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REVIEW ARTICLE

Therapeutic Effects of *Argyreia speciosa* (Linn.f.) and *Asparagus racemosus* (Wild): A Review Study

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ABSTRACT

This review study evaluates the therapeutic and *Rasayana* (rejuvenative) properties of *Argyreia speciosa* (*Vidhara*) and *Asparagus racemosus* (*Shatavari*) in traditional Ayurveda and modern pharmacology. Phytochemical profiling of *A. speciosa* seeds reveals 0.5–0.9% ergoline alkaloids, alongside a rich core oil predominantly composed of oleic acid (33.2%), stearic acid (29.13%), and methyl oleate (27.5%). Conversely, *A. racemosus* roots quantitatively comprise approximately 53% carbohydrates, 18% crude fiber, 5.4–8.8% saponins, 3% protein, and 5% oil. Pharmacological investigations validate that both herbs exhibit potent neuroprotective, nootropic, and anti-amnesic properties, significantly enhancing spatial learning while modulating central nervous system activity. Furthermore, both plants demonstrate, scientifically proven antioxidant, immunomodulatory, and broad-spectrum anti-ulcer activities across multiple experimental models. While *A. speciosa* displays significant, immunomodulatory, nootropic, antioxidant, anticonvulsant, antiulcer, and aphrodisiac actions, *A. racemosus* serves as a critical endocrine and reproductive stabilizer, showing notable antidepressant-like and adaptogenic efficacys.

1. INTRODUCTION

Argyreia speciosa sweet (syn. *Argyreia nervosa*), commonly known as Hawaiian Baby Woodrose, belongs to the Convolvulaceae family and is widely distributed throughout tropical regions. In India, it naturally occurs below 500 m elevation in states, such as Bengal, Assam, Odisha, Uttarakhand, Rajasthan, Karnataka, and Kerala. The plant is often cultivated as an ornamental species because of its luxuriant green foliage and attractive rose-purple flowers. It commonly grows in semi-deciduous forests and moist habitats, including riverbanks and lakeshores.[1] In *Ayurveda*, *A. speciosa* is regarded as a *Rasayana* (rejuvenative) herb and has been traditionally used to manage neurological disorders, chronic gonorrhea, ulcerations, strangury, gleet, and male reproductive ailments. Its leaves act as a local stimulant and rubefacient and are applied externally for eczema, itching, ringworm, and skin abscesses. Some tribal communities in Rajasthan also use the leaves as a traditional contraceptive.[2,3]

The roots of *A. speciosa* possess diverse medicinal properties and are valued as a diuretic, aphrodisiac, anti-rheumatic agent, and brain tonic. Traditional formulations combine its roots with *Grewia hirsuta*, *Asparagus racemosus*, and *Hemidesmus indicus* to treat persistent cough, cold, and fever. A specialized nervine tonic is prepared by repeatedly soaking root powder in the tuber juice of *A. racemosus* for 7 days to enhance intellect and physical endurance. The plant is also considered an anti-aging remedy and is an important ingredient of *Ajmodadi Churna*, an *Ayurvedic* formulation prescribed for hemiplegia, dysentery, and rheumatic disorders.[1,4] Pharmacological studies have shown that its seeds contain ergoline alkaloids, including lysergic acid amide (ergine) and lysergic acid ethylamide, which exhibit psychedelic, antihypertensive, and spasmolytic activities. Due to these neuroactive constituents, uncontrolled consumption of the seeds may result in psychomotor agitation, anxiety, and cognitive disorientation.[5,6] Due to its rich phytochemical composition, *A. speciosa* continues to attract attention in both traditional and modern medicine.

A. racemosus (*Shatavari*) is another highly valued *Rasayana* herb in *Ayurveda*, recognized for promoting overall health, cellular vitality, and resistance to stress. Conventionally, classified as an adaptogen, it enhances the body's non-specific defense mechanisms against physical and psychological stressors.[7,8] *Shatavari* possesses numerous therapeutic properties, including bitter-sweet, cooling, emollient, nervine tonic, antispasmodic, aphrodisiac, antacid, diuretic,

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rejuvenating, carminative, stomachic, anabolic, appetizer, and nutritive effects. Scientific investigations of its extracts and isolated constituents have demonstrated a broad spectrum of pharmacological activities, such as anti-anaphylactic, anti-stress, anti-ulcer, anti-diarrheal, antitussive, antiseptic, anticancer, immunomodulatory, antioxidant, antibacterial, and radioprotective actions.[9] Conventionally, *Shatavari* formulations have been employed in the treatment of nervous disorders, dyspepsia, diarrhea, dysentery, tumors, inflammation, excessive thirst, neuropathy, liver disorders, cough, bronchitis, hyperacidity, gonorrhea, piles, diabetes, rheumatism, gastric ailments, headaches, infectious diseases, and lactation insufficiency. Its extensive therapeutic applications and scientifically validated biological activities have established *Shatavari* as one of the most important medicinal plants in the Indian system of medicine.[7]

1.1. Aims and Objectives

To comprehensively review and analyze the therapeutic potential of *Vidhara* (*A. speciosa*) and *Shatavari* (*A. racemosus*) with special emphasis on their pharmacological actions, phytochemical constituents, and system-wise effects on human health as documented in classical *Ayurvedic* literature and contemporary scientific studies. To assess the influence of both drugs on the nervous system, including their neuroprotective, nootropic, memory-enhancing, anticonvulsant, and stress-modulating properties.

2. MATERIALS AND METHODS

Review of different Ayurveda literatures as a primary source of data, along with the literature review as secondary data from reputed journal papers and other e-resources documenting the pharmacological properties of *Vidhara* (*A. speciosa Linn*.) and *Shtavari* (*A. racemosus*) was done.

2.1. *Vidhara*

2.1.1. Description

- Common name: *Vidhara*
- English name: Elephant Creeper or Hawaiian Baby Woodrose
- Botanical name: *A. speciosa*
- Family: Convolvulaceae
- Parts used: Roots, leaves, seeds, flowers, etc.

2.1.2. Morphology

- Habit: Large, perennial climbing shrub
- Stem: Transversely elongated
- Leaves: Simple, large, heart-shaped
- Inflorescence: Cymes
- Flowers: Light purple, pink, bluish-purple
- Fruit: Berry-like, yellowish-brown
- Parts used: Roots, leaves, seeds, flower.

2.1.3. Chemical Constituents

The seeds of *Argyreia* contain 0.5–0.9% ergoline alkaloids, including psychoactive lysergamide, which causes hallucinations and can be lethal. The seed extract has an LD_{50} of 500 mg/kg.[10] It yields the steroidal glycoside *argyroside* and a rich oil containing over 20 components. This oil is predominantly composed of oleic (33.2%) and stearic (29.13%) acids, alongside methyl oleate (27.5%) and methyl palmitate (12.12%). It also contains flavonoids, triterpenoids,[11] and the long-chain alcohol triacontanol. Phytochemical investigations of the root system revealed the presence of tetradecanyl palmitate alongside a disubstituted tetrahydrofuran derivative, specifically identified as 5,8, oxidotetracosan-10-one. Furthermore, 7-OMe-3-sulfate was isolated from the roots.[12] Across spectral and chemical characterization, a distinct coumarin glucoside, 6 methoxy coumarin-7-O-D-glucopyranoside (with a melting point of 208°C), was also identified within the root matrix.[13] Concurrently, analysis of the leaves confirmed the presence of epi-friedelinol, sitosterol, and sitosterol acetate. The foliar extract also yielded the prominent flavanols quercetin and kaempferol, alongside specialized flavone glycosides, including 7,8,3',4', and 5-pentahydroxy flavone 5-O-D-glucopyranoside and kaempferol 3-O-L-rhamnopyranoside.[14]

2.1.4. Ayurvedic pharmacological action: Vidhara

Ayurveda, an ancient Indian traditional medicine, prioritizes positive health maintenance and disease cure.[16] Among its various herbal plants is *A. nervosa* (or *A. speciosa*), known as *Vrddhadaru*. Mentioned in *Nighantu* grants, *Ashtanga Sangraha,* and *Dhanvantri Nighantu*, it serves as a *Rasayana* (rejuvenator) for chronic ulcers, strangury, and gonorrhea,[17] though it remains a controversial drug. Externally, its leaves treat itching, ringworm, eczema, and act as a local stimulant or contraceptive.[18] Its roots treat bronchitis, syphilis, tuberculosis, and serve as a brain tonic or aphrodisiac.[18,19] Its formulation, *Ajmodadi Churna*, treats dysentery, paralysis, and rheumatism.[20,21] It also provides spasmolytic, hypotensive, and antiphlogistic central nervous system (CNS) support mention in Table 1.

2.1.5. Therapeutic properties[22]

- *Kaphavatashamak*: Balances and pacifies the aggravated *Kapha* and *Vata doshas* in the body
- *Santhanik Karam* (local action): Promotes wound healing and aids in blood purification
- *Abhyantranadisansthan* (nervous system): Strengthens the nerves, relieves weakness in the CNS, alleviates body aches, and offers nootropic (cognitive-enhancing) benefits
- *Pachansansthan* (digestive system): Functions as an appetizer and laxative to relieve constipation, indigestion, and piles, while also managing flatulence
- *Raktavahsansthan* (circulatory system): Serves as a cardiotonic and anti-inflammatory agent to help manage and treat heart disorders
- *Shvasansansthan* (respiratory system): Acts as an antitussive agent to soothe the throat and treat coughs, colds, and hoarseness of voice
- *Prajanansansthan* (reproductive system): Functions as an aphrodisiac and uterine tonic, useful for treating leucorrhea and male sexual disorders
- *Mutravahsansthan* (urinary system): Exhibits antidiabetic properties to help manage blood sugar levels
- *Saatmikaran* (adaptability/general health): Acts as a potent rejuvenator for overall vitality.

2.1.6. Pharmacological actions: Vidhara

Mention in Tables 2-8.

2.2. *Shatavari* (Anonymous, 2003)

2.2.1. Description

- Common Name: *Shatavari*
- English Name: buttermilk root/wild asparagus
- Botanical name: *A. racemosus*
- Family: Asparagaceae
- Parts used: Root

2.2.2. Morphology[8,40]

- Habit: Undershrub
- Stem: Spinous
- Leaves: cladodes
- Inflorescence: Raceme
- Flowers: Bisexual
- Fruit: Berry
- Parts used: Roots.

2.2.3. Chemical constituents

Shatavari root extracts are rich in diverse phytochemicals. Both ethanolic and aqueous extracts contain carbohydrates, flavonoids (like quercetin and rutin), alkaloids, phenolics, and tannins.[41,42] Ethanolic extracts specifically yield steroids, terpenes, and saponins.[43] Quantitatively, the root comprises roughly 53% carbohydrates, 18% crude fiber, 5.4–8.8% saponins, 3% protein, and 5% oil, alongside essential oils, amino acids, and vitamins.[44] Its high-molecular-weight polysaccharides are primarily composed of galactose (54%) and glucose (28%), with smaller amounts of arabinose, xylose, and rhamnose.[45]

2.2.4. Ayurvedic pharmacological action

Shatavari (*A. racemosus*) is a revered *Ayurvedic rasayana* (rejuvenator) that boosts cellular endurance[7] and features in numerous traditional formulations. Acting as a *Vata* and *Pitta shamak,* its cooling, restorative roots address digestive issues, nervous disorders, and general weakness. Most notably, *Shatavari* is a cornerstone of female reproductive health. Its estrogenic properties help balance hormones, enhance libido and fertility, support ovulation, and prepare the uterus for pregnancy. In addition, it prevents miscarriages, treats menstrual irregularities, and acts as a powerful galactagogue to increase lactation, while also improving male sperm count and motility Table 9.[47]

2.2.5. Therapeutic properties

1. *Balya* (Strength Promoting)[48] - *Balya* (Strength Promoting) listed in *Balya Mahakashaya* by *Charaka.* Used to improve strength, nourishment, and vitality
2. *Garbhasthapana* (Maintenance of Pregnancy)[49]- Included among drugs that help maintain a healthy pregnancy and support the fetus
    1. *Stanyajanana* (Promotes Breast Milk)[50]
       Recommended in conditions related to lactation and breast milk production.
    2. *Rasayana and Brimhana*[51]
       Used in *Brahma Rasayana* and other nourishing formulations for rejuvenation, tissue building, and longevity.
    3. *Vrihat shatavari ghrit*[52]
       Acharya charaka mentioned *shatavari* root as a main drug and recommended in *yoniroga*, *urahkshat raktapitta*, *unmaad*, *apasmar,* and many *vaatpittaja* disorders.
    4. Eye disorders (Drishti Roga)[53]
       Sushruta recommends *Shatavari Ghrita* and *Shatavari* preparations in diseases of vision, such as *Timira.*
    5. *Kshatksheena* (*Wasting disorder*)[54]
       Shatavari (*A. racemosus*) is prominently utilized in major tissue-replenishing formulations – most notably as a prime ingredient in *Amritaprasha Ghrita* and the *Chaturtha Sarpirguda* preparations.

2.2.6. Pharmacological actions

Mention in Tables 10-16.

3. DISCUSSION

The review study highlights the significant therapeutic and rejuvenative (*Rasayana*) values of *A. speciosa* (Vidhara) and *A. racemosus* (Shatavari) by bridging the gap between traditional *Ayurvedic* concepts and modern pharmacological evidence. The chemical profiling of both herbs underscores their complex medicinal matrices. *A. speciosa* seeds contain important ergoline alkaloids alongside a rich core oil dominated by oleic and stearic acids, while *A. racemosus* roots are densely packed with carbohydrates, crude fiber, and therapeutic steroidal saponins. These rich phytochemical profiles structurally support their diverse systemic actions, making them highly effective across multiple physiological systems.

Central to this study is the comprehensive evaluation of the nootropic and neuroprotective effects of both drugs, which firmly establishes their classification as *Medhya* (intellect-enhancing) remedies. Table 2 provides crucial insights into the nootropic capabilities of *A. speciosa* root extracts, which demonstrated a remarkable capacity to reverse scopolamine-, diazepam-, and age-related amnesia in experimental models, notably boosting memory retention and lowering acetylcholinesterase levels (Shukla *et al*., 1999). Concurrently, trials involving spatial learning tools, such as the Radial Arm Maze and Morris Water Maze revealed that *A. speciosa* drastically minimizes navigation times and errors, matching the performance of the standard cognitive-enhancer Piracetam. Correspondingly, Table 2 details the potent neuroprotective dynamics (Bhattacharya *et al*., 2002) of *A. racemosus*, showing that its extracts successfully regulate neurochemical imbalances caused by chronic electroshock stress by bringing elevated levels of norepinephrine, dopamine, and serotonin back to safe baseline numbers. Furthermore, its methanolic root extract acts as a vital shield for critical brain regions, such as the hippocampus and striatum against severe free-radical-induced oxidative damage. This protection is achieved by lowering harmful oxidative markers and boosting the brain's internal defenses, including glutathione levels, which underscores its clinical potential for mitigating neurodegenerative diseases, such as Alzheimer's and Parkinson's.

Beyond these CNS supports, the review maps a broad spectrum of other systemic benefits for both plants. Tables 3 and 4 outline the depressant, sedative, and highly potent immunomodulatory traits of *A. speciosa*, illustrating its ability to stimulate cellular and humoral immunity, counteract chemical-induced myelosuppression, and deliver profound antioxidant protections that preserve DNA integrity. Furthermore, its distinct aphrodisiac, anabolic, and reproductive behaviors are detailed across Table 5, showing that it significantly elevates serum testosterone, concentration-dependent sexual drive, and sperm concentration. Table 6 establishes its broad-spectrum gastroprotective properties, which strengthen the stomach lining against severe stress and chemical injury. In a beautifully parallel fashion, *A. racemosus* exhibits phenomenal adaptogenic, antioxidant, and antidepressant behaviors as outlined across Tables 3-5. It functions as a powerful competitive inhibitor of monoamine oxidase and cholinesterase enzymes to alleviate depressive states, while its isolated sapogenin aggressively enhances lymphocyte and cytokine levels. In addition, Table 6 validates its anti-ulcer capabilities, which match standard clinical medications by accelerating gastric emptying and boosting protective mucus production. Finally, both herbs manifest critical anti-epileptic and anticonvulsant properties, significantly delaying seizure onset and reducing convulsion durations. Ultimately, this unified review confirms that both Vidhara and *Shatavari* serve

as multidimensional therapeutic agents capable of safeguarding neural health while optimizing systemic vitality.

4. CONCLUSION

Research shows that the constituents of this herb offer various therapeutic benefits, yielding encouraging results for multiple systemic disorders. However, more extensive clinical studies are needed to confirm these findings and uncover further potential medical applications.

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6. AUTHORS' CONTRIBUTIONS

All authors give equal contribution in making of this manuscript.

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8. ETHICAL STATEMENT

Ethical approval was not required for this study as it is a case report.

9. CONFLICT OF INTEREST

The authors declare no conflicts of interest regarding the publication of this paper.

10. DATA AVAILABILITY STATEMENT

The data analyzed in this review were obtained from publicly available sources, including peer-reviewed articles, observational studies, and surveys accessible through databases.

11. DISCLAIMER/VIEW AND OPINIONS

The opinions expressed in this article are solely those of the authors and do not reflect the views of the International Research Journal of Ayurveda and Yoga or its editorial board.

12. AI-USE DECLARATION

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Table 1: Ayurveda pharmacological properties[15]

Rasa	*Guna*	*Veerya*	*Vipaka*	*Prabhava*	*Dosha Karma and Dhatu karma*
Katu, *Tikt*, *Kashay*	*Laghu*, *Snigdha*	*Ushna*	*Madhura*	*Medhya*	*Kaphvata shamaka*

Table 2: Nootropic effect

Researcher/Author	Methodology	Outcome
Shukla *et al*., 1999[23]	At dosages of 100 and 200 mg/kg, the aqueous root extract effectively treats scopolamine-induced, diazepam-induced, and age-related amnesia. Furthermore, this treatment boosts memory retention and lowers acetylcholinesterase levels within brain homogenates.	It indicates that it may be helpful in reducing learning and memory deficits, especially in elderly mice.
Vyawahare *et al*., 2009[24]	Mice were orally administered either the hydroalcoholic extract of *Argyreia speciosa* root (200 mg/kg and 400 mg/kg) or the standard drug Piracetam. Their spatial learning and memory performance were evaluated by measuring escape latencies and error rates using the Radial Arm Maze and Morris Water Maze behavioral models.	The *Argyreia speciosa* root extract significantly improved spatial learning and memory in mice, reducing errors and navigation times in both mazes, comparable to the standard drug Piracetam.

Table 3: Effect on the central nervous system

Researcher/author	Methodology	Outcome
Galani and Patel, 2009[14]	Mice were orally given *Argyreia speciosa* root fractions (n-hexane, chloroform, ethyl acetate, and water at 100, 200, 500 mg/kg) or chlorpromazine, evaluating central nervous system depression via spontaneous motor activity and pentobarbital-induced sleeping time.	All doses showed CNS depressant activity, reducing motor activity and prolonging sleep time, mimicking the control chlorpromazine.
Vyawahare *et al*., 2009[25]	To evaluate *Argyreia speciosa* root extract's anxiolytic and locomotion effects, mice given 100–400 mg/kg doses were tested using an elevated plus-maze, open field, or actophotometer apparatus.	However, the intervention did successfully reduce the animals' locomotion activity to some degree across the tested doses.

CNS: Central nervous system

Table 4: Immunomodulatory and antioxidant properties

Researcher/author	Methodology	Outcome
Tiwari *et al*., 2018[26]	To evaluate immunomodulatory activity, mice were orally given *Argyreia speciosa* root extract (50, 100, and 200 mg/kg) and tested for delayed-type hypersensitivity reactions and circulating antibody titers against sheep red blood cells and oxazolone. In addition, total white blood cell counts were measured in a cyclophosphamide-induced myelosuppressive model during chronic administration.	The *Argyreia speciosa* root extract demonstrated strong immunomodulatory activity by stimulating both humoral and cellular immunity. It successfully delayed hypersensitivity reactions, increased circulating antibody titers, and counteracted cyclophosphamide-induced myelosuppression by restoring total white blood cell counts.
Gokhale *et al*., 2003[27]	A 95% ethanolic extract of dried root admistrated.	It stimulates both cellular and humoral immunity.
Azmi *et al*., 2019[28]	To evaluate *Argyreia speciosa* seed extract and fraction antioxidant potential, researchers measured *in vitro* phenolic content, reducing power, and radical scavenging. *In vivo* antioxidant effects were tested in a CCl_4-induced rat model, tracking glutathione, lipid peroxidase, catalase, and superoxide dismutase markers.	*Argyria speciosa* showed strong antioxidant property and protected oxidative DNA damage.
Jaiswal *et al*., 2011[29]	Rats given *Argyreia speciosa* leaf fraction (50–200 mg/kg) for 5 days were evaluated against ulcer aspirin, ethanol, CRS, and pylorus ligation-induced ulcers. Antioxidant enzyme activity was estimated in the CRS model to determine underlying mechanisms.	Argyreia speciosa leaf extract significantly increases gastric wall mucus ($P<0.001$), strengthening the stomach's defenses through powerful cytoprotective properties.
Hubbu *et al*., 2009[12]	*In vitro*: Bacteria, fungi, and Mycobacterium tuberculosis H_{37} Rv sensitive strain. *In vivo*: Mice infected with *Klebsiella pneumoniae*.	Showed significant inhibition of Gram-positive and Gram-negative bacterial growth.

CRS: Cold-resistant stress

Table 5: Aphrodisiac activity

Researcher/author	Methodology	Outcome
Hema Latha *et al*., 2008[30]	In Fortege drug, *Argyreia speciosa* is the main ingredient of this drug administration.	It is very effective in erectile failure, ejaculating spermatorrhea, and impotence without any side effects.
Jaiswal *et al*.,1984[31]	Medication name spemen, contained *Argyreia speciosa* among other plant-based components.	This administration showed anabolic and androgenic action in rats.
Subramonium *et al*., 2007[32]	To evaluate the aphrodisiac activity of the plant, Male mice were given 200 mg/kg of *Argyreia speciosa* alcohol root extract in 2% gum acacia. Researchers tracked post-administration mounting behavior, mating performance with females, and the final offspring sex ratio compared to an untreated control group.	It shows a dependent surge in sexual activity within 1 h. Furthermore, the herbal treatment successfully influenced the sex ratio of the offspring, resulting in a significantly higher proportion of male pups compared to the control group.
Mishra and Mathur, 2013[33]	To assess Fortege's protective effects against lanthanum-induced infertility, researchers treated mice for 21 days. efficacy was evaluated by comparing seminal vesicle weight, fructose content, sperm count, and motility against a control group.	Fortege successfully reversed lanthanum-induced infertility in mice within 21 days, fully restoring seminal vesicle weight, fructose content, sperm count, and motility.
Subramoniam, *et al*, 2007, Mitra, *et al.,* 1996[34,35]	Male rats were orally administered *Argyreia nervosa* (another species) root extracts (10, 25, 50 mg/kg) to evaluate aphrodisiac and spermatogenic potential. Researchers assessed sexual behavior, serum testosterone, cholesterol, reproductive organ weights, and final sperm concentrations.	An oral dose of 50 mg/kg *Argyreia nervosa* significantly enhanced rat fertility, boosting testosterone, cholesterol (+146.7%), sperm concentration (+30.26%), and reproductive organ weights while improving mating latencies and frequencies.

Table 6: Anti-ulcer property

Researcher/author	Methodology	Outcome
Thakur *et al*., 2013[36]	*Argyreia nervosa* leaf fractions A and B (containing quercetin and kaempferol) were administered orally to animals. Researchers then analyzed stomach tissue homogenates via spectrophotometric assays to measure antioxidant enzyme levels (SOD, CAT, and GSH) and oxidative stress markers.	*Argyreia nervosa* leaf fractions A and B, rich in quercetin and kaempferol, showed strong antiulcer and antioxidant properties by significantly boosting protective enzymes (SOD, CAT, and GSH) and reducing stomach tissue damage.
Jaiswal *et al*., 2011[29]	Researchers orally administered *Argyreia speciosa* leaf fraction (50–200 mg/kg) to rats with ulcers induced via chemical, stress, or surgical models. They then analyzed stomach tissues and gastric juices to measure defensive mucus and antioxidant markers, SOD, CAT, and LPO.	*Argyreia speciosa* fraction strongly protected against ulcers (up to 78.36% in stress models) by significantly increasing stomach mucus and reducing tissue damage and oxidative stress markers (LPO, SOD, CAT).
Rao *et al*., 2003[37]	Researchers orally administered *Argyreia speciosa* flower extract (100–200 mg/kg) to rats with ulcers induced via chemical, stress, or surgical models. Stomachs were then macroscopically examined to evaluate ulcer reduction compared to untreated control groups.	*Argyreia speciosa* flower extract (100–200 mg/kg) showed broad-spectrum anti-ulcer properties, successfully protecting the stomach lining against chemical, stress, and surgical injury.

SOD: Superoxide dismutase, LPO: Lipid peroxidation, CAT: Catalase

Table 7: Anti-convulsant activity

Researcher/author	Methodology	Outcome
Singh *et al*., 2019[38,39]	Administration of *Argyreia speciosa* root extract (200–400 mg/kg) in rats before seizure induction via chemicals or shock. Researchers recorded onset, severity, and duration changes against untreated controls to evaluate anticonvulsant effects.	*Argyreia speciosa* root extract (200–400 mg/kg) significantly reduced and delayed convulsions, validating its traditional anti-seizure use.

Table 8: System-wise action

System	Action
Endocrine system	The study directly notes a significant increase in serum testosterone and serum cholesterol.[34,35]
Gastrointestinal system	Dose-dependent ulcer protective effect and present healing effect against acetic acid induced ulcer index with decreased perforations.[37]
Nervous system	Study shows CNS depressant activity was observed and reduction in motor activity and potentiated pentobarbital-induced hypnosis.[14]

CNS: Central nervous system

Table 9: Ayurveda pharmacological properties[46]

Rasa	*Guna*	*Veerya*	*Vipaka*	*Dosha Karma and Dhatu karma*
Madhura	*Guru*, *Snigdha*	*Sheeta*	*Madhura*	*Vatapitta-shamaka*, *Rasayana*

Table 10: Neuroprotective effect

Researcher/author	Methodology	Outcome
Bhattacharya *et al*., 2002[55]	Researchers assessed the therapeutic potential of EuMil by inducing stress via chronic electroshock, which elevated brain neurotransmitters. concentrations back to baseline levels.	EuMil treatment successfully reversed electroshock-induced stress by normalizing elevated brain norepinephrine, dopamine, and serotonin levels, confirming its antistress potential., thereby confirming its therapeutic potential as an antistress agent capable of mitigating neurological disorders.
Parihar *et al*., 2004[56]	Mice were anesthetized, injected with kainic acid, and treated before brain biochemical assays measured oxidative stress.	The extract protected brain regions by reducing oxidative markers and boosting defenses against neurodegenerative diseases, such as Alzheimer's and Parkinson's.
Singh *et al*., 2009,[57] Ojha *et al*., 2010,[58] Jalapure *et al*., 2009[59]	Researchers evaluated the extract using animal behavioral models for depression, memory, and seizures, combined with biochemical assays tracking acetylcholinesterase inhibition, free radical neutralization, and neuronal protection.	The extract demonstrated antidepressant, antiamnesic, and anticonvulsant activities by inhibiting acetylcholinesterase, neutralizing free radicals, and protecting neurons from cellular damage.
Ojha *et al*., 2010[58]	Rats pre-treated with the methanolic extract of *Asparagus recemosus* MAR (50–200 mg/kg) were evaluated using Morris Water Maze and Elevated Plus Maze tasks after scopolamine and sodium nitrite-induced memory impairment.	*Asparagus racemosus* produced significant nootropic and anti-amnesic outcomes in rodents. It directly enhanced spatial learning and memory recall in healthy rodents.
Srihari *et al*., 2015[60]	This group containing 22 children was administered *Shatpushpa* churn with honey in the dosage of 1 *Vidal pada* (10–12 g) in 2 divided doses in the morning and evening before food for a period of 1 month.	The drug shows significant efficacy in improving IQ, with no adverse reactions noted during the observation period. This cognitive enhancement is likely driven by the drug's inherent pharmacological properties.

Table 11: Antioxidant activity

Researcher/author	Methodology	Outcome
Bhatnagar *et al*., 2005[61]	To evaluate *Shatavari's* antioxidant activity, researchers measured antioxidant and lipid peroxidase levels in indomethacin-treated rats given methanolic root extract.	*Shatavari* root extract successfully countered oxidative stress by boosting antioxidants and reducing harmful lipid peroxidation.
Kamat *et al*., 2000[45]	Researchers exposed rat liver mitochondria to gamma radiation, treating them with *Shatavari* extract to measure protection against oxidative damage.	*Shatavari* provided 100% protection against radiation-induced mitochondrial damage.
Acharya *et al*., 2012[62]	alcoholic extract of the root of *A. racemosus* administration in rats.	Decreased levels of AST and ALT in carbon chloride-induced hepatic damage in rats
Parihar and Hemnani, 2004[56]	Researchers treated mice with *Shatavari* extract, analyzing tissues for glutathione levels, enzyme activity, lipid peroxidation, and protein carbonyl content.	*Shatavari* reduced free-radical damage by boosting antioxidants and minimizing oxidation.

AST: Alanine aminotransferase, ALT: Aspartate aminotransferase

Table 12: Anti-depressant-like activity

Researcher/author	Methodology	Outcome
Dinghra and Kumar, 2007[63]	Researchers tested *Shatavari's* antidepressant activity in mice using tail suspension, forced swim, and biochemical assays measuring brain MAO enzyme inhibition.	The extract showed strong antidepressant activity by reducing immobility and inhibiting MAO enzymes while interacting with multiple neurotransmitter systems.
Singh *et al*., 2009[57]	Researchers tested the extract's antidepressant activity in rats using FST, LH tests, and assays measuring enzyme inhibition and neurotransmission.	The extract showed antidepressant activity by improving behavioral outcomes, boosting antioxidants, and inhibiting regulatory enzymes.
Meena *et al*., 2011[64]	*In vitro* kinetics assays tested three extracts against cholinesterase and MAO enzymes, quantifying saponin content to correlate with inhibition levels.	Methanolic extract competitively inhibited cholinesterase and MAO enzymes, directly correlating with its high saponin content.

MAO: Monoamine oxidase, FST: Forced swimming test, LH: Luteinizing hormone

Table 13: Immunostimulant activity

Researcher/author	Methodology	Outcome
Sharma *et al*., 2009[65]	Researchers administered sapogenin acids to healthy and immunosuppressed animals, measuring CD3/CD19 and cytokines. Separately, shatavarosides A and B underwent leukocyte function tests and chemical assays.	Sapogenins and shatavarosides showed potent immunostimulatory activity, increasing CD3/CD19 counts and cytokines at nanomolar concentrations.

Table 14: Anti-ulcer property

Researcher/author	Methodology	Outcome
Bhasale *et al*., 1994[66]	Researchers induced animal ulcers using stress, ligation, aspirin, and cysteamine, while humans took *Shatavari* mandur daily, monitored via endoscopy.	*Shatavari* healed ulcers, strengthened mucosal defenses, and relieved symptoms.
Bhatnagar *et al*., 2006[67]	Researchers treated indomethacin-induced ulcerated rats with *Asparagus racemosus* or ranitidine, measuring ulcer index, gastric secretions, cell shedding, and mucin.	*Asparagus racemosus* matched ranitidine by lowering gastric acid and ulcer index while increasing protective mucin.

Table 15: Anti-epileptic activity

Researcher/Author	Methodology	Outcome
Jalapure *et al*., 2009[59]	Methanolic and aqueous extracts were evaluated against MES- and PTZ-induced convulsions in rats, monitoring seizure onset latency and phase durations.	Extracts showed GABA-mediated anticonvulsant activity, delaying and shortening seizures.

MES: Maximum electroshock, PTZ: Pentylene tetrazole, GABA: Gamma-aminobutyric acid

Table 16: System-wise action

System	Action
Respiratory system	Antioxidant constituents help neutralize free radicals and may protect lung tissues from oxidative stress-induced damage.[68]
Gastrointestinal system	*Shatavari* treats dyspepsia and ulcers by accelerating gastric emptying, increasing mucus production, and providing prostaglandin-like mucosal cytoprotection.[69]
Cardiovascular system	When you slash low-density lipoprotein and very low-density lipoprotein by over 40% and stop lipid peroxidation, you are directly preventing atherosclerosis (the hardening and narrowing of the arteries).[70]
Genital–urinary system	The antioxidant constituents, particularly steroidal saponins (shatavarins), may protect kidney tissue against drug-induced and toxin-induced injury.[71]
Nervous system	*Shatavari* exhibits neuroprotective potential against neurodegenerative disorders, such as Alzheimer's disease.[72]
Skin	Exhibits anti-inflammatory activity, which may help reduce skin irritation and inflammatory skin conditions.[8]