International Journal of PharmaO2
Journal Home Page: http://www.ijpo.in/
(IJPO: A Peer-reviewed Bi-monthly online journal)

Review Article

Tripakshi in Ayurveda: A critical Review

Dr. Vivek V. Nemade[*1] and Dr. Manish Phalak[2]

[1]Reader, Department of Rognidan Avam Vikruti Vidynan, Chaitanya Ayurved Mahavidyalaya, Sakegaon, Bhusawal, India.
[2]Lecture, Department of KayaChikista, Chaitanya Ayurved Mahavidyalaya, Sakegaon, Bhusawal, India.

ARTICLE INFO

Article history:
Received: 13/02/2021;
Revised: 20/02/2021
Accepted: 27/02/2021;
Available online: 01/03/2021.

Key Words:
'Tripakshi', modern literature, *Coldenia procumbens*, folklore medicine, traditional knowledge.

Please cite this article as: Nemade V. V. *et al.* (2021). Tripakshi in Ayurveda: A critical Review. 3(2), 085-090.

ABSTRACT

'Tripakshi' is widely used in the codified Indian systems of medicine namely Ayurveda and Sidha. Botanical name of 'Tripakshi' is as a *Coldenia procumbens* Linn. (Family- Boraginaceae). In folklore medicine it is used to treat rheumatic swelling, immature abscesses, leucorrhoea, menorrhagia, anti-diabetic, anti-arthritic and hypertensive. Considering the indigenous uses of the 'Tripakshi', the present study deals with the investigation of till date reported study of these traditionally important plants and try to correlate traditional knowledge with modern literature. After studying modern literature it is concluded that traditional knowledge or folklore/ethano-botanical claims are true and proved by various in-vivo and in- vitro study.

*Corresponding author: Dr. Vivek V. Nemade, Reader, Department of Rognidan Avam Vikruti Vidynan, Chaitanya Ayurved Mahavidyalaya, Sakegaon, Bhusawal, India. Contact: +919545595095; e-mail: drvivek.nemade@gmail.com

Introduction

The nature has provided abundant plant wealth for all the living creatures, which possess medicinal virtues. Therefore, there is a necessity to explore their uses and to ascertain their therapeutic properties. 'Tripakshi' is a commonly available prostrate herb/weed, which is widely used in the codified Indian systems of medicine namely Ayurveda and Siddhha. This plant is widely used in traditional medicines in India, Africa, Malaysia. 'Tripakshi' is a procumbent, deep rooted hairy herb found throughout India as a weed in moist places. It is known as 'Tripunkhi' in Hindi and 'Creping Coldenia' in English. It is found commonly in wastelands, agricultural fields and ponds during summer season as a weed. Botanical name of 'Tripakshi' is as a *Coldenia procumbens* Linn. (Research Gate 2021; Been A.P. 2005). It is a member of Boraginaceae family. As per the Ayurvedic literatures Tripakṣī (Sanskrit: त्रिपक्षी) used for rheumatism and abscess (Shakila, R. *et al.*,

2021). Powder form of the plant is prescribed in the dose of 3-6 g. *C. procumbens* is described as Serupadai or Serupadi in Siddha literatures. It is consumed either as kudineer or in the form of powder (Shakila, R. *et al.*,2021). In folklore medicine it is used to treat rheumatic swelling, immature abscesses, leucorrhoea, menorrhagia, anti-diabetic, anti-arthritic and hypertensive (Ganesan, R. *et al.*, 2013).

Fig. 1: Tripakshi (*Coldenia procumbens*) Plant

Considering the indigenous uses of the 'Tripakshi', the present study deals with the investigation of till date reported study of these traditionally important plants and try to correlate traditional knowledge with modern literature.

Material and Methods

This is conceptual type of research. All sorts of references has been collected and compiled from various available Ayurvedic classics texts like Charak samhita, Shushrut samhita and available commentaries on it. The available modern literatures like research articles and reviews were also used in presented study. Research article is also searched from various websites, available repositories of the different universities related to 'Tripakshi'. All matter is analyzed for the discussion and attempt has been made to draw some conclusions after the study.

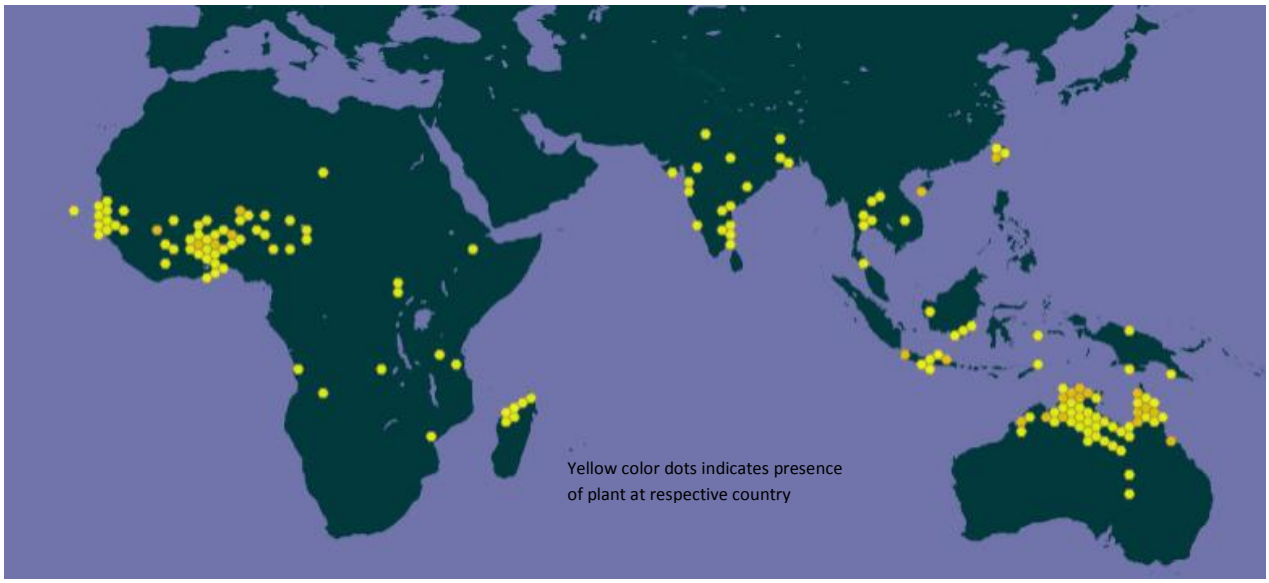

Fig. 1: Distribution of 'Tripakshi' Plant (GBIF, 2021)

Botanical Classification of 'Tripakshi'

Kingdom- Plantae
Division- Magnoliophyta
Class- Magnoliopsida
Order- Boraginales
Family- Boraginaceae
Genus- Coldenia Linn.
Species- *procumbens*

Description (Wali A., *et al*., 2016)

Habit- Procumbent, spreading herbs.

Stem- Weak, herbaceous, prostrate,, 30-45cm long, shaggy with white hairs, branches many, young parts silky with white hairs.

Leaves- Simple, alternate, 1.2-3.5X 0.6-1.9 cm, ovate oblong, obovate- oblong, hairy on both sides, crisped; apex obtuse, base- acute, obligue; margins crenate-denate.

Inflorescence- Axillary solitary.

Flowers- Regular, bisexual, hypogynous, white, 0.4-0.5 cm wide, subsessile, tetramerous.

Calyx- Sepa;s 4, gamospealous, hairy, lobes ovate, acute, ciliate.
Corolla- Petals 4, gamospealous, lobes 0.25cm long, oblong, spreading, rounded at apex.
Androecium- Stamens 4, free, epipetalous, scarely higher than corolla tube.
Gynoecium- bicarpellary, syncarpous, ovary superior, ovoid, 4 lobed, 2-4 locules; style 2, cohering to middle; stigma capitates.
Fruits- Drupes 0.3-0.4 cm long, beaked, 4- lobed, breaking in to 4-pyrenes.
Seeds-Seeds Four.

Micro-morphology and Physical Constant Study

The leaf of *Coldenia procumbens* Linn. Studied for its Micro morphological (vein islet, vein termination numbers and stomatal index) anatomical characters, Physico chemical standards such as ash values, extractive values, crude fibre content and fluorescence characters of various extracts and leaf powder after treatment with different chemical reagents under UV light. Preliminary phytochemical tests on various extracts of the leaf have also been carried out (Senthamari, R., *et al*., 2002).

Chemical Constituents

Coldenia procumbens having the glycosides, phytosterols, proteins, amino acids, fixed oils flavonoids, gums and mucilage as a chief constituents. Alkaloids and tannins are higher in alcoholic extract than in water extract. Reducing sugars and phenols are higher in water extract than in alcoholic extract. Non-reducing sugars and steroids are equally present in both the extracts. Saponins and fixed oils and fats are present only in water and alcoholic extracts respectively. Wedelo-lactone is identified in the *Coldenia procumbens*. The wedelo-lactone, coumestan derivative was identified and estimated in the methanolic extract of the plant. The oncentration of wedelolactone in the plant extract was found to be 2.2%w/w (Aleemuddin M.A. *et al*., 2011).

Medicinal Uses

Antibacterial Activity

The leaves of the plant have a variety of medicinal applications. The fresh poultice of leaves is applied to mature abscesses. The powdered roots enter into a compound formulation given in leucorrhoea and menorrhagia. The decoction of root is given in rheumatism and for digestion. The plant juice is active against gram+ve bacteria. Based on the above claim, a preliminary study of the antibacterial activity of the plant was carried out (Been A.P. 2005).

Anti-Oxidant and Anti-Arthritic Activities

The percentage inhibition by DPPH method was found to be 76.26% at a concentration of 500 g/0.1ml when compared with Quercetin (87.74%). The reducing capabilities of the leaf extract of C. procumbens L was found to be in dose dependent manner which was compared with standard Quercetin. The total antioxidant activity was found to be 0.2mg equivalents of ascorbic acid. The total phenolic content was found to be 31.9mg Pyrocathecol equivalent /gm of extract. The maximum membrane stabilization of *C. procumbens* L was found to be at 98.09% and inhibition of protein denaturation was found to be at 52.84%. Therefore, our studies support the use of active constituents from *C. procumbens* L in treating inflammations and rheumatism (Lavanya, S. *et al*., 2010).

Analgesic activity

The Benzene, Chloroform, Acetone and Alcoholic extracts of the leaves of *C. procumbens* were screened for analgesic activity using Tail Clip and Hot Plate Methods. In both the methods, all the extracts at the dose of 200 mg/kg-1 exhibited significant analgesic activity when compared with standard drug Morphine sulphate at the dose of 5 mg/kg-1. The basal reaction time was increased in the benzene and alcoholic extract treated groups like standard drug Morphine sulphate. The possible
mechanism may be due to involvement of opioid receptors and by enhancement of threshold to painful
stimuli (Aleemuddin M.A. *et al*., 2011).

Anthelmintic Activity

The in vitro experiments were conducted to evaluate the possible anthelmintic effects of different extracts (petroleum ether, chloroform,

ethanol, aqueous) of the leaves of *Coldenia procumbens* on Pheretima Posthuma worms. Various concentrations (25, 50, 100mg/ml) of all extracts were tested and a result shows potent anthelmintic activity of *Coldenia procumbens* when compared with Albendazole as a reference standard and saline as a control group (Aleemuddin, M.A., *et al*, 2012).

Hepatoprotective Activity

Hepatoprotective Activity of *Coldenia procumbens* Linn whole plant chloroform Extract - Shade dried and coarsely powdered plant (1 kg) was extracted successively with chloroform and methanol in a Soxhlet's apparatus and tested for antihepatotoxic activity on rats with 200 mg/kg of D-Galactosamine (D-GalN) orally. The parameters assessed were serum levels of Serum Glutamic Oxaloacetate Trasaminase (SGOT), Serum Glutamic Pyruvate (SGPT), Trasaminase (SGOT), Alkaline Phosphatase (ALP), total protein, albumin, globulin, total cholesterol, total bilirubin and blood sugar changes in liver. There was significant reversal of biochemical changes induced by D-Galactosamine treatment in rats by chloroform extract treatment, indicating promising hepatoprotective activity (Ganesan, R. *et al.*, 2013).

Anti-diabetics Activity

Anti-diabetic evaluation of Coldenia procumbens was done using 18 hr fasting glucose model, oral glucose tolerance test and streptozotocin induced diabetes model. Coldenia procumbens showed hypoglycemic activity in fasting glucose model which indicates that these extracts were devoid of insulin secreting or insulin like activity. Effect on blood glucose level in oral glucose tolerance test (OGTT) the lowering of blood glucose was observed at 30 and 60min. post glucose administration when compared to control. Effect on blood glucose level in streptozotocin induced diabetes model: the extracts i.e. 50% ethanol extract and 90% ethanol extract of Coldenia procumbens exhibited varied degree of reversal of diabetic condition with maximum effect in 50% ethanol extract when compared to the streptozotocin control. In the group treated with 50% ethanol extract, the blood glucose level significantly reduced to 146.85 ± 14.18 mg/dl on day 28 as compared to that of 300.10 ± 23.03 mg/dl in streptozotocin control. The 50% ethanol extract may be subjected fractionation in order to enrich an active fraction and thereby the phytochemical responsible for this anti-diabetic activity may be identified, isolated and characterized. It may be say that the leaves of Coldenia procumbens possess anti-diabetic activity in animal models (Omanakuttan, O. 2016).

Antimicrobial studies

Previous workers reported the in-vitro antibacterial activity of aqueous and ethanolic extract of leaf of *C. procumbens* against *Staphylococcus aureus*, Streptococcus pyrogenus, Salmonella typhi, Escherichia coli and a fungus Candida albicans. The Shakila authors investigated the inhibiting capacity of ethanolic extract of *C. procumbens* whole plant against some selected organisms.

The ethanolic extract was screened for growth inhibition of microbes such as *Aeromonas hydrophila*, *Bacillus cereus*, *Bacillus subtilis*, *Enterobacter aerogens*, *Escherichia coli*, *Klebsiela pneumoniae*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Salmonella typhimurium*, *Staphylococcus aureus*, *Streptococcus pyrogens*, *Vibrio fischeri* and *Candida albicans*. The ethanolic extract was found to inhibit *K. pneumoniae*, *E. coli*, *B. cereus*, *S. typhimurium* and *P. vulgaris* (Shakila, R. *et al.*, 2017).

Anti-Viral Activity and Cytotoxicity

The aqueous extracts of *Coldenia procumbens*, against replication of HIV-1 (III B) and HIV-2 (Rod) in MT-4 cells was studied. The extracts tested were relatively nontoxic to human lymphocytic MT-4 cells, these extracts exhibited anti-HIV activity in an in-vitro MTT assay. The aqueous extract of *Coldenia procumbens* inhibited both HIV-1 and HIV-2 replication at comparable IC50 values, namely 32.10 and 41.60 respectively. No cytotoxicity was observed at125µg/ml. The maximum inhibition of this extract in HIV-1 replication is 141% and HIV-2 replication is 114.5%. The results showed that aqueous extract of *Coldenia procumbens* more potent anti-HIV activity (Venkatachalam, D. 2018).

Anti -Inflammatory Activity

The Ethanolic and aqueous extract of whole plant of Coldenia Procumbens were subjected for *in-vitro* anti-inflammatory activity. The results obtained indicate that the extracts possessed significant level of activity; the highest concentration of extract was high effective as an anti-inflammatory agent. However, these effects need to be confirmed using in vivo models and clinical trials for its effective utilization as therapeutic agents (Keerthana, R. *et al.,* 2018).

The in-vitro anti-inflammatory activity was tested using coumarin compound of *C. procumbens*. Coumarins are a group of polyphenolic compounds isolated by TLC method from *C. procumbens* plant extract. In anti-inflammation study, the methanolic extract showed high percentage of inhibition observed in egg albumin denaturation studies was 78.8% of 0.8µg/ml concentration of coumarin compounds where as compared to standard drug Diclofenac sodium 74.8%. While, bovine serum albumin denaturation assay was 67.8 % of 0.8 µg/ml concentration when compared to other concentration of coumarin compounds (Babu, S. *et al.,* 2018).

Anticancer activity

The anticolon cancer effect of Coldenia procumbens against 1,2- dimethylhydrazine (DMH) induced coloncancer in male wistar albino rats. Dichloromethane extract of Coldenia procumbens which is a plant extract, at a dose of 200 and 400 mg/kg is found to decrease aberrant crypt foci (ACF) significantly (Ramachandran, K., *et al.,* 2018).

Conclusion

From the time of immemorial, plants have been widely used as curative agents for variety of ailments. 'Tripakshi' is widely used in the traditional system of medicine like Ayurvedic and Siddha suppuration of boils, rheumatic swellings, piles. The reported modern pharmacological studies so far have been performed *in vitro* and *in vivo* systems, proves the traditional knowledge. As the 'Tripakshi' shows potent antibacterial activity, anti-viral activity, hepatoprotective activity, anti-diabetic's activity, anticancer activity, anti-oxidant activity, anti-inflammatory activity, anti-arthritic activity and anthelmintic activity. Therefore it is concluded that traditional knowledge or folklore/ethanobotanical claims are true.

Acknowledgments

The authors are thankful for the Chaitanya Ayurved Mahavidyalaya, Sakegaon, management for the encouragement and support.

Funding

There was no funding for this work.

Conflict of interest

The authors declare no conflict of interest

Disclosure statement

There are no conflicts of interest.

References

1. Research gate (2021). Antibacterial activity of *coldenia procumbens* linn. Available from: https://www.researchgate.net/publication/224898400_antibacterial_activity_of_coldenia_procumbens_linn (retrieved on 26.01.2021).

2. Been, A.P. (2005). antibacterial activity of *coldenia procumbens* linn. *Ancient science of life*, 24(3) 109 – 111.

3. Shakila, R., Ganesan, R., Meeradevi, S.P., Arul A.S. and Sathiyarajeswaran, P. (2017). Antimicrobial studies on *Coldenia procumbens* Linn. whole plant. *World journal of pharmaceutical sciences*, 5(4), 25-27, https://www.academia.edu/32599570/antimicrobial_studies_on_coldenia_procumbens_linn_whole_plant

4. Ganesan, R., Mathuram, V., Pawar, S., Reddy, G.P., Anandan, T. and Masilamani APR. (2013). hepatoprotective effect of coldenia procumbens linn against dgalactosamine induced acute liver damage in rats. *International journal of integrative sciences*, 2(2), 9-11.

5. Global Biodiversity Information Facility (2021).https://www.gbif.org/species/4059906

6. Wali a. And bachulkar m. (2016). Tradition herbal drugs. Ankur publication, 1st ed., pp-70.

7. Aleemuddin, M.A., Karthikeyan, M, and Rajasekar, S. (2011). *Coldenia procumbens* linn - a phytopharmacological review. *International*

Journal of Pharmaceutical Sciences Review and Research, 11(2), 133-136.

8. Senthamari, R., Uvarani, M. and Jayakar, B. (2002). Pharmacognostical studies on leaf of *coldenia procumbens* linn. *Ancient science of life*, 22(1).

9. Venkatachalam, D. (2018). Studies of anti-viral activity and cytotoxicity of sphaeranthus indicus and coldenia procumbens. *International journal of medical research and pharmaceutical sciences* 5 (6), 1-5. https://www.doi-10.5281/zenodo.1261057;

10. Jahirhussain, G., Palanivel, S., Tamilselvan, V., Muniappan, V., Deepa, K. and Veerappan, R. (2016). In-vitro rapid multiplication of *coldenia procumbens* From shoot tip explants. *Journal of advanced applied scientific research*, 2,18- 28.

11. Omanakuttan, O. (2016). Evaluation of antidiabetic potential of whole plant extracts (ethanol and aqueous) of *Coldenia procumbens* Linn. in rats, http://repository-tnmgrmu.ac.in/4945/

12. Keerthana, R. and Anuradha, R. (2018). *In-vitro* anti -inflammatory activity of *Coldenia procumbens. World Journal of Pharmaceutical Research,* 7(3), 561-569. Doi: 10.20959/wjpr20183-10606

13. Babu, S., Ambikapathy, V and Panneerselvam, A. (2018). Determination of anti-inflammatory activity of coumarin compounds of *Coldenia procumbens* Linn. *International journal of scientific research in biological sciences*, 5(5), 77-79.

14. Ramachandran, K. and Venketnarayanan, R. (2018). Evaluation of anticancer activity of coldenia procumbens Linn in 1, 2-dimethyl hydrazine induced colon cancer on rat model. *Acta Biomedica Scientia*, 5(2),71-82. https://dx.doi.org/10.21276/abs.2018.5.2.7

15. Lavanya, S., Maheshwari, U., Harish, G., Bharath Raj, J., S Kamali, Hemamalani, D., Varma, J.B. and Reddy, C.U. (2010). In-vitro anti-oxidant, anti-inflammatory and anti-arthritic activities in the leaves of coldenia procumbens Linn. *Research journal of pharmaceutical, biological and chemical sciences*, 1(4).

16. Aleemuddin, M.A., Karthikeyan, M. and Krishna Priya P. J. (2012). *In-vitro* anthelmintic activity of different extracts of *Coldenia procumbens*. *Nat. Prod. Plant resour.*, 2 (2), 267-271.