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DISCOVER HOW ASHWAGANDHA MAY IMPACT HEALTH; A COMPREHENSIVE REVIEW

Badri. Sireesha*[1], B. David Raju[2], Ch. Koushik[2], G. Ranga Prasad[2], B. Mastan[2]

*[1]Associate Professor, Dr.Samuel George Institute of Pharmaceutical Sciences Tarlupadu Road, Markapur, Prakasam Dt.Pincode-523316

[2]B.Pharmacy. Dr.Samuel George Institute of Pharmaceutical Sciences Tarlupadu Road, Markapur, Prakasamdt. Pincode 523316

***Corresponding Author**
Badri. Sireesha

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Abstract

Ashwagandha has been a vital component of Ayurvedic medicine, functioning as s vitality. Classified as a "Rasayana," it is recognized for its adaptogenic and rejuvenating effects. Its traditional use in India dates back more than 3000 years. The root of Ashwagandha has been employed for multiple therapeutic purposes, including as a narcotic, aphrodisiac, diuretic, anti-helminthic, tonic, and stimulant. The chemical constituents of Ashwagandha are known for their complex and variable phytochemical composition, which contributes to its wide range of therapeutic properties. Neurodegenerative diseases are not exclusive to humans but are also observed in animals, exhibiting comparable pathological mechanisms and disease progression across species. Canine Cognitive Dysfunction (CCD) is an age-related neurodegenerative disorder characterized by structural and functional alterations in the brain, leading to progressive memory decline, disorientation, and impaired motor coordination. Its anti-inflammatory and antioxidant properties have also attracted interest for their potential in managing chronic conditions such as arthritis, cardiovascular disease, and neurodegenerative disorders.

Keywords: Ashwagandha, neurodegenerative, pharmacological activities, antioxidant.

Introduction

Ashwagandha, derived from the Sanskrit words "ashwa" meaning "horse" and "gandha" meaning "smell," refers to Withania somnifera. The species name somnifera, translating to "sleep-inducer" in Latin, reflects its notable anti-stress and calming properties. The herb's name also alludes to the characteristic "wet horse" odor of its roots. Commonly known as Indian ginseng or Indian winter cherry, Ashwagandha shares similar pharmacological properties and traditional uses with Korean ginseng. Although native to India, it is also cultivated in various regions, including Africa, the Mediterranean, the Himalayas, the Cape of Good Hope, the Canary Islands, and Australia. Historically, Ashwagandha has been a vital component of Ayurvedic medicine, functioning as s vitality. Classified as a "Rasayana," it is recognized for its adaptogenic and rejuvenating effects. Its traditional use in India dates back more than 3000 years. The root of Ashwagandha has been employed for multiple therapeutic purposes, including as a narcotic, aphrodisiac, diuretic, anti-helminthic, tonic, and stimulantTraditionally, Ayurvedic practitioners prepare this remedy by boiling fresh Ashwagandha roots in milk. Alternatively, the roots may be crushed into a fine powder, known as "churna," and mixed with various liquids such as milk, honey, or water. Moreover, to promote longevity and improve overall health, other parts of the plantincluding its leaves, shoots, seeds, and berriesare also used.Ayurvedic medicine, Ashwagandha is classified as a Rasayana, denoting its function as a rejuvenating agent that promotes overall health, enhances physical vitality, and may contribute to longevity. This medicinal plant contains a diverse range of bioactive phytochemicals, including alkaloids, steroidal lactones (notably withanolides and withaferins), saponins, and glycol-withanolides. Although the roots are most commonly used for therapeutic purposes, all parts of the plant-such as the leaves, flowers, seeds, and roots-exhibit health-promoting properties. Among these phytoconstituents, withanolides are particularly significant due to their well-documented pharmacological activities. Withaferin A, a major withanolide found in Ashwagandha, has garnered considerable attention for its wide spectrum of biological effects, including immunomodulatory, anti-inflammatory, anti-angiogenic, antioxidant, pro-apoptotic, and anti-adipogenic actions.Although the potential therapeutic benefits of Ashwagandha are encouraging, additional research is required to elucidate its precise mechanisms of action and to confirm its efficacy across various health conditions. In this regard, the present paper seeks to review existing literature on the pharmacological activities of Ashwagandha, emphasizing its potential roles in stress management, cognitive enhancement, and physical performance improvement. Thousands of years of traditional use and available scientific evidence indicate that Ashwagandha is well-tolerated, safe, and clinically effective. Data from multiple studies have not reported any serious adverse events of concern. However, the Danish Technical University (DTU) raised certain concerns in its report, including possible abortifacient effects, stimulation of the thyroid gland and immune system, influence on sex hormones, and adverse liver reactions. The committee has endeavored to incorporate the most reliable and credible scientific information to create a comprehensive and scientifically sound document on the subject.

History of Ashwagandha

For more than two thousand years, ashwagandha has been treasured for its powerful healing properties. But what makes this ancient herb so extraordinary. Scientifically known as *Withania somnifera*, ashwagandha is highly valued in Ayurvedic medicine as a potent rejuvenator believed to enhance vitality and promote longevity. For millennia, it has been an important part of traditional health practices across India, the Middle East, and North Africa.The earliest mentions of ashwagandha are found in sacred Ayurvedic scriptures such as the Charaka Samhita and Sushruta Samhita, two of the foundational texts of Ayurveda. Ayurveda**,** India's traditional system of medicine, dates back thousands of years-some records trace its origins to around 6000 BC. Within this ancient healing tradition, ashwagandha is considered one of the most powerful herbs, known for restoring energy, balance, and overall wellness.Historical accounts link the use of ashwagandha to the teachings of the revered sage Punarvasu Atreya, who is said to have served as the royal physician to a king. His wisdom and medical insights laid the groundwork for the Charaka Samhita, one of Ayurveda's most influential texts.

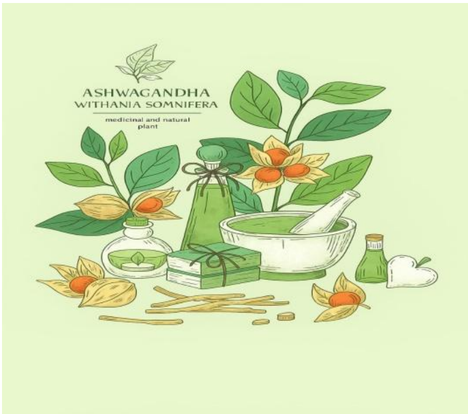

Figure 01: Ashwagandha

Ashwagandha Active Substances

The chemical constituents of Ashwagandha are known for their complex and variable phytochemical composition, which contributes to its wide range of therapeutic properties. Phytochemical analysis of Withania somnifera has revealed a diverse distribution of bioactive compounds across its various morphological parts, including fruits, leaves, stem bark, and roots. Each part of the plant exhibits a unique chemical profile that determines its specific pharmacological actions.The leaves are particularly rich in twelve distinct withanolides, along with flavonoids, glycosides, condensed tannins, and free amino acids. These constituents are primarily responsible for the plant's antioxidant, anti-inflammatory, and immunomodulatory properties. The roots, which are the most commonly used part in traditional and modern formulations, contain a wide array of secondary metabolites such as alkaloids, volatile oils, reducing sugars, and steroids. Among these, the withanolides, sitoindosides, and withaferin A are considered the principal bioactive compounds contributing to its adaptogenic, neuroprotective, and anti-stress effects.In addition to these major compounds, several minor phytochemicals including saponins, phenolic compounds, and iron-containing molecules have also been identified, which further enhance its pharmacological potential. The synergistic interaction of these compounds is believed to underlie the multi-targeted therapeutic efficacy of Ashwagandha.Due to this complex phytochemical composition; Ashwagandha has been the subject of extensive pharmacological and clinical research worldwide. Scientists have demonstrated that its constituents exhibit antioxidant, anti-inflammatory, anticancer, antidiabetic, neuroprotective, hepatoprotective, and immunomodulatory properties. Continuous advancements in analytical techniques such as HPLC, LC-MS, and NMR spectroscopy have enabled the precise characterization of these compounds, paving the way for standardization, quality control, and development of evidence-based herbal formulations. Overall, the rich and intricate chemical profile of Withania somnifera underpins its wide therapeutic potential and justifies its prominent position in traditional Ayurvedic medicine as well as its growing acceptance in modern pharmacotherapy. The primary bioactive constituents of the plant are steroidal alkaloids and steroidal lactones, collectively known as withanolides. These compounds form the characteristic chemical framework of Withaniasomnifera and are largely responsible for its diverse pharmacological activities.The alkaloid fraction of Withania somnifera comprises compounds such as witanin, somniferine, and tropine, along with other bioactive constituents like choline, cuscohygrine, and anaferine. Additionally, the plant contains a rich array of flavonoids, including 3-O-rutinoside, 6,8-dihydroxycaffeoyl derivatives, quercetin, and its glycosidic forms such as 3-O-rutinoside-7-O-glucoside. Withanolide glycosides are distinguished by the presence of a glucose moiety at the C-27 position and include compounds like sitoindoside IX and sitoindoside X.In addition, Withania somnifera extracts have been reported to contain sitoindosides, withanamides, and several other chemical substances such as withanicil, reducing sugars, starch, glycosides, peroxidases, benzyl alcohol, 2-phenylethanol, dulcitol, benzoic acid, 3,4,5-trihydroxycinnamic acid, and phenylacetic acid.

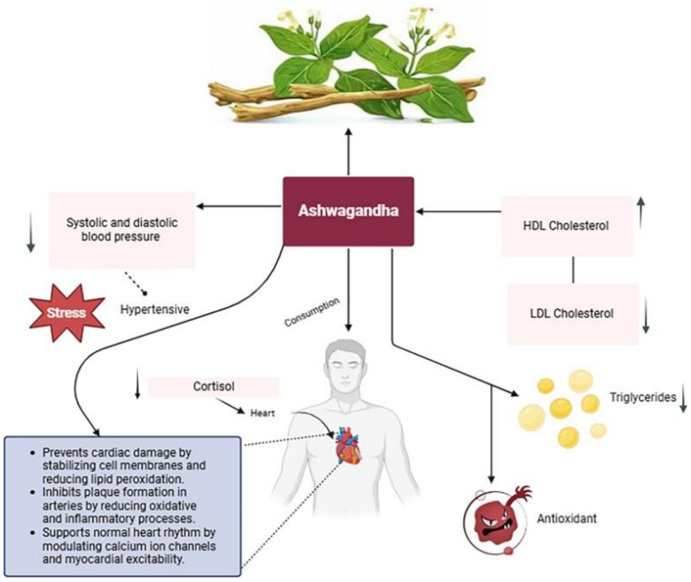

Figure 02: Ashwagandha Active Substances

These compounds are distributed throughout both the roots and leaves of the plant, collectively contributing to its broad spectrum of pharmacological and therapeutic effects.Natural product chemists and medical researchers have shown considerable interest in the bioactive compounds synthesized and accumulated in the roots and leaves of Withania somnifera, particularly the withanolides such as withanolide D, withaferin A, withanolide A, and withanone. These steroidal lactones are regarded as the principal phytochemical markers responsible for the plant's diverse pharmacological activities. The leaves are especially rich in withaferin A, a potent compound with documented anticancer and anti-inflammatory properties, whereas the roots contain a high concentration of withanolide A, known for its immunomodulatory, neuroprotective, and adaptogenic effects. The pharmacological profile of Ashwagandha has been extensively studied and is well-documented in both traditional and modern scientific literature. Numerous studies have demonstrated its wide spectrum of therapeutic properties, including antioxidant, anti-inflammatory, immunostimulant, neuroprotective, aphrodisiac, antimicrobial, analgesic, adaptogenic, anti-arthritic, cardioprotective, anti-stress, and anticancer effects. The synergistic action of its multiple phytoconstituents enables Ashwagandha to influence several physiological systems simultaneously, promoting overall health and homeostasis.

Ashwagandha Biological Activity

The global trend of population aging has become increasingly evident in recent decades, leading to a substantial rise in the prevalence of dementia syndromes. Dementia is a multifactorial neurocognitive disorder characterized by a constellation of symptoms resulting from brain pathology, typically exhibiting a chronic and progressive trajectory. The condition predominantly compromises higher cortical functions, including memory, cognitive processing, orientation, comprehension, learning capacity, and emotional regulation.Dementia is a multifactorial neurocognitive disorder characterized by a spectrum of symptoms resulting from brain pathology, typically exhibiting a chronic and progressive course. It predominantly affects higher cortical functions, including memory, cognition, orientation, comprehension, learning capacity, and emotional regulation.

Neuroproctective and Anti- Neurodegenerative Effects

Neurodegenerative diseases, such as Alzheimer's disease, lead to the progressive destruction of the central nervous system, resulting in irreversible neuronal damage. In Alzheimer's disease, abnormal deposition of β-amyloid protein occurs in the brain. In its fibrillar form, β-amyloid exerts neurotoxic effects by inducing free radical formation and impairing neuronal glucose transport, ultimately leading to cellular injury and death. Additionally, hyperphosphorylated τ-proteins aggregate to form neurofibrillary tangles surrounding β-amyloid plaques. Under normal physiological conditions, τ-proteins stabilize microtubules and support neuronal structure; however, their pathological aggregation disrupts cytoskeletal integrity. The accumulation of β-amyloid plaques activates microglial cells, which initiate an inflammatory response aimed at clearing damaged and dead neurons. Nevertheless, prolonged microglial activation results in the excessive release of cytotoxic mediators, exacerbating neuronal damage and amplifying Neuroinflammation within the brain parenchyma.

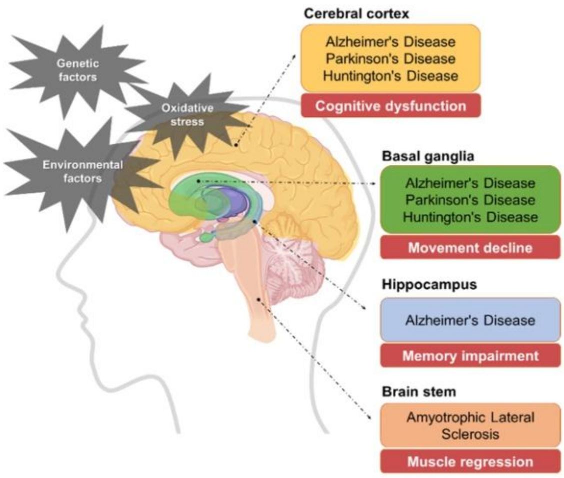

Figure 03: Neuroproctective And Anti- Neurodegenerative Effects

Neurodegenerative diseases are not exclusive to humans but are also observed in animals, exhibiting comparable pathological mechanisms and disease progression across species. Canine Cognitive Dysfunction (CCD) is an age-related neurodegenerative disorder characterized by structural and functional alterations in the brain, leading to progressive memory decline, disorientation, and impaired motor coordination. Similar to human neurodegenerative conditions, aging in dogs is associated with increased oxidative stress and cumulative neuronal damage within the central nervous system.

Ashwagandha Use in Alzheimer's Disease

Several experimental and preclinical studies have highlighted the neuroprotective potential of Withania somnifera (Ashwagandha) and its bioactive constituents in the management of Alzheimer's disease and related neurodegenerative conditions. In studies conducted on cultured human neuronal cells, Ashwagandha extracts have been shown to neutralize the neurotoxic effects of β-amyloid, a key pathological hallmark implicated in neurocognitive impairment, including that observed during HIV-associated neurodegeneration. Animal studies further corroborate these findings. Oral administration of vitanon—an active compound isolated from the root of Withania somnifera-in rats resulted in significant improvements in cognitive performance. This was associated with the inhibition of amyloid β-42 formation, along with a marked reduction in pro-inflammatory cytokines such as TNF-α, IL-1β, IL-6, and MCP-1, as well as decreased levels of nitric oxide and lipid peroxidation. The study also reported suppression of β- and γ-secretase activity, key enzymes responsible for generating insoluble β-amyloid aggregatesAmong the identified withanolides, withaferin A has attracted particular attention for its promising neuroprotective properties in Alzheimer's disease. It exhibits a multifaceted mechanism of action by reducing β-amyloid aggregation, inhibiting τ-protein accumulation, and suppressing oxidative and inflammatory mediators. Furthermore, withaferin A modulates heat shock proteins (HSPs), whose expression increases under cellular stress, thereby promoting neuronal resilience Notably, withaferin A also inhibits amyloid β production and downregulates

NF-κB–related neuroinflammatory gene expression, reinforcing its role as a potent anti-inflammatory and anti-amyloidogenic agent In transgenic mouse models of Alzheimer's disease, administration of a semi-purified Withania somnifera root extract enriched with withanolides for 30 days reversed behavioral deficits and reduced β-amyloid accumulation. This therapeutic effect was mediated through up regulation of low-density lipoprotein receptor-related protein 1 (LRP1) in the liver, which facilitates peripheral clearance of β-amyloid from the brain Since LRP1 plays a crucial role in amyloid precursor protein (APP) processing and modulates β-amyloid formation, its upregulation by Ashwagandha indicates a systemic mechanism contributing to amyloid clearance and neuronal protection.

Molecular docking and spectroscopic studies have further revealed that withanolide A, withanolide B, witanoside IV, and witanoside V interact directly with the hydrophobic core of β-amyloid (1–42) oligomers. This interaction prevents monomer aggregation and reduces the formation of insoluble fibrils, thereby mitigating β-amyloid toxicity Additionally, bio-transformation of Withania somnifera extracts by the fungus Beauveria bassiana yielded cysteine and glutathione conjugates of withaferin A, including the derivative CR-777. These derivatives demonstrated potent neuroprotective effects by shielding neurons against multiple stressors, indicating the potential of bioconverted withanolides as next-generation neurotherapeuticsIn vitro studies using human embryonal neuroblastoma SK-N-SH cells have demonstrated that Withania somnifera (Ashwagandha) extract possesses potent antioxidant properties, effectively reducing free radical generation and protecting neuronal cells from oxidative injury. Moreover, Ashwagandha has been shown to modulate cholinergic neurotransmission, potentially through the inhibition of acetylcholinesterase activity. This dual mechanism-antioxidant defense and cholinergic modulation-suggests that Ashwagandha may hold therapeutic potential in the management of both canine cognitive dysfunction and Alzheimer's disease by mitigating oxidative stress and preserving synaptic function .

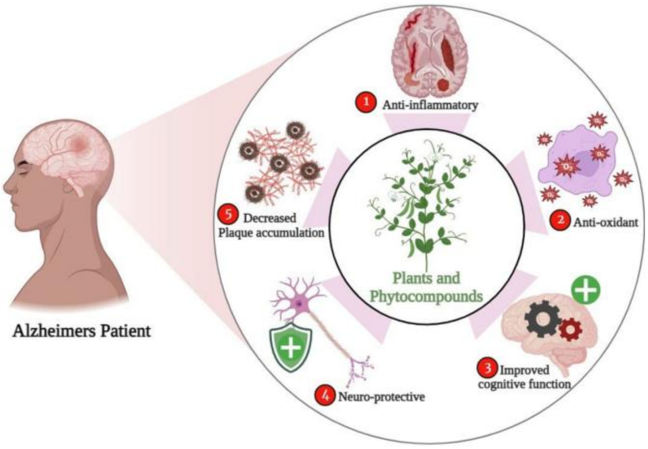

Figure 04: alzheimer 's disease

Anti Oxidant Activity

Numerous studies have demonstrated the beneficial effects of Withania somnifera (Ashwagandha) on the modulation of antioxidant biomarkers. Owing to its potent free radical scavenging and antioxidant properties, the plant is widely recognized as an adaptogen and natural energy enhancer. The antioxidant efficacy of Ashwagandha is primarily attributed to its bioactive withanolides, including withaferin A, withanone, withanolide B, withanoside V, and 1,2-deoxywithastramonolide. These phytoconstituents play a pivotal role in attenuating oxidative stress, stabilizing redox homeostasis, and enhancing overall physiological resilience.Withania somnifera (Ashwagandha) has been extensively reported to possess potent antioxidant and free radical scavenging properties, in addition to its immunomodulatory effects. Several of its bioactive constituents have demonstrated efficacy in neutralizing reactive oxygen species implicated in the onset and progression of Alzheimer's disease. Both in vitro and in vivo investigations have shown that withanolide A effectively inhibits axonal, dendritic, and synaptic degeneration within the cerebral cortex and hippocampus, thereby preserving neuronal integrity. Moreover, treatment with withanolide A has been observed to alleviate memory impairments in murine models of neurodegeneration.Complementary studies have revealed that Withania somnifera extract exerts significant antioxidant effects by reducing free radical generation in human embryonal neuroblastoma cells. Additionally, withaferin A, another major constituent of the plant, has been found to markedly suppress the expression of neuroinflammatory genes and inhibit amyloid production, further underscoring its potential therapeutic role in mitigating neurodegenerative processes.

Anti inflammatory Owing to its diverse pharmacological properties, Withania somnifera (Ashwagandha) has been extensively investigated for its therapeutic potential in various inflammation-associated disorders, including cardiovascular, pulmonary, autoimmune, metabolic, oncological, and neurodegenerative diseases. Preclinical studies have demonstrated that this medicinal plant modulates mitochondrial function, regulates apoptotic pathways, and attenuates inflammation by suppressing key pro-inflammatory mediators such as cytokines (IL-6, TNF-α), nitric oxide, and reactive oxygen species. Furthermore, in murine models of lupus, administration of Withania somnifera root powder exhibited a protective effect, significantly reducing proteinuria and nephritic manifestations, thereby highlighting its potential as an adjunctive therapeutic agent in autoimmune and inflammatory pathologies. Due to its broad spectrum of pharmacological activities, Withania somnifera has been extensively investigated for its potential therapeutic applications in various inflammation-related disorders, including cardiovascular, pulmonary, autoimmune, diabetic, oncological, and neurodegenerative diseases. Preclinical studies have demonstrated that W. somnifera can modulate mitochondrial function, regulate apoptosis, and suppress inflammatory responses through inhibition of key inflammatory mediators such as cytokines (IL-6, TNF-α), nitric oxide, and reactive oxygen species. In a murine model of lupus, treatment with Ashwagandha root powder exhibited a potential inhibitory effect on disease-associated conditions, including proteinuria and nephritis.Clinical evidence further supports these findings. Kanjilal et al. reported that supplementation with Ashwagandha extract for 8–12 weeks effectively mitigated arthritis symptoms in patients. Moreover, the immunomodulatory capacity of W. somnifera was demonstrated in immunodeficient mouse models, where administration of the root powder increased total leukocyte and bone marrow cell counts, enhanced antibody titres, stimulated antibody-producing cells, and promoted macrophage phagocytic activity. A randomized, double-blind, placebo-controlled clinical trial with an open-label extension also confirmed that Ashwagandha extract significantly elevated natural killer (NK) cell activity and cytokine levels in healthy participants, further substantiating its role as an effective immunomodulatory agent.

Anti Cancer Effect

Cancer encompasses a heterogeneous group of diseases characterized by the uncontrolled proliferation of abnormal cells. This dysregulation arises primarily from mutations in genes encoding proteins that regulate the cell cycle, including proto-oncogenes and tumor suppressor genes. Despite extensive global research and the development of numerous therapeutic strategies, cancer continues to pose a significant public health challenge and remains one of the leading causes of mortality worldwide.Ashwagandha has shown therapeutic activity against a wide spectrum of cancers, including breast, colon, lung, prostate, and hematological malignancies. In breast cancer specifically, W. somnifera and its withanolide derivatives act as chemotherapeutic and chemopreventive agents, demonstrating efficacy against estrogen receptor/progesterone receptor (ER/PR)-positive breast cancer as well as more aggressive triple-negative breast cancer subtypes. Moreover, studies suggest that Ashwagandha supplementation may improve the quality of life in breast cancer patients by alleviating treatment-related fatigue and enhancing general well-being.Collectively, these studies provide compelling evidence that Withania somnifera and its bioactive constituents, particularly withaferin A, hold substantial promise in the field of oncology. Their multifaceted mechanisms-ranging from the induction of apoptosis and inhibition of metastasis to the modulation of oxidative stress and inflammation-underscore their therapeutic relevance. Further clinical trials and mechanistic studies are warranted to fully elucidate the molecular targets of these compounds and to optimize their integration into existing cancer treatment protocols.

Anti Diabetics

The therapeutic potential of Withania somnifera (Ashwagandha) has also been explored in the context of diabetes mellitus, particularly for its antidiabetic and hypolipidemic properties. Although the number of studies addressing this area remains relatively limited compared to other pharmacological applications, available evidence from preclinical and limited clinical investigations suggests encouraging outcomes. A comprehensive review by Durg et al. summarized the antidiabetic activity of Ashwagandha, highlighting its potential to modulate key biochemical and molecular pathways involved in glucose homeostasis. Several animal studies have demonstrated that extracts of W. somnifera effectively reduce fasting blood glucose levels and improve insulin sensitivity. These findings suggest that the plant may exert its hypoglycemic action through multiple mechanisms, including enhancement of pancreatic β-cell function, increased glucose uptake in peripheral tissues, and modulation of oxidative stress. Tekula et al. further provided mechanistic insights by revealing that withaferin A, one of the principal bioactive withanolides, could regulate hyperglycemia in an induced type 1 diabetes rat model through modulation of the Nrf2/NFκB signaling axis. This dual modulation helps to suppress inflammation and oxidative stress-two critical contributors to pancreatic β-cell dysfunction-thereby offering a multifaceted therapeutic approach. Complementary in silico docking studies also confirmed the strong binding affinity of withaferin A to several key targets involved in glucose metabolism, reinforcing its potential role as an antidiabetic compound. Despite these promising preclinical results, human data remain scarce. To date, only one clinical investigation, conducted in 2000, has demonstrated a direct hypoglycemic effect of Ashwagandha in diabetic subjects, emphasizing the need for further well-designed clinical trials to validate these preliminary findings. Collectively, these findings underscore the multifaceted metabolic benefits of Withania somnifera, which appear to stem from its antioxidant, anti-inflammatory, and adaptogenic properties. While preclinical and computational studies provide a strong mechanistic foundation-particularly implicating Nrf2/NFκB modulation and lipid-regulatory effects-robust, large-scale randomized controlled trials are essential to confirm its clinical efficacy in managing diabetes and its associated metabolic abnormalities.

TRADITIONAL US

Ayurveda**,** a holistic system of medicine with roots tracing back over 5,000 years in India, emphasizes balance between the mind, body, and spirit to maintain health and prevent disease. Within this tradition, ashwagandha (*Withania somnifera*) holds a special place as a *rasayana*-a rejuvenating herb known to restore vitality, promote longevity, and enhance both physical and mental resilience.Modern scientific research has begun to confirm many of these traditional beliefs. Recent studies suggest that ashwagandha possesses powerful anti-inflammatory and antioxidant properties, which may help protect against chronic conditions such as arthritis, heart disease, and neurodegenerative disorders. Additionally, emerging evidence indicates that ashwagandha may help regulate blood sugar levels, making it a potential supportive therapy for individuals with diabetes or metabolic imbalances. Another fascinating aspect of ashwagandha is its role as an adaptogena natural compound that helps the body adapt to physical and emotional stress. Adaptogens work by supporting the adrenal system and balancing key stress hormones. Research has shown that ashwagandha may help reduce cortisol levels, the primary hormone released during stress responses.

Cultural significance

- Ashwagandha holds deep cultural In essence, ashwagandha bridges ancient wisdom and modern science, offering a holistic approach to enhancing vitality, mental clarity, and resilience in today's fast-paced world and historical importance that extends beyond India to regions such as the Middle East and North Africa. Throughout history, it has been valued not only as a healing herb but also as a symbol of strength and rejuvenation. Traditionally, it was used to treat wounds, burns, and a variety of ailments through different Ayurvedic formulations.
- Its prominence is also reflected in ancient Hindu mythology, where ashwagandha is often associated with vitality and the elixir of life**.** References to its life-enhancing properties can even be found in sacred texts like the Bhagavad Gita, highlighting its enduring significance in both spiritual and medicinal traditions.

Scientific Interest and Modern Usage

The 20th century ushered in a new era of scientific exploration into ashwagandha, transforming it from a traditional Ayurvedic remedy into a subject of global research interest. Scientists began isolating and studying its bioactive compounds, particularly withanolides-naturally occurring steroidal lactones believed to be responsible for many of the herb's therapeutic effects. These compounds have been the focus of numerous studies examining their potential roles in reducing stress, enhancing cognitive performance, and protecting against inflammation and oxidative damage. Modern research suggests that ashwagandha may help regulate cortisol levels, the body's primary stress hormone, thereby supporting emotional balance and resilience. Additionally, studies indicate that it may contribute to improved brain function**,** enhanced memory, and better focus, making it a promising natural aid for cognitive health. Its anti-inflammatory and antioxidant properties have also attracted interest for their potential in managing chronic conditions such as arthritis, cardiovascular disease, and neurodegenerative disorders.

Table 01: Comparision B/W Ashwagandha and General Medicine

Feature	Ashwagandha (Herbal Medicine)	General Medicine
Regulation	Regulated as a dietary supplement in many countries such as the U.S. and Denmark. Regulatory agencies like the FDA do not approveit for treating specific medical conditions. Oversight mainly focuses on manufacturing quality, not on proving efficacy or safety.	Regulated as a drug by agencies such as the FDA. Drugs must undergo extensive preclinical and clinical trials to demonstrate safety, efficacy, and proper dosage before approval for use.
Scientific Evidence	Some clinical studies indicate potential benefits for stress reduction, anxiety, and sleep improvement, but research is still limited. More data are needed to confirm dosage, formulation, and long-term safety.	Supported byrigorous, controlled clinical trials that establish efficacy, safety, dosage, and side effect profiles. Evidence is generally comprehensive and standardized

Mechanism of Action	Believed to act as an Adaptogen, helping the body manage stress by influencing stress-related biochemical pathways. However, its mechanisms are not fully understood or as precisely defined as pharmaceutical drugs.	Works through specific, well-characterized biochemical mechanisms. Drugs are designed to target particular molecular pathways to treat or manage diseases effectively.

Conclusion

Ashwagandha is a plant that has been used for centuries in traditional medicine systems, particularly in Ayurveda. Over time, numerous studies have investigated its properties, revealing that Ashwagandha may exert a wide range of beneficial effects on various body systems. Nevertheless, research on this plant remains ongoing, and further studies are required to confirm its therapeutic potential, as well as to establish optimal dosages and durations of use. It is also essential to consider the safety profile of Ashwagandha, especially when it is used alongside other medications or dietary supplements. Continued clinical research is therefore necessary to better understand both the potential benefits and the risks associated with its use as a therapeutic agent. Based on current evidence, Ashwagandha root can be regarded as a plant material with multidirectional and promising physiological effects. Given the growing number of emerging studies, it is essential to continuously update and expand our understanding of Ashwagandha, both in terms of its potential therapeutic applications and, most importantly, its safety profile.

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Nil

Conflict of Interest

None Declared

Author Contribution

Both Authors contributed equally

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Ethical Approval and Inform Consent

Not Applicable

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