

Pharmacognostical Evaluation and Phytochemical Screening of *Convolvulus Pluricaulis*: A Systematic Review on Its Nootropic Potential

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Abstract— *Convolvulus pluricaulis*, a significant 'Rasayana' drug in the Ayurvedic system of medicine, is primarily recognized for its role in mental stimulation and rejuvenation therapy. Commonly known as Shankhpushpi, it is extensively used for its therapeutic effects on the Central Nervous System (CNS), specifically in enhancing memory and boosting intellectual capacity. While ancient Sanskrit and Ayurvedic literature identify four distinct plant species under the name "Shankhpushpi," *C. pluricaulis* is the most widely studied for its pharmacological potential. The plant exhibits a broad spectrum of biological activities, including neuroprotective, antioxidant, anti-inflammatory, anxiolytic, antidepressant, and antiepileptic effects, alongside its hepatoprotective and cardiovascular benefits. These diverse medicinal properties are attributed to its rich phytochemical profile, which includes alkaloids, flavonoids, and coumarins, specifically bioactive compounds like convolvulic, \beta-sitosterol, valeric acid, squalene, and ascorbic acid. Empirical evidence from various in-vitro and in-vivo preclinical studies supports its traditional use in managing cognitive dysfunction, anxiety, and oxidative stress, particularly in models of Alzheimer's Disease (AD). This paper evaluates the clinical efficacy of *C. pluricaulis* in treating CNS disorders and establishes a scientific foundation for its development as a natural cognitive enhancer in modern medicine.

Index Terms— *Convolvulus pluricaulis*, Shankhpushpi, Nootropic, Ramayana, Neuroprotection, Alzheimer's.

I. INTRODUCTION

Convolvulus pluricaulis is an esteemed medicinal herb with a long history of use in traditional medicine, particularly for the management of various psychiatric and neurological disorders. A prominent member of

the Convolvulaceae family, it is widely recognized across India by the vernacular name Shankhpushpi. The plant is highly regarded for its profound therapeutic potential and its characteristic aromatic profile. Upon steam distillation, the fresh herb yields a distinct, pale-yellow essential oil. Often referred to by common names such as 'Morning Glory' or 'Bindweed', it is natively distributed across the arid suburbs of the Sahara, Sindh, and the plains of Northern India, thriving under xerophytic conditions especially during its peak growth period in September and October. From a botanical perspective, *C. pluricaulis* is a perennial, prostrate herb characterized by spreading branches that frequently exceed 30 cm in length. Its morphology includes small, alternate, elliptic leaves (approximately 2 mm) and distinct blue funnel-shaped flowers (approximately 5 mm). In the Ayurvedic tradition, Shankhpushpi is celebrated as a potent medhya-rasayana (brain tonic) aimed at augmenting memory and cognitive performance. Each part of the plant offers specific medicinal utility: the leaves are traditionally indicated for respiratory ailments like chronic bronchitis and asthma, while the roots are utilized in treating pediatric febrile conditions. Modern pharmacological evaluations have substantiated its multifaceted biological activities, including antifungal, antibacterial, antidepressant, anti-ulcer, anxiolytic, antipyretic, and anthelmintic properties. Beyond its systemic benefits, the plant's extracted oil is recognized for its dermatological and trichological value, promoting hair growth and providing deep dermal nourishment. Furthermore, contemporary research has highlighted its cardiovascular potential, as alcoholic extracts of the flowers have been shown to significantly reduce serum

levels of total cholesterol, triglycerides, and phospholipids, suggesting a promising role in lipid management.



Figure 1: Morphological view of Convolvulus pluricaulis (Shankhpushpi).

II. TAXONOMICAL CLASSIFICATION

Rank	classification
1. Kingdom	Plantae
2. Division	Angiosperm
3. Class	Eudicots
4. Order	Solanales
5. Family	Convolvulaceae
6. Genus	Convolvulus
7. Species	Pluricaulis

Figure 2: Herbarium specimen of Convolvulus pluricaulis showing vegetative parts."

III. BOTANICAL DESCRIPTION-

1. Habit: It is a prostrate herb with multiple spreading branches.
2. Leaves: The leaves are small (0.5–2 cm), linear, and covered with fine hairs.
3. Flowers: The flowers are funnel-shaped (conch-shaped), appearing in white or light pink colors.
4. Part Used: The whole plant (Panchang), including roots and stems, is utilized for medicinal purposes.



Figure 3: Natural habitat and spreading (prostrate) growth habit of C. pluricaulis in sandy soil.

IV. CLINICAL APPLICATIONS (DISEASE TREATMENT)

- Memory Enhancement: It increases the levels of acetylcholine in the brain, improving concentration and memory retention.
- Anxiety and Stress: It acts as an anxiolytic by regulating cortisol levels, effectively reducing mental fatigue.
- Insomnia (sleep disorders): Due to its mild sedative properties, it helps in treating chronic sleep deprivation.
- Epilepsy: Studies suggest its role in reducing the frequency of seizures through CNS stabilization.
- Hypertension: It has been found to lower blood pressure by reducing emotional stress and tension.



V. PHYTOCHEMISTRY (CHEMICAL CONSTITUENTS)-

The therapeutic efficacy of Convolvulus pluricaulis is attributed to a diverse range of bioactive compounds:

- Alkaloids: These include Sankhpushpine, Convolvine, Convolamine, and Convalidine.
- Flavonoids: Kaempferol and Quercetin are the primary antioxidants present.
- Coumarins: Scopoletin is a major coumarin responsible for anti-inflammatory and anti-anxiety effects.
- Sterols: \beta-sitosterol and other phytosterols are present in the roots.

- Others: Fatty acids, carbohydrates, and proteins contribute to its nutritional value.

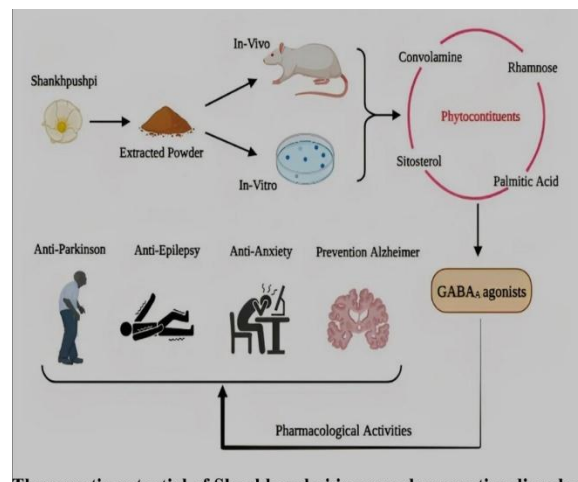


VI. MECHANISM OF ACTION-

Shankpushpi works primarily through its interaction with the neurotransmitter systems in the brain. It exhibits neuroprotective properties by scavenging free radicals and reducing oxidative stress in the neurons. It modulates the Hypothalamic-Pituitary-Adrenal (HPA) axis, which is responsible for the body's stress response. By increasing the synthesis of Nerve Growth Factor (NGF), it assists in the repair and growth of brain cells.

- Cognitive Enhancement:** It acts as a memory booster, improving concentration, learning, and reasoning abilities.
- Neuroprotective Action:** It contains flavonoids and antioxidants that prevent neural damage and reduce the buildup of beta-amyloid plaque.
- Anti-Stress & Sedative:** It acts on the central nervous system to decrease anxiety, promoting relaxation, calmness, and better sleep.
- Brain Tonic:** It helps manage Alzheimer's and Parkinson's by improving cognitive function and reducing age-related cognitive decline.
- Ayurvedic Function:** It balances Vata and Pitta doshas, reducing mental fatigue and calming the "head region".
- Memory & Focus:** Known for improving mental sharpness and focus, it is widely used to aid in cognitive development.
- Mental Well-being:** It acts as an anti-depressant and helps manage anxiety.
- Other Potential Benefits:** It has anti-thyroid properties, aids in digestion, is used for headaches, and can help improve skin health.

These mechanisms highlight Shankpushpi's potential as a natural brain booster and its therapeutic implications in treating cognitive disorders and enhancing mental performance.



Therapeutic potential of Shankpushpi in neurodegenerative disorders.

Figure 4: Neuroprotective mechanism and memory enhancement pathways of *C. pluricaulis*."

VII. TRADITIONAL USE

In traditional Ayurvedic medicine, *Convolvulus pluricaulis* is highly esteemed for its therapeutic versatility. A primary application involves the administration of the fresh juice from the whole plant (Panchang), typically combined with milk, to enhance intellectual capacity and cognitive development in children. Beyond its neurological benefits, the herb is traditionally prepared as a topical paste to treat various dermatological conditions and consumed as a decoction to promote digestive health and gastrointestinal stability. The classification of Shankpushpi as a 'Ramayana' indicates its historical use as a rejuvenating agent aimed at promoting longevity and preventing age-related cognitive decline. Unlike many synthetic stimulants, the herb is recognized as non-toxic and generally free from adverse side effects. Furthermore, it is traditionally noted for its positive influence on general vitality, often associated with healthy weight gain and overall physical vigor. According to Ayurvedic principles, Rasayana therapy operates holistically on both the physical body and the mind. This dual-action approach is believed to retard the aging process, sharpen intelligence, and strengthen the body's innate resistance against pathogens (immunity). From a

doshic perspective, *C. pluricaulis* is utilized to balance the Kapha, Vata, and Pitta doshas, providing a stabilizing effect on the body's internal equilibrium. Characterized by its astringent and bitter (Tikta) taste, the herb is favored by traditional practitioners for its ability to soothe the nervous system.

Modern herbalists and ethnopharmacologists believe that Shankhpushpi's calming effect is rooted in its ability to regulate the endocrine system. It is thought to stabilize the production of key stress hormones, specifically cortisol and adrenaline, thereby mitigating the physiological impact of chronic stress and anxiety.

- Effect on learning
- Improve cognitive functioning
- Prevents And memory headache
- Reduce mental functioning
- Enhances Memory fatigue
- Cardiac boosting herb



VIII. CONCLUSION

Convolvulus pluricaulis stands as a multifaceted medicinal herb with immense potential in the realm of modern pharmacology. Its diverse phytochemical profile, characterized by a rich concentration of alkaloids, flavonoids, and glycosides, substantiates its traditional reputation as a safe and effective neuroprotective tonic. As global healthcare shifts toward natural and plant-based therapies, Shankhpushpi emerges as a primary candidate for the development of novel, evidence-based neuroprotective drugs. Contemporary pharmacological research has successfully validated its traditional indications as a potent memory enhancer, anxiolytic, and antidepressant. These bioactive constituents play a pivotal role in managing cognitive impairment, chronic stress, and various

neurological disorders. However, while preclinical data is exceptionally promising, the transition from "bench to bedside" requires more rigorous, systematic clinical trials and the standardization of herbal extracts. To establish Shankhpushpi as a cornerstone of modern phytotherapy, future research must focus on elucidating its precise molecular mechanisms, pharmacokinetic profiles, and the development of advanced formulations. Synergistic herbal combinations also offer a promising avenue for enhancing its therapeutic window. Integrating *C. pluricaulis* into the modern pharmacological armamentarium would provide a valuable, holistic addition to existing treatments for brain health and mental wellness, bridging the gap between ancient Ayurvedic wisdom and modern clinical science.

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