

### List of publication (During 2008-2011)

#### (H. Index- 2.0)

1. **Sethiya, N. K.**; Thakore, S. G.; **Mishra, S. H.** (2009). Comparative evaluation on commercial sources of indigenous medicine shankhpushpi for anti-stress potential- A preliminary study. *Pharmacologyonline*. Vol. 2, pp. 460-467.
2. **Sethiya, N. K.**; Nahata, A.; Dixit. V.K.; **Mishra, S. H.** (2009). Shankhpushpi: Cognition boosting ayurvedic medicine- An update. *Journal of Chinese Integrative Medicine/ Zhong Xi Yi Jie He Xue Bao*. Vol. 7, No. 11, pp. 1001-1022.
3. **Sethiya N. K.**; Patel, M. B.; **Mishra, S.H.** (2010). Phyto-pharmacological Aspects of *Canscora decussata* Roem & Schult., *Phcog Rev*. Vol. 4, No. 7. pp. 49-57.
4. **Sethiya, N. K.**; Mishra, S. H. (2010). Review on ethanomedicinal uses and phyto-pharmacology of memory boosting herb *Convolvulus pluricaulis* Choisy. *Aus Jour of Med Herb*. Vol. 22, No. 1, pp. 19-25.
5. **Sethiya, N. K.**; **Mishra, S. H.** (4<sup>th</sup> April 2010). Controversial drugs of Ayurveda. Pharmavision- 2020, Bhopal, By Veer Society. pp. 2-3.
6. **Sethiya, N. K.**; Trivedi, A.; Patel, M. B.; **Mishra, S. H.** (2010). Comparative pharmacognostical investigation on four ethanobotanicals traditionally used as Shankhpushpi in India. *J Adv Pharm Tech Res*. Vol. 1, No. 4, pp.388-395.

#### Book Chapter

1. **Sethiya NK**, Dube B, **Mishra SH**. Herbs in mental health. "Mental Illness / Book 2", ISBN 979-953-307-696-5., InTech - Open Access Publisher, Croatia. (Accepted-2011)

#### Under Review

- Cognition boosting effect of *Canscora decussata* Schult. (A South Indian shankhpushpi). **Pharmaceutical Biology** 2011

**Neeraj K. Sethiya**, Alok Nahata, V. K. Dixit, S. H. Mishra

#### Under Preparation

1. Simultaneous estimation and validation of HPTLC method for scopoletin, mangiferin, and rutin for the identification and differentiation on four commercialized shankhpushpi ethanobotanicals.
2. Simultaneous estimation and validation of HPTLC method for Betulinic acid, ursolic acid, stigmasterol and lupeol for the identification and differentiation on four commercialized shankhpushpi ethanobotanicals.
3. Shankhpushpi botanicals and their isolate- An in vitro comparative PflDH enzyme inhibition based antimalarial activity evaluation.

4. Shankhpushpi botanicals and their isolate-A comparative evaluation of in vitro lipooxygenase and acetylcholinesterase enzyme inhibition.
5. Shankhpushpi botanicals and their isolate-An in vitro and in vivo comparative preclinical evaluation of age related memory decline
6. Comparative antioxidant potential of shankhpushpi botanicals and their isolate used in brain supplement.
7. Validation of HPTLC and HPLC method for estimation of mangiferin in *Canscora decussata* and their formulation.
8. Preliminary application of TLC-DPPH – differentiation and identification based on antioxidant among various sources of shankhpushpi in a multicomponent extracts.

#### **Conference, symposia and presentation (2008-2011)**

1. Poster presentation in International Conference on New Developments in Drug Discovery from Natural Products and Traditional Medicines, entitled as **“Isolation, Characterization and Memory enhancing activity of Mangiferin isolated from Canscora decussata Schult.”** Held in NIPER Mohali, India. Dated 16-20 November-2008.
2. Oral Presentation in GUJCOST entitled as **“Comparative evaluation of controversial sources of shankhpushpi for CNS activity”** Held in SSPC, Mehsana, Gujarat. India. Dated 9-10 January-2009.
3. Oral Presentation in ISP-2009 entitled as **“Histological evaluation for cognition boosting effect of mangiferin isolated from Canscora decussata SCHULT. on rats brain** Held in DOPS, Barkatullah University, Bhopal (M.P.). India. Dated 15-16 Feb-2009.
4. Oral Presentation in 2nd Biennial International Conference on New Developments in Drug Discovery from Natural Products and Traditional Medicines, entitled as **“Assessment of various identification and differentiation parameters on four ethanobotanicals traditionally used as Shankhpushpi in India”** Held in NIPER Mohali, India. Dated 20-24 November-2010.
5. Oral Presentation in 15th Annual conference & First International Convention of Society of Pharmacognosy entitled as **“Simultaneous estimation and validation of HPTLC method for mangiferin, rutin and scopoletin for the differentiation of four ethanobotanicals commercialized in ayurveda by the name of shankhpushpi.”** Held in KLE University College of pharmacy, Belgaum, Karnataka. Dated 18-20 Feb-2010.

#### **Training**

- Three days HPTLC instrument handling training by Anchrom Pvt. Ltd. Mumbai, India.

# Review on ethnomedicinal uses and phyto-pharmacology of memory boosting herb *Convolvulus pluricaulis* Choisy

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*Convolvulus pluricaulis* Choisy: a rasayana drug which is mainly advocated for use in mental stimulation and rejuvenation therapy. It is known as Shankhpushpi by Ayurvedic practitioners in ancient systems of Indian medicine as it was a prominent memory improving drug, a psychostimulant and tranquiliser in traditional Indian medicine. The plant contains several alkaloids, flavanoids and coumarins as active chemicals that bring about its biological effects. Little human research has been published in the Western medical literature regarding this plant. Preclinical (in vivo and vitro) investigations have demonstrated nootropic, anxiolytic, tranquillising, antidepressant, antistress, neurodegenerative, anti-amnesic, antioxidant, hypolipidemic, immunomodulatory, anti-inflammatory, analgesic, antimicrobial, insecticidal, antifungal, antibacterial, antidiabetic, antiulcer, anticonvulsant and cardiovascular activity. Clinical studies of its polyherbal formulation justified its potential for the ancient claim of brain tonic. The present review is an attempt to compile information on various ethnomedicinal aspects of *Convolvulus pluricaulis*, shankhpushpi of Indian traditional medicine.

**Key words:** Shankhpushpi, rasayana, brain tonic, alkaloids

## Introduction

Drugs acting in the central nervous system (CNS) were among the first to be discovered by primitive human and are still the most widely used group of pharmacological agents. The CNS acting drugs are invaluable therapeutically as they can produce specific physiological and psychological effects. From the vast array of materia medica of the indigenous system, many plants have been reported to have activity against CNS disorders and act as very useful remedies for the alleviation of human suffering (Suba 2002).

All critical analyses on commercial and other information available on traditionally known CNS active herbal remedies indicate that the most popular amongst such remedies are those which are clinically and preclinically the most well studied and which are also recommended for therapeutic purposes by the health authorities of many Western and other countries outside the USA (Kumar 2006). Shankhpushpi is a Sanskrit word meaning 'the plant with flowers shaped like a conch'. The conch or Shankha is one of Lord Shiva's sacred instruments often used in ritual worship.

Shankhpushpi of the Ayurvedic Pharmacopeia of India consists of the whole plant of *Convolvulus pluricaulis* Choisy (Convolvulaceae) syn *Convolvulus microphyllus* Sieb. ex Spreng (MHFW 2001). Plants other than *Convolvulus pluricaulis* use the name Shankhpushpi in different parts of the country. These include *Evolvulus alsinoides* Linn, *Clitorea ternatea* Linn and *Canscora*

*decussata* Schult. The Indian Council of Medical Research has given quality standards for *C. pluricaulis* drug in its publication (Gupta 2005).

## Botany

*Convolvulus pluricaulis* Choisy is a prostrate spreading perennial wild herb commonly found on sandy or rocky ground under xerophytic conditions in northern India. *Convolvulus* is known from the margins and within the Sahara and Sind deserts, a distribution that Sa'ad (1967) called Saharo Sindian (Sa'ad 1967). In India it is widely distributed in and grows on the waste land in the plains of Punjab, Bihar and Chhotanagpur. The herb produces flowers during the months of September and October which are white to light pink in colour (Dandiya 1970). The shape of the flower is like a shankh (a marine shell) giving it the name is Shankhpushpi. Different botanical features of *Convolvulus pluricaulis* are shown below.

## Classification (taxonomic)

Kingdom	Plantae, plants
Sub kingdom	Tracheobionta, vascular plants
Super division	Spermatophyta, seed plants
Division	Magnoliophyta, flowering plants
Class	Magnoliopsida, dicotyledons
Sub class	Asteridae
Order	Solanales
Family	Convolvulaceae
Genus	<i>Convolvulus</i>
Species	<i>pluricaulis</i>



## An update on Shankpushpi, a cognition-boosting Ayurvedic medicine

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**Abstract:** Shankpushpi is an Ayurvedic drug used for its action on the central nervous system, especially for boosting memory and improving intellect. Quantum of information gained from Ayurvedic and other Sanskrit literature revealed the existence of four different plant species under the name of Shankpushpi, which is used in various Ayurvedic prescriptions described in ancient texts, singly or in combination with other herbs. The sources comprise of entire herbs with following botanicals viz., *Convolvulus pluricaulis* Choisy. (*Convolvulaceae*), *Evolvulus alsinoides* Linn. (*Convolvulaceae*), *Clitoria ternatea* Linn. (*Papilionaceae*) and *Canscora decussata* Schult. (*Gentianaceae*). A review on the available scientific information in terms of pharmacognostical characteristics, chemical constituents, pharmacological activities, preclinical and clinical applications of controversial sources of Shankpushpi is prepared with a view to review scientific work undertaken on Shankpushpi. It may provide parameters of differentiation and permit appreciation of variability of drug action by use of different botanical sources.

**Keywords:** *Convolvulus pluricaulis*; *Evolvulus alsinoides*; *Clitoria ternatea*; *Canscora decussata*; medicine, Ayurvedic; cognition disorders

Sethiya NK, Nahata A, Mishra SH, Dixit VK. *J Chin Integr Med*. 2009; 7(11): 1001-1022.

Received July 13, 2009; accepted September 23, 2009; published online November 15, 2009.

Indexed/abstracted in and full text link-out at PubMed. Journal title in PubMed: *Zhong Xi Yi Jie He Xue Bao*.

Free full text (HTML and PDF) is available at [www.jcimjournal.com](http://www.jcimjournal.com).

Forward linking and reference linking via CrossRef.

DOI: 10.3736/jcim20091101

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## 提高认知能力的印度传统草药土丁桂

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**摘要:**土丁桂属草药是作用于中枢神经系统的印度传统药物,特别是对促进记忆和改善智力有较好疗效。从印度传统医学和梵语文献中提取的大量信息提示,冠以土丁桂属草药名称的植物类别共4种:旋花科田旋花、旋花科土丁桂、蝶形花科蝴蝶花豆和龙胆科穿心草。这些草药名称均在古代文献中有所记载,可单独使用或与其他药材组合成各种草药处方。本文就现有的科学信息,如土丁桂属不同植物来源物种的生药学特征、化学成分、药理作用、临床前及临床应用等方面进行述评,以期科学地应用土丁桂提供依据。此外,还可根据不同植物来源土丁桂属草药的不同功效进行鉴别应用。

**关键词:** 旋花科田旋花; 旋花科土丁桂; 蝶形花科蝴蝶花豆; 龙胆科穿心草; 医学, 印度传统; 认知障碍

Ayurveda is the oldest medical science in the Indian subcontinent and has been practiced since the 12th century BC. Its objective is to accom-

plish physical, mental, social and spiritual well-being by adopting preventive, health promoting and holistic approach towards life<sup>[1]</sup>. Drugs acting

COMPARATIVE EVALUATION ON COMMERCIAL SOURCES OF INDIGENOUS  
MEDICINE SHANKHPUSHPI FOR ANTI-STRESS POTENTIAL  
A PRELIMINARY STUDY

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Summary

The present study was undertaken to determine a comparative account of the effects of methanolic extract of the aerial parts of the plants available as commercial sources of Shankhpushpi in India and one of its marketed formulation (Brand name- Shankhpushpi), on the experimental induced stress in albino rats. The parameters selected were CAR, stress induced epinephrine level and potentiation of barbiturate induced hypnosis for the purpose of present investigation. All the examined plant extracts were effective against experimental stress, and the results are comparable with marketed formulation. Out of the plant tested, the methanolic extract of *Convolvulus pluricaulis* (100 mg/kg.b.w.) in rats has shown significant anti-stress activity.

**Keywords:** *Convolvulus pluricaulis*, Anti-stress, Shankhpushpi, CAR, Epinephrine.

**List of Abbreviations:** MEEA: Methanolic Extract of *Evolvulus alsinoides*; MECP: Methanolic Extract of *Convolvulus pleuricaulis*; MECT: Methanolic Extract of *Clitoria ternatea*; SS: Shankhpushpi Syrup.

Introduction

The CNS acting drugs are invaluable therapeutically; because they can produce specific physiological and psychological effects [1]. All critical analysis on commercial and other information available on traditionally known CNS active herbal remedies indicate that the most popular amongst such remedies are those which are clinically and preclinically the most well studied ones, and which are also recommended for therapeutic purposes by the health authorities of many Western and other countries outside the USA [2]. Shankhpushpi is a drug of ayurvedic 'Medhya Rasayana' category which was used to boost memory and intellect. In India, *Convolvulus pluricaulis* Choisy., *Evolvulus alsinoides* Linn., and *Clitoria ternatea* Linn. and *Canscora decussata* Schult. are generally used as shankhpushpi by practitioners of ayurveda [3-10].

Ayurvedic medicine regards *Evolvulus alsinoides* highly effective for impairment of the central nervous system. Laboratory studies revealed the herb as anticonvulsant and central nervous system depressant with an LD<sub>50</sub> of 450 mg/kg [11]. The cyto-protective effects of *E. alsinoides* on hippocampal cells in mice suggested that in addition to improving memory the drug also has cytoprotective anti-stress effects [12].



# Phytopharmacologic aspects of *Canscora decussata* Roem and Schult

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Submitted: 08-03-10

Revised: \*\*\*\*

Published: 10-04-2010

## ABSTRACT

Nature is an inexhaustible source of secondary metabolites—different types of alkaloids, terpenoids, phenolics, and other classes of organic compounds. In the process of isolation, purification, and determination of the structures of lead, with their biological effectiveness, every type of experimental tool and strategy, known to and developed over the years by practitioners, is used. The present review is an attempt to compile information on various aspects of *Canscora decussata*, “Shankhpushpi” of Indian traditional system of medicine. The phytoconstituents, such as phenolic compounds, xanthenes, and triterpenoids were isolated from different parts of the plant. The plant possesses immunomodulatory, analgesic, anticonvulsant, antitubercular, and antiinflammatory, spermicidal, central nervous system–depressive, and cardiostimulant properties. Clinical trials of marketed formulation showed very encouraging results.

**Key words:** Shankhpushpi, phenolic compounds, xanthenes, triterpenoids

## INTRODUCTION

India has an ancient heritage of traditional medicine. Materia Medica of India provides a lot of information on the folklore practices and traditional aspects of therapeutically important natural products. Alternative systems of medicine, namely, *Ayurveda*, *Siddha*, and *Chinese* Medicine have become more popular in recent years.<sup>[1]</sup> Natural products have been our single most successful source of medicine. Each plant is like a chemical factory capable of synthesizing a limited number of highly complex and unusual chemical substances derived from plants that are considered as important drugs currently in use, while several other drugs are simple synthetic modifications of the natural products.<sup>[2]</sup> Numerous drugs have entered the international pharmacopoeia through the study of ethnopharmacology of traditional medicine.<sup>[3]</sup> The research and development thrust in the pharmaceutical sector is focused on the development of new innovative/indigenous plant-based drugs through the investigation of leads from the traditional system of medicine.<sup>[4]</sup> Drugs acting on the central nervous system (CNS)

were among the first to be discovered by the primitive human and are still the most widely used group of pharmacologic agents. The drugs that act on the CNS are invaluable therapeutically, because they can produce specific physiologic and psychologic effects. From the vast array of Materia Medica of the indigenous system, many plants have been reported to have activity against CNS disorders and thus act as very useful remedies for the alleviation of human suffering.<sup>[5]</sup>

## CANSCORA DECUSSATA SCHULT. (GENTIANACEAE)

In India, *Canscora decussata* Schult. is popularly known as “Shankhpushpi” and found throughout India, up to an altitude of 1300 m. It is also grown in Sri Lanka and Myanmar. It is much branched, annual plant propagated by seeds. The flowering season of this plant is from Oct–Dec. The plant is cultivated in the gardens as ornamental plant for its flowers. This is an erect annual herb with 4-winged stem and half a meter in length with decussate branches. It grows well in moist conditions. Leaves are sessile, 2.5–4 cm in length, lanceolate, decussate with 3 prominent vertical lines; flowers are axillary, solitary, and white or yellowish in color. The entire plant, as well as fresh juice, is used in the traditional medicine for the treatment of insanity, epilepsy, and nervous debility. This plant contains bitter substances and an oleoresin. It is also found to contain triterpenes, alkaloids, and xanthenes.<sup>[6]</sup> It is also a natural source of penta-oxygenated, hexa-oxygenated, and dimeric xanthenes.<sup>[7]</sup>

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