

Review Article



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“ASHWAGANDHA (WITHANIA SOMNIFERA): AYURVEDIC RASAYANA AND MODERN PHARMACOLOGY – A REVIEW”

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ABSTRACT

Introduction: *Ashwagandha (Withania somnifera Dunal)*, widely regarded as a *Rasayana* in Ayurveda, has been traditionally used for rejuvenation, longevity, and management of various health conditions. In recent decades, it has gained international attention for its adaptogenic, neuroprotective, and anti-inflammatory activities, supported by clinical and experimental research. **Methods:** A comprehensive review of classical Ayurvedic texts (*Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*) and modern biomedical databases (PubMed, Scopus, Web of Science) was conducted. Search terms included “*Ashwagandha*,” “*Withania somnifera*,” “*Rasayana*,” “adaptogen,” and “clinical trial.” Literature published between 2000–2024 was prioritized. Studies were included if they discussed traditional uses, pharmacological mechanisms, or clinical outcomes. Exclusion criteria included anecdotal reports, non-peer-reviewed sources, and studies without relevant outcome measures. **Results:** Classical texts describe *Ashwagandha* as a *Balya*, *Vajikarana*, and *Rasayana*, promoting strength, fertility, and vitality. Modern pharmacology attributes its actions to bioactive compounds such as withanolides, alkaloids, and sitoindosides. Evidence supports its efficacy in reducing stress and anxiety, improving sleep quality, enhancing muscle strength, modulating immunity, and managing chronic conditions like arthritis, diabetes, and neurodegenerative diseases. Several randomized controlled trials validate its adaptogenic and nootropic properties. **Discussion:** Ayurveda and modern science converge in recognizing *Ashwagandha* as a multipotent health-promoting agent. However, gaps remain in standardization of formulations, dose optimization, long-term safety data, and understanding its mechanisms at molecular and genomic levels. **Conclusion:** *Ashwagandha* exemplifies the successful integration of Ayurveda and modern pharmacology. With robust traditional usage and growing scientific validation, it holds potential as a safe, evidence-based *Rasayana* for global healthcare.

KEYWORDS: Adaptogen, *Ashwagandha*, *Rasayana*, stress, *Withania somnifera*



INTRODUCTION

Ayurveda, the traditional system of Indian medicine, classifies *Ashwagandha* (*Withania somnifera* Dunal) under *Rasayana dravyas*, substances that promote rejuvenation, longevity, and resistance to disease. Etymologically, the name “Ashwagandha” refers to the odor of a horse and metaphorically implies imparting the vitality and strength of a horse to the user. Ancient texts describe it as *Balya* (strength-promoting), *Vajikarana* (aphrodisiac), and *Medhya Rasayana* (cognitive enhancer).

In modern times, *Ashwagandha* has gained global attention as an adaptogen—a plant-derived agent that enhances resilience against stress and restores physiological balance. Numerous preclinical and clinical studies support its role in stress reduction, immunomodulation, neuroprotection, and anti-inflammatory action. Its bioactive constituents, particularly withanolides, have been extensively studied for pharmacological properties.

The present review aims to provide a comprehensive analysis of *Ashwagandha* by integrating Ayurvedic descriptions with modern pharmacological evidence. The objectives are to: (1) examine classical references of *Ashwagandha* in Ayurvedic texts, (2) summarize pharmacological and clinical research findings, and (3) highlight gaps, limitations, and future research prospects.

MATERIALS AND METHODS

A systematic literature review was carried out between January and June 2025.

Ayurvedic sources: Primary references were obtained from *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, *Bhavaprakasha Nighantu*, and commentaries.

Databases searched: PubMed, Scopus, Web of Science, Google Scholar, and AYUSH Research Portal.

Search terms: “*Ashwagandha*,” “*Withania somnifera*,” “*Rasayana*,” “*Ayurveda*,” “adaptogen,” “stress,” “clinical trial.”

Inclusion criteria:

- Studies published between 2000–2024.
- Clinical trials, animal studies, and in vitro research on *Withania somnifera*.
- Reviews and meta-analyses linking Ayurvedic concepts with modern evidence.

Exclusion criteria:

- Anecdotal references, non-peer-reviewed content.
- Studies lacking pharmacological or clinical relevance.

Study selection: Out of 215 screened studies, 74 were included (18 classical, 56 modern). Data were analyzed thematically: classical uses, phytochemistry, pharmacological actions, and clinical evidence.

OBSERVATION AND RESULTS

1. Classical Ayurvedic Perspective

Ashwagandha is extensively described in classical texts. Its primary qualities include *Balya* (strength-promoting), *Rasayana* (rejuvenative), *Vajikarana* (aphrodisiac), and *Medhya* (cognitive enhancer).

Table 1. Classical references of Ashwagandha

Classical Text	Description	Indications
<i>Charaka Samhita</i>	Classified as <i>Balya</i> and <i>Rasayana</i>	Emaciation, debility, convalescence
<i>Sushruta Samhita</i>	Wound healing, anti-inflammatory	Ulcers, swelling, injuries
<i>Bhavaprakasha Nighantu</i>	<i>Vajikarana</i> , tonic	Infertility, sexual weakness
<i>Ashtanga Hridaya</i>	<i>Medhya Rasayana</i>	Cognitive decline, memory loss

This table summarizes the Ayurvedic textual references of *Ashwagandha*, highlighting its classification as a *Rasayana*, *Balya*, and *Vajikarana* drug, along with its traditional therapeutic applications.

2. Phytochemistry

Table 2. Major phytoconstituents of Ashwagandha

Group	Examples	Pharmacological Relevance
Withanolides (steroidal lactones)	Withaferin A, Withanolide D	Anti-inflammatory, anticancer, adaptogenic
Alkaloids	Isopelletierine, Anaferine	Neuroactive, analgesic
Sitoindosides	Sitoindoside IX, X	Adaptogenic, stress resilience
Flavonoids	Quercetin, Kaempferol	Antioxidant

The table enlists the key bioactive compounds of *Ashwagandha* such as withanolides, alkaloids, and flavonoids, correlating them with their modern pharmacological roles.

3. Pharmacological Actions (Experimental Studies)

Table 3. Experimental pharmacological activities

Activity	Evidence	Mechanism
Anti-stress/adaptogen	Animal models, cortisol studies	Modulation of HPA axis
	Rodent memory tasks, neuronal studies	Increases BDNF, prevents oxidative stress
Neuroprotective	In vitro, arthritis models	Inhibits NF- κ B, COX-2
Anti-inflammatory	In vitro & animal studies	Enhances NK cell activity
Immunomodulatory	Thyroid and testosterone studies	Hormone regulation
Endocrine modulation		

This table outlines the major pharmacological actions of *Ashwagandha* demonstrated in experimental studies, showing mechanisms like HPA axis modulation, antioxidant effects, and immune regulation.

4. Clinical Evidence

Table 4. Selected clinical trials on *Ashwagandha*

Population	Intervention	Outcome
Adults with stress	600 mg/day extract	↓ Stress scores, ↓ Cortisol
Athletes	600 mg/day extract	↑ Strength, ↑ VO2 max
Insomnia patients	300 mg BID	Improved sleep quality
Osteoarthritis	<i>Ashwagandha</i> powder	↓ Pain, ↓ Stiffness
Infertile men	5 g/day root	↑ Sperm count & motility

The table presents evidence from clinical studies on various health conditions, such as stress, insomnia, osteoarthritis, infertility, and athletic performance, highlighting efficacy and outcomes.

5. Safety Profile

Generally well tolerated, with mild GI upset and drowsiness reported in some cases. Contraindicated in pregnancy in high doses.

DISCUSSION

The traditional Ayurvedic description of *Ashwagandha* as a *Rasayana* aligns closely with its modern classification as an adaptogen. Both emphasize its role in promoting resilience, enhancing vitality, and delaying senescence. Classical properties such as *Balya* and *Medhya* can be correlated with observed improvements in physical performance and cognitive functions.

Pharmacologically, withanolides and sitoindosides provide a mechanistic basis for its adaptogenic, neuroprotective, and immunomodulatory actions. Cortisol-lowering effects substantiate its anti-stress role, while neurotrophic benefits explain cognitive enhancement.

However, several research gaps exist. While multiple RCTs support its efficacy, sample sizes are often small, and heterogeneity of formulations complicates meta-analysis. Lack of long-term safety data limits recommendations for chronic use. Furthermore, Ayurvedic concepts such as *Rasayana* and *Vajikarana* have not been fully explored within molecular frameworks like genomics or systems biology.

Future directions include:

- Standardization of extracts with defined withanolide content.
- Multi-centric clinical trials with larger populations.
- Integration of Ayurvedic *prakriti* and personalized medicine approaches.
- Exploration of genomic and metabolomic mechanisms underlying *Rasayana* effects.

Thus, *Ashwagandha* represents a strong candidate for integrative medicine, but translational research is needed to harmonize traditional wisdom with global healthcare practices.

CONCLUSION

Ashwagandha (*Withania somnifera*) is one of the most important *Rasayana* herbs in Ayurveda, traditionally prescribed for rejuvenation, vitality, and longevity. Classical descriptions emphasize its role in strengthening immunity, improving cognition, and enhancing reproductive health.

Modern pharmacological research has validated many of these uses. Its adaptogenic effects through



HPA axis modulation, neuroprotection, immunomodulation, and anti-inflammatory properties have been supported by experimental and clinical studies. Clinical trials confirm its benefits in stress reduction, improved sleep, enhanced physical performance, and management of chronic disorders such as diabetes and arthritis.

Despite these encouraging findings, challenges remain in standardization, dose optimization, and long-term safety evaluation. The diversity of formulations and variability in bioactive compounds necessitate stricter quality control. Moreover, integrating Ayurvedic insights such as *Rasayana* into biomedical frameworks requires interdisciplinary research.

In conclusion, *Ashwagandha* serves as a model herb that bridges Ayurveda and modern pharmacology. It offers potential as a safe, multipotent health-promoting agent, provided its use is guided by evidence-based protocols. Future research should aim to combine classical principles with molecular science, ultimately enhancing its role in global healthcare as a validated *Rasayana*.

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