



Review Article

Phytochemical And Pharmacological Review of *Evolvulus Alsinoides* (Linn.)

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ABSTRACT

Evolvulus alsinoides (Linn.), belonging to the Convolvulaceae family, is a medicinal herb with significant therapeutic potential in traditional medicine systems. This review examines its phytochemical constituents, pharmacological properties, and ethnomedicinal applications. The plant contains bioactive compounds including β -sitosterol, scopolin, and betaine that contribute to its neuroprotective, hepatoprotective, and adaptogenic properties. Scientific research validates its traditional uses as a memory enhancer, antimicrobial agent, and treatment for various disorders. This comprehensive assessment highlights the plant's therapeutic significance and identifies prospects for future investigations.

INTRODUCTION

Medicinal plants have historically served as valuable therapeutic agents, particularly in traditional medicine systems like Ayurveda. The recent surge in phytochemical and pharmacological research has rekindled interest in plant-derived remedies. *Evolvulus alsinoides* (Linn.), commonly known as Shankhpushpi, represents one such significant medicinal plant recognized for its neuroprotective attributes.

This perennial herb from the Convolvulaceae family flourishes in tropical and subtropical regions across India and Africa. In Ayurvedic medicine, *E. alsinoides* is classified as a Medhya Rasayana—an agent that enhances intellect,

memory, and cognitive functions. Traditional practitioners employ it to address conditions ranging from respiratory ailments to neurodegenerative disorders. Contemporary research supports its traditional application as a brain tonic, demonstrating its memory-enhancing and anti-inflammatory properties. Additionally, the plant exhibits anti-helminthic, antioxidant, and anti-hemorrhagic activities. According to the World Health Organization, a substantial portion of the global population relies on medicinal plants for healthcare, underscoring the importance of further exploration into the therapeutic potential of plants like *E. alsinoides*¹.

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BOTANICAL DESCRIPTION AND HISTORY

Evolvulus is a modest genus comprising approximately 10-15 species distributed throughout Asia and the Americas. *E. alsinoides*, characterized by its small stature with branched rootstocks and prostrate, hairy stems, has a rich history in traditional medicine, particularly in Ayurveda, where it is valued for its cognitive enhancement properties. The plant features elliptic, densely hairy leaves and distinctive blue flowers². Beyond its indigenous applications, preparations containing this herb—especially as a nervine tonic (Shankhpushpi)—are commercially available across Asia. The plant extracts are utilized for various ailments, including respiratory disorders, neurological conditions such as epilepsy, and immune-related diseases^{3,4}.

PHYTOCHEMISTRY

Phytochemical analysis of *E. alsinoides* reveals a diverse composition of bioactive compounds. Different extracts (methanol, ethanol, and aqueous) contain varying phytoconstituents, including⁸:

- **Present in methanol extract:** Alkaloids, carbohydrates, tannins, pseudo tannins, chlorogenic acid, flavonoids, phenols, terpenoids, triterpenoids, and volatile oils.
- **Present in ethanol extract:** Alkaloids, carbohydrates, saponins, tannins, flavones, flavonoids, phenols, terpenoids, triterpenoids, volatile oils, and glycosides.
- **Present in aqueous extract:** Tannins, phenols, terpenoids, triterpenoids, and volatile oils.

KEY PHYTOCONSTITUENTS

The therapeutic benefits of *E. alsinoides* are attributed to its active compounds, which include⁹:

- Evolvine
- Pentatriacontane and triacontane

- β -sitosterol
- Glycoflavone and 4'-methoxyvitexin
- Phenolic acids (p-hydroxybenzoic acid, vanillic acid, protocatechuic acid, gentisic acid)
- Fatty acids (tetradecanoic acid, myristic acid, pentadecanoic acid)
- Other compounds including phytol isomers, squalene, and various esters

PHARMACOLOGICAL PROPERTIES

Antimicrobial Activity

Ethanollic extracts demonstrate significant antibacterial effects against pathogens including *Salmonella* spp., *Staphylococcus aureus*, *Vibrio cholera*, *E. coli*, and *Pseudomonas aeruginosa*, with the root showing maximum potency¹⁰.

Wound Healing

Studies in Wistar mice indicate that ethanolic extracts of the whole plant promote wound healing, with comparative analysis showing its efficacy alongside betaine alkaloid¹¹.

Hepatoprotective Effects

The plant demonstrates hepatoprotective properties by reversing paracetamol-induced hepatotoxicity in rats, normalizing liver enzymes (ALT, AST, ALP) and potentially inhibiting cancer cell proliferation in liver cancer models¹².

Lipid Regulation

Ethanolic extracts reduce cholesterol, LDL, VLDL, and triglycerides in hyperlipidemic rat models, suggesting applications in hyperlipidemia management¹³.

Neurological Benefits

- **Anxiolytic Effects:** Ethyl acetate extracts (100 mg/kg) exhibit significant anxiolytic properties¹⁴.



- **Adaptogenic and Antiamnesic Activity:** Extracts reduce stress parameters in rats and reverse scopolamine-induced amnesia in mice¹⁵.
- **Learning and Memory Enhancement:** Hydro-alcoholic extracts improve cognitive functions while reducing oxidative stress and enhancing cholinergic activity¹⁷.
- **Neuroprotection:** The plant inhibits acetylcholinesterase activity and amyloid plaque formation, indicating potential in Alzheimer's disease management¹⁸.
- **Immunomodulation:** Anti-inflammatory and immunosuppressive effects in arthritis models²⁶.
- **Antiparasitic Activity:** Inhibition of *Plasmodium falciparum* lactate dehydrogenase, suggesting antimalarial potential²⁷.
- **Anticancer Potential:** In vitro studies indicate anti-leukemic activity through inhibition of cancer cell proliferation²⁸.
- **Anticonvulsant Effects:** Protection against pentylenetetrazole-induced seizures, possibly via GABAergic modulation²⁹.

Other Therapeutic Properties

- **Anthelmintic Activity:** Ethanolic extracts demonstrate potent anthelmintic properties, surpassing the efficacy of the reference standard piperazine citrate¹⁶.
- **Antistress Activity:** Phenolic compounds, especially Evolosides C-E, effectively normalize stress-induced parameters including plasma corticosterone and hyperglycemia¹⁹.
- **Antioxidant Activity:** Strong free radical scavenging properties attributed to flavonoids, diterpenes, and phenolic compounds²⁰.
- **Antidepressant Effects:** Ethanolic extracts (50-100 mg/kg) reduce immobility time in forced swim tests²¹.
- **Anti-inflammatory Activity:** Ethyl acetate and chloroform extracts demonstrate significant anti-inflammatory effects in carrageenan and formalin-induced edema models²².
- **Cardiovascular Benefits:** Methanolic extracts lower blood pressure in hypertensive models²³ and protect against myocardial injury²⁴.
- **Antidiabetic Properties:** Regulation of glucose levels in diabetic rats with improved insulin sensitivity²⁵.

- **Sleep Promotion:** Moderate doses induce drowsiness and improve sleep quality without toxicity³⁰.

Safety Profile

Acute toxicity studies indicate no significant toxic effects at human-equivalent doses, with favorable results in LD50 tests and sub-acute toxicity evaluations³¹.

TRADITIONAL AND ETHNOMEDICINAL APPLICATIONS

E. alsinoides has been used traditionally for its bitter, anthelmintic, febrifuge, and alexiteric properties³². Common applications include treatment of:

1. **Neurological Conditions:** Memory enhancement, neurodegenerative diseases, epilepsy, stress-related disorders
2. **Respiratory Ailments:** Bronchitis, asthma (leaves smoked as therapeutic cigarettes)
3. **Febrile Conditions:** Various fevers, including malarial fever
4. **Digestive Disorders:** Indigestion, diarrhea
5. **Dermatological Issues:** Skin diseases, hair growth promotion

Regional Applications

- **India:** Treatment of venereal diseases (Southern Western Ghats)³⁷,



spermopoietic agent (Karnataka)³⁸, fever management (Tamil Nadu)³⁹

- **Sri Lanka:** Management of dysentery and depression³⁶
- **Philippines:** Treatment of bowel irregularities⁴⁰
- **Nigeria:** Stomachic remedies⁴⁰
- **Kenya:** Treatment of sores⁴⁰ and depression⁴¹
- **Tanzania:** Application to enlarged glands⁴⁰

DISCUSSION AND CONCLUSION

Evolvulus alsinoides (Linn.) represents a valuable medicinal resource with significant therapeutic potential verified by both traditional knowledge and modern scientific investigations⁴². Its diverse phytochemical profile, including alkaloids, flavonoids, and phenolic compounds, contributes to its wide pharmacological spectrum encompassing neuroprotective, hepatoprotective, anti-inflammatory, and antimicrobial properties. The plant's traditional applications as a cognitive enhancer and treatment for various disorders are increasingly supported by scientific evidence. Particularly noteworthy are its effects on memory enhancement, stress reduction, and management of neurodegenerative conditions.

With continuing research into its bioactive compounds and mechanisms of action, *E. alsinoides* offers promising opportunities for development of novel therapeutics based on traditional knowledge. Further clinical studies are warranted to fully elucidate its potential and establish standardized applications in contemporary medicine.

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