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MAGAZINE NOTES

SHATAVARI (Asparagus racemosus): The Herbal Wonder

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SCIENCE & TECH

ENVIRONMENT

GS3

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SHATAVARI (*Asparagus racemosus*): The Herbal Wonder

Science Reporter Chapter 2 · 3 min read

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Shatavari (*Asparagus racemosus*) is one of India's most revered medicinal plants — valued in Ayurveda for millennia and now validated by modern molecular science. CSIR research is unlocking its biochemical secrets and protecting it from pest threats.

BOTANICAL PROFILE

PARAMETER	DETAIL
Scientific name	<i>Asparagus racemosus</i> Willd.
Family	Asparagaceae
Sanskrit name	Shatavari (“one who has a hundred roots” / “curer of a hundred diseases”)
Distribution	Throughout tropical India, Sri Lanka, Himalayas up to 1,400 m
Part used	Tuberous roots, leaves
Cultivation states	Rajasthan, UP, Bihar, MP, Maharashtra

ACTIVE CHEMICAL COMPOUNDS

CSIR-National Chemical Laboratory (NCL) has conducted advanced phytochemical profiling:

- Steroidal glycosides (Shatavarins I–IV):** Primary bioactive compounds; responsible for most pharmacological effects
- Saponins:** LC-MS profiling identified **33 steroidal saponins** and **16 triterpene saponins**
- Flavonoids and polyphenols**
- Racemosol** (alkaloid)
- Vitamins:** A, B1, B2, C, E

Transcriptome Analysis (CSIR-NCL): Sequencing root, leaf, and fruit tissues revealed:

- 153 transcripts in steroidal saponin biosynthesis

- 45 transcripts in triterpene saponin biosynthesis
- 44 transcripts in monoterpenoid biosynthesis
- 79 transcripts in flavonoid biosynthesis

This molecular mapping guides targeted breeding for high-saponin cultivars.

TRADITIONAL MEDICINAL USES (AYURVEDIC)

Shatavari is classified as a **Rasayana** (rejuvenating herb) in Ayurveda. Key traditional uses:

USE	MECHANISM
Galactagogue	Enhances breast milk production in nursing mothers
Adaptogen	Reduces stress; balances hormones
Digestive aid	Treats gastric ulcers, dyspepsia, IBS
Immunomodulator	Boosts innate immunity
Anti-inflammatory	Suppresses inflammatory cytokines

MODERN PHARMACOLOGICAL VALIDATION

Research published in peer-reviewed journals confirms:

- **Anti-ulcer:** Root extracts protect gastric mucosa in animal models
- **Cardioprotective:** Reduces LDL oxidation; anti-hypertensive effects
- **Neuroprotective:** Promising results against Alzheimer's-like neurodegeneration
- **Anti-tumour:** Shatavarin IV inhibits breast cancer cell proliferation in vitro
- **Antidiabetic:** Improves insulin sensitivity in preclinical studies

CSIR-CIMAP: PEST MANAGEMENT INNOVATION

CSIR-CIMAP (Lucknow) discovered and described a **new species of parasitoid wasp** that naturally parasitizes the asparagus beetle (*Crioceris* sp.) — the primary pest of Shatavari cultivation. This biological control agent:

- Eliminates need for chemical pesticides on a medicinal crop
- Aligns with organic and natural farming mandates
- Protects crop and preserves bioactive compound integrity

UPSC RELEVANCE

GS3 — Science & Technology / Agriculture:

- Traditional Knowledge (TK) and its validation — TKDL (Traditional Knowledge Digital Library) role in preventing bio-piracy
- CSIR's role in converting Ayurvedic heritage into validated pharmaceuticals
- Medicinal plants as components of India's Bioeconomy (\$200 billion target by 2030)
- Natural/biological pest control as part of natural farming push

GS4 — Ethics:

- Ethical questions around patenting traditional medicinal knowledge
- Benefit-sharing with local/tribal communities who hold traditional knowledge (Nagoya Protocol)

Key Connections:

- **Nagoya Protocol** (2010, under CBD): requires benefit-sharing for commercial use of traditional knowledge
- **TKDL**: India's defensive database of 900 Ayurvedic formulations — prevents wrongful patents abroad
- **National Ayush Mission**: Promotes Shatavari and other adaptogens under AYUSH integrative health framework

FACTS CORNER

- Scientific name: *Asparagus racemosus* (Family: Asparagaceae)
- Shatavarins I–IV: key steroidal glycosides (active compounds)
- CSIR-NCL identified 33 steroidal + 16 triterpene saponins via LC-MS
- CSIR-CIMAP: discovered new parasitoid wasp for asparagus beetle biocontrol
- Traditional classification: Rasayana (rejuvenating) in Ayurveda
- Key therapeutic use: galactagogue, adaptogen, immunomodulator
- TKDL: India's database protecting ~900 traditional formulations from biopiracy



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