

Preliminary Phytochemical Screening and Anthelmintic Activity of *Desmodium Triflorum* (L.) DC Leaf and Root Extracts

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ABSTRACT

The present day study is an attempt to know the anthelmintic activity of the leaves and roots of the *Desmodium triflorum* (L.) DC. For this work, the leaves and roots were extracted separately with cold water, Methanol and petroleum ether by following maceration method. Various doses of cold water, methanolic and combined (cold water, Methanol and petroleum ether) extracts were evaluated for their anthelmintic activity on adult Indian earthworms, *Pheretima posthuma*. All extracts were able to show anthelmintic activity of 10mg/mL concentration. All the doses of cold water, methanolic and combined extracts of *Desmodium triflorum* (L.) DC showed dose dependent anthelmintic activity in comparison to standard drugs.

Keywords: Anthelmintic activity, *Desmodium triflorum* (L.) DC, Fabaceae, cold water extract, Methanolic extract

INTRODUCTION

Desmodium Triflorum (L.) DC (Fabaceae/Leguminosae) a medicinal plant is a very small terrestrial, annual, prostrate herb, up to 50cm long, slender branches rooting at nodes. Its leaves are small, alternate, stipulate and trifoliate. Flowers are irregular, bisexual, very small and bright purplish blue in colour. This plant is found on a wide range of soils and most commonly in dry, distributed in lawns, waste places and along road sides in tropical countries including India, Srilanka, Philippines and Taiwan. The plant is easily available throughout the states of India.

The various vernacular names of plant in India are as follows:

Telugu :Muntamandu

Hindi :Kudaliya, Motha

Tamil :Ankuca-Pati

Sanskrit :Hamsapaadi,Tripaadi

Marathi :Jungalimethi,Raan methi

Kannada:Kaadu pullam purasi, Kaadu menthe

Bengali :Kudaliya

The useful parts of the plant are roots, leaves and whole plant. *Desmodium Triflorum* (L.) DC contains chemical constituents Ursolic acid, Vitexin, Genistin, Fucosterol [1] and rare diholosylflavane, 2-O Glucosylvitexin [2]. *Desmodium triflorum* (L.) DC leaves contains total alkaloid, 0.01-0.015%, β -Phenethylamine(major alkaloid), Indole-3-acetic acid, Tyrumine, Trigonelline, Hypaphorine and Choline. *Desmodium Triflorum* (L.) DC root contains the total alkaloid 0.01-0.018% Hypaphorine(major alkaloid), N, N-Dimethyl tryptophan betaine and Choline [3, 4]. The leaves are used in diarrhea, convulsions and as a galactagogue [1, 5]. The fresh leaves of the plant are applied to wounds and abscesses that are usually difficult to heal. The paste is sometimes applied to sores and itch. The fresh juice of the plant is also recommended for use in dysentery and as a laxative [2].

Dried powder of whole plant *Desmodium Triflorum* (L.) DC when taken on empty stomach is useful in curing bone fracture [6]. The Infusion of root of *Desmodium Triflorum* (L.) DC is used to promote labour and treat Vertigo [7]. *Desmodium Triflorum* (L.) DC leaf paste (or) external leaf

paste in water is applied on forehead to bring down high fever [8]. The roots are reputedly carminative, tonic and diuretic and used in bilious complaints. The leaves are ground with cow's milk; they are given daily in the morning. The main actions include antispasmodic, sympathomimetic, central nervous system stimulation, curare-mimetic activity and diuretic [9]. In Philippines, a decoction is also used as mouth wash and as an expectorant. In Thailand, the whole plant is used as an antipyretic and to quench thirst. In Indonesia, Malaysia, Philippines, Laos and India, the plant in crushed form (or) a poultice of the leaves is externally applied on wounds, ulcers and for skin problems in general, apparently for its antiseptic properties [9].

Literature survey revealed that no systematic study on different parts of *Desmodium Triflorum (L.) DC* has been reported for its anthelmintic activity. So the present study was carried out to find out the anthelmintic activity of the leaves and roots extracts of *Desmodium Triflorum (L.) DC*.

MATERIALS AND METHODS

Drugs and Chemicals

Albendazole, methanol, petroleum ether and other chemicals were procured from different suppliers.

Plant Material

The leaves and roots of *Desmodium triflorum* were collected from local area of Araku of Visakhapatnam district, India. The plant was identified by Botany department, Andhra University, Visakhapatnam, India. The collected plant material was shade dried under normal environmental condition, powdered stored in a closed container.

Preparation of extract

The powdered leaves and roots of *Desmodium triflorum* (500gm) each were extracted with cold water, methanol and petroleum ether using maceration method. The extracts were filtered and concentrated by distilling of the solvent to obtain crude extract. The extracts obtained were then evaporated to dryness under reduced pressure.

Phytochemical Screening

Chemical tests were carried out on *Desmodium triflorum* extracts for the qualitative determination of phytochemical constituents as per the standard procedure [10]. Results were shown in Table 1.

Biological Study

Healthy adult Indian earthworms *pheretima-posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings were used in the present study [11] for evaluating the anthelmintic activity. All earthworms were of approximately equal size. They were collected from local place, washed and kept in water.

Anthelmintic activity

Indian adult earthworms collected from moist soil and washed with normal saline solution to remove all faecal matter, were used for anthelmintic activity. Different concentrations of the dried extracts (10-25mg/mL in saline solution with tween 80) were prepared. 20ml of each concentration of cold water extract was delivered into a petridish. Then six worms (same type) were placed in it. Similarly for each concentration of methanolic extract six worms were used. Time taken for paralysis was noted when the worm did not revive even in normal saline solution. Time taken for the death of worms was also recorded when the worms lost their body colour (when dipped in warm water of 50°C). Albendazole (10 mg/mL in vehicle tween 80) was used as positive control and saline solution was used as negative control. The results were shown in Table 2.

RESULTS AND DISCUSSION

Cold water, methanol and combined extracts of *Desmodium triflorum* exhibited anthelmintic activity. The cold water and methanol extracts of *Desmodium triflorum* at different concentrations produced an anthelmintic activity in a dose dependent manner.

Table 1. Phytochemicals detected in cold water, methanol and petroleum ether extracts of *Desmodium triflorum (L.) DC*

Phytochemicals	Cold water extract (Root)	Cold water extract (Leaf)	Methanol extract (Root)	Methanol extract (Leaf)	Pet. ether extract (Root)	Pet. ether extract (Leaf)
Starches	+ve	+ve	-	-	-	-
Terpenoids	+ve	+ve	+ve	+ve	-ve	-ve
Saponins	-ve	-ve	-ve	-ve	-	-
Tannins	-ve	-ve	+ve	-ve	-	-
Flavonoids	-	-	+ve	+ve	-	-
Polyphenols	-	-	+ve	-ve	-	-
Steroids	-	-	-ve	-ve	+ve	+ve
Polypeptides	-ve	-ve	-	-	-	-
Anthocyanins	+ve	+ve	+ve	+ve	-	-
Alkaloids	-	-	-	-	+ve	+ve
Coumarins	-	-	-	-	+ve	+ve

Table 2. Anthelmintic activity of the leaf, root and combined extracts of *Desmodium triflorum* and controls

Treatment	Concentration (mg/mL)	Time taken for paralysis (min)	Time taken for death (min)
Saline water (negative control)	-	-	-
Albendazole (positive control)	10	36	53
Cold water extract (root)	10	48	100
	15	38	90
	25	38	85
Cold water extract (leaf)	10	60	76
	15	50	91
	25	40	68
Methanol extract (root)	10	60	84
	15	49	74
	25	49	68
Methanol extract (leaf)	10	40	60
	15	37	57
	25	36	55
Combined extract (root)	10	20	35
Combined extract (leaf)	10	25	38

Considering time taken for paralysis and death of earthworms, the positive control (Albendazole 10mg/mL) was more potent than both the concentrations of the cold water and methanolic extracts. While the combined extract (10mg/mL) produced more potent effect than the Albendazole (positive control). The negative control (saline water with tween 80) did not show any activity against earthworms.

The study on the anthelmintic activity of the plant was not available till now. From this study, it may be concluded that the extracts (cold water, methanol and combined) of *Desmodium triflorum* possess anthelmintic activity.

CONCLUSION

The Phytochemical studies indicated the presence of several types of chemical constituents. It could be concluded that all the cold water, methanolic and combined extracts of *Desmodium triflorum* exhibited comparable anthelmintic activity with standard drug. Further studies are required to identify the actual chemical constituents that are present in the crude extracts of this plant which are responsible for anthelmintic activity.

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REFERENCES

1. Yoganarsimhan, Medicinal Plants of India. Vol-1; Karnataka; Interline Publishers, 1996.
2. Adinarayana D and Syamsundar KV (1982). Occurrence of a rare diholosylflavone-2-O-glucosylvitexin in *Desmodium Triflorum*. *Curr Sci* 51: 936-7
3. Ghosal RS, Srivastava, Banerjee PK et al. (1971). Alkaloids of *Desmodium triflorum* *Phytochemistry* 10:3313-14

4. Khare CP. editors, Indian Medicinal Plant. New York: Springer-verlag, 2007.
5. Rout SK and Kar DM (2010). A Review on antiepileptic agents, current research and future prospectus on conventional and traditional drugs. *Int J Pharm Sci Rev Res* 3:19-23
6. Prusti AB., behera kk, Ethno-medico botanical study of sundargarh district, Orissa, India. *Ethnobotanical leaflets* 2007;11:148-63
7. Tabuti JR, Lye KA. Dhillion SS (2003). Traditional herbal drugs of Bulamogi, Uganda; Plants, use and administration. *J Ethnopharmacol* 88:19-44
8. Samvatsar S (2004). Plant used in treatment of different types of fever by Bhils and subtribes in India. *Ind J Traditional Knowledge* 3:96-100
9. *Desmodium triflorum* (L.) DC-Fabaceae – Dicotyledon. Available from; URL:http://www.oswaldasia.org/species/d/destr/destr_en.html#debut
10. Prasant Tiwari, Bimlesh Kumar, Mandeep Kaur et al. (2011). Phytochemical screening and extraction: a review. *Internationale Pharmaceutica Scientia* 1(1)
11. Vidyarthi RD; A text book of Zoology, S. Chand and Co. Press New Delhi, 14th edn 1977, 1088

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