

## Pharmacological and ethnomedicinal studies of *Tridax procumbens* linn family (Compositae) for anti-asthmatic activities

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### Abstract

*Tridax procumbens* linn. of family- *Compositae* (*Asteraceae*) is found plentifully in the plane areas near rivers and on marshy land. The villagers use this plant in bronchial asthma, dysentery and diarrhoea. Leaf juice is generally used to kill the bed bug in cote and wooden furniture and to protect the woods from termites etc. The whole herb juice in decoction is used by the villagers to check the hemorrhage of wounds. The detailed chemistry of the insecticidal compound was carried out, which revealed the structure of the compound. In the present communication, an effort has been made to screen the *Tridax procumbens*, a common plant used in folk medicines.

### Introduction

The practices of traditional medicine are based on hundreds of years of belief and observations which create the development and spread of modern medical system. In some countries traditional medicines remain an integral part of formal health system and exist at equal footing with modern medicine. The methods of practices of traditional medicine many appear to be numerous and dissimilar but they all represent variations of three basic activities, faith healing, hygiene measures and drug therapy. Traditional medicine plays an important role in health care in India.

Survey of certain pharmacologically active phytoconstituents in wild plants, which are commonly used in folk medicine, have attracted our attention during the past few decades. The results of these studies have proved to be of much significance for their commercial exploitation. Many reports are available now on the photochemical screening of plants of a particular geographical region. However, only few are concerned with plants, used by rural folks and tribal peoples.

### Materials and Methods

*Tridax procumbens* L. (Compositae) is a common weed found throughout India and used for a variety of medicinal purposes. The whole herb was collected from the field of village Chiocholi (Gavasne Forest) district Betul, India

During months of Feb- March (A voucher specimen is preserved in the Herbarium) shade-dried and powdered to a fine mesh extraction and purification: Air dried powdered material was Soxhleted in acetone for 24 hours and solvent was evaporated under reduced pressure in vacuum evaporator. A dark green semi-solid substance was obtained which accounted for 0.01% of the total dried powdered material. The crude extract was diluted with acetone to make 10% stock solution, dilutions were made from this stock solution. The crude extract was initially tested on TLC plate of Silica Gel "G" (0.22mm) where total eight spots were obtained using Benzene: Methanol (9:1). The crude extract was then poured into an open glass column (65cm x 4cm) and

eluted with  $C_6H_6$ : MeOH (9:1) and about 7 fraction were collected. Some fractions overlapped when subjected to TLC. They were once again eluted using the same solvent system. The different fractions were collected in the small glass vials and were kept in refrigerator. Out of seven fractions obtained, fraction  $FR_5$  (Brown colour) was analyzed spectroscopically for active constituents.

## Results

Purification, isolation and structural elucidation of biologically active compound:

The purification and isolation of biologically active compound from crude extract of *Tridax procumbens* was done by column chromatography and TLC. Table(1) indicates the results for column chromatography of petroleum, ether, acetone and methanol extracts of *Tridax*. A total of nine fractions were obtained. The solvent system used for column chromatography are Benzene:P.Ether(4:1), P.Ether:Acetone (9:1) and  $CCl_4$ : $CH_3COOH$ (5:1). The detail of the percentage yield, weight of each and colour characteristic have been mentioned in Table(1).

### TLC of crude extract

The three crude extracts obtained through soxhletion were preliminarily examined on TLC plate using silica Gel "G" and different solvent systems as indicated in Table(2). For P.Ether extract Benzene : P.Ether (2:3) gave two spots and  $CHCl_3$ : Ether(4:1) gave three spots.

In acetone extract of three different combinations using Benzene :Ether (4:1) four spots were obtained while in Benzene: Methanol (9:1) eight spots were obtained .

For methanol extract four combinations were used, which gave three and one each .In the last three combinations with different revalues and different behaviour pattern as already indicated in Table 2.

### Further purification

The column purification fractions were further identified for their purity on TLC Plates. Fraction  $FR_1$ , using  $C_6H_6$ : P. Ether (2:3) gave three spots thus it seems to be mixture of compounds whereas  $FR_2$ , gave no spot presuming it to be a purified compound. With Benzene: Methanol (9:1) also  $FR_1$  and  $FR_2$ , gave no further splitting hence was thought to be purified. Fractions five to nine were tested using  $CHCl_3$ : Ether (4:1) in which fractions 3 coded  $FR_6$ ,  $FR_8$  and  $FR_9$ , gave no further spot thus assumed to be purified whereas fractions coded  $FR_5$  and  $FR_7$  gave two spots each indicating a further need of their purification . The characteristics of each spot in UV and visible light along with their Rf values have been already mentioned in Table 3.

### Isolation and structural elucidation of compound

Isolation and structural elucidation of the purified fraction over IR, UV, HNMR and mass spectrum were carried out using spectrophotometer at R.S.I.C, Chennai. The IR spectrum revealed the absorption at  $3010\text{ cm}^{-1}$ , (C=C-H),  $2940\text{ cm}^{-1}$  ( $CH_3$ ),  $1990\text{ cm}^{-1}$  (Amides),  $1450\text{ cm}^{-1}$  (C-H-1),  $1370\text{ cm}^{-1}$ ,  $1210\text{ cm}^{-1}$ ,  $750\text{ cm}^{-1}$  (monosubstituted aromatic ring) and  $660\text{ cm}^{-1}$  (monosubstituted aromatic ring).

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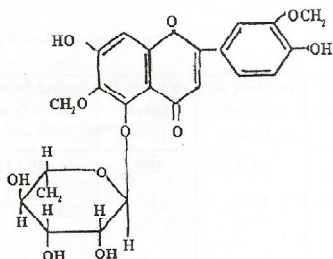
The UV spectra showed absorption at maximum, 412 nm, H-NMR showed intense peak at  $\delta$  0.945 (7-C Methyl Group),  $\delta$  1.70 (6H),  $\delta$  4.27 (3H),  $\delta$  7.20 (Ortho proton of the aromatic ring). The  $\text{CHCl}_3$  soluble fraction of the methanolic extract of the whole herb, *Tridax procumbens* which yielded a flavone glycoside (Fig. 1)

The present survey work will be useful in the commercial utilization of *Tridax procumbens* as a medicinal plant for curing dysentery, diarrhoea and to check the haemorrhage of wounds. Sinha and Dogra also reported pharmacological study of the medicinal plants and mentioned that it would be quite helpful for commercial utilization of the medicinal plants in the country. Yadav and Kumar (1996) also reported similar compound in *Tridax procumbens* Linn.

### Medicinal Use

Leaves are used for curing bronchial catarrh, dysentery, diarrhoea and haemorrhage of wounds. Leaf juice is also insecticidal and piscicidal.

**Fig 1 : Trihydroxy -6,3 D Di methoxy Flavone 5-O- $\alpha$ -1-rhamnopyranoside**



**Table 1: Column Chromatography of *Tridax procumbens* Linn.**

Plant Extract	Solvent system power (50 ml)	Fraction obtained dried (mg)	Weight of fraction (mg)	% yield of characteristics	Colour
Tridax P. Ether production	Benzene: P.Ether 2:1	FR <sub>1</sub> TPP	500	0.10	Light Green
		FR <sub>2</sub> TPP	15	0.03	Light yellow
Extract	CHCl <sub>3</sub> :Ether 4:1	FR <sub>3</sub> TPP	11	0.02	Yellowish
		FR <sub>4</sub> TPP	60	0.12	Green Yellow
<i>Tridax procumbens</i>	Benzene:Acetone 4:1	FR <sub>5</sub> TPP	620	0.12	
		FR <sub>6</sub> TPP	25	0.13	Brown
	P.Ether:Acetone	FR <sub>7</sub> TPP	10	0.05	Milky Colour
		FR <sub>8</sub> TPP	110	0.02	Light Yellow
<i>Tridax procumbens</i>	CCl <sub>4</sub> : CH <sub>3</sub> COOH 5:1	FR <sub>9</sub> TPP	320	0.022	Green
				0.064	Yellow

Table:2 TLC of Crude extract of *Tridax procumbens* Linn

Plant extract	Solvent system used in TLC	No. of Spots	Behaviour		Rf Value of each Spot	
			Visible light	UV light		
<i>Tridax procumbens</i>	Benzene:P.Ether 2:3	<b>2 Spots</b>				
		Spot-I	Invisible	Blue	0.25	
		Spot-II	Brown	Yellow	0.35	
P. Ether Extract	CHCl <sub>3</sub> : Ether 4:1	<b>3 Spots</b>				
		Spot-I	Dark yellow	Fluorescent	0.18	
		Spot-II	Yellow	Brown	0.25	
		Spot-III	No spot	Fluorescent	0.12	
<i>Tridax procumbens</i> Crude Acetone Extract	Benzene : Ether	<b>7 Spots</b>				
		Spot-II	Green	Dark blue	0.44	
		Spot-III	Light Yellow	Green	0.64	
		Spot-IV	Invisible	Fluorescent	0.94	
		Spot-V	Visible	Light Yellow	0.85	
		Spot-VI	Invisible	Fluorescent	0.94	
		Spot- VII	Dark Green	Black	0.92	
	Chloroform:Ether 4:1	<b>4 Spots</b>				
		Spot-I	Blue	Green	0.071	
		Spot-II	Yellow	Green	0.271	
		Spot-III	Invisible	Fluorescent	0.875	
			Spot-IV	Yellow	Green	1.000
	Benzene: Methanol 9:1	<b>8 Spots</b>				
		Spot-I	Green	Black	0.07	
		Spot-II	Yellow	Fluorescent	0.15	
		Spot-III	Yellow	Invisible	0.26	
		Spot-IV	Yellow	Red	0.50	
		Spot-V	Green	Blue	0.75	
		Spot-VI	Green	Black	0.84	
		Spot-VII	Yellow	Green	0.96	
		Spot- VIII	Green	Green	1.00	
Benzene : Methanol 9:1	<b>3 Spots</b>					
	Spot-I	Dark Green	Black	0.92		
	Spot-II	Green		1.00		
		Spot-III	Yellow	Green	0.96	
Chloroform: Ether 4:1	<b>1 Spot</b>					
	Spot-I	Green	Reddish Black	1.00		
Benzene: Acetone 4:1	<b>1 Spot</b>					
	Spot-I	Light Green	Black	0.75		
Benzene: P.Ether	<b>1 Spot</b>					
	Spot-I	Yellow	Green	0.24		

.Table 3: TLC of Purified compound of *Tridax procumbens* Linn.

Solvent	Purified fraction	No. of Spots	Colour Characterization in		Rf value of each spot
			Visible light	UV light	
Benzene :P Ether 9:1	FR <sub>1</sub> , TPP	3 Spots			
		Spot-I	Brown	Invisible	0.10
		Spot-II	Invisible	Yellow	0.25
		Spot-III	Invisible	Blue	0.35
Chloroform: Ether	FR <sub>2</sub> , TPA	No Spot	No Spot	No Spot	Nil
	FR <sub>3</sub> , TPA	No Spot	No Spot	No Spot	Nil
	FR <sub>4</sub> , TPA	No Spot	No Spot	No Spot	Nil
	FR <sub>5</sub> , TPA	2 Spot			
		Spot-I	Dark Yellow	Fluorescent	1.12
	Spot-II	Creamy	Invisible	0.56	
	No Spot	No Spot	No Spot	Nil	
	2 Spots	Spot-I	Yellow	Brown	0.18
		Spot-II	No Spot	Fluorescent	0.25
	No Spot	No Spot	No Spot	Nil	
	1 Spot				
Spot-I	Invisible	Fluorescent	0.12		

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