



COLDENIA PROCUMBENS LINN - A PHYTOPHARMACOLOGICAL REVIEW

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ABSTRACT

The medicinal herbs are plays a vital role in the prevention and treatment of diseases, ailments or the promotion of health and healing. Herbal medicine is also known as botanical medicine or phytomedicine which means a plant or any part of the plant is used to prepare medicine to assist in the healing process during illness and disease. *Coldenia procumbens* is commonly found as a weed and it is widely distributed in India, Africa and Malaysia. The whole plant has been used in traditional medicine for the treatment of inflammation, rheumatism, diabetes. *C.procumbens* consists of several Phytoconstituents belonging to category of flavonoids, alkaloids, glycosides and many others. The present article including the exploration of phytopharmacological properties of *C.procumbens* in attempt to provide a direction for further research.

Keywords: *Coldenia procumbens*, Phytomedicine, Phytoconstituents, Phytopharmacology.

INTRODUCTION

The word herb, as used in herbal medicine, is also known as botanical medicine or as phototherapy or phytomedicine which means a plant or plant part is used to make medicine to assist in the healing process during illness and disease¹. *Coldenia procumbens* Linn (Boraginaceae) is an annual herb, common weed in India. It is found widely in south india on waste lands, common in dry rice grounds. The genus having 24 species of prostate^{2,3}. *Coldenia procumbens* is only species of its genus has a place both in the Hortus Bengalensis and Moon's Catalogue of ceylon plants⁴. This plant is widely used in traditional medicines in india, Africa, malaysia. Acetone, water, methanolic extract of dried aerial parts shows weak angiotensin-converting enzyme inhibition *in vitro*⁵. Some of its chemical and pharmacological properties are discussed in this review.

Synonyms : Creeping Coldenia

Ayurvedic : Tripakshee

Vernacular Names:

Sanskrit- Tripakshee; English- Creeping Coldenia; Hindi- tripungkee; Telugu-hamsapadu; Tamil - serupadai or cherupadi.

MORPHOLOGICAL CHARACTERISTICS

Habit and Habitat

It is a prostrate herb usually lying quite flat on the ground, common on dry rice grounds, stems reaching 10-50cm long, shaggy with white hairs, branches often numerous. It is distributed in tropical and subtropical zones and found widely in south India³⁻⁶.

Leaves

Crisped, alternate, short and sessile 2-6×1.2-2cm, obovate to oblong, rounded at the apex, warty hair with

rosette of basal cells, stomata anomocytic, palisade adaxial, veins 4-6 pairs on each side^{4,7,9,10}.



Figure 1: *Coldenia Procumbens* leaves

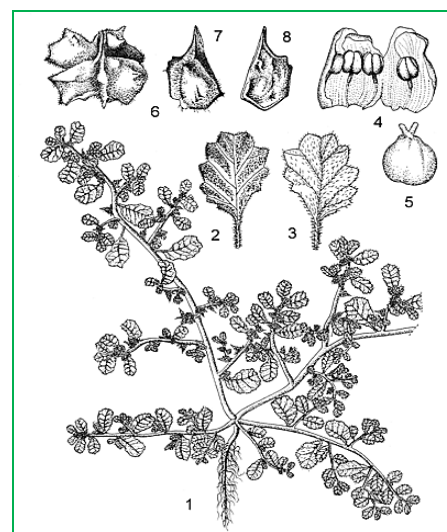


Figure 2: 1-Root, 2-Leaf upper surface, 3-Leaf lower surface, 4-Corolla showing stamens, 5-Pistil, 6-Fruit, 7- Nutlet dorsal surface, 8-Nutlet ventral surface

Flowers

Small, 3-4mm long, white, sessile, inconspicuous, solitary, axillary, nearly sessile; calyx- 1-1.5cm, lobes lanceolate to ovate lanceolate, corolla a pale yellow and very small. Sepals-5, broadly lanceolate, 2.5mm long, petals-5, united below into a short tube, stamens-5, inserted styles-2^{9,12}.

Fruit

3-4mm long, Composed of four cells wrapped in calyx, with single seed in each cell. Fruit initially splitting into 2 halves, later each half into 2 one seeded nutlets with distinct beak^{4,7}.

BOTANICAL CLASSIFICATION8

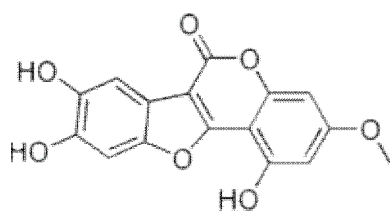
Kingdom	: Plantae
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Lamiales
Familia	: Boraginaceae
Genus	: <i>Coldenia</i>

TRADITIONAL USES

Fresh leaves of *Coldenia procumbens* ground and applied to Rheumatic Swellings, equal parts of dried powder mixed with seeds of fenugreek causes Suppurations of boils. Fresh leaves are used to promote maturation, the decoction of *Coldenia procumbens* leaves when mixed with *Centella asiatica* and *Madhuca longifolia* and *Ixora coccinia* would give significant result in wound healing, plant extract also used in treatment of piles, Leucorrhoea, Menorrhagia^{2-5,7,11-18}.

PHYTO 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 & fats are present only in water and alcoholic extracts respectively¹⁹⁻²¹. Wedelolactone is identified in the *Coldenia procumbens*. The wedelolactone, coumestan derivative was identified and estimated in the methanolic extract of the plant by TLC. The concentration of wedelolactone in the plant extract was found to be 2.2%w/w. the method development and validation was performed by using HPLC²².



Wedelolactone

PHARMACOLOGICAL ACTIVITIES

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 stimuli²³.

Antimicrobial activity

Beena P *et al* postulated that the aqueous extract of the *Coldenia procumbens* had shown anti bacterial activity against the microorganisms of *Bacillus subtilis*, *Staphylococcus aureus*, *E-coli*, *Proteus vulgaris*, *Klebsiella pneumonia*. The effect of the extract was compared with standard drug ciprofloxacin²⁴. G Ramakrishnan *et al.*, conducted an *in vitro* anti bacterial activity by Agar well diffusion method against different Gram-positive (*Staphylococcus aureus* and *Streptococcus pyrogenus*), Gram-negative (*Salmonella typhi* and *Escherichia coli*) bacteria and fungi (*Candida albicans*). In this study the aqueous extract of leaves of *Coldenia procumbens* showed the significant antibacterial activity against Gram-positive bacteria. No antifungal activity was recorded with aqueous extract²⁵.

Anti-Inflammatory Activity

The Anti-inflammatory activity was evaluated in the ethanolic extract of the aerial parts of *Coldenia procumbens* Linn on albino Wistar rats. In this study carrageenan induced left hind paw edema, pleurisy and cotton pellet induced granuloma model were applied. The results showed that the ethanolic extract at the dose of 150 mg/kg, p.o., produced the inhibition of carrageenan induced paw edema. It also showed an inhibitory effect on leukocyte migration and a reduction on the pleural exudates as well as reduction on the granuloma weight in the cotton pellet granuloma method. The results indicated that the ethanolic extract produced significant (P<0.001) anti-inflammatory activity when compared with the standard and untreated control²⁶.

Coldenia procumbens leaves had been shown significant anti inflammatory activity of maximum membrane stabilization of *C. procumbens* L was found to be at 98.09% in comparison with diclofenac sodium (standard drug) by HRBC membrane stabilization method due to presence of chemical profile such as Flavones, Tri-Terpenoids, Flavonones and Phenols²⁷.

Antidiabetic Activity

In the alloxan induced diabetic model the *Coldenia procumbens* exhibited significant (p < 0.05) increase in



body weight and significant ($p < 0.05$) reduction in blood glucose level when compared with diabetic control group of rats. Serum triglyceride levels decreased significantly ($p < 0.05$) in *C. procumbens* treated rats. Treatment with *C. procumbens* significantly ($p < 0.05$) reduced the serum cholesterol level in rats. The analysis of data indicated that the *C. procumbens* has good hypoglycemic effect in diabetic rats.²⁸

In Vitro hepatoprotective activity

The *In Vitro* hepatoprotective activity was evaluated in ethanolic extract of *Coldenia procumbens* Linn. Antitubercular drugs such as Isoniazid, Rifampicin, Pyrazinamide were used as toxicants and Galactosamine HCL also used. silymarin was used as standard drug. The MTT (3-(4,5 dimethylthiazole –2 yl)-2,5 diphenyl tetrazolium bromide) assay was carried out. The results indicated that the extract showed dose dependent activity against Galactosamine HCL, anti tubercular drugs in comparisons with standard drug silymarin²⁹.

In Vitro anti-oxidant activity

Lavanya *et al.*, conducted a study on *C. procumbens* L for possible antioxidant activity by DPPH, total antioxidant, total phenolic and reducing power. The percentage inhibition by DPPH method was found to be 76.26% at a concentration of 500g/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 Pyrocatechol equivalent /gm of extract.³⁰

An investigation was carried out by Beena *et al.*, to evaluate the *In Vitro* antioxidant activity of ethanolic extract of *Coldenia procumbens* Linn by Diphenyl-1-picryl hydrazyl method (DPPH) and Nitric oxide radical scavenging inhibition activity method. It has been showed significant activity in comparison with standard drugs ascorbic acid and rutin³¹.

CONCLUSION

From the time of immemorial, plants have been widely used as curative agents for variety of ailments. *C. Procumbens* is widely used in the traditional system of medicine like Ayurvedic and Siddha and Unani as anti-inflammatory, suppuration of boils, rheumatic swellings, piles. The pharmacological studies so far have been performed *in vitro* and *in vivo* systems. Therefore there is need of investigation and quantification of phytoconstituents and pharmacological profile.

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