WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
ISSN 2278 – 4357 Impact Factor 8.025
Volume 15, Issue 1, 1206-1230 Review Article Coden USA: WJPPAJ

HERBAL COSMECEUTICAL CREAM OF SHANKHPUSHPI (CONVOLVULUS PROSTRATUS): A NATURAL APPROACH TO SKIN ACNE AND WRINKLES

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Article Received on 05 Dec. 2025,
Article Revised on 25 Dec. 2025,
Article Published on 10 Jan. 2026,

https://doi.org/10.5281/zenodo.18220102

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How to cite this Article: Ms. Bharti Roy*. (2026). HERBAL COSMECEUTICAL CREAM OF SHANKHPUSHPI (CONVOLVULUS PROSTRATUS): A NATURAL APPROACH TO SKIN ACNE AND WRINKLES. World Journal of Pharmacy and Pharmaceutical Sciences, 15(1), 1206–1230.
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ABSTRACT

One of the most significant medicinal plants utilized in ancient Indian medical systems, especially Ayurveda, Unani, and Siddha, is Shankhpushpi (Convolvulus prostratus Forssk.), a perennial herb in the Convolvulaceae family. It is categorized as a Medhya Rasayana, a collection of revitalizing herbs that are well-known for improving mental health, memory, and cognitive abilities. Shankhpushpi has been used for centuries to treat neurological and psychological conditions like epilepsy, anxiety, depression, sleeplessness, and mental exhaustion. Growing interest in herbal remedies and natural therapies in recent years has prompted a great deal of scientific investigation to confirm their traditional claims and investigate their possible uses in contemporary medicine and cosmetics. Numerous bioactive components, such as alkaloids (Shankhpushpi and evolvine), flavonoids (kaempferol and quercetin derivatives), coumarins, phenolic compounds, phytosterols, carbohydrates, and glycosides, have been identified by phytochemical analyses of Convolvulus prostratus. The plant's various pharmacological actions, including its antioxidant, neuroprotective, anti-inflammatory, anxiolytic, antibacterial, and anti-aging qualities, are attributed to these substances. Through modulation of neurotransmitter systems and decrease of oxidative stress in brain tissues, Shankhpushpi has been shown in experimental investigations to exhibit strong nootropic activity by enhancing learning ability, memory retention, and cognitive function. Shankhpushpi has demonstrated encouraging antioxidant and anti-inflammatory

properties in oxidative damage and inflammatory reactions. These characteristics point to its possible use in the creation of dermatological and cosmeceutical formulations intended to treat skin aging, acne, and inflammatory skin problems as well as in the prevention of neurological illnesses. Large-scale clinical research is still limited, although preliminary investigations on topical preparations using Shankhpushpi extracts have shown promising outcomes. Despite widespread traditional use and encouraging preclinical data, Shankhpushpi clinical validation and standardization continue to be significant obstacles. Its repeatability and therapeutic consistency are limited by variations in phytochemical content brought on by seasonal, regional, and processing factors. Furthermore, thorough pharmacokinetic and toxicological research is needed to determine its long-term safety and effectiveness. Future studies should therefore concentrate on developing sophisticated herbal formulations, standardizing extracts, clarifying molecular pathways, and conducting carefully planned clinical trials. The goal of this paper is to give a thorough analysis of Convolvulus prostratus botanical traits, phytochemical composition, traditional usage, pharmacological actions, safety considerations, and possibilities for the future. This paper highlights the medicinal value of Shankhpushpi and stresses its potential as a rich natural resource for the development of contemporary phytopharmaceutical and herbal cosmeceutical products by combining existing scientific and traditional knowledge.

KEYWORDS: Convolvulus prostratus, Medhya Rasayana, Shankhpushpi, nootropic activity, antioxidants, herbal remedies, and cosmetics.

INTRODUCTION

The largest and most noticeable organ in the human body, the skin acts as the body's main defense against external environmental elements such pollution, UV rays, infections, and chemicals. The skin is vital for immunological defense, thermoregulation, sensory perception, and general homeostasis maintenance in addition to its protective role. Additionally, psychological well-being, self-esteem, and physical beauty are all strongly correlated with healthy skin. However, there has been a notable increase in dermatological problems globally due to increased exposure to environmental contaminants, unhealthy lifestyle choices, hormonal imbalances, stress, and poor skincare practices. Among these, the most common skin issues affecting both adults and adolescents are acne and premature skin aging, especially wrinkles.[1,2]

Comedones, papules, pustules, nodules, and, in extreme situations, cysts and scarring are the hallmarks of acne vulgaris, a chronic inflammatory condition of the pilosebaceous unit. Excessive sebum production, aberrant follicular keratinization, Cutibacterium acnes colonization of the pilosebaceous follicles, and ensuing inflammatory reactions are all part of the multifactorial pathophysiology of acne. Wrinkles, on the other hand, are a defining feature of aging skin and are brought on by both extrinsic (such as UV radiation, oxidative stress, smoking, pollution, and chronic inflammation) and intrinsic (such as genetic predisposition and hormonal shifts) causes. Antioxidant and anti-inflammatory-based treatments can address wrinkles and acne because they both have similar underlying processes, such as oxidative stress, inflammation, and compromised skin barrier function.[3–5]

Synthetic chemical agents such topical and systemic retinoids, antibiotics, benzoyl peroxide, salicylic acid, corticosteroids, and chemical anti-aging chemicals are the mainstay of conventional acne and wrinkle therapy methods. Even while these therapies work well to manage symptoms, long-term use of them is often linked to side effects include skin dryness, erythema, irritation, photosensitivity, hypersensitivity reactions, and the emergence of antibiotic resistance. Moreover, long-term skin damage and disruption of the skin barrier are potential consequences of synthetic anti-aging products. Due to these restrictions, there is a growing need for safer, more efficient, and natural substitutes, especially plant-based treatments that provide numerous advantages with few adverse effects.[6–8]

Cosmeceuticals are a sophisticated class of skincare products that fall somewhere between medications and cosmetics. Cosmeceuticals, in contrast to traditional cosmetics, contain physiologically active chemicals that have cellular-level therapeutic effects on the skin. Because of their antioxidant, anti-inflammatory, antibacterial, wound-healing, and anti-aging qualities, herbal cosmeceuticals—which use extracts from medicinal plants—have become incredibly popular. Herbal cosmeceuticals are a promising treatment for skin conditions including wrinkles and acne since they are backed by both contemporary scientific research and traditional medical knowledge.[9,10]

One of the most significant therapeutic plants mentioned in traditional Indian medical systems, especially Ayurveda, is Shankhpushpi (Convolvulus prostratus Forssk.), a perennial herb of the Convolvulaceae family. Shankhpushpi is traditionally categorized as a Medhya Rasayana, a collection of restorative herbs that are well-known for improving mental health, memory, intelligence, and learning capacity. Shankhpushpi is described as a relaxing nervine

tonic with restorative and adaptogenic qualities in traditional Ayurvedic books like the Charaka Samhita and Sushruta Samhita. Recent research has shown the plant's wide pharmacological potential beyond neurological uses, despite the fact that it has primarily been investigated for its neuroprotective and cognitive-enhancing benefits.[11–13]

Numerous bioactive components, such as alkaloids (Shankhpushpi convolamine and evolvine), flavonoids (kaempferol and quercetin derivatives), phenolic compounds, coumarins (scopoletin), glycosides, and phytosterols like β-sitosterol, have been found in Convolvulus prostratus, according to phytochemical studies. The powerful antioxidant, anti-inflammatory, antibacterial, and tissue-protective properties of these phytochemicals are widely recognized. Acne lesions and the breakdown of collagen and elastin fibers that cause wrinkles are largely caused by oxidative stress and persistent inflammation. Thus, the prospective use of Shankhpushpi in dermatological and cosmeceutical applications is highly supported by the existence of such bioactive substances.[14–16]

Convolvulus prostratus antioxidant activity is essential for shielding the skin from oxidative damage brought on by free radicals produced by UV light and environmental contamination. By triggering matrix metalloproteinases, which break down collagen and elastin and cause wrinkles and a loss of skin suppleness, free radicals hasten the aging process of the skin. Shankhpushpi contains flavonoids and phenolic compounds that have anti-aging and skin-protective properties by scavenging free radicals, preventing lipid peroxidation, and boosting endogenous antioxidant defense mechanisms.[17,18]

Shankhpushpi has strong anti-inflammatory and antibacterial effects in addition to its antioxidant qualities. Suppression of inflammatory mediators can help lessen the severity of acne and avoid post-inflammatory hyperpigmentation and scarring, as inflammation is a key component in the pathophysiology of acne. Its therapeutic potential is further enhanced by its antimicrobial activity against bacteria that cause acne. Convolvulus prostratus is a desirable natural element for the creation of herbal cosmeceutical formulations aimed at aging and acne-prone skin because of these qualities.[19,20]

Because of their non-greasy nature, ease of administration, patient compliance, and capacity to deliver active ingredients directly to the afflicted location, topical drug delivery methods, such as creams, are frequently chosen in dermatological and cosmetic applications. Medicinal plant extracts are used in the formulation of herbal cosmeceutical creams, which offer lower

systemic exposure, better skin hydration, increased barrier function, and sustained release of bioactive substances. Incorporating Shankhpushpi extract into an appropriate cream base minimizes the negative effects typically associated with synthetic skincare products while providing a natural, safe, and effective method for managing wrinkles and acne.[21,22]

The cosmeceutical potential of Shankhpushpi is still largely unexplored, despite its widespread traditional use and encouraging pharmacological profile. There aren't many scientific studies on standardized herbal creams using Convolvulus prostratus that are intended for anti-aging and acne treatments. Major obstacles to its commercialization include variations in phytochemical content brought on by seasonal and geographic factors, a lack of consistent extraction techniques, and inadequate clinical validation. Therefore, to determine its effectiveness, safety, and therapeutic relevance, thorough evaluations and formulation-based research are crucial.[23,24]

The creation and therapeutic value of a herbal cosmeceutical cream of Shankhpushpi (Convolvulus prostratus) as a natural remedy for wrinkles and acne are the main topics of this review. This review highlights its potential as a valuable natural ingredient in contemporary dermatological and cosmeceutical products by gathering and critically analysing the literature on its botanical characteristics, phytochemical composition, pharmacological properties pertinent to skin health, and formulation aspects.[25]



Figure: Different type of Shankhpushpi.

Introduction of Plant Profile

Shankhpushpi flower (convolvulus Prostratus)

In the Indian medical system, Shankhpushpi (Convolvulus Prostratus Forssk.), botanically known as Evolvulus alsinoides in some traditional literature, is a well-known medicinal plant. It is found all over India, particularly in arid, sandy, and open grassland areas. It is a member of the Convolvulaceae family. Shankhpushpi gets its name from the plant's small, delicate, white to pale blue blossoms that resemble conch shells, or "Shankha" in Sanskrit. Because of its many therapeutic uses, this herb has been used for ages in Ayurvedic, Unani, and Siddha medical systems. Shankhpushpi is a prostrate, perennial herb with simple, linear-oblong leaves and thin, creeping stalks. The plant is unique both botanically and medicinally due to its solitary, axillary, and slightly fragrant blossoms. In classical Ayurvedic literature, Convolvulus Prostratus is regarded as one of the most genuine and generally recognized species of Shankhpushpi. The entire plant, including the leaves, stalks, and blossoms, is traditionally used medicinally.

Convolvulus prostrates has drawn a lot of interest in herbal cosmetics and cosmeceuticals in recent years. Because of their calming, anti-inflammatory, and antioxidant properties, Shankhpushpi flower extracts are being investigated for their possible use in treating wrinkles, acne, and aging skin. Shankhpushpi is a desirable component of contemporary herbal formulations intended to support skin health and general well-being because of its natural origin, safety profile, and diverse biological activity. All things considered, the Shankhpushpi flower of Convolvulus prostrates is a useful therapeutic resource that connects conventional knowledge with contemporary scientific investigation. The necessity of ongoing research and sustainable use of this amazing herb is highlighted by its wide medicinal potential and increasing significance in the pharmaceutical and cosmetic industries.

The entire plant, including the blooms, is traditionally used in a variety of concoctions, including churnas, syrups, ghritas, and tailas, to treat ailments like mental weariness, anxiety, sleeplessness, epilepsy, and memory loss. Shankhpushpi has been traditionally administered externally for wounds, burns, skin irritation, and ulcers in addition to its neuropharmacological advantages, underscoring its dermatological significance. The flower is very helpful for sensitive and irritated skin issues because of its cooling and calming qualities.



Figure: Shankhpushpi Flower.

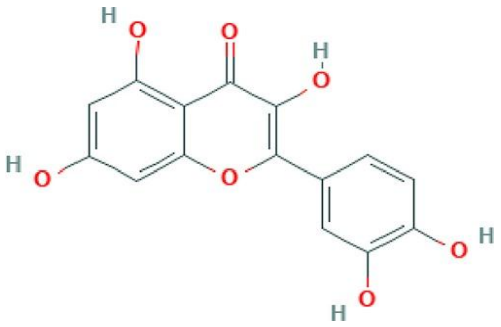
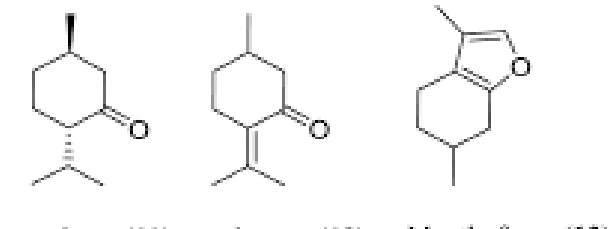
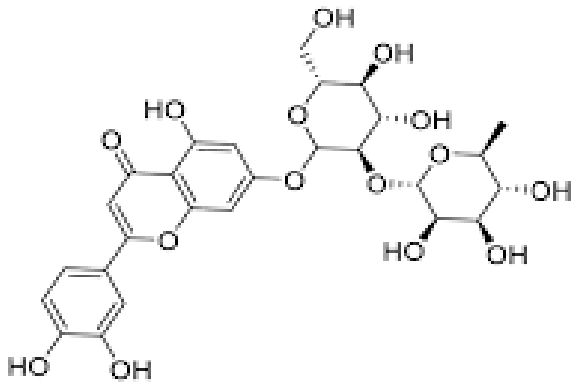


Figure: Chemical Constituent of Convolvulus Prostratus.



menthone (11) pulegone (12) Menthofuran (13)



luteolin7-O-rutinoside(leaves) (14)

Taxonomical Description

Convolvulus prostrates Forssk., the botanical name for Shankhpushpi, is a flowering plant in the Convolvulaceae family that has significant therapeutic use. Several species in the genus Convolvulus are distinguished by their funnel-shaped blooms and twining or prostrate growth behaviour. Convolvulus prostrates stands out in this species because of its low growth rate, ability to spread, and therapeutic value in conventional medical systems. Because the plant develops flowers and seeds inside fruits, it is frequently categorized as an angiosperm. Convolvulus prostratus belongs to the division Magnoliophyta, which comprises all flowering plants, from a higher taxonomic standpoint. It is a dicotyledonous plant, which means that its seeds have two cotyledons. It also has a taproot system and reticulate leaf venation, which are characteristics of dicots. The plant belongs to the class Magnoliopsida, which is made up of broad-leaved plants with flowers that are typically arranged in multiples of four or five.[61]

Table 1: Taxonomy of convolvulus Prostratus.

Kingdom	**Plantae**
Division	Magnoliophyta
Class	Magnoliopsida
Order	Solanales
Family	Convolvulaceae
Genus	Convolvulus
Species	Convolvulus Prostratus
Sub-kingdom	Tracheobionta
Sub-division	Angiospermae

4.3 Vernacular Names

The plant is referred to by several names in various Indian states and other nations.

Table 2: Other names of Shankhpushpi flower.

Language / Region	**Vernacular Name**
Sanskrit	Shankhpushpi
Hindi	Shankhpushpi
English	Dwarf Morning Glory, Prostrate Bindweed
Marathi	Shankhpushpi
Gujarati	Shankhpushpi
Bengali	Shankhpushpi
Tamil	Shankhpushpi
Telugu	Shankhpushpi
Kannada	Shankhpushpi

MORPHOLOGY

Convolvulus prostratus Forssk. is a spreading, prostrate, perennial herb belonging to the Convolvulaceae family. The plant exhibits typical morphological modifications that enable it to thrive in sunny, dry, and open environments. Its significance in medicine and diagnosis stems from the distinct differentiation of both vegetative and reproductive organs.

a) Habit and Habitat

The plant forms dense mats on the soil's surface and has a prostrate or creeping habit. Effective ground coverage is made possible by the stems' radial expansion from the core rootstock. It is frequently found in open fields, roadsides, wastelands, and dry grasslands. In addition to preventing water loss, the prostrate habit shields the plant from mechanical harm.

b) Root

The plant has a creeping or prostrate habit, covering the soil's surface with dense mats. From the central rootstock, stems radiate outward, providing effective ground coverage. Wastelands, open fields, roadsides, and dry meadows are frequent places to find it. The plant is shielded from mechanical harm and water loss by its prostrate habit.

c) Stem

The stem is cylindrical, thin, herbaceous, and heavily branched. When it comes into touch with moist soil, it may root at the nodes and grow horizontally along the ground. The smooth surface of the stem is glabrous to sparingly hairy. Because of their length, internodes spread quickly. Older stems may look light brown or purple, whereas younger stems are green.

d) Leaves

Simple, exstipulate, alternating leaves are carried on short petioles. They are about 1-3 cm long and have an ovate, oblong, or elliptic form. The base of the leaf is rounded or slightly cordate, the apex is obtuse or slightly acute, and the leaf border is complete. The lamina has reticulated venation and is thin, delicate, and glabrous. The lower surface is somewhat lighter, whereas the upper surface is darker. In addition to being employed in medical remedies, leaves are essential for photosynthesis.

e) Inflorescence

The inflorescence is axillary and solitary, with flowers emerging individually from the leaf axils. A thin pedicel supports each flower. Bracts are either very little or nonexistent. This configuration guarantees sufficient flower exposure for insect pollination.

f) Flower

Flowers are actinomorphic, tiny, complete, and bisexual. They are infundibuliform, or funnel-shaped, with a diameter of roughly 1-2 cm. The hue of flowers varies from pure white to bluish-violet or pastel blue, and they frequently have a slight purplish or yellow throat.

i. **Calyx**: Five free, green, ovate sepals that are persistent and shield the flower bud make up.
ii. **Corolla**: Gamopetalous, with a spreading limb and a tubular base. Five weak lobes can be seen near the edge of the flower.
iii. **Androecium:** Consists of five unevenly sized epipetalous stamens. Fine pollen grains are produced by tiny, dorsifixed anthers.
iv. **Gynoecium:** Synchronous, bicarpellary, and with a superior ovary. There is one ovule in each locule of the bilocular ovary. The slim style culminates in a bifid stigma.

g) Fruit

The fruit is a globose, dry capsule with persistent sepals surrounding it. The capsule dehisces to release the seeds as it reaches maturity. Depending on the success of fertilization, the fruit typically contains one to four seeds.

h) Seeds

The seeds are tiny, dark brown to black in colour, and angular to ovoid in shape. The smooth, rigid seed coat helps with dormancy and protection. The reserve food resource needed for germination is abundant in seeds.

1.4 Distribution and origin of Shankhpushpi Flower (Convolvulus Prostratus)

Shankhpushpi is abundantly found in the lower hilly and plains regions of India. States like Uttar Pradesh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh, Telangana, West Bengal, and Bihar are among those in North, Central, and South India where it grows natively. Roadsides, open grasslands, wastelands, fallow agricultural fields, sandy soils, and field edges are typical habitats for the plant. It is a popular

wild herb in rural and semi-urban settings because of its prostrate growth habit and robust root system, which enable it to flourish in disturbed and nutrient-poor soils.[27,28,29]

Convolvulus prostratus is found in a number of South Asian countries outside of India, such as Bangladesh, Nepal, Pakistan, and Sri Lanka. Additionally, reports of the plant have come from Southeast Asian nations including Thailand and Myanmar. It is also found in tropical sections of the Middle East and Africa, where climate factors including high temperatures and moderate rainfall encourage its growth. The plant's ability to adapt to many ecological situations is reflected in its extensive range.[29]

Shankhpushpi thrives in well-drained sandy or loamy soils and enjoys warm climates with lots of sunlight. It may thrive in regions with little rainfall and is drought-tolerant. During the summer and monsoon seasons, the plant exhibits strong vegetative development and typically thrives at low to moderate elevations. Warm months are typically when flowers bloom, which promotes pollination and seed dissemination and aids in the plant's natural spread.[30]

Convolvulus prostratus is a readily available medicinal plant due to its wide spread and native provenance. However, there is a rising need for accurate identification, conservation, and cultivation of the genuine species due to its growing demand in the herbal pharmaceutical and cosmetic sectors, as well as confusion caused by several plants being sold under the common name "Shankhpushpi."[30,31]

Convolvulus prostratus is also found in Southeast Asia, some sections of the Middle East, and parts of Africa, especially in North and East African nations. The plant thrives in these regions because it is suited to semi-arid and tropical climates with moderate rainfall and high temperatures.[31]

Shankhpushpi thrives in areas with little to moderate rainfall. It thrives in regions with 500–1,000 mm of yearly precipitation. Because of its resistant nature and prostrate growth style, the plant exhibits good drought resistance and can endure brief times of water scarcity. During the monsoon season, luxuriant vegetative growth and flowering are supported by moderate rainfall. On the other hand, excessive rainfall or wet circumstances are detrimental since they can lead to root rot and lower plant density. Therefore, the best conditions for its growth are well-distributed rainfall as opposed to heavy, continuous precipitation.[39]

Warm tropical and subtropical conditions are ideal for the plant's growth. The ideal temperature range for Shankhpushpi growth is between 20°C and 35°C. It can withstand greater summertime temperatures, but under severe heat stress, it grows less. Shankhpushpi does not thrive in extremely cold locations and is susceptible to frost. Its growth is restricted to the warmer months in colder climates. Warm temperatures and enough sunlight encourage improved flowering and the build-up of active phytoconstituents, which is crucial for its therapeutic and aesthetic value.[39]

Once established, the plant needs very little irrigation. Because Shankhpushpi is sensitive to wet circumstances, overwatering is harmful. Long-term soil saturation can result in fungal infections and root rot, both of which are detrimental to plant health and biomass production. Continuous growth is supported, particularly in the early phases of establishment, by light and sporadic irrigation during dry spells. The plant can be grown in areas with limited water resources because of its low water requirements.[40]

From an ecological standpoint, Shankhpushpi helps preserve soil by serving as a ground-cover plant that lessens soil erosion. Sustainable farming methods are supported by its capacity to grow without the need for expensive agricultural inputs. The plant is environmentally beneficial and appropriate for organic agricultural systems, especially in the herbal and cosmetic industries, due to its low need for fertilizers and pesticides.[40]

PHARMACOLOGICAL PROPERTIES

Nootropic (Memory-Enhancing) Activity

By lowering oxidative stress in brain tissues, Shankhpushpi also enhances cognitive performance. The brain's high oxygen consumption and fat content make it extremely vulnerable to oxidative injury. Flavonoids and phenolic acids, two powerful antioxidants found in Shankhpushpi, scavenge free radicals and stop lipid peroxidation in neuronal membranes. The herb supports learning capacity and memory retention by shielding neurons from oxidative damage and maintaining the structural integrity and functional efficiency of brain cells. The prevention of cognitive decline linked to aging and long-term stress is greatly aided by this antioxidant-mediated neuroprotection.[47]

Shankhpushpi capacity to improve alertness and lessen mental weariness is a significant component of its nootropic activity. The herb enhances cerebral circulation and oxygen delivery to brain tissues, leading to improved cognitive function and prolonged focus.

Shankhpushpi is especially helpful for professionals, students, and anyone who participate in continuous intellectual pursuits because regular use has been demonstrated to enhance focus, processing speed, and mental endurance. Shankhpushpi improves mental function in a balanced way without producing anxiety, restlessness, or dependency, in contrast to synthetic stimulants.[48]

Anxiolytic and Anti-Stress Activity

Shankhpushpi capacity to alter neurotransmitter systems involved in stress response and emotional regulation is intimately related to its anxiolytic action. According to experimental research, the plant affects the serotonin and gamma-aminobutyric acid (GABA) pathways, which are essential for lowering neuronal excitability and fostering mental calm. Shankhpushpi helps lessen anxiety symptoms like restlessness, excessive worry, palpitations, and mental strain by improving inhibitory neurotransmission and stabilizing excitatory signals. Without compromising cognitive performance, this neurochemical modulation leads to a balanced mental state and enhanced emotional stability.[58]

By controlling the hypothalamic-pituitary-adrenal (HPA) axis, the main neuroendocrine system involved in stress response, Shankhpushpi also demonstrates potent anti-stress and adaptogenic activity. Stress hormones like cortisol are released excessively as a result of prolonged stress, which can have detrimental effects on mental health, cognitive function, and general physiological balance. Shankhpushpi improves the body's capacity to adjust to environmental, psychological, and physical stressors and helps return cortisol levels to normal. The herb decreases fatigue brought on by stress and shields the neurological system from long-term harm by increasing stress tolerance.[58]

Antidepressant Activity

Shankhpushpi capacity to alter monoamine neurotransmitters in the brain, specifically serotonin, dopamine, and norepinephrine, is the main reason for its antidepressant effects. These neurotransmitters are essential for controlling motivation, mood, pleasure, and emotional stability. Depressive illnesses are frequently linked to imbalances or decreased amounts of these monoamines. According to experimental research, Shankhpushpi improves synaptic transmission and neural communication by increasing the availability of these neurotransmitters either by promoting their release or by preventing their breakdown. This neurochemical regulation aids in improving mood, lowering depressive and hopeless feelings, and reestablishing emotional balance.[48]

Shankhpushpi potent antioxidant and neuroprotective properties are another significant mechanism that underlies its antidepressant impact. Oxidative stress and neuroinflammation, which can affect neuronal function and plasticity, have been increasingly associated with depression. By neutralizing free radicals and lowering oxidative damage in brain cells, Shankhpushpi antioxidant components shield neurons from harm brought on by stress. The herb promotes normal brain function and long-term improvements in mood and emotional resilience by maintaining neuronal integrity and boosting synaptic plasticity.[48]

Anticonvulsant Activity

Shankhpushpi anticonvulsant action is primarily caused by the brain's excitatory and inhibitory neurotransmission being modulated. Excessive neuronal activity and an imbalance between excitatory neurotransmitters like glutamate and inhibitory neurotransmitters like gamma-aminobutyric acid (GABA) are the causes of convulsions. According to experimental research, Shankhpushpi reduces excessive excitatory neurotransmission while increasing inhibitory GABAergic activity. By preventing the aberrant electrical discharges that cause seizure activity and stabilizing neuronal membranes, this combined effect lowers the frequency and severity of convulsions.[51]

Shankhpushpi neuroprotective and antioxidant properties play a significant role in its anticonvulsant action. Increased oxidative stress in brain tissues is frequently linked to seizure activity, which exacerbates epileptic disorders and damages neurons. Shankhpushpi antioxidant chemicals prevent oxidative damage to brain cells by scavenging free radicals and lowering lipid peroxidation in neuronal membranes. In addition to aiding in seizure management, this neuroprotective action guards against long-term neuronal damage that is frequently linked to chronic epilepsy.[51]

Neuroprotective Activity

Shankhpushpi strong antioxidant impact is one of the main reasons underpinning its neuroprotective action. Because of its high lipid content and oxygen consumption, the brain is particularly vulnerable to oxidative stress. Too many free radicals can harm DNA, proteins, and neuronal membranes, resulting in cell malfunction or death. By scavenging these reactive oxygen species and lowering lipid peroxidation, Shankhpushpi antioxidant chemicals shield neurons from oxidative damage. This activity is especially crucial for preventing neurodegenerative diseases like Parkinson's and Alzheimer's, where oxidative stress is a major factor in the progressive loss of neuronal function. Shankhpushpi promotes regular

synaptic communication, which is crucial for cognitive functions like learning, and helps preserve the structural integrity of neurons by reducing oxidative damage.[44]

Shankhpushpi modulates neurotransmitter systems to produce neuroprotective benefits in addition to its antioxidant qualities. According to studies, the herb affects the brain's levels of acetylcholine, dopamine, serotonin, and gamma-aminobutyric acid (GABA), all of which are essential for preserving neuronal excitability, synaptic plasticity, and emotional stability. Shankhpushpi promotes appropriate neural signalling and lowers the danger of excitotoxicity, a disorder in which excessive neuronal stimulation results in cell death, by improving cholinergic transmission and balancing excitatory and inhibitory neurotransmitters. This process is very helpful in preventing cognitive decline, enhancing memory, and guarding against neuronal damage caused by stress or toxins.[44]

Antioxidant Activity

Herbal and cosmetic compositions can benefit from the herb's antioxidant action. Shankhpushpi is a useful component of anti-aging and rejuvenating treatments because it helps prevent wrinkles, fine lines, and premature aging by lowering oxidative damage to skin cells. The benefits of its historic use in mental, physical, and dermatological health are extended by its capacity to scavenge free radicals and decrease reactive species, protecting both neural and peripheral tissues from oxidative damage.[43]

Additionally, Shankhpushpi anti-inflammatory and neuroprotective activities are intimately associated with its antioxidant qualities. Inflammation and oxidative stress frequently work together to harm cells and tissues, especially in long-term medical problems. Shankhpushpi prevents tissue damage and promotes cellular repair processes by reducing the activation of inflammatory pathways through the action of free radicals. This dual action justifies the herb's traditional use as a protecting and renewing agent and increases its total medicinal potential.[44]

Anti-Inflammatory Activity

Shankhpushpi primarily reduces inflammation by blocking inflammatory mediators such prostaglandins, leukotrienes, and cytokines, which are essential for both starting and maintaining inflammation. According to experimental research, Shankhpushpi extracts may reduce the production of pro-inflammatory mediators by blocking the cyclooxygenase (COX) and lipoxygenase (LOX) pathways. Shankhpushpi reduces tissue swelling, redness,

discomfort, and cellular infiltration linked to inflammatory responses by altering various metabolic pathways. Its historic usage in disorders involving tissue irritation and chronic inflammation is supported by this mechanism.[41]

Shankhpushpi anti-inflammatory qualities also apply to skin and peripheral tissues, which supports its usage in herbal cosmetic formulations and inflammatory skin diseases. Acne, dermatitis, and early skin aging are all significantly impacted by inflammation. Shankhpushpi aids in healing, lessens irritation, and preserves skin health by lowering oxidative stress and inflammatory reactions in skin tissues. This characteristic increases its worth in cosmetic treatments meant to relieve irritated skin and stop long-term skin damage.[49]

Antimicrobial activity

Shankhpushpi has been shown to have antibacterial properties against a variety of Gram-positive and Gram-negative bacteria. The plant's bioactive substances disrupt vital bacterial cellular functions, such as enzyme activity, membrane integrity, and cell wall formation. Shankhpushpi inhibits bacterial growth or induces cell death by rupturing bacterial cell membranes and changing permeability, which allows intracellular contents to seep out. Its efficacy in preventing bacterial infections of the skin, digestive system, and wounds can be explained by this method. Its potential use in herbal remedies for acne and other skin disorders where bacterial growth is a major factor is further supported by the antibacterial activity.[46]

Shankhpushpi has antifungal efficacy against a number of harmful fungus species in addition to its antibacterial properties. Due to the lack of effective antifungals and the adverse effects of synthetic medications, fungal infections are challenging to treat and frequently cause harm to skin and mucosal tissues. By interfering with the creation of fungal cell walls and upsetting membrane-bound enzymes, the phenolic and flavonoid chemicals in Shankhpushpi prevent the growth of fungi. This antifungal effect supports the herb's historic usage in treating fungal skin infections and preserving skin health by preventing fungal colonization.[46]

Shankhpushpi anti-inflammatory and antioxidant qualities are directly linked to its antibacterial action. Tissue damage and delayed recovery are caused by oxidative stress and inflammation, which are frequently brought on by microbial infections. Shankhpushpi makes it more difficult for microorganisms to survive and speeds up the healing of damaged tissues by lowering oxidative stress and inhibiting inflammatory reactions.[46]

Hepatoprotective Activity

Additionally, Shankhpushpi contributes to the improvement of biochemical markers related to liver function and the stabilization of liver enzymes. Shankhpushpi extracts have been proven in experiments to normalize increased serum liver enzymes, including alkaline phosphatase (ALP), aspartate aminotransferase (AST), and alanine aminotransferase (ALT), which are frequently elevated in liver injury. Shankhpushpi demonstrates its protective effect on hepatocytes and its capacity to stop intracellular enzyme leakage into the bloodstream by keeping these enzyme levels within normal ranges.[52]

Additionally, Shankhpushpi hepatoprotective action might entail improving liver detoxification processes. By enhancing antioxidant enzyme activity and encouraging effective toxin processing, the herb boosts the liver's metabolic capability. This detoxifying action is especially helpful in shielding the liver from harm brought on by long-term drug use, alcohol consumption, and environmental contaminants. Shankhpushpi contributes to the maintenance of metabolic balance and general physiological health by promoting hepatic detoxification pathways.[52]

Cardioprotective and Antihypertensive Activity

Shankhpushpi strong antioxidant effect is one of the main factors for its cardioprotective properties. Because oxidative stress damages cardiac cells, vascular endothelium, and lipid membranes, it is a major factor in the development of cardiovascular illnesses. Shankhpushpi antioxidant components prevent lipid peroxidation and neutralize free radicals, shielding heart muscle cells from oxidative damage. This preventive impact lowers the risk of myocardial dysfunction and ischemia damage while preserving the structural and functional integrity of the heart. Shankhpushpi promotes overall cardiovascular resilience by strengthening endogenous antioxidant defences.[41]

Shankhpushpi relaxing and stress-relieving effects on the neurological system are intimately associated with its antihypertensive activity. Due to increased sympathetic nervous system activity and the overproduction of stress hormones like cortisol and adrenaline, psychological stress and anxiety are significant causes of raised blood pressure. By encouraging parasympathetic dominance and decreasing sympathetic overactivity, Shankhpushpi helps control autonomic nervous system activity, which causes blood vessels to relax and blood pressure to gradually drop. In cases of mild to moderate hypertension brought on by stress, this neurogenic technique of blood pressure regulation is especially helpful.[41]

Antidiabetic Activity

Shankhpushpi capacity to control blood glucose levels is one of the main reasons underpinning its antidiabetic action. According to experimental research, Shankhpushpi improves peripheral glucose consumption and increases insulin sensitivity, which helps lower high blood glucose. By altering insulin signalling pathways, the bioactive substances in the plant may help tissues absorb glucose and lower hyperglycemia. In type 2 diabetes, where insulin resistance is a significant contributing factor, this approach is especially helpful.[41]

Shankhpushpi may help reduce stress-induced metabolic disorders, which are frequently linked to diabetes, in addition to controlling blood sugar. Because psychological stress and worry increase the release of stress hormones like cortisol and adrenaline, they can raise blood glucose levels. Shankhpushpi anxiolytic and adaptogenic qualities assist lower stress and restore normal stress hormone levels, which in turn supports blood glucose regulation. The herb's comprehensive approach to treating metabolic problems is highlighted by its neuroendocrine modulation.[41]

Gastroprotective Activity

Shankhpushpi anxiolytic and anti-stress qualities further bolster its gastroprotective action. Due to its disruption of mucosal defense mechanisms and increased release of stomach acid, psychological stress is a well-known cause of gastrointestinal diseases. Shankhpushpi supports a healthy gut-brain connection and helps prevent stress-related stomach damage by lowering stress and anxiety. This all-encompassing effect emphasizes the herb's usefulness in treating stress-related functional gastrointestinal problems.[41]

Shankhpushpi may aid in controlling stomach acid secretion in addition to its anti-inflammatory and mucosal protective properties. One of the main causes of acid-related illnesses is excessive acid secretion. According to reports, Shankhpushpi has a modest antisecretory effect that balances stomach acid levels without totally inhibiting regular digestion. While avoiding acid-induced mucosal damage, this mild control of acid output promotes digestive health.[41]

Additionally, Shankhpushpi has anti-inflammatory activity, which greatly enhances its gastroprotective qualities. Inflammatory processes can exacerbate mucosal damage and discomfort and are frequently implicated in gastrointestinal illnesses. The plant aids in the suppression of inflammatory mediators that cause stomach inflammation, including as

prostaglandins and cytokines. Shankhpushpi relieves gastritis and peptic ulcer symptoms like pain, burning, and discomfort by lowering inflammation in the stomach mucosa.[41]

PROCEDURE AND METHODOLOGY

Procedure

Gathering and Preparing Plant Material

a) We shall get the entire Shankhpushpi flower (Convolvulus prostratus) plant from a trustworthy source.
b) To get rid of dirt and other objects, the gathered plant material will be carefully cleaned by running tap water.
c) It will be ground into a powder using a mechanical grinder after being shade-dried at room temperature.
d) For later use, the powdered substance will be kept in an airtight container.

Shankhpushpi flower Extract Preparation

a) The powdered plant material will be extracted by maceration extraction process using an appropriate solvent, such as ethanol solvent.
b) After filtering, a water bath will be used to concentrate the extract. Until it is formulated, the concentrated extract will be kept in a refrigerator.

Formulation of Herbal Cosmeceutical Cream

a) We'll make an oil-in-water (O/W) cream. To reach a temperature of 70–75°C, the oil phase and aqueous phase will be heated independently.
b) With constant stirring, the Shankhpushpi extract will be added to the aqueous phase.
c) To create a homogenous cream, the oil phase will be gradually introduced to the aqueous phase while being continuously homogenized. After cooling, the manufactured cream will be put into appropriate containers.

Assessment of the Cream Formulation

The following criteria will be used to assess the formulated cream:

i. Physical appearance
ii. pH
iii. Spreadability
iv. Homogeneity
v. Viscosity

vi. Stability
vii. Skin irritation

METHODOLOGY

Research Design

In order to formulate and assess a herbal cosmeceutical cream including Shankhpushpi (Convolvulus prostratus) for anti-acne and anti-wrinkle activity, the current investigation will be conducted in an experimental laboratory.

MATERIALS AND EQUIPMENT

The materials and equipment that will be used include:

i. Shankhpushpi flower (Convolvulus prostratus) extract
ii. Emulsifying agents
iii. Oils and waxes
iv. Preservatives
v. Distilled water
vi. Standard laboratory glassware and instruments

Experimental Plan

i. Collection and authentication of plant material
ii. Extraction of bioactive constituents
iii. Selection of suitable excipients
iv. Formulation of oil-in-water cream
v. Evaluation of the prepared formulation

EVALUATION STRATEGY

The created cream quality, safety, and stability will be evaluated using standard pharmaceutical and cosmetic evaluation techniques.

CONCLUSION

The produced herbal cosmeceutical cream will have acceptable physicochemical and physical characteristics, such as a reasonable pH, good spreadability, appropriate viscosity, and consistent homogeneity. These qualities will attest to the formulation's skin-friendliness and suitability for frequent topical application. The stability studies will support the formulation's anticipated shelf life by showing that it remains stable under various storage settings.

The current investigation will come to the conclusion that Shankhpushpi (Convolvulus prostratus) can be used as a useful herbal component in the creation of a cosmeceutical cream meant to treat wrinkles and acne. The intended formulation and assessment will show that it is practical, stable, and aesthetically pleasing to incorporate Shankhpushpi extract into an oil-in-water cream base.

The safety assessment will show that there is no skin irritation, redness, or discomfort from the cream's formulation. This will highlight the benefits of employing herbal compounds, especially Shankhpushpi, which is well-known for its gentle and calming qualities. The formulation's non-irritating properties will make it appropriate for a variety of skin types, including sensitive skin.

Shankhpushpi bioactive phytoconstituents will support the formulation's anticipated anti-wrinkle and anti-acne properties. The cream will protect the skin from oxidative damage, reduce inflammation, regulate microbial growth, and improve the texture and flexibility of the skin. These results will bolster the formulation's medicinal and cosmetic applicability.

The idea that herbal cosmeceuticals made from traditional medicinal plants like Shankhpushpi (Convolvulus prostratus) will provide a secure, efficient, and natural substitute for synthetic cosmetics will be supported overall by the results of the proposed study. Additionally, the study will give Shankhpushpi-based herbal cosmetic formulations a scientific foundation for future research, product development, and commercialization.

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