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ASHWAGANDHA (*Withania somnifera*):A Review.

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Abstract:
Ashwagandha (*Withania Somnifera*) is a plant used in the Ayurved medicines. The powder of the root of *Ashwagandha* is very famous in India for the *Rasayana* and *Vajikarana* effect. It is in use for a very long time for all ages and even in pregnancy also without any side effect. The root of the *Ashwagandha* contains withanolides and the leaves contain number of withanolide steroidal lactones which exhibit antibacterial, anti fungal and anti tumor properties. For any new research regarding *Ashwagandha* researcher requires its literature review, so this article provides the detail information regarding *Ashwagandha.* This review article deals with vernacular names, synonyms, classification, geographical distribution, external morphology, chemical constituents, ayurvedic properties with pharmacological action of Ashwagandha.

Keywords: *Ashwagandha, Ashwagandha churna, Withaniasomnifera, Rasayana*.

INTRODUCTION

Ashwagandha (Withania somnifera) is a plant used in the Ayurved medicines. The powder of the root of *Ashwagandh*a is very famous in India for the *Rasayana* and *Vajikarana* effect. In Ayurved *Samhitas* there are different formulations in which *Ashwagandha* plays role as important ingredients. It is in use for long time for all age groups and in pregnancy also without side effect(1). The roots of Ashwagandha contain withanolides, a group of steroidal lactones(2 According to different descriptions in Ayurved textbooks, Ashwagandha is used to have potent aphrodisiac, rejuvenating and life prolonging properties. It is also used to increase energy, youthful vigor, strength, muscle fat, health, blood, semen and cell production. It helps in weakness, bone weakness, chronic fatigue, and dehydration, loosing teeth, premature ageing, impotency, debility and emaciation. It invigorates the body by rejuvenating the reproductive organs (5-9). By this description Withania somnifera claims its importance in Ayurved medicine.

The review deals with review from Ayurvedic *Samhitas* and modern literature related with vernacular names, synonyms, classification, geographical distribution, external morphology, chemical constituents, and its Ayurved properties with pharmacological action.

AIMS & OBJECTIVES

To review Ashwagandha(*Withania Somnifera*)from available Ayurvedic*samhitas*, various texts, journals and modern literature.

MATERIALS & METHODS

Various Ayurved *samhitas* with their commentaries by different authors, web search, various textbooks and peer reviewed journals were studied to get more information about Ashwagandha.

MeaningofAshwagandha:

Ashwagandha attains the special name because its root smells like horse ("*Ashwa*") and believe to provide power like horse when consumed (10).

Vernacular Names:

Ashwagandha has been mentioned by different names in different regions. Below are given regional names according to region.

Latin name- Withania somnifera, English- Winter Cherry, Hindi- Asagandha, Asgandh, Marathi- Dhorgunja, Bengali- Ashwagandha, Gujarati- Asandh, Ghoda Aahan, Tamil- Chuvadigam, Aamkulang, Telugu- Piniru, Kannad- Angarveru, Malyaalam- Amukkura, Punjabi- Asgandh, Sanskrut- Ashwagandha, Urdu- Asgandanagaori, Arabic- Hajarat el dib(11-13).

Synonyms:

- Ashwagandha- Plant smells quite like hoarse dung.
- Hayagandha- Plant smells quite like hoarse dung.
- Vajigandha -Plant smells quite like hoarse dung.
- Turagi- Useful to improve sexual performance.
- Vajikari- Can perform sex like hoarse
- Balada- Improves strength
- Varahakarni- Its leaf looks similar to ear of pigs.
- Vajinama- Named according the name of Ashwa.
- Some other synonyms are as follows- Gandhanta, Varada, Vanaja, Vajini, Pushpada, Punya, Pivara, Palashaparni, Vataghni, Shamala,

Kamrupini, Kalapriya, Gandhapatri, Hayapriya, Varahaputri, Vajikari, Kanchukya, Gokarni, Vrusha (14).

Classification

Two varieties of Ashwagandha have been mentioned in classical Unani literature:

1) *Asgand Nagori* 2) *Asgand Dakani*. *Asgand Nagori* is preferred for its more potential medicinal properties (15).In Ayurvedic text, Ashwagandha is divided into two types 1) *Ghavati* 2) *Jangali*(16).

According to Modern Science (Botanical information) -

Taxonomy: Kingdom- Plantae
Subkingdom- Angiosperms
Division- Eudicots
Class- Asterids
Order- Solanales
Family- Solanaceae
Genus- Withania
Species- somnifera

Geographical distributions

Ashwagandha is distributed all over the world from southern Mediterranean regions to the Canary island and from south to East Africa, from Palestine to North India covering Israel, Iran, Jordan, Sudan, Egypt, Afghanistan, Pakistan & Baluchistan. In India it can be seen growing in the North Western regions extending to the mountainous region of Jammu, Himachal Pradesh and Punjab (17). Plantation of Ashwagandha done on commercial basis in Mandsour district of Madhya Pradesh (18).

External Morphology

Ashwagandhais green, erect, branched or unbranched herb. It may grow in height up to 1.25m. The stem, calyx and leaves are covered with fine hairy tomentum. Its branches are rounded; leaves are simple, ovate, petiolate, entire, smooth, shiny and opposite; flowers are inconspicuous, greenish or yellow, in axillary umbellate cymes, bisexual; fruit is a berry in persistent calyx and seeds are flat, small, yellow, very light & reniform, (19,20). 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 (21).

Chemical Constituents

Laboratory analysis has revealed over 35 chemical constituents contained in the root of *Withania somnifera* (22).The biologically active chemical constituents are alkaloids (isopellertierine, anferine), steroidal lactones (withanolides, withaferins), saponins containing an additional acyl group (sitoindoside VII and VIII), andwithanoloides with a glucose at carbon 27 (sitonidoside XI and X). *Withania somnifera* is also rich in iron.Withanolides and alkaloids are the major secondary groups characterized from *W. somnifera* and are of great medicinal interest (23). Large numbers of withanolides have been isolated from its roots and leaves which attribute the medicinal property of this plant. Withaferin A represented the first natural lactone of thewithanolide series isolated from its shoots (24). Most of the pharmacological activities of this plant are due to two main withanolides, withaferine A and withanolide D (25).

Further chemical analysis has shown the presence of the following: Anaferine (Alkaloid), Anahygrine (Alkaloid), Beta-Sisterol, Chlorogenic acid (in leaf only), Cysteine (in fruit), Cuscohygrine (Alkaloid), Iron, Pseudotropine (Alkaloid), Scopoletin, Somniferinine (Alkaloid), Somniferiene (Alkaloid), Tropanol (Alkaloid), Withanine (Alkaloid), Withananine (Alkaloid) and Withanolides A-Y(Steroidal lactones) (26,27)

Rasa Pamchaka (Properties):

Rasa - Madhur, Kashaya, Tikta.

Veerya-Ushńa
Vipaaka -Madhura
Guńa -Laghu, Snigdha.
Prabhaava -No specific prabhaava

***Karma*:** Vaata- Vaataghna
Kapha- Kaphaghna

Pharmacological Actions-
In Ayurveda texts Ashwagandha described as having following pharmacological actions: *Balya, Bruhaniya, Kushthaghna, Krumighna, Shvasaghna, Vedanasthapaka, Shothaghna, Vatavyadhihar, Galgandahar, Udarahar.*

On the basis of above mentioned pharmacological actions, it is used in many medicinal preparations.

Indication-

In classical Aayurvedic texts, *WithaniaSomnifera* is indicated in following diseases mentioned according to *Srotasa*.

***Srotasa*- IndicatedDiseases**
Praańavaha- Kaasa, Śhwaas
Annavaha- Parinamshul, Krimi, Agnimandya, Aruchi
Udakavaha- Udar
Rasa- Hrudya, Hrudayottejak
Raktavaha- Kusťha,Raktashodhaka,Shotha, Shwitra
Mamsavaha- Karshya, Dourbalya
Shukravaha- Shukrakshaya
Mutravaha- Mutraghata
Aartavavaha- Yonishool, Shwet pradar

***Matraa*/Dose-**
Churna of roots- 3-5 gm
Kshar – 1-2gm

Desription of *Ashwgandha* According to *Samhitaas*-
***Charaka Samhitaa*:**

a) In third chapter of *Sutrasthana* i.e.*Aaragvadhiyaadhyaya,* Ashwagandha *churna* is included as *Kushthaghna* (30).
b) Along with this, Ashwagandha is included in the following 2 *Mahakashayas* of the 4th chapter of *Sutrasthana*. 1) *Bruhaniya* 2) *Balya* (31).

***Sushruta Samhitaa*:**
In *Sushruta Samhitaa,* Ashwagandha is the main content of the following *Gana*.
Urdhva bhagahar(32)

Vranropana(33)

Vranautsadana(34)

Kaphashodhaghna(35)

Asht'aamga Hŕdaya(36)**:**

Ashwagandha was not included in any *Gana* described in 33 *ganas* of *Shodhanadi Gana Samgraha Adhyaya.*
ŚhaaramgadharaSamhitaa(37)**:**

In Śhaaramgadhara there are many medicinal preparations in which Ashwagandha was used as key ingredient.

- *Ashwagandhadi Churna-* It is mentioned in *Madhyama Khanda Churna kalpanaadhyaya* as *Vajikara kalpa.*
- *Kamdev Ghrita-* Ashwagandha is the main content of this *ghrita* and is useful in *Raktapitta, Kamala, Shukrakshaya*.
- *Narayan taila- Narayan taila* is used as *Abhyanga, Pan, Basti* in all *Vata roga*.

Other preparations like *Baladi taila, Shatavari tail, Madankamdev rasa* also contents Ashwagandha.

3) *Yogaratnaakara*(38):

There are many references of Ashwagandha in *Yogratnakara*.e.g. *Trayodashanga Guggula, Yograj Guggul, Vajigandhadi kwatha, Aabhadi Churna, Mahavishagarbha tail, Narayan tail, Shatavaryadi yoga* etc.

Pharmacological Action According to Modern Science:

Centuries of Ayurvedic medical experience using Ashwagandhahave revealed it to have pharmacological value as an antiinflammatory, adaptogen, sedative, antibiotic, aphrodisiac, astringent, diuretic, abortificient, narcotic, and tonic. Ashwagandha has been found to have potent antioxidant protection (39, 40). It stimulates the activation of immune system cells like lymphocytes and phagocytes (41, 42). It counteracts the effects of stress and generally promotes wellness (43).

Anti Cancerous Activity-

Cancer is a hyper proliferative disorder that results in apoptosis, transformation and metastasis (44). Millions of people suffer with various kind of cancer and die each year (45). Ashwagandha a proud herb of Ayurvedhas great anti-tumorogenic activity against various cancer cell lines due to the presence of withaferin A (WFA), a withanolide derived from this medicinal plant (46).

Anti Stress Activity-

Study conducted by the Institute of Basic Medical Sciences at Calcutta University examined the effects of Ashwagandha on chronic stress in rodents. For a period of 21 days, the animals received a mild electric shock to their feet. The resulting stress on the animals produced hyperglycemia, glucose intolerance, and increase in plasma corticosterone levels, gastric ulcerations, male sexual dysfunction, cognitive deficits, immunosuppression and mental depression (47). Researchers using *Withania somnifera* discovered the animals given the herb an hour before the foot shock experienced a significantly reduced level of stress. This research confirms the theory that Ashwagandha has a significant anti-stress adaptogenic effect (48).

Anti inflammatory Activity-

Anti-inflammatory activity of *Withania somnifera*has been attributed to the naturally occurring steroids, of which withaferin A is a major component and as effective as hydrocortisone sodium succinate dose, an anti-inflammatory drug (49). Rats treated with powder of *Withania somnifera*orally 1h before the injection ofinflammatory agent for 3 days produces anti-inflammatory responses which are comparable to hydrocortisone sodium succinate (50). Withaferin A was found to suppress the arthritic syndrome effectively without any toxic effect. In arthritic syndrome animals treated with hydrocortisone show weight loss while animal treated with withaferin A show gain in weight (51, 52).

Antibiotic Activity-

The antibiotic activity of the roots as well as leaves has recently been shown experimentally. Withaferin A in concentration of 10µg/ml inhibited the growth of various Gram-positive bacteria, acid-fast and aerobic bacilli, and pathogenic fungi. It was active against Micrococcus pyogenes var aureus and partially inhibited the activity of Bacillus subtilis glucose-6-phosphatedehydrogenase. Withaferin A inhibited Ranikhet virus. The shrub's extract is active against Vaccinia virus and Entamoeba histolytica (53). Ashwagandha showed the protective action against systemic Aspergillus infection. This protective activity was probably related to the activation of the macrophage function revealed by the observed increases in phagocytosis and intracellular killing of

peritoneal macrophages induced by Ashwagandha treatment in mice (54).

Anti-diabetic Effect

Sarangi and co-workers conducted an investigation to explore the possibilities of using leaf and root extracts of *Withania somnifera*against diabetes mellitusand also to examine their hypoglycaemic and hypolipidaemic effects on streptozotonic-induced diabetic rats (55).The extract possess hypoglycaemic and hypolipidaemic properties and hence useful in diabetes mellitus. Another study show significant positive anti-diabetic activity of *Withania somnifera*on diabetic rats when compared with Glibenclamide standard drug. Anti-diabetic activity may be due to increase in hepatic metabolism, increased insulin release from pancreatic *β*-cells or insulin sparing effect (56). *Withania somnifera*root and leaf extract show hypoglycaemic and hypolipidaemic effect on alloxan-induced diabetic rats (57).

Antioxidants-

*Withania somnifera*acts as a powerful antioxidant by increasing the level of three naturally occurring antioxidant enzymes like superoxide dismutase, catalase and glutathione peroxidase in the brain of rats (58). Active principles present in the root of *W. somnifera* have powerful antioxidant effect like anti-stress, cognition-facilitating, anti-inflammatory and anti-aging (59). Antioxidant protects the body against free radical damage. The antioxidant activity in Ashwagandha may be due to withanolides, glycowithanolides and sitoindosides VII-X. So the study indicates that Ashwagandha could be proved as natural source of safe anti-oxidative agent (60).

Anti-aging activity-

Ashwagandha was tested for its anti-aging properties 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. The subjects experienced significant improvement inhemoglobin, red blood cell count, hair melanin, and seated stature. Serum cholesterol decreased and nail calcium was preserved. Seventy percent of the research subjects reported improvement in sexual performance (61).

Immunomodulatory Activity-

A series of studies conducted on animals showed that *Withania somnifera* has a profound effect on hematopoietic system by acting as an immune regulator and chemo protective agent (62, 63). Extract of this plant experimentally in normal mice records the increased cell mediated immunity and root extract known to enhance the level of interferon gamma, interleukin and granulocyte macrophages colony stimulating factor in mice. This suggests their immune protective and myeloprotective effect. Ashwagandha increases the microbes killing power of these immune cells by enhancing nitric oxide synthatase activity of the macrophages (64).

Sexual behavior-

Methanolic root extract of *Withania somnifera* were orally administered at dose 3000 mg/kg/day of 7 days in rats. Their sexual behavior was evaluated 7 days prior to treatment, day 3 and 7 of treatment, and day 7, 14 and 30 post-treatment by pairing each male with a receptive female. The *Withania somnifera* root extract induced a marked impairment in libido, sexual performance, sexual vigor, and penile erectile dysfunction. These effects were partly reversible on cessation of treatment. This antimasculine effect was not due to changes in testosterone levels but attributed to hyperprolactinemic, serotonergic or sedative activities of the extract. *Withania somnifera* roots may be detrimental to male sexual competence (65).

CONCLUSION

From above review, we can say*Withania somnifera* (Ashwagandha) has several health benefits and is the most important 'Rasayana' in Ayurveda. Ashwagandha can boost the immune functions; enhancethe longevity with reducing the stress. There are many references from Ayurved Samhitaas regarding Ashwagandha that can prove the usefulness of this plant. It is described in different formulations in different diseases. As well as its single use is also beneficial to build immunity and face different diseases. Thus Ashwagandha has immensepractical applicability in biomedicine but more clinical trials should be conducted to support its therapeutic uses. Thus from this Review article, we have all the information regarding Ashwagandha which will be beneficial to Researchers who wants to study on Ashwagandha.

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