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A REVIEW ON SHANKHPUSHPI (CONVOLVULUS PLURICAULIS)

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ABSTRACT

Shankhpushpi (*Convolvulus Pluricaulis*) belongs to the family Convolvulaceae. Shankhpushpi plant is rich carbohydrate, L-Mannomethylose, malt sugar (maltose), saccharose and amylum. It also contains α-amino [alpha-amino] carboxylic acid, proteins, and the alkaloids- $C_{16}H_{21}NO_4$ (convolvine), $C_{17}H_{23}NO_4$ (convolamine), $C_{17}H_{21}NO_5$ (Confoline), $C_{33}H_{40}N_2O_9$ (Subhirsine), $C_{16}H_{21}NO_5$(Convoline), convolidine, phyllabine, β-sitosterol, Convosine, subhirsine and convolvidine along with fatty acid and wax constituents, hydro-carbons, other bio-chemicals which makes it highly suitable for disease treatment in human body. The whole plant of Shankhpushpi *(Convolvulus Pluricaulis)* possesses many pharmacological activities like Anti-depressant activity, antidiabetic, Effect on learning and memory, Antimicrobial, insecticidal, antifungal, antibacterial and antihelmintic activity, Anticonvulsant activity, Antiulcer and anticatatonic activity, Effect on thyroid gland, Cardiovascular activity, Neuroprotective activity, antioxidant activities, antihperlipidemic, Effect on reproductive system and immunomodulation. The Present Review Critically Deals with Synonyms, Taxonomy, Description, Identity, Purity and Strength, Chemical Constituents, Pharmacological Activities, Application present in Shankhpushpi.

KEYWORDS: Shankhpushpi, Synonyms, Taxonomy, Description, Identity, Purity and Strength, uses, pharmacological activities, chemical constituents.

INTRODUCTION

Convolvulus Pluricaulis commonly known as Shankhpushpi, or Aparajit in Indian dialects, belonging to Family Convolvulaceae. Shankhpushpi is a highly values plant for its characteristic aroma and medicinal value. The Shankhpushpi flower is look like a “Shankh” (a marine shell). Fresh plant of Shankhpushpi gives pale yellow colour oil by Steam

distillation and produce characteristic odour.[1-3] It is often considered as morning glory.[4] It is extensively distributed in and grows on Punjab, Bihar Chhotanagpur[5-6] and northern India. The methanolic extract of the complete plant produce anxiolytic effect and reduces total serum-Cholesterin, phosphatide and free fatty acids.[7] Session of autumn herb produces white to light pinkish flowers.[8] In Ayurveda Shankhpushpi is considered as very important herbs. It is improve Learning memory and behaviour.[9] In traditionally Shankhpushpi leaves are used to treat asthma and chronic bronchitis and roots are used to treat childhood fever and oil of Shankhpushpi plant stimulates the growth of hair.[10] and also enhances beauty of skin and helps in nourishing. There is some study on the herb, which shows light on its anti-fungal, anti-bacterial, Antidepressant, Antiulcer, Antistress, antipyretic, anthelmintic properties and its helpfulness in diminish the symptoms of overactive thyroid,[6] fever and also used as a brain tonic, alterative and increase mental alertness, substitutive, tonic, generally to treat weakness, sleeplessness, exhaustion, reduction in energy level and also treat gastric mucosa ulcer.[11]

The Pharmacological studies of the Shankhpushpi herb have produced lowering the blood pressure and tranquilizing effects. Clinical studies have demonstrated advantageous effects in the persons which suffer from anxiety neurosis. The Shankhpushpi doesn't produce any side issues and its non-poisonous herb. On the other word, there is making one feel strong, healthy, and full of energy and also increase weight.

Synonyms[11-12]

Table 1: Synonyms of shankhpushpi.

Languages	Name
Sanskrit	Sankhapuspi
Hindi	Shankhpushpi, Aparajit
English	English speedwheel
Urdu	Sankhali
Punjabi	Shankhpushpi, Sankhapuspi, Sankhahuli
Bengali	Sankhapuspi
Gujarati	Shankhavali
Kannada	Bilikanthisoppu, Shankhapushpi, Shankhauli[12]
Malayalam	Krsna kranti, Vishnukranthi,
Marathi	Shankhavela, Sankhahuli, Sankhapuspi[12]
Oriya	Krishna-enkranti[12] Sankhapuspi.
Telugu	Shankhapushpi
Tamil	Sanghupushpam, kakkurattai.[11] Kakattam, Kakkanangudi, Karakhuratt[12]
Tibetan	Shankhpushpi

Taxonomy

Table 2: Taxonomy of shankhpushpi.

Kingdom:	Plantae
Sub kingdom	Tracheobionta
Division:	Magnoliophyta
Class:	Magnoliopsida
Sub class	Asteridae
Order:	Solanales
Family:	Gentianaceae
Genus:	*Convolvulus*
Species:	Pluricaulis
Parts Used:	Entire plant and juice

Description[12]

The stem of Shankhpushpi is light green, slender, cylindrical, about 0.1 cm or less in thickness with clear hairy nodes and internodes. According to microscopy stem shows single layered epidermis, covered with thick cuticle; at places unicellular hairs present; cortex differentiated in two zones, 2-3 upper collenchymatous and 1-2 lower parenchymatous layers, both having round to oval, elongated and microscopy of Midrib of leaves appears convex and concave in lower and upper side; vascular bundles maked 4-5 layers of parenchymatous cells and usual elements of phloem and xylem, Lamina shows epidermis and hairs unicellular present on both surfaces, palisade two layered, few bicollateral vascular bundles present in spongy parenchyma, vein islet number 20-25 per sq. mm., stomatal index in lower surface 16.9-19.8 and in upper surface, 13.8-17.0; stomatal number in lower surface 185-247, and in upper surface 202-238 per sq. mm. The Leaves are shortly petiolate, linear-lanceolate, acute, hairy on both surfaces; 0.5-2 cm long and 0.1-0.5cm broad; light green. The flowers are White or pinkish; solitary or in pairs sessile or sub-sessile in the leaf axis; sepals narrowly, linear-lanceolate, sparsely hairy; corolla shortly discoid; stamen 5, free, epipetalous, alternate with the petals, inserted deep in the corolla tube; ovary superior and bicarpellary. The fruits are Capsuled, oblonged globose with coriaceous, pale brown pericarp and the seeds and roots are Brown and yellowish-brown color. Seeds are minutely puberulous and root is usually branched, cylindrical, ribbed having some rough stem nodules and small secondary roots, 1-5 cm long, 0.1-0.4 cm thick, yellowish-brown to light brown. According to microscopy outline of the root is circular form, and appears like circular, 10-15 layers are composed between cork and primary phloem.

Identity, Purity and Strength

Table 3: Identities, Purity and Strength of shankhpushpi.

Foreign matter:	Not more than 2 per cent.
Total Ash:	Not more than 17 per cent.
Acid-insoluble ash:	Not more than 8 per cent.
Alcohol-soluble extractive:	Not less than 6 per cent.
Water-soluble extractive:	Not less than 10 per cent.

Chemical constituents

The active chemical constituents of Shankhpushpi are carbohydrate, L-Mannomethylose, malt sugar (maltose), saccharose and amylum. It also contains α-amino [alpha-amino] carboxylic acid, proteins, and the alkaloids- $C_{16}H_{21}NO_4$ (convolvine), $C_{17}H_{23}NO_4$ (convolamine), $C_{17}H_{21}NO_5$ (Confoline), $C_{33}H_{40}N_2O_9$ (Subhirsine), $C_{16}H_{21}NO_5$(Convoline), convolidine, phyllabine, β-sitosterol, Convosine, subhirsine and convolvidine along with fatty acid and wax constituents, hydro-carbons, other bio-chemicals which include scopoletin, glacial acetic acid, three coumarins, tropane alkaloids, kaempferol, linoleic acid, palmitic acid and straight chain hydrocarbon hextriacontane, 20-oxodotriacontanol, tetratriacontanoic acid and 29-oxodotriacontanol. Alcoholic extract of speedwheel produce:

Di-oh-cinnamic acid, kaempferol and Betastosterol-glucos steroid of microphyllic acid. Hydroxy Cinnamic acid, Octacosanol tetracosane along with glucose, saccharose also have been isolated from the plant.[1,13,14]

Table 4: Phytochemical features of.

Phytochemical	**Shankhpushpi *(Convolvulus pluricaulis)***
Carbohydrates	D-glucose, maltose, rhamnose, malt sugar, starch and other carbohydrates.[15,16]
Proteins and amino acids	α-amino [alpha-amino] carboxylic acid and Proteins.[17,18]
Alkaloids	Only convolamine has been identified but other alkaloids convoline ($C_{16}H_{21}NO_4$), convolidine, convolvine ($C_{16}H_{21}NO_4$), Confoline ($C_{17}H_{21}NO_5$), convosine, etc., were found in other species of this family. The plant contains alkaloid shankhapushpine ($C_{17}H_{25}NO_2$), melting point from 163°C to 164°C.[16,19-24]
Fatty acids/volatile oil/Fixed oil	Volatile oil, fatty acids, fatty alcohols; hydrocarbons, myristic acid (30.9%), palmitic acid (66.8%) and linoleic acid (2.3%) and straight chain hydrocarbon, hextriacontane.[25,26]
Phenolics/Glycosides/ Triterpenoid/ Steroids	Scopoletin, β-sitosterol and ceryl alcohol.[27] Chloroform fraction of this contains 20-oxodotriacontanol, tetratriacontanoic acid and 29-oxodotriacontanol, flavonoid-kampferol, steroids-phytosterols, β-sitosterol.[28] CP-1, a phytochemical marker has been isolated and characterised by HPTLC technique[27] Estimation of scopoletin by HPTL in

	Shankhpushpi and its formulation[29,30] Estimation of scopoletin by spectrofluorimetry.[31]

Pharmacological activities

Pharmacological activities of Shankhpushpi have been extensively described as follows:

1. Anti-depressant activity

Shankhpushpi are one of the drugs which are used as antidepressant and to produced stress-free state in the brain.[32]

2. Antidiabetic activity

The alcoholic extract of Shankhpushpi used for the treatment of hyperglycemia *(In vitro)* and which are effectively produced Antidiabetic effect in the human body.[33]

- **Effect on Learning and Memory**

An improvement in memory after administering with Shankhpushpi extracts was clearly identified in Simple memory tests such as pole-climbing apparatus, passive avoidance paradigm and active avoidance paradigm tests. The ethanolic extract of Shankhpushpi and its ethyl acetate and aqueous fractions were evaluated for their memory enhancing properties. Two doses (100 and 200 mg/kg/p.o.) of ethyl acetate and aqueous fractions of the ethanolic extract were administered in separate groups of animals. Both the doses of all the extracts of Shankhpushpi significantly improved memory and learning in rats.[32,34]

- **Antimicrobial, Insecticidal, Antifungal, Antibacterial and Antihelmintic activity**

The entire plant was bioassayed by the leaf disc method by feeding deterrence using Spilosoma oblique walker as a test insect. A novel compound, 29-oxodotriacontanol isolated from the chloroform fraction of this plant was shown to be a potent antifeedant constituent under laboratory evaluations, whereas another compound, tetratriacontanoic acid was found for the first time in this plant. The azadirachtin and crude neem extracts were taken as standard. A new compound (29-oxodotriacontanol) produced 85.74% inhibition at 8000 ppm concentration.[35]

The alcoholic extract of Shankhpushpi exhibited potent antifungal activity.[36]

- **Anticonvulsant activity**

The water soluble portion of an alcoholic extract abolished spontaneous motor activity and the fighting reaction, but did not affect the escape response; electrically induced convulsive

seizures and tremorine induced tremors were antagonised by the extract.[37] It was observed that the animals treated with the methanolic extracts of stem callus, leaf callus and entire plant (200 mg/ kg oral) showed noteworthy protection against tonic convulsion induced by transcorneal electroshock, which was also similar with that of the standard drug phenytoin.[38] It has also been shown to possess a potent anticonvulsant activity.[39]

- **Antiulcer and Anticatatonic activity**

Shankhpushpi produced mucosal defensive factors such as glycoprotein, lifespan of mucosal cells. These kinds of defensive factors increased the antiulcerogenic effect.[40]

- **Effect on thyroid gland**

The extract of Shankhpushpi root (0.4 mg / kg.d) administered into L-thyroxine induced hyperthyroid (mice) animal which produced inhibition in serum concentration of T3 and hepatic 5-D activity. The plant extract which reduced the thyroid activity is primarily mediated through T4 to T3 conversion.[33,41]

- **Cardiovascular activity**

Total water soluble fraction of the plant caused a marked and prolonged hypotension in dogs and inhibited the frog myocardium.[42,43] an ethanolic extract of the entire plant exerted a negative ionotropic action on amphibian and mammalian myocardium. It also exerted spasmolytic activity on smooth muscles.[37]

- **Hypo-lipidemic**

Ethanolic extract of whole plant of Shankhpushpi reduced lipid level in case of hyper-lipidemia. After 90 days the Ethanolic extract of Shankhpushpi significantly reduced the Low Density lipoprotein level, serum cholesterol level and phospholipids levels in the human body.[43]

- **Antioxidant activity**

Antioxidant activities are produced by the ethanolic or methanolic extact of entire plant of Shankhpushpi.[44,45]

- **Neuroprotective activity**

Aqueous extract of Shankhpushpi produced potent neuroprotective activity through anti AChE and antioxidant activity.[69,46]

- **Effect on reproductive system and immunomodulation**

The entire plant of Shankhpushpi produces prevention against the excessive menstruation. The fine paste of Shankhpushpi helpful in the cure of abscesses.[70,47]

Application of shankhpushpi *(Convolvulus pluricaulis)*

1. The Shankhpushpi plant extract is used for treating insanity and hematemesis.[48]
2. Bronchitis and asthma are treated by the leaves of Shankhpushpi.[48]
3. Ethanolic extract of Entire plant of Shankhpushpi are used to treat hyper-lipidemia and oxidation.
4. Shankhpushpi are one of the drugs which are used as antidepressant to produced stress-free state in the brain, improving memory and are used as a brain tonic.
5. The alcoholic extract of Shankhpushpi used for the treatment of hyperglycemia *(In vitro)* and which are effectively produced Antidiabetic effect in the human body.
6. Root of Shankhpushpi is used for treatment of childhood fever.[48]
7. The alcoholic/ethanolic extract of Shankhpushpi herb reduces the levels of (NEFA) non esterified fatty-acid which is main cause of death due to cardiac arrest.[48]
8. In Ayurveda Shankhpushpi plant is also used for treatment of epilepsy.[48]
9. Shankhpushpi are used for enhancing beauty of skin and helps in nourishing all the layers of skin.
10. The whole plant of Shankhpushpi is used in medical treatment.[49,50]
11. Reducing the level of cholesterol in blood, including triglycerides, phospholipids and fatty acids by the extract of Shankhpushpi.[49,50]
12. The most important herbal ingredients available in the Shankhpushpi is used for the treatment of diseases/syndromes, such as hypertension, hypotension, anxiety neurosis, stresses etc.
13. Shankhpushpi has an energizing effect on overall body and promote health and weight gain.[49,50]

CONCLUSION

Shankhpushpi exhibits Antiulcer, anticatatonic, Anti-diabetic, Anti-microbial, anti-fungal, anti-bacterial, Antioxidant, Anticonvulsant Neuroprotective, immunomodulation, and cardiovascular activities etc. In this review discusses about the profile of plant, pharmacognosy, pharmacology, phytochemistry. It also contains α-amino [alpha-amino] carboxylic acid, proteins, and the alkaloids- $C_{16}H_{21}NO_4$ (convolvine), $C_{17}H_{23}NO_4$

(convolamine), $C_{17}H_{21}NO_5$ (Confoline), $C_{33}H_{40}N_2O_9$ (Subhirsine), $C_{16}H_{21}NO_5$ (Convoline), convolidine, phyllabine, β-sitosterol, sterol flavonoids, Glycosides, gums and mucilage compounds are commonly present in this species.

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