var. *subnuda*, *W. pogogena*, *W. pogogena* var. *glabra*, *W. pohliana*, *W. pyrifolia*, *W. qaraitica*, *W. ramosa*, *W. reichenbachii*, *W. riebeckii*, *W. schottiana*, *W. sicala*, *W. simonyaua*, *W. sinensis*, *W. sinica*, *W. somnifera*, *W. somnifera* *obtusifolia*, *W. sordida*, *W. sphaerocarpa*, *W. sphaerocarpa* var. *grisea*, *W. suberosa*, *W. subtriflora*, *W. villosa*, *W. wiebeckii*, *W. xalapensis* and *W. yunnanensis*.

Classical Category

Bhavaprakasha Nighantu	Hareethakyaadi varga
Dhanwanthari Nighantu	Guduchyadi varga
Kaiyyadeva Nighantu	Oushadi varga
Charaka	Balya, Brimhana, Madhuraskandha, Virechanopaga
Raja Nighantu	Shatahwadi varga
Susrutha	Urdhwabhagahara

Botanical Description

W. somnifera is an erect, green, branched or unbranched herb with height up to 1.25m. The aerial parts like stem, leaves and calyx are covered with fine hairy tomentum. Its branches are rounded; leaves are simple, petiolate, ovate, entire, shiny smooth and opposite; flowers are inconspicuous, greenish or yellow, in axillary umbellate cymes, bisexual; fruit is a berry in persistent calyx and seeds are small, flat, yellow, reniform, very light.^[14,32] The plant prefers a sunny situation, seeds are sown during June or July and seedlings are transplanted at a distance of 60 cm x 30 cm. It is susceptible to bacterial, fungal, viruses, phytoplasmas and pests infections. Comparative morphological evaluations from wild accessions have also been extensively covered to find out new cytomorphotypes from North Indian wild germplasm.

Distribution

It is found throughout the drier parts of India in waste places and on bunds, in areas of Upper Gangetic Plain, West Bengal, Bihar, Orissa, Gujarat, Konkan, Deccan, Karnataka and Coimbatore.

Parts Used Root, leaf, seed.

Pharmacological activities

W. somnifera is used for centuries to treat a wide range of diseases, showed great potential as a safe and efficacious multi-purpose medicinal agent. Beside its traditional uses several recent reports have demonstrated immunomodulatory, antitumor, hypolipidaemic and cardioprotective effect of ashwagandha. Moreover, various parts of plant are reported to possess antiserotogenic, anticancer and anabolic properties and have beneficial effects in the treatment of arthritis, stress and geriatric problems. *W. somnifera* is used as home remedy to treat diseases in India as well as other parts of the world.^[32]

I) Hypoglycaemic activity Several studies demonstrated that Ashwagandha reduces blood sugar levels. A test tube study found that it increased insulin secretion and improved peripheral tissue sensitivity to insulin. One study revealed that people with schizophrenia, those treated with *Withania somnifera* for 4 weeks had an average reduction in fasting blood sugar levels of 13.5 mg/dl, compared to a 4.5 mg/dl reduction in those who received a placebo.^[17] Transina, one ayurvedic formulation which contain Ashwagandha as active ingredient have been reported to decrease streptozotocin (STZ)-induced hyperglycaemia in rats. This hypoglycaemic effect may be attributed to pancreatic islet free radical scavenging

activity because the hyperglycaemic activity of STZ is a consequence of decrease in pancreatic islet cell superoxide dismutase (SOD) activity leading to the accumulation of degenerative oxidative free radicals in islet beta cells.^[18]

ii) Antioxidative activity Lipids and iron are rich components of the brain and nervous system. That's why they are relatively more susceptible to free radical damage than other tissues. Free radical damage of nervous tissue may be involved in normal aging and neurodegenerative diseases, e.g epilepsy, schizophrenia, Parkinson's, Alzheimer's and other diseases. The free radical scavenging enzymes, superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPX) play a very vital role in protective effect on neuronal tissue. Decreased activity of these enzymes leads to accumulation of toxic oxidative free radicals and resulting degenerative effects¹⁹. In one laboratory analysis reported that glycowithanolides of withania somnifera were given once daily for 21 days, dose related increased in all enzymes were observed²⁰. Another study revealed that sitoindosides VII-X and withaferin A actively having antioxidant activity.^[31]

iii) Hypolipidaemic activity Withania somnifera effectively help to improve heart health by reducing cholesterol and triglyceride levels. Animals studies have found that it significantly decreases these blood fats. One experimental study in rats found that it lowered total cholesterol by as much as 53% and triglycerides by nearly 45%. In a 60 day experimental study of chronically stressed adults, the group taking the higher dosage of Ashwagandha experienced a 17% decrease in LDL cholesterol and 11% decrease in triglycerides²². Withania somnifera root powder reduced total lipids, cholesterol and triglycerides in hypercholesteremic animals. On the other hand, significantly increased plasma HDL-cholesterol levels, HMG-CoA reductase activity and bile acid content of liver.^[23] In another study with hydroalcoholic extract of fruits of Withania coagulans to high fat diet induced hyperlipidemic rats for 7 weeks, significantly reduced elevated serum cholesterol, triglycerides and lipoprotein levels.^[24] In one study, six mild non-insulin dependent diabetes mellitus subjects and six mild hypercholesterolemic subjects were treated with the powder of roots of Withania somnifera for 30 days. Various parameters were assessed in the blood and urine samples of the subjects. Decrease in blood glucose was comparable to that of an oral hypoglycaemic drug. Significant increase in urine sodium, urine volume, significant decrease in serum cholesterol, triglycerides, LDL and VLDL-cholesterol were observed, indicating that root of Withania somnifera is a potential source of hypoglycaemic, diuretic and hypocholesterolemic agents.^[32]

iv) Anti-stress activity Ashwagandha has been shown to reduce stress in both animal and human studies. It is a very popular herb for reducing stress. Anti-stressor effect of ashwagandha was investigated in rats using cold water swimming stress test. One clinical investigation reported that it blocked the stress pathway of rat brain by regulating chemical signaling in the nervous system. Several studies reported that it can effectively reduce symptoms in people with stress.^[26] A study conducted by the Institute of Basic Medical Sciences at Calcutta University evaluated the effects of Ashwagandha on chronic stress in rodents. Research results showed that Ashwagandha decreased the frequency and severity of stress-induced ulcers, reversed stress-induced inhibition of male sexual behavior, and inhibition the effects of chronic stress on retention of learned tasks.^[27] In one experiment, an aqueous suspension of Ashwagandha root was used at 100mg/kg/oral dosage, resulting prevents/decreases adrenal cortisol and ascorbic acid which occurs due to swimming stress. Ashwagandha has been evaluated for its adaptogenic activity²⁸. Administration of ashwagandha with other drugs in experimental animals exposed to a variety of biological, physical and chemical stressors was found to offer protection against these stressors.^[33]

v) Anti-anxiety activity Several controlled human studies have shown that it can reduce symptoms in people with anxiety disorders. In one 6 week experimental study revealed that 88% of people who took Ashwagandha results in a reduction in anxiety, compared to 50% who took a placebo³⁰. Research conducted at the Department of Pharmacology, University of Texas health science centre indicated that extracts of Ashwagandha produce GABA-like activity which may account for the herbs antianxiety effects. This produces calming effect. Excessive neuronal activity can lead to restlessness and insomnia, but GABA inhibits the number of nerve cells that the fire in brain and helps to induce sleep, uplift mood and reduce anxiety.^[32]

vi) Anti-aging activity Anti-aging properties of Withania somnifera was evaluated in a double blind clinical trial. A group of 101 healthy males, 50-59 years old were given the herb at a dosage of 3 grams daily for one year. Decrease in serum cholesterol was more in treated group than in placebo group. The subjects experienced significant enhancement in hemoglobin, red blood cell count, hair melanin, and seated stature. Seventy of the research subjects reported improvement in sexual performance.^[32]

vii) Immunomodulator activity In one animal study, Ashwagandha showed a significant modulation of immune reactivity. Administration of Ashwagandha was found to prevent

myelo-suppression in mice treated with three immunosuppressive drugs viz. cyclophosphamide, azathioprin, and prednisolone. Treatment with Ashwagandha was found to significantly increase Hb concentration, RBC count, platelet count, and body weight in mice. Administration of Ashwagandha extract was found to significantly reduce leukopenia induced by cyclophosphamide treatment. Administration of Ashwagandha extract increased the number of β esterase positive cells in the bone marrow of cyclophosphamide treated animals. Withaferin A and Withanolide E showed specific immunosuppressive effect on human B and T lymphocytes and on mice thymocytes.^[33]

viii) **Antialzheimer's and antiparkinsonian activity** Ashwagandha supplements may improve brain function, memory, reaction times and the ability to perform tasks. Animal studies suggest that Ashwagandha may reduce memory and brain function problems caused by injury or disease. Researchers have shown that it promotes antioxidant activity that protects nerve cells from harmful free radicals.^[33] In a controlled study, researchers who gave healthy men 500 mg of the herb daily reported significant improvements in their reaction time and task performance, compared to men who received a placebo.^[34] Administration of haloperidol or reserpine significantly induced catalepsy in mice. Withania somnifera significantly inhibited haloperidol or reserpine induced catalepsy and provide effective approach for the treatment of parkinson's disease. Antiparkinsonian effect of Withania somnifera extract has been reported due to potent antioxidant, antiperoxidative and free radical scavenging properties.^[35] One clinical investigation revealed that Withania somnifera significantly reversed the catalepsy, tardive dyskinesia and 6-hydroxydopamine elicited toxic manifestations and may offer a new therapeutic approach to the treatment of parkinson's disease.^[34]

ix) **Anti-inflammatory activity** Ashwagandha has been shown to increase natural killer cell activity and decrease markers of inflammation. Several animal studies have shown that Ashwagandha helps reduce inflammation. In one experimental study of humans have found that it increases the activity of natural killer cells, which are immune cells that fight against infection. It also helps to reduce markers of inflammation, such as C-reactive protein (CRP).^[38] Withaferin A showed potent anti-arthritic and antiinflammatory activities. Anti-inflammatory activity has been attributed to biologically active steroids of which Withaferin A is a major component. It is effective as hydrocortisone sodium succinate dose for dose.^[39] Withania somnifera has been shown to possess antiinflammatory property in many animal

models of inflammations like carrageenan-induced inflammation, cotton pellet granuloma and adjuvant-induced arthritis.^[40] Detailed studies were carried out to investigate the release of serum β -1 globulin during inflammation by two models of inflammations viz. primary phase of adjuvant induced arthritis and formaldehyde induced arthritis. The experiments showed interesting results as most of the APR were influenced in a very short duration and also suppressed the degree of inflammation.^[39]

x) Antibiotic activity The antibiotic activity of the roots as well as leaves has recently been shown experimentally. Withaferin A in concentration of 10 μ g/ml inhibited the growth of various gram-positive bacteria, acid-fast, aerobic bacilli, and pathogenic fungi. It was active against *Micrococcus pyrogenus* var *aureus* and primarily inhibited the activity of *Bacillus subtilis* glucose-6-phosphate dehydrogenase.^[41] One experimental study reported that Withaferin A inhibited Ranikhet virus16. The shrub's extract is active against *Vaccinia* virus and *Entamoeba histolytica*. *Withania somnifera* showed the protective action against systemic *Aspergillus* infection. This protective activity was probably related to the activation of macrophage function revealed by the observed increases in phagocytosis and intracellular killing of peritoneal macrophages induced by *Ashwagandha* treatment in mice. Antibiotic activity of Withaferin A is attributed to the presence of the unsaturated lactone ring. It is stronger than penicillin.^[42]

xi) Anticancer activity Animal and test tube studies have shown that it promotes the death of tumour cells and may be effective against several types of cancer. Animal studies have found that *Ashwagandha* helps induce the apoptosis or "programmed cell death" of cancer cells. It also inhibits the growth of new cancer cells in several ways. Main mechanism behind the anticarcinogenic effect of *Ashwagandha* is generation of reactive oxygen species (ROS), which are toxic to cancer cells but not normal cells.^[43] Animal studies suggest that it may be beneficial for treating several types of cancer, including breast, lung, colon, brain and ovarian cancer⁴⁴. In one clinical investigation, mice with ovarian tumor treated with *Ashwagandha* alone or in combination with an anticancer drug had a 70-80% reduction in tumor growth. The treatment also prevented metastasis. Research on animals revealed that the herb decreases the levels of the nuclear factor Kappa B, reduces the intracellular tumor necrosis factor, and enhances apoptotic signaling in cancerous cell lines. The most possible uses of *Ashwagandha* is its capacity to fight cancers by reducing tumour size⁴⁵. In one study, the herb was evaluated for its antitumor effect in urethane-induced lung tumors in adult male

mice. Following administration of Ashwagandha over a period of seven months, the histopathological appearance of the lungs of animals which received the herb was similar to those observed in the lungs of control animals¹⁸. Withaferin A, Withanolide D and E exhibited significant antitumour activity in vitro against cell derived from human epidermoid carcinoma of nasopharynx (KB) and in vivo against Ehrlich ascites carcinoma, sarcoma 180, sarcoma black (BL) and EO771 mammary adenocarcinoma in mice in disease of 10, 12, 15 mg/kg body weight. Withaferin A has been shown to possess growth inhibitory and radio-sensitizing effects on experimental mouse tumors.

Properties as Per various Nighantus

Rasas of Aswagandha.

RASA	DN	MN	RN	KN	BPN	SN	PN
Katu	-	-	+	-	-	-	-
Tikta	+	+	-	+	+	+	+
Kasaya	+	+	+	+	+	+	-
Madhura	-	-	-	-	-	-	-

Guna of Aswagandha.

Guna	D.N	M.N	R.N	K.N	B.P.N	S.N	P.N
Laghu	-	-	-	-	-	-	-
Ushna	+	-	-	+	+	+	-
Ishad ushna	-	-	-	-	-	-	+
Snigdha	-	-	-	-	-	-	-

Virya of Aswagandha.

VIRYA	D.N	M.N	R.N	K.N	B.P.N	S.N	P.N
Ushna	+	+	+	+	+	+	+

Important Formulations

Aswagandhadyarishta, Ashvagandhadi Leha, Bala ashvagandha laksadi Taila.

Therapeutic Uses Shotha, Kashaya, Daurbalya, Vataroga, Klaibya etc.

Dose- 3-6 g of the drug in powder form.

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