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AN OVERVIEW ON ASHWAGANDHA (WITHANIA SOMNIFERA LINN.) WITH SPECIAL REFERENCETO AYURVEDIC AND MODERN ASPECT

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ABSTRACT

Withania somnifera Linn. member of Solanaceae family popularly known as Ashwagandha. It is one of the traditional medicine of ayurveda and classified as Rasayana (rejuvenation) and increases longevity and vitality. It can be used in medicine as single drug or ingredient of polyherbal formulations. The root of Ashwagandha smells like horse (ashwa) that is why it is called Ashwagandha. Different studies indicate that Ashwagandha possesses anti-inflammatory, antioxidant, anxiolytic, memory enhancing, adaptogen, antiparkinsonian, antitumor properties. This drug is studied in all scientific aspects and also proven that broad spectrum remedy in various experimental studies. The review article include information on habitat, cultivation and propogation, phytochemical constituents, pharmacological activites, traditional uses and therapeutic uses of Withania somnifera plant.

KEYWORDS: Ashwagandha, Withania somnifera Linn. phytochemistry, pharmacological actions.

INTRODUCTION

Indian ginseng or winter cherry which is known as ashwagandha important herb in ayurvedic medicinal plant. This plant mainly used as rasayanas, helps in increasing health and longevity. This plant is used in more than 100 formulations in ayurvedic medicine. Somnifera means sleepinducing which indicates sedative properties. This plant also used for increasing sexual vitality and adaptogen ethanomedicinaly. There are different effect of Ashwagandha

like antibacterial, cardiovascular protector, hypolipidemic, immunomodulation, sexual behaviour also been studied. Decoction of the root of ashwagandha used for colds and chills and to increase the tone of uterus after miscarriage or birth.

Botanical Name – Withania somnifera Linn.

Synonyms	Dhanwantari Nighantu[2]	Raj Nighantu[3]	Madanpal Nighantu[4]	Bhavprakash Nighnatu[5]	Adarsh Nighantu[6]	Shodhal Nighantu[8]	Kaiyyadev Nighantu[7]
1.Vajigandha	+	+		+	+		+
2.Kanchuka	+			+		+	
3.Varahkarni	+	+	+	+	+	+	+
4.Turagi	+	+			+	+	+
5.Balya	+	+			+	+	+
6.Vajikari	+					+	+
7.Asagandh					+	+	+
8.Ashwagandha			+	+	+		+
9.Aasonda		+	+	+			+
10.Ajagandha		+	+	+			
11.Balada		+		+			
12.Varada		+					
13.Gokarni		+					
14.Aadan		+		+	+		
15.Ashwagandhi		+		+	+		
16.Hayapriya		+					
17.Pivara		+					
18.Vataghni		+					
19.Pushtida		+					
20.Vanaja		+		+			
21.Hayagandha		+					

Synonyms

NIRUKTI

1. Ashwagandha – The root emits smell of horse urine
2. Hayahaya – All the synonyms of haya used for this plant
3. Varahkarni – The leaves resemble the ear of pigs
4. Varada – That which acts like a blessing for the patients
5. Balada – It gives strength to the body
6. Kushthagandhi – Having smell which is unpleasant
7. Kanchuka – It retains semen
8. Putrada – It provides male progeny

Vernacular name

Sanskrit – Ahwagandha, Varahakarni, Balada, Gandhanta, Pivara, Varada; Hindi – Asagandha; Bangali – Ashwagandha; Gujrati- Asagandha, asoda; Telgu – Pulivendram;

Tamil- Amukkura; Karnataka- Aswagandhi; Goa- Fatarfodi; Punjabi- Asgand; Rajasthani- Chirpotan.[9]

Classification of Ashwagandha in Ayurvedic Samhita

1. Charaka – Balya, Bruhaniya, Madhura skandhas
2. Dhanvantari Nighantu – Guduchyadi varga (shlok no. 262-263)
3. Raj Nighnatu – Shatavhadi varga (shlok no. 106-110)
4. Aadarsh Nighantu – Kantakaryadi varga
5. Bhavaprakash Nighantu – Guduchyadi varga (Shlok no.129)
6. Shodhal Nighantu – Guduchyadi varga (shlok no.269-270)
7. Kaiyyadev Nighnatu – Aushadhi varga (shlok no. 1044-1045)

Rasapanchaka

1. **Rasa -** Katu, Tikta, Kashaya
2. **Virya -** Ushna
3. **Vipaka -** Katu
4. **Doshaghnata -** kaphavataghna
5. **Guna-** Laghu**,** Snigdha[10]

	Ras	**Virya**	**Vipaka**	**Guna**	**Doshghnta**
D.N.	Katu,tikta, Kashaya	Ushna	Katu	Laghu	Kapha-vataghna
R.N.	-	Ushna	Katu	Laghu	Kapha-vataghna
B.N.	Katu,tikta, Kashaya	Ushna	Katu	Laghu, Singdha	Kapha- vataghna
A.N.	Katu,tikta	Ushna	Katu	Laghu	Kapha-vataghna
M.N.	Katu,tikta	Ushna	Katu	-	Kapha-vataghna

Panchabhautik Sanghatan

Ras	**Pruthvi**	**Jal**	**Tej**	**Vayu**	**Akash**
Tikta				+	+
Katu			+	+	
Kashaya	+	+			

Part used – Roots, leaf.

Doses - 1. Powder – 3.5 gm

2. Decoction – 50 to 100 ml

Formulation – Ashwagandha rasayan, Ashwagandharishta, Ashwagandha churn, Ashwagandha ghrut, Ashwagandha pak, Sukumar ghrut, Shobhyagya sunti pak.

Traditional uses

Ashwgandha is used as Rasayana (rejuvent), Shwitra (skin diseases), Kas (cough), Shwas (Respiratory diseses), Shoth (swelling disorder), Shula (painrelated disorder), Mutraghat (urinary disorder), Galgand (thyroid related disorder), Raktvikar (blood disorder), Arsha (piles),Asthibhanga (bone fracture), Kilas (vitiligo), Unmad (psychosis), Yonidosh (disorders of female genital tract).[11][12][13]

1. Vataj hradrog – kalk of Ashwgandha and powder of bibhitaki are mixed with jaggery and given with luck warm water
2. Shwas - Ashwgandha kshar is given with honey and ghee.
3. Mutraghat - decoction of ashwagandha will be a useful remedy.
4. Nidranash - Powder of ashwgandha shall be taken with ghee and sugar.
5. Garbhashaygat vikar - Decoction of root is used for to increases the tone of uterus.
6. Granthi - Powder of root of ashwgandha mixed with warm water is useful in application.

Different karma of Ashwgandha according to different Nighantu

Indication	C.N	S.S	D.N	R.N	B.N	A.N
Kas	+			+		
Shwas	+			+	+	+
Shoth	+	+	+	+	+	+
Vran	+		+	+		+
Balya	+			+		
Granthi	+	+		+	+	
Urusthamb	+					
Vish	+	+	+			
Shwitra	+		+			+
Shosh	+		+		+	+
Shukravikar	+				+	

Habitat

Throughout the drier and subtropical India. Being cultivated extensively throughout India at present.

Taxonomy

- Kingdom – Plantae
- Subkingdom – Tracheophytes, vascular plant

- Superdivision – Spermatophyta, seeds plant
- Division – Angiosperm
- Class – Dicotyledons
- Order – Tubiflorae
- Family – Solanaceae
- Genus - Withania
- Species – somnifera Dunal[14]

Morphology

Withania somnifera is small, woody shrub in the Solanaceae family that grows about 2 feet in height, it can be found in Africa, the Mediterranean and India. An erect, evergreen, tomentose shrub, 30-150 cm height found throughout the drier part of India in waste places and on bunds.

1. Macroscopic

1. **Root** – straight, unbranched, thickness varying with age. Roots bear fibre like secondary roots.[15]
2. **Leaves** – Simple ovate, glabrous. These in the floral region smaller and opposite outer surfaceto grey yellow with longitudinal wrinkles crown consists of 2-6 remains of stem base, stem bases variously, thickened, nodes prominent only on the side from where petiole drises[16]
3. **Flower**- Inconspicuous, greenish or lubrid yellow in axillary, numbellate cymes, berries small,glabose, orange red when mature, enclosed in the persistent calyx.
4. **Seeds** – Yellow, reninform
5. **Fruit** – The bright red fruit is harvested in the late fall and seeds are dried for planting in thefollowing spring.


2. Microscopic

1. Root - Transverse section of root shows cork exfoliated or crushed, when present isodiametric and nonlignified, cork cambium of 2-4 diffused rows of cells, secondary cortex about twenty layers of compact parenchymatous cells, phloem parenchyma, cambium 4-5 rows of tangentially elongated cells, secondary xylem hard forming a closed vascular ring separated by multiseriate medullary rays, a few xylem parenchyma.[15]

2. Stem – The view of stem in cross section is circular with shallow ridges, it shows a thin layerepidermis fairly wide cortex and largest zone of central cylinder and wide pith.[16]

3. Leaf – The anatomical structure of leaf is bifacial, dorsiventral. The both epidermis are covered with multicellular, dendroid trichomes like on the stem with pitted terminal cells and the pits are not prominent.[17][18][19]

4. Flower – Gamosepalous ancrescent calyx which enclosed the mature, fruit develops external and internal epidermis with anomocytic stomata and two types of trichomes unicellular and long, muticelluar branched, like on the leaf but shorter. The delicate petals have a leafstructures.

5. Fruit – The pericarp of berry fruit is bounded by outer epidermis consisting from polygondal cells, cell wall with punctuations, covered by thick colourless cuticle layer and interrupted by anomocytic stomata on the basal region of fruit.[20]

Ethano-botanical study of Ashwgandha

Ashwgandha is considered as boon for all mankind by nature use of Ashwgandha has recommended by ayurveda for a wide range of diseases. It is suggested to be an antibacterial, antitumor, aphrodisiac, anti-inflammatory properties, anabolic effects, acute toxicity activities,antiulcerogenic effects.[21]

Phytochemistry (chemical composition)

1. Withania somnifera whole plant extract is rich in phytochemicals, such as alchoholic extract of plant contains anaferine, anahygrine, choline, cuscohygrine, pseudotropine, dl-isopelletierine and tropine[22] Methanolic extracts of the constitute starch, acylsteryl glucosides, iron, ducitol, hantreactone, withaniol, and amino acids such as alanine, aspartic acid, cysteine, tyrosine, glutamic acid, glycine[23] The aqueous extract of whole plant contains withanone and tubacapasenolide F.[21] The ethanol extract of whole plant constitutes isosominolide, sominone, withasomniferin A.[24]
2. **Root** – extract of Withania somnifera root using alcohol extractant yields a pyrazole alkaloid, withanolide A and withansomine.[25] Withania somnifera roots display the phytochemical existence of physaguline, withanoside IV and withanoside VI.[26]
3. **Leaves** – leaves of plant extracted with methanol shows the phytochemical presence of ashwagandhine, cuscohygrine, dl-isopelletierine, somniferine, tisopellettierine, hygrine, visamine, withanine, withananine, etc.[27]
4. **Stem bark** – Ethanolic extract of the W.somnifera stem bark mainly contains withanolides, including somniferanolide, somniwithanolides, somniferawithanolide.[28]
5. **Oil extract** – Oil extract from fresh berries of W. somnifera contains saturated and unsaturatrd fatty acids such as elaidic acid, linoleic acid, oleic acid, palmitic acid and tetracosanoic acid.[29]

Pharmacological activities

1. **Rejuvenating Effect** – A double blind, placebo-controlled study was conducted to evaluate the efficacy an ethanolic extract of Ashwgandha (Withania somnifera), in patients with ICD-10 anxiety disorders comprised be useful for generalized weakness and improve speed and lower limb muscular coordination.[30]
2. **Antiarthritic effect** – In a double blind, placebo-controlled cross over study, 42 patients with the disease osteoarthritis were randomized to receive a formula containing Ashwagandha (Ashwagandha, turmeric, Boswellia and zinc complex) or placebo for three months. This herbal formula reduced the severity and disability of pain although no significant changes in SED rate were noted.[31]
3. **Rasayana effect** – Randomized placebo-controlled Adjunctive study of an extract of Withania somnifera for cognitive dysfunction in Bipolar disorder was studied. In this study mood and anxiety scale scores remained stable and adverse events were minor. In preliminary level, WSE appears to improve auditory-verbal working memory, which

measures reaction time and social cognition in bipolar disorder.[32]

4. **Adaptogenic effect** – In double-blind clinical trial, Ashwagandha root powder was tested in group of 101 healthy males, 50-59 years old, at a dosage of 3 grams daily for one year. A significant improvement in haemoglobin, red blood cell count, hair melanin, and seated stature was observed. Serum cholesterol decreased and nail calcium was preserved. ESR decresed significantly and 71.4 percent reported improvement in sexual performance.[33] In double blind study shade dried roots of WS were powdered and made as tablets of 0.5 gms each and administered in the dose of 2 tabs 3 times a day with milk to healthy volunteers for a period of one year. Results have shown significant increase in haemoglobin, RBC, Hair melanin and seated stature in the treated group as compared to control group. Serum cholesterol and calcium level of nails have also been decreased in treated group.[34]
5. **Hypoglycemic and hypocholesterolemic effect** – Hypoglycemic, diuretic, and hypocholesterolemic effect of Ashwagandha root were assessed in human subjects, in which six type 2 diabetes mellitus subjects and six mildly hypercholesterolemic subjects were treated with a powder extract for 30 days. A decrease in blood glucose comparable to that of an oral hypoglycaemic drug was observed. Significant increases in sodium, urine volume, and decreases in serum cholesterol, triglycerides, and low density lipoproteins were also seen.[35]
6. **Anticancer activites of Withania somnifera** – Various in vitro and in vivo studies have proven the potential efficacy of W.somnifera In the prevention and treatment of different types of cancers as a result of its rich pool of pharmacologically relevant secondary metabolites and chemical constituents, two chemical components of W.somnifera, namely withanone and withaferin A, could be employed in the development of cancer drugs.[36] Mitogens-activated protein kinase (MAPK) signalling, and inhibition of angiogenesis.[37][38] showed the anticancer effect of withaferin A on melanoma cells through the induction of oxidative stress mechanisms, Withaferin A in combination with radiation stimulated apoptosis by the generation of reactive oxygen species and several other mechanisms, including the stimulation of MAPK signalling, Bcl-2 downregulation, and caspase-3 activation.[39][40] showed that cytotoxicity induced by withaferin A is cell line specific and much dependent on the MAPK signalling pathway. Withaferin A has also given a positive results against the formation of the mammospher in human breast cancer through apoptosis and complex third mitigation[41] Withaferin A also decreased the tumour size of mammary gland carcinoma in transgenic mouse.[42][43]

7. **Antimicrobial effect** – Withania somnifera has proven efficacious against infections. The antimicrobial activity of W. somnifera depends on the organism involved, and this is achieved through several mechanisms, including but not limited to cytotoxicity, immunopotentiation, and gene splicing. Several research studies have reported effective antifungal and antibacterial effects of the plant extracts in laboratotry setup, including a favourable zone of inhibitory effects on gram positive Enterococcus spp. and Staphylococcus aureus. A similar finding was recorded on the effect of W.somnifera against gram negative bacteria.[44][45][46]
8. **Antiinfertility effect** – Infertility caused by several factors such as the male factor, a disorder in ovulation, abnormalities in uterine, tubular obstruction, peritoneal factor or cervical factors one plant species that has attracted attention as an aphrodisiac or potent remedy for reproduction impotence is W.somnifera.[47] It contains withanolides the principal bioactive function of the plant.[48][49] and is present in herbal formulations marketed in many countries.[50] Previous studies reported that W.somnifera enhances steroidal harmones and improves sexual distress in both males and female rat.[51][52] Extract of W. somnifera mildly stimulates the release of gonadotropin harmones in adult rats and improves human menopausal syndromes[53][54] W.somnifera extract could be used for the treatment of oligospermia.[55] and enhancing libidoIn humans clinical investigations on the efficacy of W.somnifera have been reported.
9. **Anticardiac activity** – Cardiac related infraction is one of the major leading causes of death globally[56] W. somnifera therapeutic significance in ameliorating mycordial infraction[57] The antioxidant activity and antiapoptotic properties of the W. somnifera extracts are confirmed to have a significant cardioprotection effect based on the myocardial and antioxidant histopathological evaluations[58] W.somnifera extracts potential cardio-tonic and cardioprotective effects in preventing myocardial infraction and ischaemia-reperfusion injury to the heart also proven the therapeutic value of the herb extracts in rhe cardiovascular context.[59]
10. **Antineurodegenerative activity** – Last couple of decades, with the increasing life expectancy, the incidence and prevalence of neurodenerative diseases such as Alzheimer's, Parkinson's and Huntington's diseases have increased substantially.[60] Public health impact of neurodegenerative diseases in the ageing baby results in the aspects of cognitive and memory improvement in several preclinical studies of AD, including a pilot study in adults with mild cognitive degeneration.[61] W.somnifera root extract against AD pathology presumably involve binding of the extract biochemically

active constituents to the active motif of AB there by preclude AB fibril formation.[62]

CONCLUSION

The Ashwagandha (Withania somnifera. Linn) have various bilological activities which are proved by many experimental studies. This drug is an important source of many pharmacologically and medicinally important chemicals which are withaferins, withanol anahygrin and thirteen Dragendroff positive alkaloids. It is an herbal drug with strong traditional base as well as strong experimental base for its use. Ashwgandha having katu, tikt, kashay ras, katu vipak, ushna virya so it is used to treat kaphavataj diseases. While studying Samhita and nighantus most of common indication found are Shoth (swelling disorder), Shula (pain related disorder), Mutraghat (urinary disorder), Raktvikar (blood disorder), Arsha (piles),Asthibhanga (bone fracture), Kilas (vitiligo), Unmad (psychosis), Yonidosh (disorders of female genital tract).Research studies also provided scientific validation for certain activites like Anticancerous,Antimicobial,Antiinfertility,etc.Multiple health benefits featured in this herbal supplement makes it as a perfect rejuvenator of physical and psychological health.

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