Ashwagandha From Ancient Root to Modern Remedies

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Abstract— **Recent years, there has been an increase in reports on health-promoting properties of winter cherry (Withania somnifera), generally known as Ashwagandha. It is highly regarded Rasayana (tonic) plant in the Indian Ayurvedic medical system for over three thousand years. Although previous review papers on this plant have been published, this review article is offered to gather all of the most recent information on its phytochemical and pharmacological activities, which were conducted using variety of approaches. According to studies, Ashwagandha has antioxidant, anxiolytic, adaptogenic, memory-enhancing, anti-parkinsonian. Anti venom, anti-inflammatory and anti-cancer effects. There were 41 studies that looked at Ashwagandha's effects on stress and anxiety, sexual function and fertility, athletic performance, cognitive, performance, pain, fatigue, thyroid, function, schizophrenia, diabetes, obsessive-compulsive disorder, insomnia, hyper cholesterol, and tuberculosis. This systemic review suggests that Ashwagandha has a wide range of medicinal application such as immunomodulation, hypolipidemia, antimicrobial, cardiovascular, protection, sexual behavior, tolerance and dependence have been investigated. This growing corpus of research on Ashwagandha demonstrates its promise as a beneficial natural therapy for a review looks into the most recent discoveries and provide a detailed summary of our current understanding of Ashwagandha's potential uses, as well as any known safety problems and contraindications. Their morphological and anatomical structural have a diagnostic role in taxonomy identification and some adaptive peculiarities may be suitable morphological and anatomical structural have a diagnostic role in taxonomy identification and some adaptive peculiarities may be suitable for Ashwagandha plant successful growth in the relative dry conditions of our region**.

***Index Terms*— Ashwagandha, Withania somnifera, Traditional Medicine, plant Microscopy, Geographical Source, Phytoconstituent.**

1. Introduction

Withania Somnifera (Ashwagandha)
The Sanskrit word "ashva", which means horse and "gandha", which means smell are Combined to form the term "Ashwagandha" which together suggest that the roots have a horsey scent.

Fig1.1 Withania somnifera (Ashwagandha)

- *Synonym*: Withania root, Withania, Ashwagandha, larnax morrisoni, Alicabon somniferum, physalis alpini, physalis flexuosaL., Physalis scariosa Webb & Berthel. physalis somniferaL., physaloides somnifera (L)Moench, Withania arborescens Dunal, Withania chevalieri A.E.Gonç, Withania kansuensis Kuang & A. M. Lu, Withania microphysalis Suess, Withania morisonii Dunal, Withania mucronata Chiov, Withania obtusifolia Täckh, Withania sicula Lojac.
- *Regional name*: Ashwagandha (Bn), Asgandh (Hn), Askandha (Mr), Amukura(Tm) , winter cherry , Indian ginseng.
- *Biological source*: The drug consists of dried roots of Withania somnifera (Linn) Dunal, family Solanace.W. Somnifera is an erect, evergreen, branching tomentose under Shrub about 30 to 150cm high, found throughout the drier parts of Indian, especially, in the wastelands and on bunds. It is widely distributed in north-western India, Maharashtra, Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh, Punjab, and also extends to the mountainous region of Himachal Pradesh and Jammu. It is cultivated to a limited extended for the medicinal roots at Manasa near Indore in Madhya Pradesh and in the Pratapgarh area of Rajasthan. The leaves are ovate glabrous up to 10cm long. The leaves of the floral region are smaller in size

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and opposite, the flower is inconspicuous, greenish or lurid yellow in axillary, umbellate cymes. The fruit are the small globose berries which attain orange-red colour when ripe. Berries are enclosed in the persistent calyxes. The seeds are Reni form and yellow in colour. The roots have cylindrical stem-base of green colour with longitudinal wrinkles. The dried roots of Withania somnifera form the commercial drug. Dried roots of 20-30cm long and 6-12m in diameter, they bear few lateral secondary roots of slightly smaller size which are straight and unbranded. Roots are buffto greyish-yellow externally and creamy internally. They shoe longitudinal wrinkles and the centre have a soft solid mass with scattered pores. The roots taste breaks with a short and uneven fracture. They show Characteristics strong odour and mucilaginous bitter and acrid.

- *Habitat*: low productivity areas and sub marginal wastelands were necessary for Ashwagandha. It grows best in a subtropical climate and produce the highest quality Ashwagandha roots. Ashwagandha plant may thrive full light and in reasonably dry conditions.
- *Seasons*: the best suitable Seasons to plant Ashwagandha is July/August for October.

Fig 1.2 Ashwagandha flower

History: There is a link between the history of Ayurveda and Ashwagandha. It dates back to approximately 6000 BC. Ayurveda has included Ashwagandha since ancient times. India and Pakistan have always utilized this amazing herb. Ashwagandha is not just used in the Ayurvedic medical system years ago Chinese medical system was also fascinated with it. It is an example of an adaptogenic plant, meaning that it increases resistance to different kinds of stress and increases flexibility. It improves adaptability and resistance to a range of conditions.

2. Microscopy

- *Roots*: The section displays a circular view with a rough periderm surface. The key features of the anatomy are shown in f. The periderm is easily exfoliated, thin, and poorly defined. Thin-walled parenchyma cells with radial compression make up the cortex. The distinctive trait of the other Solanaceae species (Atropa belladonna, Scopolia carniolica, and Nicotiana tabacum) is the presence of calcium oxalate sands in the cortical cells. Two concentric rings with a well-shaped cambium strip ring between them define the secondary structure of the core cylinder. The outside ring is made of phloem, which is rich in starch, while the inner ring is made of considerably thicker lignified wood vessels. The wood is represented by a variety of diameter vessels that are frequently covered in granules and intersected by a large number of medullar rays.

Fig:2.1 cross section of Withania somnifera roots

- *Stem*: The cross-sectional image of the stem displays shallow ridges and a round shape. A thin epidermis, a reasonably wide cortex, and the biggest zone of central cylinder and wide pith are discernible on the cross section. Like in several species of the Lamiaceae family, the characteristic secondary structure is produced solely by cambium activity. The izodiametric, tiny epidermal cells have a thick coating of cuticle covering them. The surface is pubescent because to the random distribution of multicellular, brunched, and dendroid trichomes. The erect trichomes are made up of somewhat thick-walled, broad, rectangular cells arranged in a vertical plane. The corner apex of the brunched trachoma is short. Numerous Solanaceae species that are used as medicine have multicellular trichomes, but only W. somnifera has trichomes similar to dendroids.

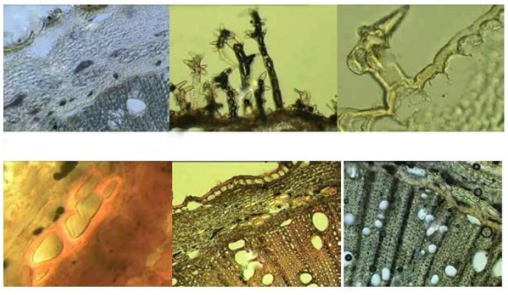

Fig 2.2 cross section of Withania somnifera

- *Leaf*: The leaf has a dorsiventral, bifacial anatomical structure. Multicellular, dendroid trichomes, like pitted terminal cells on a stem, cover both epidermis layers. The pits are more numerous and shorter on the

lower epidermis layer than on the upper. Additionally, the lower epidermis is distinguished by seldom secretory hairs, which include uni- or multicellular glands on the unicellular stalk. On both layers of the epidermis, more so on the lower, are anomocytic stomata encircled by four to six epidermal cells. Numerous calcium oxalate rosettes can be seen in the spongy mesophyll, similar to those found in the leaves of Datura stamonium, Hyosciamus niger, and Scopolia carniolica. Wax crystals with a geometric shape can be identified on the juvenile leaves. The collateral and central vascular bundles.

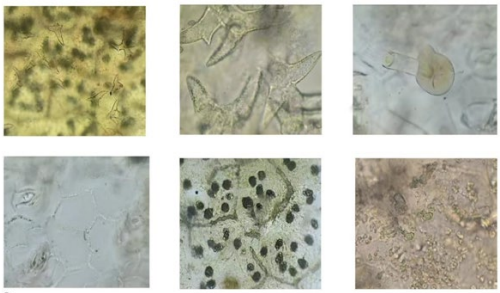

Fig 2.3 cross section of Withania somnifera leaf

- *Flower*: The mature fruit was encased in a gamosepalous ancrescent calyx that had both an exterior and interior epidermis with anomocytic stomata (rarely) and two types of trichomes: multicellular (dense), branching, and similar to the leaf but shorter. were observed to be geometric wax forms, frequently polygonal the fragile petals develop upper and lower epidermis with few stomata, tiny trichomes, and mesophyll between them. They also feature a leaf structure.

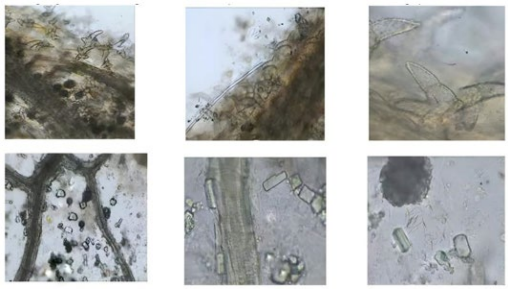

Fig 2.4 cross section of Withania somnifera flower

Fruit: The berry-fruit's pericarp is enclosed by an exterior layer of epidermis made up of punctuated polygonal cells, a thick layer of colorless cuticle, and anomocytic stomata on the fruit's basal area. With a higher degree of vacuolization, the interior tissue is primarily parenchimatous, similar to the spongy mesophyll of leaves. The mesophyll cells are abundant in fatty globules, orange to red carotenoidoplasts, and occasionally, oxalate rosettes were observed. The individual seeds are contained in distinct chambers by the endocarpic lobes, which cling to the placental false septa. An intriguing characteristic in resolving taxonomic puzzles is the existence of sand calcium oxalate crystals in the fruit, flower calyx, and root and stem as well as rosette in the leaf. The development of unique anatomic structures, such as numerous thichomes, glandular hairs, wax crystals, sclerenchymatic fiber rings, collenchyma, and conspicuous lignified wood, has also been noted in other articles. These features allow W. somnifera to be classified as a xerophyte with significant adaptability to grow in climate conditions that are different from those found in the regions of origin, such as India. Our findings may shed light on certain adaptive mechanisms that W. somnifera has evolved as well as the manufacture and storage of certain beneficial secondary metabolites in plant organ yield under various climatic conditions.

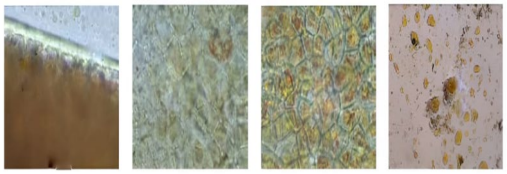

Fig 2.5 cross section of fruit of Withania somnifera

3. Different Parts of Ashwagandha That Has Medicinal Value

- *Roots*: The majority of these 6000 years have seen the use of Ashwagandha as a Rasayana. Ashwagandha root is considered a stimulant, tonic, aphrodisiac, narcotic, diuretic, anthelmintic, astringent, and thermogenic. Since the root gives off a horse-like scent (thus the name "Ashwagandha"), it is often known as such. When consumed, it also imparts equine strength. It is frequently used for a variety of ailments, including rheumatism, vitiated vata conditions, leucoderma, constipation, sleeplessness, nervous breakdown, goiter, and emaciation in children (when administered with milk, it is the best tonic for infants).

To lessen joint inflammation, use the paste that is created when water is crushed into roots. Additionally, it is used locally to painful swellings, ulcers, and carbuncles. The root is prescribed for both snake venom and scorpion stings when used in combination with other medications. According to Misra (2004), it also aids with leucorrhea, boils, pimples, flatulent colic, worms, and piles. Of all the Ashwagandha kinds, the Nagori Ashwagandha is the best. Using fresh Ashwagandha powder yields the greatest benefits.

The roots contain several bioactive compounds including withanolides, alkaloids, and saponins, which are believed to contribute to its health benefits. Withanolides, in particular, have been studied for their anti-inflammatory, antioxidant, and immunomodulatory properties. Ashwagandha is available in various forms, including capsules, powders, and liquid extracts. The appropriate dosage depends on several factors, including the user's age and health status. However, typical doses range from 250 mg to 500 mg per day.


Fig 3.1 Roots of Ashwagandha

- Leaves: Ashwagandha leaf juice is a prime example; it offers significantly more adaptogenic effects than its relative ginseng and over five times the antioxidant content of blueberries. Even better, you can simply use any blender or juicer to prepare this nutrient-rich beverage for yourself. In addition, Axiom wants to help humanity by offering its clients pure and hygienic Ayurvedic items. For millennia, Ashwagandha leaf has been used to cure a wide range of illnesses. Among the significant Ayurvedic herbs that have been used for more than 3,000 years is Ashwagandha. It is particularly effective for reducing stress, boosting vitality, and enhancing focus.

The usage and existence of Ashwagandha are also mentioned In the Atharvaveda. In Indian traditional medicine, Ashwagandha is considered a miracle and anti-stress plant. As a result, Ashwagandha is also a name for the herb used to treat anxiety disorders and symptoms associated with stress.

Ashwagandha leaf is said to decrease Kapha dosha (body accumulating defect) and Vata dosha (body flow disorder) while increasing pitta or bike (body altering defect). These three primary flaws are subject to change due to anycondition within the body.


Fig 3.2 leaf of Ashwagandha

- Fruit: course! Let's examine the applications for the Ashwagandha plant's its fruits, or berries: Ashwagandha Fruits/Berries Usage
- *Traditional Medicine*: - Ashwagandha berries are employed in traditional Ayurvedic medicine because of their adaptogenic qualities, which support general well-being by assisting the body in adjusting to stimulates. are frequently included to herbal concoctions called Rasayanas, which are revitalizing drinks meant to encourage vigor and longevity. Ashwagandha berries are thought to have aphrodisiac qualities and may increase fertility in both men and women, they are occasionally used to boost reproductive health.
- *Reduction of Stress and Anxiety*: By regulating cortisol levels and bolstering the body's stress response system, the bioactive chemicals in Ashwagandha berries, especially withanolides, may help lower stress and anxiety levels. Eating Ashwagandha berries or goods with berry extracts may help one feel peaceful and relaxed.
- *Cognitive Suberrt*: - According to some research, Ashwagandha berries may have neuroprotective properties that enhance memory, concentration, and cognitive function. Regular Ashwagandha berry product consumption may improve cognitive function and brain health, especially in older populations.
- *Immune Modulation*: - Ashwagandha berries' immunomodulatory qualities may aid in promoting a robust immune system and warding off illnesses.

Consuming Ashwagandha berry extracts on a regular basis may improve immune system performance and immunological health in general.


Fig 3.3 fruits/ Berries of Ashwagandha

A. Seeds:

Nutritional Support: - Proteins, good fats, dietary fiber, vitamins, and minerals like calcium and iron are among the many vital nutrients that Ashwagandha seeds are high in. Including Ashwagandha seeds in the diet can boost general health and well-being and offer nutritional assistance.

Culinary Uses: - In some areas where the plant is grown, Ashwagandha seeds may be used in cooking, despite their less frequent usage in traditional medicine. To add taste and nutrients to savoury foods, you can roast the seeds and eat them as a snack.

Cardiovascular Health: - Linoleic acid and oleic acid, two of the fatty acids found in Ashwagandha seeds, may be beneficial to the cardiovascular system. Regular Ashwagandha seed consumption may improve cholesterol levels, cardiovascular health in general, and heart.

Fig 3.4 seeds of Ashwagandha

4. Adulteration

- *Known adulterants*: W. somnifera undisclosed non-root components, such as the aerial portions, stem, and leaves of Ashwagandha, which are high in withaferin A and other withanolides.
- *Information Confirming adulteration*: The quality assessment of Ashwagandha raw ingredients and finished products.2,19,20 Sang-wan et al. discovered that ten commercial items supplied by Indian producers of dietary supplements had extremely varied chemical fingerprints and amounts of aflatoxin A ranging from 0.02 to 2.34 mg per gram of Ashwagandha. The authors noted that a portion of the outcomes might be attributable to uncontrolled and frequently unremarkable root supplementation.19 Mundkinajeddu et al. analysed authenticated samples of W. somnifera leaves (n = 5), aerial parts (n = 3), and roots (n = 17) that were procured from India and Egypt using high-performance liquid chromatography with UV detection (HPLC-UV).2. To further investigate the possibility of adulteration with aerial components, flavonol glycosides (Figure 1), which are indicators of flavonoid glycoside content, were examined in ten commercial extract samples labeled as "derived from the roots." Only two of the commercial extract samples were found to be devoid of all marker chemicals for aerial parts, suggesting that aerial pieces are occasionally added as adulterants to extracts made from Ashwagandha roots. Nevertheless, no signs of adulteration were discovered during the verification of 28 samples of entire roots in the Indian state of Kerala. According to the authors, mold growth on the root surface is a frequent issue.20 Using high-performance thin-layer chromatography (HPTLC) under the conditions shown in Figure 2, data on the identity testing of 584 commercial raw material samples of Ashwagandha root (Alkem-ist Laboratories; Costa Mesa, CA) revealed that 119 samples (20.4%) were not made entirely of authentic root material. In 84 samples (14.0%), the presence of leaf material resulted in sample rejection. (Email exchange between S. Gafner and S. Sudberg [Alkemist Laboratories], May 12, 2017) Shaheen Majeed (Sabinsa Corporation, East Windsor) also acknowledged indulgence with Ashwagandha leafs extracts.

Accidental or intentional adulteration. Whether deliberate or inadvertent, financial gain is the driving force for adulteration in commercial items. The roots of Ashwagandha are in greater demand worldwide as a result of the plant's consistent sales growth. As a result, the price of roots has increased significantly in comparison to the cheaper aerial parts, which also contain withanolides as previously mentioned. Greater quantities of aerial components can be gathered in a comparatively short length of time, which can then be turned into extracts at a fraction of the cost of making root extracts. These extracts can be sold for less than the going rates for real root extracts, giving the producer/seller a sizable profit. Unintentional Because some farmers might not be aware of the variations in the contents and the significance of employing roots exclusively rather than aerial portions, adulteration might occur during the harvest stage. A fraction of the raw materials containing aerial portions may be produced if the roots are cut too far aboveground during the root harvesting procedure.

A. Substituent

Rhodiola Rosea: Native to extreme areas like the Arctic and hilly regions of Europe and Asia, this herb grows naturally. It is well known for assisting the body in adapting to stimuli because to its adaptogenic qualities. Rhodiola is thought to function by lowering cortisol levels, generating a sense of peace and well-being, and harmonizing the body's stress response system. It's frequently used to fight weariness, sharpen cognitive function, and build physical stamina.

Fig 4.1 Rhodiola Rosea plant

Holy Basil (Tulsi): Known for its therapeutic qualities, holy basil, also known as tulsi, is regarded in Ayurveda as a sacred herb. It is well known for its capacity to lessen tension, encourage relaxation, and elevate mood. It is also high in antioxidants. Additionally, holy basil is utilized to enhance digestion, support respiratory health.

Fig 4.2 Tulsi plant

Panax Ginseng: Asian or Korean ginseng, also known as Panax ginseng, has been a part of traditional Chinese medicine for millennia. It's an adaptogenic herb, similar to Ashwagandha, that supports general wellbeing and helps the body handle stress. Panax ginseng is frequently used to boost immunity, improve physical performance, increase energy levels, and improve cognitive function.

Fig 4.3 Panax Ginseng plant

Eleuthero (Siberian Ginseng): Another adaptogenic plant with characteristics comparable to Panax ginseng is Eleuthero, usually referred to as Siberian ginseng. It is indigenous to north-eastern Asia, including Siberia. Eleuthero is thought to improve mental clarity, boost physical endurance, boost energy levels, and assist the body in adjusting to stress. It's frequently used to boost general vigor, fight weariness, and lessen worry.

Fig 4.4 Eleuthero plant

L-Theanine: An unusual amino acid called L-theanine is mostly present in tea leaves, especially green tea. It's well renowned for its capacity to ease tension and encourage relaxation without making people feel sleepy. L-theanine has a relaxing and mood-enhancing impact by raising the levels of neurotransmitters including dopamine and GABA. It's frequently used to enhance general cognitive function, encourage calm awareness, and enhance attention and concentration.

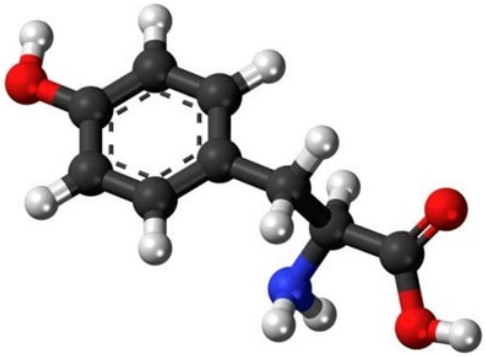

Fig 4.5 L-Theanine

Bacopa Monnieri: Bacopa is a traditional Ayurvedic herb that is frequently used to promote brain health and improve cognitive function. It has been demonstrated to increase learning capacity, lessen anxiety, and boost memory because of its high antioxidant content. It is thought that bacopa functions by raising neurotransmitter levels, such as acetylcholine, which is important for memory and learning.

Fig 4.6 Bacopa Monnieri

5. Geographical Distribution, Collection, Cultivation

A. Distribution of Ashwagandha

Ashwagandha (Withania somnifera) cultivation is concentrated in warm-weather areas. This is a map showing the locations of Ashwagandha farms:

- *India*: Ashwagandha is indigenous to India, where it is extensively grown, especially in warm climates like Madhya Pradesh, Punjab, Rajasthan, Gujarat, and Uttar Pradesh. Because of its many health benefits, this herb has been utilized for millennia in Ayurvedic therapy.
- *Nepal*: Also grown there, Ashwagandha is referred to as "Asuro" or "Ashwagandha." Like India, it's grown in hilly and temperate places like the Terai region, which have ideal climates.

- *China*: Certain areas of China, especially those with a subtropical climate, are also home to Ashwagandha farming. On the other hand, compared to India and Nepal, it is not as commonly grown in China.
- *Mediterranean Region*: Efforts to plant Ashwagandha have been made recently in the Mediterranean region, which includes Greece, Turkey, and Israel. These regions have favourable growing conditions, and Ashwagandha is being investigated as a possible cash crop.
- *North America*: Ashwagandha farming has also become more popular in North America, especially in warm climatic areas like the southwest. The growing popularity of Ashwagandha in natural health markets has sparked interest in cultivating it in states like Arizona and California.
- *Australia*: Cultivating Ashwagandha has also showed promise in certain parts of Australia, especially in the warmer climes. There are initiatives in place to investigate its commercial cultivation in certain regions of New South Wales and Queensland. Although Ashwagandha may grow in a variety of climates overall, it prefers warm, dry weather and well-drained soil. It is grown in home gardens for both personal and commercial usage. Growing in popularity worldwide, attempts are being made to cultivate it in new areas.

B. *Cultivation*

- *Direct sowing*: It is possible to spread seeds straight into the field. Because it's mostly a rain fed crop, the monsoon dictates when to plant. The second week of July is when the crop is cultivated after the soils have been raised to a one tilt by pre-monsoon rainfall. For this kind of crop-raising, a seed rate of 12 kg per hectare is sufficient.
- *Transplanting*: process of transplanting to produce enough seedlings for one hectare, about five kg of seeds are needed. Before seeding, Dithane M-45 should be used at a dosage of 3 g/kg of seed. Before the rainy season officially begins, seeds are sowed at the nursery. The seeds require six to seven days to germinate after being covered with light soil. The crop that is sown directly is thinned 25–30 days after sowing in order to keep the plant population at 20,000–25,000 per hectare. An effective way to control weeds is to hand weed every 25 to 30 days. The greatest root production of 1.2 t ha–1 was obtained by preparatory tillage to a depth of 30 cm combined with a density of 60 plants m–2ل, which was 50% more than that obtained after 15 cm of tillage depth and the same density (Kothari et al. 2003). This is explained by the previous treatment's favourable effects, which increased plant height, the number of branches per plant, and the biomass production of the shoots by 33, 37, and 21%, respectively. Moreover, the majority of the best-quality root pieces (68%) were produced by this treatment. Length of the main root, lateral root length, and lateral root diameter.
- *Fertilizer application*: Applying fertilizer to Ashwagandha (Withania somnifera L.) 8911.3 Most farmers in Madhya Pradesh don't use fertilizers. Additionally, experimental data indicates that fertilizer treatment in Madhya Pradesh has little effect on root yield. On the other hand, medicinal plants grown organically are in high demand on both domestic and foreign markets. Therefore, to harvest large root yields in a sustainable manner, apply 10–15 t/ha of farmyard manure or 3–5 t/ha of vermicomposting coupled with bio fertilizers such phosphorus-solubilizing bacteria. As an alternative, 200 kg of single superphosphate, 50 kg of muriate of potash, and 65 kg of urea may be applied per hectare; P and K should be applied at planting, and N should be applied in two splits at 30- and 60-days following planting (Rajeswara Rao et al., 2012).
- *Irrigation*: Watering Usually, it is grown as a crop that is rain fed. Light irrigations, however, once every 15 to 20 days, when irrigation facilities are available, promote healthy crop growth and yield large amounts of roots. Schedule of activities during the duration of the experiments.
- *Insect pests, disease and their management*: Their Significance and Upkeep Diseases, pest insects, and how to handle them Withania somnifera is vulnerable to various illnesses and pests. The most common illness, leaf spot disease, is primarily found in the plains of Punjab, Haryana, and Himachal Pradesh and is caused by Alternation alternate. There have been reports of biodeterioration of its pharmaceutically active components during leaf spot disease. Withania somnifera suffers from stem and leaf rot due to The Choanephora cucurbitarum. Because a treehopper feeds on the apical parts of the stem, these parts appear brown and have a rough, woody texture. The plant eventually withers away after losing its apical leaves. The most common plant pest in India is the Tetranychu surticae, often known as the carmine red spider mite. Principal Insects: Mite and shoot borer. The three main diseases are leaf blight, seedling blight, and seed root

C. *Collection*

- *collect Timing*: After the leaves and berries have dried, it is best to collect the roots in the winter, from October to March.
- *Plant Maturity*: Look for mature plants that have yellowing leaves and dried-out berries. These signs point to a high concentration of active substances in the roots.
- *Harvesting Technique*: Remove the entire plant, including the roots, with gentle digging. Make sure you thoroughly wash the roots to get rid of any dirt or

debris.

- *Drying Method*: To preserve the roots' quality, cut them into thin slices and let them dry in a well-ventilated, shady place. Avoid exposing them to direct sunlight.
- *Advice Regarding Storage*: Store the desiccated Ashwagandha roots somewhere cool, dark, and airy. When storing, use airtight containers to preserve After 180–210 days of seeding, the crop is ready for harvesting. A crop that is 150–180 days old is harvested in some areas. Leaves desiccating and berry reddening determine the crop's maturity. The roots are separated by chopping the stem 1-2 cm above the crown after the entire plant is removed. After being washed, the roots are either chopped into 7–10 cm lengths and dried in the sun, or they are dried whole and preserved. The seeds are saved for the following harvest after the berries are hand-picked, dried, and threshe

6. Phytoconstituent

A. Uses:

1) Classic use of Ashwagandha:

As per the 1949 Charak Samhita, Ayurveda, the traditional medical practice in India, for much of these 6000 years, Ashwagandha has been used as a Rasayana. The tonic, narcotic, diuretic, anthelmintic, astringent, stimulant, and thermogenic qualities of Ashwagandha root. It is commonly used for a variety of conditions, including emaciation in children (when taken with milk, it is the best tonic for small infants), old age debility, rheumatism, leucoderma, constipation, insomnia, neurological breakdown, goitre, etc. Applying the paste made from pulverized roots and water relieves joint

2) External application:

Ashwagandha leaves and root paste are applied to enlarged cervical glands or swelling of other glands, since they reduce oedema and pain. Oil massage is used to cure weakness and vata issues. Eardrops containing Ashwagandha leaf juice are used to clear blocked ears. Blisters are treated with black root ashes to promote healing. The dried leaves are ground into a powder, which is then used to make a paste that women apply to their faces to treat burns and wounds and serve as sunscreen.

3) Internal applications

Nervous System: Ashwagandha root, a sedative, tranquillizer, and nervine tonic, is good for tonic nerves, fainting, giddiness, and insomnia (the species somnifera's Latin name means "sleep-inducing"; Stern, 1995). It's also taken as a general tonic, a "adaptogen" to help the body cope with everyday stress, and a mind-booster. It also improves memory-related mental functions like focus and attention, which reduces the impacts of neurodegenerative diseases like Parkinson's and Alzheimer's.

Encourages restful, cozy slumber at night All muscular tissues, including the heart and lungs, are strengthened, toned, and benefitted by Ashwagandha. It improves muscle tone and reduces inflammation in the muscles. It is the best treatment for low body weight, muscular aches and pains, stiffness, and weakness.

- *Digestive system*: Worms, constipation, and stomach pain are all treated with Ashwagandha bark powder due to its anthelmintic, carminative, and appetizing qualities.
- *The circulatory system*: Ashwagandha affects the heart, cleanses the blood, and reduces swellings. Therefore, it is used for edema, blood problems, and heart weakness. Decoction is used to treat Rheumatoid arthritis. The respiratory system: Ashwagandha helps with coughing as it is an expectorant and has anti-asthmatic properties. Ashwagandha, ghee, and honey can treat asthma. If the phlegm is thin, ash or an alkaline extract can be used. Bark decoction should be taken in small doses to treat cough and asthma. In the mentioned situations, it is also used as a tonic.
- *Reproductive system*: Ashwagandha is regarded as a sukrala, or semenogogue, which increases sperm production. It is used to treat semen problems and is widely recognized for its aphrodisiac qualities. A wonderful tonic, nutritive, and aphrodisiac is a combination of 5 gms of Ashwagandha powder, 10 gms of ghee, and sugar with 250 ml of milk. It entirely cures endometritis-related leucorrhea and puerperal backaches.
- *Urinary system*: It is used as a diuretic for oliguria or anuria. Skin: Ashwagandhadi churna is recommended for wrinkled skin, early aging, and early hair graying. It is used to treat vitiligo and other skin.
- *Satmilkaran*: It is an aphrodisiac, raises weight, and boosts immunity. Used in children with marasmus and debilitating disorders.

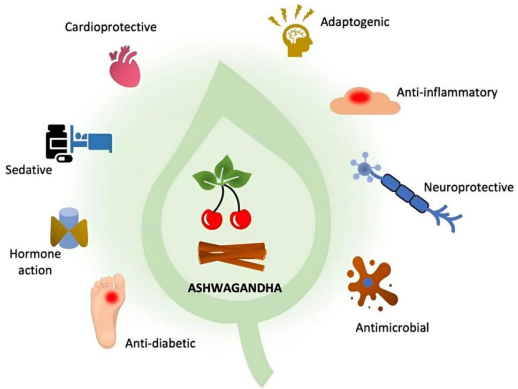

Fig 6.1 uses of Ashwagandha

B. Adverse Effects

- When taken orally, Ashwagandha may be used for up to three months without any problems. It is unknown if Ashwagandha is safe over the long term. Ashwagandha taken in large amounts may upset your stomach and cause diarrhea and vomiting. In rare cases, liver issues could arise, necessitating a liver

transplant and leading to serious liver failure.

- When administered topically: Using Ashwagandha-containing lotion for up to two months may be safe.
- Pregnancy: Using Ashwagandha during pregnancy is probably not advised. There is evidence to suggest that Ashwagandha may contribute to miscarriages.
- Breastfeeding: Insufficient and unreliable data are available to determine whether Ashwagandha is safe to take during nursing. Remain cautious and refrain from using.
- "Auto-immune diseases" include rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), multiple sclerosis (MS), and other conditions. Ashwagandha may stimulate the immune system, exacerbating symptoms of these conditions. It is advisable to avoid consuming Ashwagandha if you have any of these illnesses.
- Surgery: The central nervous system may be slowed down by Ashwagandha. During and after surgery, medical professionals are concerned that aesthetic and other drugs may exacerbate this effect. Give up taking Ashwagandha at least two weeks prior to the planned procedure.
- When taken orally, Ashwagandha may be used for up to three months without any problems. It is unknown if Ashwagandha is safe over the long term. Ashwagandha taken in large amounts may upset your stomach and cause diarrhea and vomiting. Rarely, liver issues could arise, necessitating a liver transplant and leading to serious liver failure.

Fig 6.2 adverse effect of Ashwagandha

C. Marketed Formulation

Table 1.2 Marketed formulations of Ashwagandha

D. Home Remedies:

- For those recuperating from lengthy medical procedures and illnesses like tuberculosis, Ashwagandha is an excellent therapy.
- Women should consume Ashwagandha root powder to treat sterility. One week following the menstrual cycle, take six grams of powder mixed with milk and drink it on a regular basis.
- Give the kids a bottle of milk with one teaspoon of Ashwagandha root powder mixed in to keep them strong.
- Taking one teaspoon of powdered Ashwagandha root combined with honey and ghee (shahad). It improves overall strength and helps to develop tissue.
- Take one glass of warm, sweetened cow's milk and three to six grams of powdered Ashwagandha root. If ingested frequently, it elevates energy levels.
- Men should drink one glass of milk with one teaspoon of Ashwagandha root powder to enhance their sexual vitality, sperm count, and quality.
- Ashwagandha helps prevent both mental and physical weakness if it is regularly administered to someone experiencing vertigo, unconsciousness, or sadness.
- Drink one glass of milk and one teaspoon of powdered Ashwagandha root in the morning to relieve arthritis symptoms.
- It may be possible for Ashwagandha to reduce cancer cells without having a negative impact on Carbuncles, ulcers on the skin, and tumors should all be removed with orange berries from the Ashwagandha plant.
- Ashwagandha boosts white blood cell counts and primes the body to create antibodies to fight various allergies and diseases.
- When combined with oil, finely ground Ashwagandha powder is quite beneficial for a variety of skin issues.
- Consume Ashwagandha powder along with sugar or cow milk ghee to treat hip pain and insomnia.
- Take Ashwagandha powder and baheda with jaggery (gud) to relieve heart pain.
- Ayurvedic home remedy for women who are planning for conception: Take Ashwagandha root powder add it to 400ml water, boil it and reduce the water level to 100 ml and then add 100ml of milk to it. Continue heating this decoction till it becomes 100 ml. Filter it and take 30ml every morning before food along with half spoonful of ghee for a period of 2 to 3 months. (Once after preparing the milk remedy, it should not be re-boiled and should be taken within 3-4 hours after preparation).

Table.1. Phytoconstituent

Phytoconstituent	Description	Properties
Withanolides	A group of naturally occurring steroids.	Anti-inflammatory, anti-tumor, anti-stress, antioxidants, immunomodulatory, hemopioetic, rejuvenating
Alkaloids	Including Withania somnifera, somniferine somnine, withananine, pseudo-withanine, tropine, pseudotropine, choline	Neuroprotective, sedative.
Saponins	Compounds with health benefits.	Anti-inflammatory, immune-boosting.
Iron	A minerals found in Ashwagandha.	Contributes to hematopoietic activity.
Flavonoids, tannis , nitrates, and others	Various compounds.	Antioxidants activity, combat oxidative stress.
Amino acids, fatty acids, glucose	Nutritional constituents.	Nutritional and energy- giving properties.

Table.2. Marketed formulations of Ashwagandha

Types	Brand name	Company's name	Dose	Price
Capsule	Zandu Ashwagandha capsules	Zandu realty Ltd.	One or two capsules two times a day or as directed by the physician.	200/-
Capsules	Himalaya Ashwagandha caplets	The Himalaya drug company.	One capsule twice a day or as directed by the physician.	2151/-
Capsules	Patanjali Ashwagandha capsule	Patanjali Ayurved limited.	One ot two capsule daily.	90/-
Capsule	Organic India Ashwagandha	Organic India Pvt Ltd	One or two capsule daily	1822/-
Capsules	Ashwagandha probiotics	Zero harm Science pvt Ltd	Twice a day 30min before dinner for 3months.	2998/-
Capsules	TrueBasics Ashwagandha	Health kart pvt Ltd	One tablet daily at bed time.	699/-
Tablets	Hk vitals	Health kart pvt Ltd	One or two tablet per day or as directed by physician	479/-
Tablet	Neuherbs-Ashwagandha 1000plus	Bliss lifesciences LLP	Two tablets daily 30min after meal.	499/-
Tablet	Baidyanayth Ashwagandha tablets	Shree Baidyanath ayurved bhawan pvt Ltd	One tablet twice a day or as directed by physician.	180/-
Tablet	Dabur Ashwagandha tablets	Dabur India LTD	One tablet daily or as directed by physician.	175/-
Tablet	Himalaya Ashwagandha tablet	The Himalaya drug company	One tablet daily or as directed by physician.	
Powder	Divya Ashwagandha churna	Patanjali Ayurved LTD	1-2 teaspoon mix with warm milk or as directed by physician	85/-
Powder	Dabur Ashwagandha churna	Dabur India LTD	¼ or ½ teaspoons twice a day with milk	200/-
Powder	Badiyanath Ashwagandha churna	Shree Badiyanath Ayurved bhawan Pvt Ltd	1-2 teaspoon twice daily or as directed by physician	350/-
Powder	Neuherbs organic Ashwagandha powder	Bliss lifesciences LLP	½ or 1 teaspoon with lukewarm water before/after meals.	249/-
Herbal jam	Dabur Ashwagandha lehya	Dabur India Ltd	With meal or breakfast.	388/-
Powder	Ashwagandha Withania somnifera powder	Wilson drugs and pharmaceuticals Pvt Ltd	5-10 gms with water or milk or as directed by physician.	Not mentioned

- Grind 12 grams of Ashwagandha and mix it with 12 grams of sugar candy to treat whooping cough. Pour one litre of water, create a decoction, and drink it after the quantity is reduced to one eighth.
- In addition to being an energy booster, herbal tea made from Ashwagandha leaves also reduces fever and uncomfortable swellings. Patches of white from the cornea. Ashwagandharishta, a tonic made from the seeds of the plant, is used to cure a variety of conditions including syncope, anxiety, hysteria, and memory loss.
- With yoghurt or curd: To make a hydrating and nutritious pack, combine Ashwagandha powder with milk or yoghurt. Apply it to your entire body or just your face, depending on your preference, and then let it sit for ten to fifteen minutes before washing it off. This pack leaves your skin feeling smooth and supple by restoring moisture to it.
- In a bowl, combine ½ tsp Ashwagandha powder, ½ tsp ghee, and honey. Blend thoroughly and take this concoction twice daily.
- As an alternative, take a glass of warm milk infused with half a teaspoon of ashwagandha powder right before bed. Your body and mind will feel more relaxed as a result, which will improve your sleep and general wellbeing.

7. Conclusion

Traditional medicinal systems such as Ayurvedic medicine have long used plant extracts like Ashwagandha. Over time, a variety of effects of Ashwagandha have been investigated, and include Studies have shown that it has several positive effects on a wide range of body systems. It is important to remember that more research is needed to confirm the possible therapeutic uses of Ashwagandha and to determine the ideal dosages and intervals of use. It is important to consider the safety of Ashwagandha, particularly when combined with other medications or supplements. Thus, additional. Research is needed, especially clinical studies, to learn more about the potential benefits and risks of using Ashwagandha as a medication. Based on the research conducted thus far, it is evident that Ashwagandha root is a plant raw material with diverse effects.

However, because there are so many recent claims, it's critical to stay up to date on the most recent details regarding this raw material—both in terms of the possibility that it will be utilized to treat illnesses and—above all—in terms of its level of user safety. Further research, mostly in the medical field, is required to ascertain the effects of Ashwagandha in order to establish the efficacy of the raw material. The study suggests that Ashwagandha may be useful in treating a range of neurological conditions.

Data indicate Ashwagandha's potential medicinal uses, although the precise mechanisms by which it functions are still unknown. Determining the precise mechanisms of action of Ashwagandha is essential for developing more specialized and successful treatment plans.

References

[1]. Mikulski P, Malinowska M, lgnacyk M, Szustowski. P, Novak J, Pesta K, Pharmaceutics 2023 March 4, Ashwagandha (Withania somnifera) current Research on the health Promoting Activities: A narrative review.
[2]. Gupta GL, Rana AC Pharmacognosy reviews, Jan 2017, Withania somnifera (Ashwagandha 0: A Review.
[3]. Rangari VD, Pharmacognosy & Phytochemistry, 3rd edition vol II, career publications, Nasik, June 2019 pg no 305-306.
[4]. Ali M, Pharmacognosy, 1st edition, vol I, CBS publishers & distributors, New Delhi, pgno 57.
[5]. Calalb T, ciorchina N, cutcovshi-Mustue A, Matveiciue L, Macroscopically and microscopically study of Ashwagandha plant Withania somnifera (L) Dunal Journal of Botany 2015, vol VII pgno 12-15.
[6]. Kulkarni Sk, Sharma A, Verma A, Ticku MK, GABA receptor mediation anticonvulsant action of Withania somnifera roots extract Indian drugs, 1993, pg no 305-312.
[7]. Meena L, Meena AK, Gupta J, Patel M, Medicinal plants in India – Importance cultivation, vol I, Jaya publishing house, Delhi, pgno 81-94.
[8]. NIIR Board of Consultant and Engineer's: Rheumatoid complete Book on Jatroha(biodiesel) with Ashwagandha, Stevie Brahml and Jatamasi herbs (Cultivating, processing, and uses) Asia Pacific Business press Inc. Delhi, 2006.
[9]. Singh et al. Ashwagandha cultivation, conservation, and utilisation, National Institute of health (.gov),2011, pgno 254.
[10]. Singh VK, Mundkinajeddu D, Agrawal A, Nguyen J, Sudberg S, Gafner S, Adulteration of Ashwagandha (Withania somnifera) roots and extracts Botanical Adulteration prevention bulletin 2018.
[11]. Andalucia et al, An overview on Ashwagandha: A Rasayana (rejuvenator) of Ayurveda, National Institute of health, 2010, pgno 292.
[12]. National centre for Complementary and integrative health, National Institute of health (.gov) 2022.
[13]. Sivaranjan V.V, Indira Balachandran, Ayurvedic drugs and their plant source, vol 1, Oxford & IBH Publishing CO.PVT, LTD, Delhi, 2006. Pgno 63
[14]. Gupta S, Bansal R.N, Singh Sodhi S.P, Brar GK, Malhotra M, Ashwagandha (Withania somnifera) -A herb with versatile medicinal properties empowering human physical and mental health, Journal of pre- clinical and clinical research 2021, vol 15, 129-133.
[15]. Jana S.N, Charan S.M, Health Benefits and Medicinal potency of Withania somnifera A review, International Journal of Pharmaceutical Science, 2018, pgno 22-29.
[16]. Mirjalili M.H, Moyano E, Bonilla M, Cusido RM, Palawan J, Steroidal lactones from Withania somnifera an ancient plant for novel medicine molecules,2019.
[17]. Uddin Q, Samiulla L, Singh V.k and jamil S.S, phytochemical and pharmacological profile of Withania

somnifera Dunal: A review, Journal of applied pharmaceutical science, 2012,02, 170-175.
[18]. Gupta GC, Rana S, Rana AC, Pharmacognosy, year 2017, pgno-130.
[19]. Gupta L.G, Rana A.C, Withania somnifera (Ashwagandha): A review, Pharmacognosy Reviews 2007 vol 1 pgno 129-136.
[20]. Rath et al., conservation and substantially of Ashwagandha: A medicinal plant, ResearchGate,2019, pgno 3.
[21]. Sharif-Rad J, Quispe C, Ayatollah SA, Kobarfard T, Stanaik M, Stephen A, Chemical composition, Biological Activity and health – Promoting effect of Withania somnifera for pharma- food Industry Applications, Journal of food Quality, 29 Dec 2021. Vol 2021 pgno 3-4.
[22]. Wicinski M, kurant Z, kurant D, Falkowski M, winsiewska M, Ohla J, can Ashwagandha Benefit the endocrine system, International Journal of Molecular Sciences, 20 Nov 2023, Pgno 9-15.
[23]. Mishra LC, Singh BB, Dagenais S, scientific Basis for the Therapeutic uses of Withania somnifera (Ashwagandha) Alternative Medicine Review, 2000, vol5, pgno – 341-343.
[24]. Chandrasekhar K, Kapoor J, Anishetty S, A prospective Randomized double Blind plaebo controlled study of safety and efficacy of high concentration of Ashwagandha ull spectrum extract of Ashwagandha root in reducing stress and anxiety in adults, National Library of Medicine (PMC) Jul-sep 2012.
[25]. Andalucia et .al Ashwagandha (Withania somnifera) – current Research on the health Promoting Activities: A narrative Review, National Institute of health (.gov), pgno 429.
[26]. Martin, A handbook of medicinal plants, 2003, pgno 214.
[27]. Lad, The complete Book of Ayurveda Home Remedies, 2014, pgno 102.
[28]. VithalKar A, kaiwartya M, Patel YK, Ashwagandha: A Gift of God, International Journal of current Research, August 2023, vol 15, pgno 2650.
[29]. Gupta GL, Rana A.C, PHCOG MAG: plant Review Withania somnifera (Ashwagandha): A Review, Pharmacognosy Review, Jan-May 2007, vol 1.
[30]. Shalini R, A literature review on Ashwagandha (Withania somnifera (Linn)Dunal), An Ayurvedic Aphrodisiac Drug International Ayurvedic Medicinal Journal, October 2017.
[31]. Sonawane N, kokare S, kanjane H, Ashwagandha- an Ayurvedic tablet, International Journal of pharmaceutical science and medicine, 2022.