



An Overview Shankpushpi (*Convolvulus Pluricaulis*)

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ABSTRACT:-

India is enriched in a diversity of plants since past times. Herbal plants are indigenous and very potent that consider a gift of nature. Shankpushpi (*Convolvulus pluricaulis*) is known as a Medhya (brain tonic) Rasayana in the Indian traditional system. *Convolvulus pluricaulis* Choisy (*C. pluricaulis*) is a perennial herb that seems like morning glory. All parts of the herb are known to possess therapeutic benefits. The plant is used locally in Indian and Chinese medicine to cure various diseases. It is used in Ayurvedic formulation for chronic cough, sleeplessness, epilepsy, hallucinations, anxiety etc. Based on the comprehensive review of plant profile, pharmacognosy, phytochemistry, pharmacological and toxicological data on the *C. pluricaulis*, there will be more opportunities for the future research and development on the herb *C. pluricaulis*. Thus this medicinal plant is playing a vital role in the medical field. The present review is a summary of the phytomedicinal importance of *Convolvulus pluricaulis* in the traditional medicinal system as well as the modern system.

Keywords: *Convolvulus pluricaulis*, Shankpushpi, *Canscoradecussata*, *Clitoriaterneata*.

Introduction:-

Herbal medicines are gaining popularity in the field of medicine in both developing and developed countries due to their natural origin and lack of side effects. Humans recognised their reliance on nature for a healthy life. Humans realised they needed the natural world to live a healthy life. For centuries, humans have relied on plant resources for food, clothing, shelter, and medication to treat a wide range of illnesses. Plant life is the main source of natural substances with biological and pharmacological properties. (1)



The phytochemical constituents of the plant are extracted. They have been used throughout the world in both traditional and modern medicine. Shankpushpi is primarily used in Ayurvedic medicine in India. All parts of the plant are thought to be therapeutic for a variety of human diseases. Shankpushpi was composed entirely of *Convolvulus pluricaulis*, *Evolvulusalsenoids*, *Citoretarneata*, *Lavendulabipinnata*, and *Canscoradecussata*. In different parts of the country, plants other than *C. pluricaulis* are known as Shankpushpi. According to further research, *Convolvulus pluricaulis* is the plant species that should be taken in the name of Shankpushpi. *Convolvulus* is a genus in the family *Convolvulaceae*. *Convolvulaceae* is the morning glory plant family, which includes over 1880 species and 57 types. The number of researches proved their scientific potential in the central nervous system, depression, anxiolytic, tranquilizing, antidepressant, antistress, neurodegenerative, anti-amnesia, antioxidant, hypolipidemic, immunomodulatory, analgesic, antifungal, antibacterial, antidiabetic, antiulcer, anticatonic, and cardiovascular, antidiabetic, antiulcer, anticatonic and cardiovascular activity. Shankpushpi is a Sanskrit word that means "the plant with flowers shaped like a conch". According to Hinduism, Shankha is

one of the sacred instrument of Lord Shiva. The plant is widely distributed in southern parts of India, Sri Lanka and Myanmar. It is mostly cultivated above an altitude of 1300m. It consists of various phytochemical compounds like xanthenes, triterpenoids, loliolide, sterols and flavonoids. (3)

Table 1. Vernacular names of *Convolvulus pluricaulis*

English	Speedwheel
Hindi	Shankhpushpi, Aparajit
Sanskrit	Sankhapuspi
Urdu	Sankhali
Punjabi	Shankhpushpi
Bengali	Sankhapuspi
Gujarati	Shankhawali
Kannada	Bilikanthisoppu
Malayalam	Krsnakranti, Vishnukranthi
Marathi	Shankhabela
Oriya	Krishna-enkranti
Tamil	Sanghupushpam, kakkurattai
Tibetan	Shankhapushpi
Telugu	Shankhapushpi

The scientific classification of *C. pluricaulis* is demonstrated [8]:

Taxonomical Rank	Taxon
Kingdom	Plantae
Sub Kingdom	Tracheobionta
Division	Magnoliophyte
Class	Magnoliopsida
Order	Solanales
Family	Convolvulaceae
Genus	<i>Convolvulus</i>
Species	<i>Pluricaulis</i>
Common Name	Shankhpushpi

BOTANICAL DESCRIPTION OF *CONVOLVULUS PLURICAULIS*

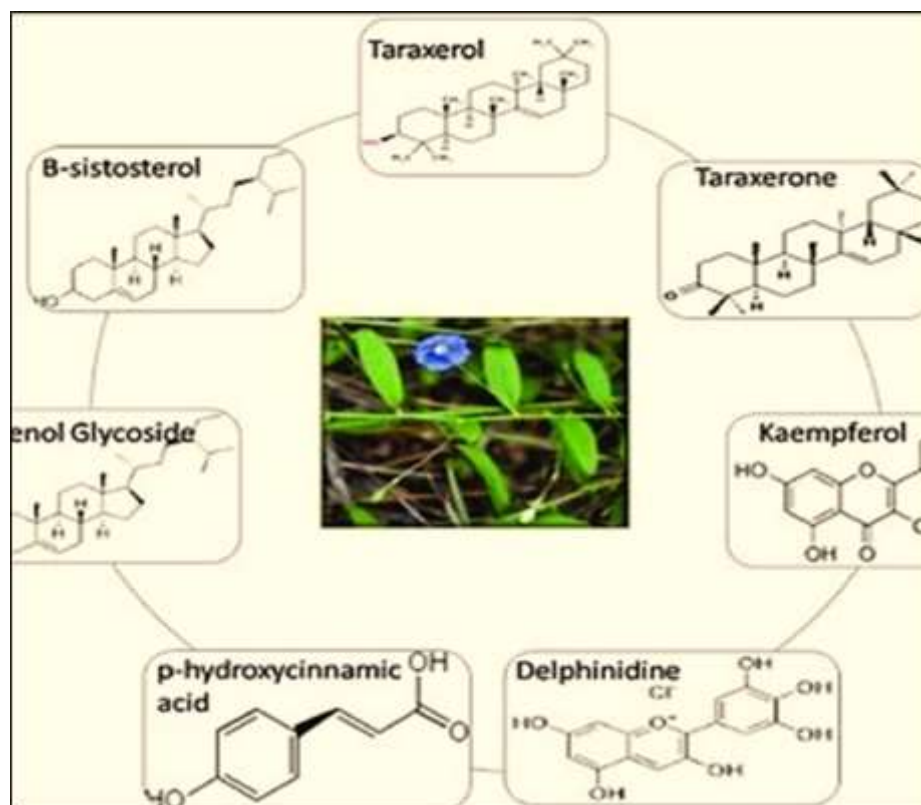
C. pluricaulis (Figure 1) is a perennial plant. The branches of *C. pluricaulis* are widely spread on the ground and long up to 30 cm. Roots are usually branched, cylindrical, ribbed having some rough stem nodules. Small roots are 1-5cm long, 0.1-.04 cm thick. The colour of the root changes from brown to light brown. Stems are cylindrical with hairy nodes and internodes. Leaves are shortly petiolate linear-lanceolate, acute, hairy on both surfaces. Leaves are 10.5-2 cm long and 0.1-0.5cm broad light green in color. Flowers are white or purple. It is solitary or in pairs sessile or sub-sessile in the leaf axis. Fruits are capsuled, oblong globose with coriaceous, pale brown pericarp. Seed are minutely puberulous and brown in color .



PHYTOCHEMICAL CONSTITUENTS OF *CONVOLVULUS PLURICAULIS*

There are various chemical constituents isolated from Shankhpushpi like Carbohydrates-Dglucose rhamnose, maltose, sucrose and starch. It also contains protein, amino acids and the alkaloids-convolvine, convosine, subhirsine and convolidine along with fatty acid and wax constituents, hydrocarbons, aliphatic and sterol and certain other bio-chemicals.

1. Carbohydrates: D-glucose, maltose, rhamnose, sucrose, starch and other carbohydrates[19,20].
 2. Fatty acids/ Volatile oil/ Fixed oil: Fatty alcohols and hydrocarbons, 30.9% myristic acid, 66.8% palmitic acid and 2.3% linoleic acid and hextriacontane .
 3. Protein and Amino acids: Proteins and amino acids are also isolated from the plant.
 4. Phenolic/Glycosides/Triterpenoid/Steroids: Deshpande et al., reported a chemical examination of the whole plant of *C. pluricaulis* and found the presence of scopoletin, β -sitosterol and ceryl alcohol. Chloroform fraction of this contains 20-oxodotriacontanol, tetratriacontanoic acid and 29-oxodotriacontanol, flavonoidkaempferol, steroidsphytochemical
- [4]. CP-1 is a phytochemical marker that has been isolated and characterized by the



TRADITIONAL AND MODERN VIEW

AYURVEDIC VIEW

not include it in any Gana or Varga. Dhanvantarinighantu mentioned only one variety of Shankhpushpi. Sodhala mentioned Convolvulus pluricaulis is a common plant in southern India. The herb is quoted to be Soubhagyakarana and Vasikarana in Vedas. There are various synonyms used for shankhpushpi in Ayurveda like Nyastika, Subhangakarani, Sahasraparni, samvanani, samuspala, babhru, kalyani etc. According to Acharya Charak Shankhpushpi is one of the best "medhya drug" in MedhyaRasayana. Brihtrayi has mentioned Shankhpushpi's limited number of times and they did both varieties red (Raktapuspika) and blue flowered (Nilapushpa) and Kaiyadevni ghantu described two varieties like Shankhpushpi and Sarpakshi. Bhavamishra quoted it in two varieties like white (Shvet) and blue (Nila) varieties [28]. The rasa Panchak and description of this herb according to nighantus .

REPORTED PHARMACOLOGICAL STUDIES OF CONVOLVULUS PLURICAULIS

Various studies have been conducted on this plant to know its pharmaceutical and therapeutic uses. Large-scale clinical studies are still needed to prove the clinical efficacy of this herb, especially in stress-related diseases, neuronal disorders and antidepressants. Some reported studies on Convolvulus pluricaulis are shown below::

1. Nootropic Activity:

From reported studies, it was investigated that the ethanolic extract of Convolvulus pluricaulis and its ethyl acetate and aqueous fractions were possessing nootropic activity. Two doses of 100 and 200 mg/kg/p.o of ethyl acetate and aqueous fractions were given to rats in separate groups. Both the doses of Convolvulus pluricaulis proved to be significant for memory and learning in rats. This activity was assessed with passive and active avoidance paradigms using Cook and Weidley's pole climbing apparatus and elevated plus-maze as models. One more study was conducted to find out the nootropic property of Shankhpushpi. Three plants i.e. Convolvulus pluricaulis, Clitoriateratea, Evolvulusalsinoides were evaluated for the nootropic activity using RPM, Porsolt's swim despair and actophotometer models. The results showed that all three plants possess nootropic.

2. Anxiolytic, Antidepressant, Antistress, Neurodegenerative and Anti-amnesic activity:

It was determined from numerous studies that *C. pluricaulis* has antagonist activity. The potential antagonistic effects of the alcoholic extract of *C. pluricaulis* against amphetamines and tremorine have been studied. An investigation was done to see how the depressed mice responded to the petroleum ether, chloroform, and ethyl acetate fraction of the ethanolic extract of *C. pluricaulis*. It was given orally to separate groups of Swiss young male albino mice for ten days in a row. The forced swim test (FST) and tail suspension test (TST) were used to evaluate the effects on the immobility times of mice. Only chloroform fraction, at doses of 50 and 100 mg/kg, significantly decreased the immobility time in both the FST and the TST, according to the results [24]. According to a published study, the methanolic extract of *C. pluricaulis* altered the animal model's general behaviour pattern, decreased motor activity, caused hypothermia, decreased the exploratory behaviour pattern, and suppressed aggressive behaviour [23]. More research was done on albino rats to determine the anti-amnesic properties. The model received 100 mg of *C. pluricaulis* per 100g of body weight. As compared to diazepam, the effects of Centellaasiaticalinn and urban Hydrocotyleasiaticalinn were greater.

3. Effect on Thyroid Function: The hyperthyroid mice were the subject of one more investigation. Convolvulus pluricaulis root extract was given to the model over the course of 30 days. It was discovered that the plant extract inhibited thyroid function and that this was mediated by T4 to T3 conversion. [28].

4. Antioxidant activity: Nahata et al., reported that the ethanolic extract of *C. pluricaulis* possesses significant antioxidant activity.

5. Hypolipidemic activity According to a published study, the ethanolic extract of *C. pluricaulis* has hypolipidemic activity. Gerbils that had been fed cholesterol received the extract. After 90 days, the results revealed a significant drop in serum cholesterol, LDL cholesterol, triglycerides, and phospholipids. [26].

6. Analgesic Activity: According to a published study, the ethanolic extract of *C. pluricaulis* has hypolipidemic activity. Gerbils that had been fed cholesterol received the extract. After 90 days, the results revealed a significant drop in serum cholesterol, LDL cholesterol, triglycerides, and phospholipids.

7. Antimicrobial activity The leaf disc method of feeding deterrence was used to bioassay the *C. pluricaulis* plant using *Spilosoma oblique* walker as a test insect. The chloroform fraction of this plant yielded two new compounds: 29- oxodotriacontanol, which was found to be a significant antifeedant constituent, and tetratriacontanoic acid, which was found in this plant for the first time. [26,16].

8. Antidiabetic Activity: Alam et al., was reported that *C. pluricaulis* plant possesses antidiabetic activity. The extracts were found to be an effective remedy for the treatment of diabetes [26].

9. Antiulcer and anticatatonic activity: Sairam et al., investigated the antiulcerogenic activity of the fresh juice of *C. pluricaulis* in rat model. The model was artificially injected with ethanol and aspirin to cause gastric ulcer in the stomach. *C. pluricaulis* was given orally twice daily in the doses of 375 and 750 mg/kg body weight. Results showed anti-ulcerogenic effects in the rats [26].

10. Effect on Reproductive system: According to Singh et al., the juice of the *C. pluricaulis* plant prevents excessive menstruation. The plant's fine paste is useful for treating abscesses [82] ionotropic action on amphibian and mammalian myocardium. It also used spasmolytic agents on smooth muscles. [26,27]

12. Alcohol Addition: A mouse study was carried out to investigate the effect of shankhpushpi as an anti-addictive drug. The effect of shankhpushpi churna on ethanol withdrawal anxiety in mice was studied using an elevated plus maze. In these mice, shankhpushpi churna reversed ethanol withdrawal anxiety and also reduced chronic alcohol consumption in a GABA receptor-dependent manner. [26].

13. Anthelmintic Activity

Shankhpushpi is a highly bitter herb that is also used as an anthelmintic. The anthelmintic effect of six adult Indian earthworms and cattle worms was evaluated in vitro. Shankhpushpi was discovered to be effective against earthworms and to have anthelmintic activity.

[30].

Actions of Shankhpushpi according to Ayurveda

Medhya - increases intellectual capacity.

Swarakarini - enhances voice

Grahbhootadidoshaghni - beneficial in supernatural diseases

Rasayani- revitalises the body

Kantida- improves the aura of the body and gives it a healthy appearance.

MajjadhatuRasayana - revitalises the nervous system.

Unmadaghna - aids in the treatment of insanity and emotional instability.

Vrishya- is an aphrodisiac.

Pachanbala- improves the digestive system's strength.

Chedana- is a laxative.

Nidrajnana- aids in sleep.

MEDICINE FORMULATION SHANKHPUSHPI:-

- **Abana (The Himalaya Drug and Co, India)**

The syrup and tablets include 19 species: *C. asiatica*, *C. pluricaulis*, *C. paniculatus*, *Balsamodendron mukul*, *Ocimum sanctum*, *Nardostachys jatamansi*, *Piper longum*, *Carum copticum*, *Zingiber officinale*, *Cyperus rotundus*, *A. calamus*, *E. ribes*, *Syzygium aromaticum*, *Santalum album*, *Elettaria cardamomum*, *Foeniculum vulgare*, *Rosa damascena*, *Cinnamomum cassia* and *Crocus sativus*.



- **Tejras (Sandu Brothers, India)**

The syrup consists of the following 12 species: *C. asiatica*, *C. pluricaulis*, *C. paniculatus*, *Eclipta alba*, *Cynodactylon*, *A. racemosus*, *Withania somnifera*, *Nardostachys jatamansi*, *A. calamus*, *Zingiber officinale* and *Vetiveria zizanioides*[31].



Shankhapushpi (BAIDYANATH Pharmacy, India)

The syrup includes 6 species: *C. pluricaulis*, *C. asiatica*, *Nardostachys jatamansi*, *Nepeia hindostana*, *Nepeia elliptica* and *Onosma brateatum*[32].



Medicinal Importance of *Convolvulus pluricaulis*[13-18]:**1. *Convolvulus pluricaulis* best for hypertension**

The herb *Convolvulus pluricaulis* is one of the most crucial components in the treatment of many syndromes and disorders, including hypotension, hypertension, anxiety neurosis, etc. *Convolvulus pluricaulis* herbs help to relieve stress and anxiety by regulating the body's production of stress hormones like cortisol and adrenaline. *Convolvulus pluricaulis* functions as a rejuvenation therapy, sedative, and stimulant.

2. *Convolvulus pluricaulis* for hypertension& ulcers

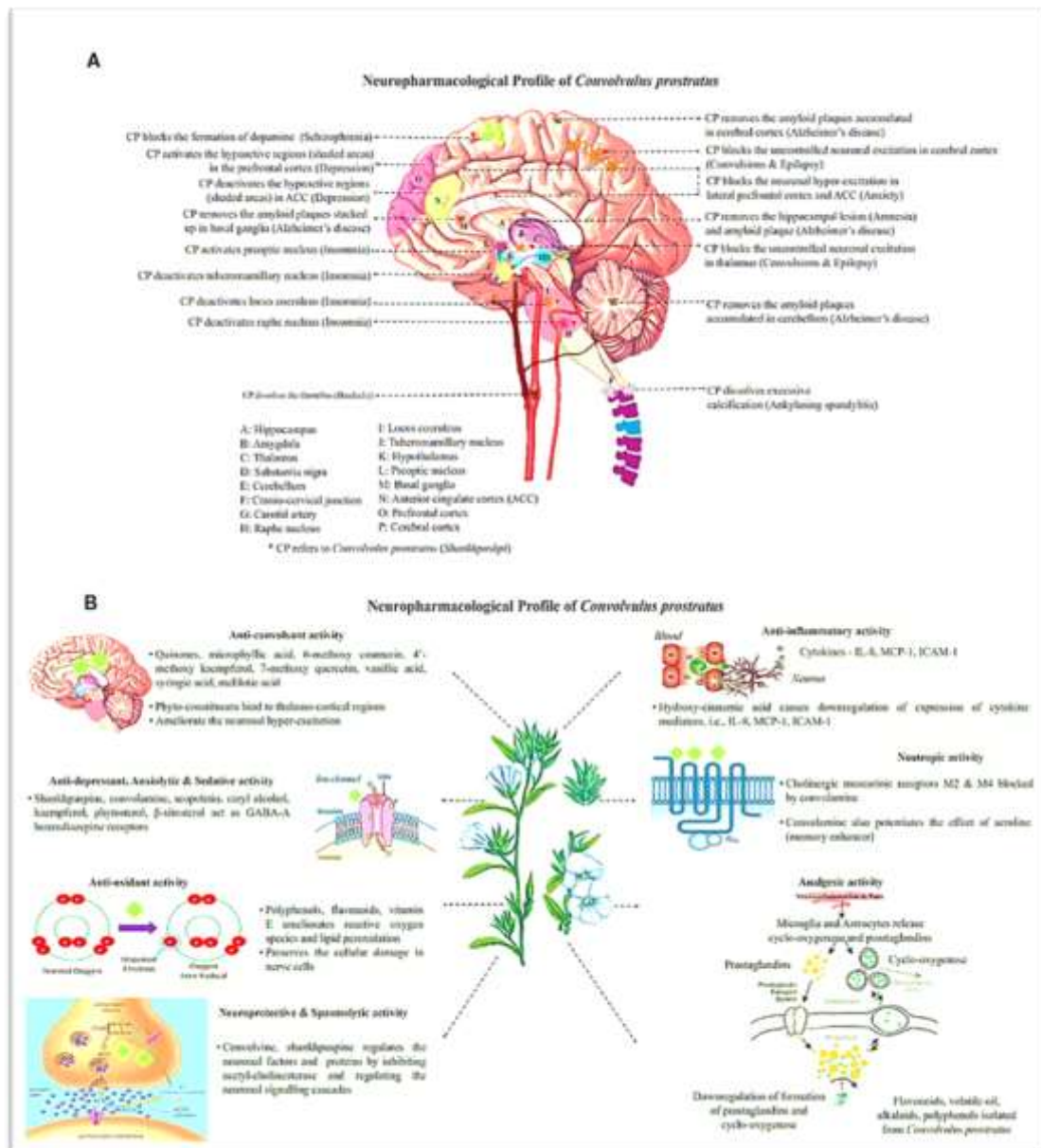
The herb *Convolvulus pluricaulis* is very effective in treating a variety of ulcers that develop in the body as a result of mucous secretions and glycol protein. It also enhances nerve tissues, improves bone marrow quality, and increases nerve tissues. Due to mucosal protective factors like mucin secretion and glycoproteins, *Convolvulus pluricaulis* also contains anti-ulcer properties. *Convolvulus pluricaulis* is the best treatment for hypothyroidism, according to studies.

3. *Convolvulus pluricaulis* CholesterolDecrease

The extract of *Convolvulus pluricaulis* herb helps to decrease the cholesterol level in the blood including triglycerides, phospholipids and helps in removing certain types of fatty acids that are harmful for the body.

4. *Convolvulus pluricaulis* for neurodegenerative disease

Due to its memory enhancing property *Convolvulus pluricaulis* herb is useful to treat neurodegenerative diseases like Alzheimer' s disease. It has anti-ulcer properties and is helpfulness in alleviating the symptoms of hyperthyroidism, Dementia and reduces theactiveness of a liver enzyme.



5. *Convolvulus pluricaulis* Improve Memory

Convolvulus pluricaulis is one of the best and prominent natural medicines for improving memory due to its chemical composition, including phytonutrients like Scopolin, β -Sitosterol, Convolvulid, Subhirsine, Convolvul, Phyllabine, Convoline and Confoline. *Convolvulus pluricaulis* is mainly used as a brain tonic and brain stimulator. Daily consumption of *Convolvulus pluricaulis* prevents memory loss. The whole plant of *Convolvulus pluricaulis* is used as medicine.



6. *Convolvulus pluricaulis* for hypertension & ulcers

The *Convolvulus pluricaulis* herb is very helpful in fighting various ulcers which are formed in the body due to mucous secretions and glycol protein it also improves the nerve tissues and increase bone marrow quality and nerve tissues. *Convolvulus pluricaulis* includes anti-ulcer due to mucosal defensive factors like mucin secretion and glycoprotein's. It also have been studied that *Convolvulus pluricaulis* is best remedy for Hypothyroidism.

7. *Convolvulus pluricaulis* for Beauty

Convolvulus pluricaulis herb is used as an alternative, tonic, and febrifuge it is also used for nourishing all the layers of skin and helps in Enhancing Beauty. *Convolvulus pluricaulis* is used in the form of decoction with milk and cumin

8. *Convolvulus pluricaulis* Cholesterol Decrease

The extract of *Convolvulus pluricaulis* herb helps to decrease the cholesterol level in the blood including triglycerides, phospholipids and helps in removing certain types of fatty acids that are harmful for the body.

9. Improving memory with *Convolvulus pluricaulis*:

To improve memory, take 3 to 6 grammes of *Convolvulus pluricaulis* powder with milk in the morning. If you spend a lot of time studying, fatigue would disappear. For children to become sharp and intelligent, combine 2 to 4 grammes of *Convolvulus pluricaulis* powder with 1 gramme of Sweet Flag (bach) powder. Take 2-4 grammes of its powder and mix it with honey or sugar for 6 months. In old age, wrinkles would vanish from your face. Astuteness and memory capacity would both improve. Take 3 to 6 grammes of *Convolvulus pluricaulis* powder, honey, and milk for sharp memory..

10. Treatment for High Blood Pressure with *Convolvulus pluricaulis*:

For a few days, take 10–20 mg of fresh *Convolvulus pluricaulis* swaras every morning and evening to lower your blood pressure.

11. Treatment for Head Ache with *Convolvulus pluricaulis*.

To relieve a headache in five minutes, take 250 milligrammes of Black Henbane and 1 gramme of *Convolvulus pluricaulis* with hot water.

12. Treatment for Vomiting with *Convolvulus pluricaulis*:

Take two spoonfuls of *Convolvulus pluricaulis* juice, add one quarter of black pepper powder, and repeatedly administer it with honey to prevent vomiting.

13. Cure for Bed Urination with *Convolvulus pluricaulis*:

Give *Convolvulus pluricaulis* powder 2 grammes and black sesame 1 gramme along with milk to a child if they are urinating in their bed at night to check the problem.

14. Treatment for Sun Stroke with *Convolvulus pluricaulis*:

You could administer 5–10 grammes of *Convolvulus pluricaulis* powder with milk and honey to the patient when they start babbling and becoming unconscious.

15. Treatment for Bleeding with *Convolvulus pluricaulis*:

To stop bleeding, mix 10–20 grammes of swaras of *Convolvulus pluricaulis* with honey. Milk and 2 grammes of *pluricaulis* powder and 1 gramme of black sesame are added to test for bed-wetting issues.

16. Treatment of Diabetes with *Convolvulus pluricaulis*:

To manage diabetes, take 6 grammes of *Convolvulus pluricaulis* in the morning and evening with water or cow's butter. Take 2-4 grammes of powder or swaras of 10–20 mg to combat the weakness brought on by diabetes.

REFERENCES:

1. Fatima A, Agrawal P, Singh PP. Herbal option for diabetes: an overview. *Asian Pac J Trop Dis* 2012; 2 (suppl 1): S536-S544.
2. Agarwal P, Alok S, Fatima A, Singh PP. Herbal remedies for neurodegenerative disorder (alzheimer's disease): a review. *Int J Pharm Sci Res* 2013; 4(9): 3328-3340.
3. Abdolshahi, A., Naybandi-Atashi, S., Heydari-Majd, M., Salehi, B., Kobarfard, F., Ayatollahi, S. A., ... Sharifi-Rad, J. Antibacterial activity of some Lamiaceae species against *Staphylococcus aureus* in yoghurt-based drink (Doogh). *Cellular and Molecular Biology*
4. *Ayurvedic Pharmacopoeia of India, Part- I, Volume II*, pg-147.
5. *Dravyaguna Vijnana II*, Dr. JLN Shashtri, Chaukhamba Orientalia, Varanasi, Reprint edition: 2014, pg- 359- 60.
6. Bisht NPS, Singh R. Chemical studies of *Convolvulus microphyllus* Sieb. *Planta Med.* 1978; 34 (2): 222-223.
7. Shah SC, Quadry SJ. *A textbook of pharmacognosy*. 7th edition. New Delhi: CBS Publishers. 1990: 388-389.

8. Deshpande SM, Srivastava DN. Chemical studies of *Convolvuluspluricaulis* Choisy. *J Indian Chem Soc.* 1969; 46(8): 759-760.
9. Singh GK., Bhandari A. Text book of pharmacognosy. New Delhi: CBS publishers. 2000: 193-194.
10. Deshpande SM, Srivastava DN. Chemical examination of fatty acids of *Convolvuluspluricaulis*. *Indian Oil Soap J.* 1969; 34(2): 217-218.
11. Srivastava DN, Deshpande SM. Gas Chromatographic identification of fatty acids, fatty alcohols, and hydrocarbons of *Convolvuluspluricaulis* (Choisy). *J am oil Chem Soc.* 1975; 52 (8): 318-319.
12. Patil UK, Dixit VK. Densitometric standardization of herbal medical products containing *Evolvulusalsinoides* by quantification of scopoletin in *Convolvuluspluricaulischoisy* and in commercial for mulutions of *Shankhpushpi*. *J planar chromatograph.* 2005; 18(3): 234-239
13. Kapadia NS, Acharya NS, Acharya SA, Shah MB. Use of HPTLC to establish a distinct chemical profile for *Shankhpushpi* and for Quantification of scopoletin in *Convolvuluspluricaulischoisy* and in commercial for mulutions of *Shankhpushpi* *J Planar chromatogr.* 2006; 19(109): 195-199 Zafar R, Ahmad S, Mujeed M. Estimation of scopoletin in leaf and leaf callus of *Convolvulus microphyllus* Sieb. *Indian J pharm Sci.* 2005; 67 (5): 600-603
14. Many types or research have been done on the *Convolvulus pluricaulis* plant and showed various therapeutic and pharmacological activities. It includes nootropic activity, antidepressant, antistress, anxiolytic, antioxidant, antidiabetic, cardiovascular activity and many others. Vernacular names and Taxonomy of *Convolvulus pluricaulis* is given in table 1 and 2 respectively.
15. Dr. JLN Shashtri, *DravyagunaVijnana II*, ChaukhambaOrientalia, Varanasi, Reprint edition: 2014, pg- 359- 60.
16. Nahata A, Patil UK, Dixit VK. Anxiolytic activity of *Evolvulusalsinoides* and *Convolvulus pluricaulis* in rodents. *Pharm Biol* 2009.47:5:444-51.
17. Malik J, Karan M, Vasisht K. Nootropic, anxiolytic and CNS-depressant studies on different plant sources of *shankhpushpi*. *Pharmaceutical biology.* 2011 Dec 1;49(12):1234- 42.
18. Sharma VN, Barar FSK, Khanna NK, Mahawar MM. Some pharmacological actions of *Convolvulus pluricaulis*: an Indian indigenous herb. *Ind J Med Res.* 1965. 53:9:871-6.
19. Barar FSK, Sharma VN. Preliminary pharmacological studies on *Convolvulus pluricaulis* Choisy: an Indian indigenous herb. *Indian J PhysiolPharmacol.* 1966. 9:2:99-102.
20. Dhingra D, Valecha R. Evaluation of the antidepressant-like activity of *Convolvulus pluricaulischoisy* in the mouse forced swim and tail suspension tests. *Medical science monitor.* 2007 Jul 1;13(7):BR155-61.
21. Pawar SA, Dhuley JN, Naik SR. Neuropharmacology of an extract derived from *Convolvulus microphyllus*. *Pharm Biol.* 2001. 39:4:253-8.
22. Singh RH, Mehta AK. Studies on the psychotropic effect of the *MedhyaRasayana* drug 'Shankhpushpi' (*Convolvulus pluricaulis*) part 1 (Clinical Studies). *J Res Ind Med YogHomeo.* 1977. 12:3:18
23. Shukla SP. A comparative study on the barbiturate hypnosis potentiation effect of *Medhyarasayana* drugs *shankhpushpi* (*Convolvulus pluricaulis*). *BMEBR* 1981b. 1:4:554
24. Sinha PA, Kumar SP, Wahi A. Comparative pharmacognostic study on *Shankhpushpi* - *Canscoradecussata* Schult, *Convolvulus pleuricaulis* Chios and *Evolvulusalsinoides* Linn. *BMEBR* 1986. 2:62-73.
25. Dandiya PC. The pharmacological basis of herbal drugs acting on CNS. *Eastern Pharm.* 1990. 33:39-47.
26. Dubey GP, Pathak SR, Gupta BS. Combined effect of *Brahmi* (*Bacopamonniera*) and *Shankhpushpi* (*Convolvulus pluricaulis*) on cognitive functions. *Pharmacopsychocol* 1994. 7:3:249-51.
27. Sharma K, Arora V, Rana AC, Bhatnagar M. Anxiolytic effect of *convolvulus pluricaulis* petals on elevated plus maze model of anxiety in mice. *J Herb Med & Toxicol.* 2009. 3:1:41-46.
28. Panda S, Kar A. Inhibition of T3 production in levothyroxine-treated female mice by the root extract of *Convolvulus pluricaulis*. *HormMetab Res.* 2001 33:1:16-18.
29. Gupta RC, Singh PM, Prasad GC, Udupa KN. Probable Global dispensary *Australian Journal of Medical Herbalism* 2010 22(1) National Herbalists Association of Australia 2010
30. Chaturvedi M, Mali PC, Dixit VP. Hypolipidaemic effect of *Convolvulus microphyllus* on cholesterol fed gerbils. *J Phytological Res.* 1997;8(2):153-5.
31. Bhakuni RS, Tripathi AK, Shukla YN, Singh SC. Insect antifeedant constituent from *Convolvulus microphyllus* (L) Sieb. *Phytother Res.* 1996. 10:2:170-1
32. Alam MM, Siddiqui MB, Hussain W. Treatment of diabetes through herbal drugs in rural India. *Fitoterpia.* 1990. 61:3:240-2.

33. Sairam K, Rao CV, Goel RK. Effect of *Convolvulus pluricaulis* Choisy on gastric ulceration and secretion in rats. *Ind J Exp Biol.* 2001. 39:4;350-4
34. Singh MP, Panda H. *Medicinal herbs with their formulations* 1st edn. Delhi: Daya Publishing. 2005
35. Rakhit S, Basu NK. *Convolvulus pluricaulis*. *Indian Y Pharm.* 1958;20:357-9.
36. Sharma VN, Barar FSK, Khanna NK, Mahawar MM. Some pharmacological actions of *Convolvulus pluricaulis*: an Indian indigenous herb. *Ind J Med Res.* 1965. 53:9;871-6.
37. Chaturvedi GN, Sharma RK, Sen SP. Hypotensive effect of certain indigenous drugs with special reference to shankhapuspi (*C. pluricaulis*) in anaesthetised dogs. *JRIM.* 1966. 1:1;57-67.
38. Heba M, Faraz S, Banerjee S. Effect of Shankpushpi on alcohol addiction in mice. *Pharmacognosy magazine.* 2017 Jan;13(Suppl 1):S148.
39. Giradkar PN. Anthelmintic shankpushpi pellets: taste masking. *International Journal of Pharmaceutical Research and Bio-Science.* 2015;4(4):129-56
40. Sethiya NK, Mishra SH. Review on ethnomedicinal uses and phytopharmacology of memory boosting herb *Convolvulus pluricaulis* Choisy. *Australian J Med Herbalism* 2010; 22(1): 19-25.
41. Upadhyaya AS, Kambhojkar MS. Studies on Ayurvedic drug Shankpushpi from Western maharashtra medicobotanical reported aspects. *Bullet Med Ethanob Res* 1993; 14(1-2):64-69.