



Withania somnifera: A wonderful immune booster herbs of India

Radha Singh¹, Dileep Kumar Singh¹, Dushyant Kumar Singh^{2*}

¹Department of Botany, Kishori Raman P.G. College (Affiliated to Dr. B. R. Ambedkar University), Mathura, Uttar Pradesh, India

²Department of Botany, Bundelkhand University, Jhansi, Uttar Pradesh, India

Abstract

Medicinal plants are gifts from nature to treat infinite number of diseases between human beings, play an essential role in local communities all over the world. *Withania somnifera*, plant of Solanaceae family is an important healing short-woody evergreen shrub recognized as Ashwagandha that naturally growing at Braj region of western Uttar Pradesh. It is also known as Prince of Herbs in Indian system of Ayurveda because it has a markedly broad range of therapeutic effects and provides potential benefits for human healthiness. Several parts of *W. somnifera* include root has many biochemical activity and wonderful medicinal properties which used in Indian system of Ayurveda and Siddha and Unani system of medicine from ancient times to treat of senile dementia, ulcers, bronchitis, asthma, emaciation, leukoderma, diarrhea, liver disease and insomnia by local people. Ashwagandha root is among the prominent part used in Ayurveda, a holistic system of medicine that originated in India. Information used in present review was obtained from several books, available articles and databases using many search engines. The key objective of this review on *W. somnifera* will serve as a database is an effort to distribute comprehensive information about the botanical explanation, pharmaceutical activity, medicinal impertinence and traditional uses of Ashwagandha plant.

Keywords: Ashwagandha, Medicinal plant, Solanaceae, Traditional medicine

Introduction

Medicinal plants and related awareness play a significant role in Indian civilization overall well-being. Medicinal herbs have been used from olden time for the therapy of different illnesses. Plants are vital component of herbal medicine and play an essential role in human strength. According to the world health organization (WHO), approximately 80% of the world's population uses herbal medications in developing nations and keep faith in traditional, largely herbal medicines to meet their primary treatment (Jain *et al.*, 2011) [1]. Medicines achieve from herbs are of much requirement as they are reasonably priced and have few known side effects (Modak *et al.*, 2015) [2]. Historically, all medicinal preparations are resultant from plants, whether in the easy form of raw plant resources (Krishnaraju *et al.*, 2005) [3]. The increasing importance of the medicinal plants and traditional health systems in solving the health care problems of the world because of this resurgence of interest to explore medicinal importance some members of Solanaceae family have been chosen. Solanaceae is an important medium-sized plant family that consists of about 2,700 species distributed in 98 genera. Plants from this family has been playing an vital role in traditional medicine and human diet because they are rich in bioactive metabolites and have been used by different tribes around the world for ages (Olmstead and Bohs, 2006; Afroz *et al.*, 2020) [4, 5]. Solanaceae family is global distributed in hot and humid regions across the world. Members of this family are extremely varied in terms of habit, ranging from little annual herbs to trees, in habitat, from deserts to the wettest tropical rain forests and in morphology, with amazing difference in various characters of equally the fruits and flowers (Knapp *et al.*, 2004) [6]. They are high in alkaloids some of which finds their use in numerous

traditional medicinal systems including Ayurveda and Siddha, traditional Chinese medicine (TCM), Unani, and homeopathy (Chowanski *et al.*, 2016) [7].

The medicinal herb *Withania somnifera* is an important medicinal herb belongs to the family Solanaceae. It is indigenous to India; however it can also distributed in desiccated subtropical region of Pakistan, Shrilanka, Afghanistan, Spain, Middle-East Africa and Canary Islands (Chopra *et al.*, 1980) [8]. The name Ashwagandha consequent from Sanskrit word ashbva which mean horse and gandha mean smell, so due to smell of a horse it is simply recognized and generally known as Ashwagandha or Winter cherry in India, where it is used as an adaptogenic herbal medicine to improve over all physical condition, strength, longevity and traditionally prescribed to help people become stronger and more protected. *W. somnifera* listed in the Indian Materia Medica and has been used in the Ayurveda Siddha & Unani system of medicine and indigenous herbal medicine for over 3000 years (Anonymous, 1982) [9].

Taxonomic Position

Kingdome: Plante

Subkingdome: Viridiplantae

Superkingdome: Embryophyta

Division: Tracheophyta

Subdivision: Spermetophyta

Class: Magnoliopsida

Superclass: Asteranae

Order: Solanales

Family: Solanaceae

Genus: *Withania*

Species: *somnifera* L.

Vernacular Name**Marathi:** Asgundh, Kanchuki, Askandha**Sanskrit:** Ashvagandha, Gandhpatri, Kamrupini**Bengali:** Ashvagandh**Punjabi:** Asgand**Tamil:** Asuragandi**Telugu:** Asvagandhi, Penneru**Urdu:** Asgandanagaori**Gujarati:** Aksand, asvagandha**Kannada:** Hiremaddina gida, Penneru, Sogade beru**Malayalam:** Amukkuram, pevetti**Common name:** Ashvagandha and Winter Cherry**Ayurvedic Properties****Rasa:** Katu (Pungent), Tikta (Bitter), Madhura (Sweet)**Guna:** Snigdha (Oily), Laghu (Light)**Vipaka:** Madhura (Sweet)**Virya:** Ushna (Hot)**Doshakarma:** Kapha-Vatashamak (Teli *et al.*, 2014) ^[10]**Botanical Description**

W. somnifera (Ashvagandha) is a little evergreen, tiny, woody shrub plant (chromosome number $2n=48$) that grows naturally across 1 m height in damage garden, road side, rough and dry place, arid soil and waste area of Braj region of western Uttar Pradesh. The entire Ashvagandha plant is covered with short and silver branched. Leave are about 5-8 cm long, alternate, broadly ovate, simple, glabrous on upper surface, hairless and green. Stem is much branched, woody, silver-green, upright but sometime prostrate. Flowers are small, green, axillary, organized cymes, bisexual appear at the leaf nodes, 5-lobes calyx, sphere-shaped, stellately tomentose and acute, 5-lobes corolla, narrowly and yellow-green. Stamens 5 and yellow-orange in color, the flower produce red fruit in midpoint. Fruit is red-yellow, soft, small, circular berry, globose and hairless. Seeds are numerous, kidney-shaped, pale-brown or yellow in color, scurfy. Root is thick, heavy, long tuberous, branched, fleshy and whitish-brown in color (Figure 1).



Fig 1A: Plant of *Withania somnifera*, B: Seeds, C: Roots

Pharmacological Property

Entire plant of *W. somnifera* has constitutes a variety of major phytoconstituents. Leaves contain 12 withanolides and 5 unidentified alkaloids, many amino acids, glycosides, glucose, chlorogenic acid, flavonoids and tannins, root contain many amino acids include aspartic acid, glycine, tyrosine, alanine, proline, tryptophan, glutamic acid, and cystine, volatile oil, steroids, starch, reducing sugars, hentriacontane, dulcitol, glycosides, and alkaloids like withanine, withasomnine, and visamine, shoots contains crude protein, calcium and phosphorous, fruit contain

proteolytic enzyme, amino acids, condensed tannins, and flavonoids, amino acids such as alanine, proline, glycine, tyrosine, hydroxyproline, valine, aspartic acid, glutamic acid, cystine and cysteine (Khare, 2007; Qamar *et al.*, 2012) ^[11, 12]. It is confirmed from published work from last two decade, the whole plant of *W. somnifera* has various biochemical activities such as antiinflammatory and antiarthritic, immunomodulatory, antioxidant, antimicrobial, hypothyroid, antistress and anabolic, neuropharmacological, anticarcinogenic, antihyperglycemic effect, antiaging, musculotropic, macrophage activating effect,

hepatoprotective, cardio protective activity and anticonvulsant activity (Teli *et al.*, 2014) ^[10]. Known biochemical constituents namely; stigmasterol, stigmasterol glucoside, viscous lactone B and $\alpha + \beta$ glucose are reported first time from the roots of Ashwagandha (Mishra, 2008) ^[13].

Medicinal Uses

- *Withania somnifera* (Ashwagandha) is a significant traditional medicine plant used in Ayurvedic medicine, generally in Asia and Africa. Commercially, the Ashwagandha is cultivated in North India especially in Uttar Pradesh., Madhya Pradesh., Rajasthan, Gujarat and Punjab for production of herbal drugs.
- Plant of Ashwagandha contains various chemical compounds obtained from the leaves and roots; therefore it is also famous as prince of herbs. These compounds of this plant are used in manufacture of herbal medicine. It has great antioxidant qualities that seek and destroy the free radicals.
- According to Ayurveda, the root powder of Ashwagandha can be used to treatment of a variety of disease namely; asthma, ulcers, psoriasis, inflammations, bronchitis, consumption, scabies, insomnia, senile debility and in marasmus of children. According to Unani system of medicine, the root is beneficial for treatment in asthma, leucoderma, bronchitis, inflammations and in lumbago (Oudhia, 2021) ^[14].
- Ashwagandha is also used for strengthening of female reproductive system and it is excellent medicine for people who do hard work or exercise a lot to very helpful for body adapt to physical stress, they helps to manage body weight and maintain proper nourishment of tissues, particularly muscle and bones (Teli *et al.*, 2014; Jain *et al.*, 2001) ^[10,15].
- The entire plant including leaves, stem, flower, seeds, root and bark of *W. somnifera* used in traditional systems of Indian medicine for the treatment of liver tonic, aphrodisiac, astringent, anti-inflammatory agent, and to treat senile dementia, ulcers, bronchitis, asthma, emaciation and insomnia etc. (Verma and Kumar, 2011) ^[16].
- Ashwagandha has been used to improve memory, supercharge the immune system and encourage overall well-being (Chatterjee and Pakrashi, 1995) ^[17].
- Ashwagandha may be use for treatment of Alzheimer's and Parkinson's degenerative diseases (Jesberger and Richardson, 1991) ^[18].
- Studied from last two decades indicate that, *W. somnifera* has great antimicrobial, antioxidant, anti-inflammatory, anti-tumor and anti-stress properties, it also has rejuvenating, and mind boosting properties (Nadkarni, 1982) ^[19].
- It is used to treat anxiety, insomnia, tuberculosis, tumors, asthma, bronchitis, leukoderma, backache, fibromyalgia, menstrual issues, and chronic liver disease, and for improving thinking ability, decreasing pain and swelling and preventing the effects of aging (Anonymous, 2007) ^[20].
- The amazing effective uses of Ashwagandha root powder to improve the sexual strength such as increasing in fertility and even sperm count, improves

the function of the reproductive system promoting a healthy sexual and reproductive stability, however the roots powder of Ashwagandha may actually decrease fertility in women, therefore, women should use root power only with the recommendation of a consultant (Nadkarni, 1982; Singh *et al.*, 2011) ^[19, 21].

- According to Khare (2007) ^[11], the concentration of some hormones level are lower or higher in human body, the Ashwagandha should be increases and decreases them in hormones level because they operates overall body level system by maintaining balance in the substances and processes running in the human body.
- Ashwagandha may have powerful effects on testosterone levels and significantly increase sperm quality and bell increase fertility in men (Spritzler, 2019) ^[22].
- Ashwagandha increase the function of the brain and nervous system function, as well as human memory.
- Ashwagandha is used with milk in emaciation of children, rheumatism, leucoderma, debility from old age, vitiated conditions of vata, insomnia, constipation, goiter and in nervous breakdown (Sharma, 1999) ^[23].
- Ayurvedic medicines derived from Ashwagandha plant may be valuable in the management of COVID-19, It is a prescribed Ayurvedic botanical known as an antiviral, immunomodulatory, anti-inflammatory and adaptogenic agent which may have helpful effects on comorbidities related with the COVID-19 (Saggam *et al.*, 2021) ^[24].

Conclusion

Medicinal herbs are going to play an significant role in the current and future generation without or minimal negative effect. In recent year, the global markets of herbal drugs have been notable increasing. Plants are a major source of herbal drugs and play a significant role in human fitness. *Withania somnifera* (Ashwagandha) is widely utilized in manufacture of herbal medicines.

All parts of *W. somnifera* has many multiple biochemical activity including immunomodulatory, antioxidant, antimicrobial, antistress and wonderful medicinal properties that can directly and indirectly use to treat a variety of human diseases. It is one of the most significant herbs of Indian system of traditional remedy used for millions and broad ranging of wonderful health benefits. The present review from database literature will serve as provide information about the medicinal importance, traditional knowledge and uses of *W. somnifera*

Authors Contributions

All the authors have contributed the manuscripts. Authors RS writing the manuscript, DKS conducted the field survey and designed the study, Author DKS supervised the research work and analyzed the study.

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