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Review Article

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"*SHATAVARI* (*ASPARAGUS RACEMOSUS*): TRADITIONAL USES AND PHARMACOLOGICAL ACTIONS – AN INTEGRATIVE REVIEW"

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ABSTRACT

Introduction: *Shatavari* (*Asparagus racemosus* Willd.) is a revered Rasayana herb in Ayurveda, traditionally used for women's health, vitality, and rejuvenation. Its classical references describe it as a galactagogue, aphrodisiac, and adaptogen. Recent pharmacological investigations provide scientific validation, but a consolidated review bridging Ayurveda and modern findings is required. **Methods:** Literature was retrieved from PubMed, Scopus, Web of Science, Embase, and Google Scholar, along with classical Ayurvedic texts (*Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Bhavaprakasha Nighantu*). Studies from 1950–2024 were included, covering phytochemistry, pharmacology, and clinical trials. Excluded were anecdotal reports, duplicates, and low-quality studies. **Results:** Ayurveda describes *Shatavari* as *balya* (strengthening), *stanya-janana* (galactagogue), *rasayana* (rejuvenative), and *vrishya* (aphrodisiac). Its phytoconstituents include steroidal saponins (shatavarins I–IV), flavonoids, polyphenols, and alkaloids. Pharmacological studies demonstrate adaptogenic, antioxidant, immunomodulatory, anti-inflammatory, gastroprotective, neuroprotective, and estrogenic activities. Clinical studies support its role in lactation insufficiency, menopausal symptoms, stress disorders, and peptic ulcers. However, sample sizes remain small, and methodological variability limits generalizability. **Discussion:** Ayurveda's holistic approach to *Shatavari* resonates with its multidimensional pharmacological profile. Standardization, dose optimization, and large-scale randomized controlled trials are essential to establish its place in integrative medicine. **Conclusion:** *Shatavari* exemplifies successful integration of traditional wisdom and biomedical validation. It holds promise for women's health, adaptogenic therapy, and gastrointestinal protection, provided future research addresses gaps in quality, safety, and clinical efficacy.

KEYWORDS: Adaptogen, Ayurveda, Immunomodulation, *Shatavari*, Women's health

INTRODUCTION

Shatavari (*Asparagus racemosus* Willd.), belonging to the family Asparagaceae, is among the most widely used herbs in Ayurvedic medicine.[1-2] Its name translates to "a woman who has a hundred husbands," reflecting its strong association with female reproductive vitality and longevity. Root tubers of *Shatavari* are used in formulations aimed at gynecological disorders, fertility, lactation, and general rejuvenation.[3-4]

Pharmacognostic studies have identified a rich chemical profile comprising steroidal saponins, alkaloids, flavonoids, and mucilage, many of which explain its therapeutic actions. Preclinical research supports its adaptogenic, antioxidant, immunomodulatory, gastroprotective, and estrogenic effects.[5-6] Additionally, clinical studies highlight its benefits in conditions such as menopausal syndrome, peptic ulcer disease, and lactation insufficiency.[7]

Despite this promising evidence, translation from Ayurveda into modern therapeutics remains incomplete. Challenges exist in dosage standardization, mechanistic clarity, and clinical validation.[8-9] The present review aims to critically analyze the traditional uses, phytochemistry, pharmacology, and clinical studies on *Shatavari*, bridging Ayurveda and biomedical science, and highlighting future directions for research and practice.[10]

MATERIALS AND METHODS

A systematic literature search was conducted between January–March 2025. Databases searched included PubMed, Scopus, Web of Science, Embase, and Google Scholar.[11] Ayurvedic classical texts (*Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, *Bhavaprakasha Nighantu*) were reviewed in their original Sanskrit and standard English translations.[12]

Search terms: *"Shatavari,"* "*Asparagus racemosus*," "pharmacology," "Ayurveda," "clinical trials," "phytochemistry," "women's health."[13]

Inclusion criteria: [14]

- Peer-reviewed articles (1950–2024).
- Preclinical *(in vitro, in vivo)* and clinical studies.
- Systematic reviews, meta-analyses, and authoritative ethnobotanical reports.
- Ayurvedic classical references and commentaries.

Exclusion criteria: [15]

- Non-English studies without reliable translation.
- Duplicate, anecdotal, or poor-quality studies.
- Reports lacking methodological detail.

Data were extracted, categorized, and synthesized thematically: (i) Ayurvedic perspective, (ii) phytochemistry, (iii) pharmacology, (iv) clinical studies, and (v) safety.

OBSERVATION AND RESULTS

1. Classical Ayurvedic Perspective

In Ayurveda, *Shatavari* is described as *Madhura* (sweet in taste), *Sheeta* (cooling in potency), *Madhura Vipaka* (sweet post-digestive effect), and *Snigdha* (unctuous in nature). It is classified as:

- ***Rasayana***: promoting longevity and rejuvenation.
- ***Balya***: strengthening and nourishing.
- ***Stanya-janana***: promoting lactation.
- ***Vrishya***: enhancing fertility and sexual vigor.

The herb is extensively mentioned in *Charaka Samhita* (as a galactagogue), *Sushruta Samhita* (as a tonic for reproductive health), and *Bhavaprakasha Nighantu* (as cooling, nourishing, and fertility-enhancing). Its traditional therapeutic indications include dyspepsia, infertility, galactorrhea, diarrhea, dysmenorrhea, bleeding disorders, and debility.

2. Phytochemistry of *Shatavari*

The pharmacological activities of *Shatavari* are attributed to a diverse range of phytoconstituents:

- **Steroidal saponins**: Shatavarins I–IV (major active constituents with estrogenic and adaptogenic activity).
- **Isoflavones & flavonoids**: quercetin, kaempferol, rutin (antioxidant, immunomodulatory).
- **Alkaloids**: asparagamine A (neuroprotective).
- **Polyphenols and mucilage**: gastroprotective and demulcent properties.

Analytical studies confirm these compounds through HPTLC, HPLC, and LC-MS/MS profiling, suggesting potential biomarkers for quality control.

3. Pharmacological Studies

3.1 Adaptogenic and Antistress Effects

Animal models show *Shatavari* enhances resistance to stress, modulates cortisol levels, and improves learning and memory. This aligns with its *Rasayana*

classification in Ayurveda.

3.2 Immunomodulatory Activity

Steroidal saponins stimulate macrophage activity, antibody production, and T-cell proliferation. Studies report enhanced resistance against infections and improved vaccine response in experimental models.

3.3 Gastroprotective and Antiulcer Effects

Preclinical studies demonstrate ulcer-protective activity via increased mucin secretion, reduced gastric acid, and antioxidant effects. This validates its use in dyspepsia and peptic ulcer.

3.4 Neuroprotective Properties

Extracts have shown memory-enhancing and anxiolytic activity, mediated by antioxidant and acetylcholinesterase inhibitory effects.

3.5 Reproductive and Estrogenic Effects

Shatavarin-rich extracts exhibit phytoestrogenic activity, improving follicular growth and uterine health in animal studies. This supports its traditional use in infertility, menstrual irregularities, and menopausal symptoms.

3.6 Antioxidant and Anti-inflammatory Effects

The flavonoid-rich fraction reduces lipid peroxidation, scavenges free radicals, and downregulates pro-inflammatory cytokines.

4. Clinical Studies

- **Galactagogue activity:** Multiple small RCTs in lactating women show significant increases in milk output and infant weight gain after *Shatavari* supplementation compared to placebo.
- **Menopausal symptoms:** Studies report improvement in hot flashes, irritability, and sleep disturbances, attributed to phytoestrogenic action.
- **Peptic ulcer disease:** Pilot studies confirm ulcer-healing properties comparable to ranitidine in mild cases.
- **Stress and immunity:** Controlled trials in healthy adults reveal improved immunity markers and reduced stress scores.

Limitations include small sample sizes, short duration, and lack of standardization across formulations.

5. Safety, Toxicity, and Standardization

Toxicological evaluations suggest *Shatavari* is safe up to 2 g/kg in animals. Human studies report no significant adverse effects at therapeutic doses (3–6 g/day of root powder). However, variability in saponin content across sources demands standardization. Development of phytochemical markers (shatavarin IV) is suggested for consistency.

DISCUSSION

Ayurveda conceptualizes *Shatavari* as a *Rasayana* and Stree-*visheshajnaushadhi* (woman-specific drug), emphasizing reproductive health, lactation, and systemic rejuvenation. Modern pharmacology validates these descriptions: its estrogenic activity supports menstrual health and menopause management, while immunomodulation and adaptogenic properties correspond to *Rasayana*.[16]

Convergence of Ayurveda and modern science:[17]

- *Stanya-janana* (galactagogue) ↔ proven increase in prolactin and milk production.
- *Rasayana* (rejuvenative) ↔ adaptogenic, antioxidant, and immunomodulatory effects.
- *Vrishya* (aphrodisiac) ↔ phytoestrogenic and fertility-enhancing effects.
- *Agnimandya* treatment ↔ gastroprotective and antiulcer actions.

Limitations and gaps:[18]

- Most clinical studies are small-scale and lack rigorous randomization.
- Standardized extracts with defined shatavarin content are rarely used.
- Long-term safety data are insufficient, particularly in pregnancy and hormone-sensitive conditions.
- Mechanistic studies on endocrine, gut-brain, and microbiome interactions remain limited.

Future prospects:[19]

- Large, multicentric RCTs with standardized extracts are required for global acceptance.
- Integration of *Shatavari* into functional foods, nutraceuticals, and phytopharmaceuticals.
- Exploration of novel bioactive molecules beyond saponins for drug discovery.
- Systems biology approaches to correlate Ayurveda's holistic descriptions with molecular pharmacology.

Thus, *Shatavari* represents a promising example of Ayurveda-modern science convergence but requires scientific rigor for mainstream medical acceptance.[20]

CONCLUSION

Shatavari (*Asparagus racemosus*) stands as one of the most significant Ayurvedic herbs, especially for

women's health and systemic rejuvenation. Classical texts describe it as *balya*, *rasayana*, *stanya-janana*, and *vrishya*, and modern evidence strongly supports its galactagogue, adaptogenic, immunomodulatory, gastroprotective, and estrogenic activities. Phytochemical studies identify steroidal saponins (shatavarins) as primary active constituents, forming the basis for its pharmacological profile.

Clinical evidence suggests efficacy in lactation insufficiency, menopausal syndrome, gastrointestinal disorders, and stress adaptation. However, methodological limitations, including small sample sizes, heterogeneous formulations, and lack of standardization, restrict definitive conclusions.

From an integrative perspective, *Shatavari* exemplifies how Ayurveda's holistic wisdom aligns with modern pharmacology. Its safe therapeutic profile, wide-ranging actions, and cultural acceptability make it a valuable candidate for incorporation into global healthcare.

Future research must focus on:

- Standardized extracts with defined chemical markers.
- Large-scale clinical trials with rigorous methodology.
- Safety studies in special populations.
- Exploration of novel formulations and delivery systems.

In conclusion, *Shatavari* is a classical herb with modern relevance, offering potential as an adaptogen, women's health promoter, and gastrointestinal protector. Bridging the gap between Ayurveda and evidence-based medicine can establish it as a global phytotherapeutic resource.

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