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Research Article

Locomotor Activity of *Tridax procumbens* Linn. in Mice and Rat

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ABSTRACT

Aqueous extract of leaf of *Tridax Procumbens* (TP) belongs to the family Asteraceae is most important medicinal plant used for bronchial catarrh, dysentery, and diarrohea and for restoring hair. Also the plant produced reflex tachycardia and showed a transient hypotensive effect on the normal blood pressure of dogs. It has also a marked depressant action on respiration. The Locomotor activity of TP was evaluated by using two methods i.e. Actophotometer and Hole Board methods in mice and rat. In the Actophotometer study diazepam, TP 4.2, 8.4 and 12.6 mg/kg (i.p.) significantly ($p<0.001$) decreased the locomotor activity. Thus the results of the present investigation indicate that TP extract dose dependently depresses the central nervous system, which is evident from TP induced decrease in locomotor activity. In this present study, Diazepam, TP 4.2, 8.4 and 12.6 mg/kg (i.p.) significantly ($p<0.001$) produced decrease in the number of head dipping and also decrease in the exploratory behavior as compared with the self-control treated group in the hole board test. Thus TP extract dose dependently depresses the CNS, which is evident from TP induced decrease in locomotor activity.

Keywords: *Tridax Procumbens* Linn., Aqueous Extract of Leaf, Locomotor Activity.

INTRODUCTION

In recent times, focus on plant research has increased all over the world and a large body of evidence has been collected to show immense potential of medicinal plants used in various traditional systems of medicine. There has been a phenomenal rise in the interest of scientific community to explore the pharmacological actions of herbs and to confirm the claims made about them in official books of Ayurveda.

Allopathic psychotropic drugs have been the mainstay of treatment for mental illnesses in India. They have number of side effects, especially those belonging to traditional system of like Ayurveda. Pharmaceutical industrial have shown an increased interest in plants as source of new drugs during last few years.

Tridax Procumbens Linn. is a member of Asteraceae family. It is called in English: Coatbuttons – Mexican Daisy, in Hindi: Gavpattha, in Marathi: Dagdipala, in Tamil: Vettu kkaaya – Thalai, in Telugu: Raavanaasuruditalakaai, Kannada: Gabbu Sanna Savanthi, Nettu Gabbu Savanthi and in Dharwar: Tikki kasa, Tikki Toppala. *Tridax Procumbens* Linn. is found in tropical southern part of Nigeria, and throughout India growing primarily during raining season. Annual or perennial weed with long stalked yellow or yellow white flowering heads. Leaves are reported to be employed in bronchial catarrh, dysentery and diarrhoea and for restoring hair. The leaf juice passess antisceptic, insceticidal and parasiticidal properties: it is used to check haemorrage from cuts, bruises and wounds. An aqueous extract of the plant produced reflex tachycardia and showed a transient hypotensive effect on the normal blood pressure of dogs. It had also a marked depressant action on the respiration. Petroleum ether extract of the floral herbs is toxic to webbing cloth- moth and larve of black corpet –betel. The flower contains luteolin, glucoluteolin, quercetin and isoquerecetine. The pollen may causes allergy in some people (Wealth of India 1976).

A hispid, procumbent herb, with woody base, sometimes rooting at the nodes, up to 60cm. High, found as weed up to an altitude of 2,400 m. leaves ovatelanceolate, 2-7 cm X 1- 4 cm., lamina pinnatisect, sometimes 3-lobed; flowers in small, long- peduncle heads; ray florets strap –shaped, white; disc florets yellow; achene's black, narrowly obconical, 2.0 –2.5 mm. long with feathery pappus. Chemical Constituents present in the plant leaves are Crude protein – 26.3%, crude fiber: 17.0%, ether extract 1.8% sol. Carbohydrates -39.0%, ash- 15.9%, K_2O- 8.4%, CAO- 4.6%, P_2O_5- 1% and MgO –1.7%, Fumaric Acid. The presence of β- sitoserol and Tannin has also been reported in the plant. (The Wealth of India, Raw Materials 1976).

The leaves are cooked as a vegetable; cattle also eat them. The extract of *Tridax Procumbens* has been reported to have various pharmacological effects, anti microbial activity against both gram–positive and gram–negative bacteria, and stimulate wound healing.

Most of the central nervous system acting drugs influence the locomotor activities in man and animals. The CNS stimulant drugs such as caffeine, amphetamine increases the locomotor activity while CNS depressant drugs such as barbiturates and alcohol reduce the locomotor activity. In other words, the locomotor activity can be an index of wakefulness (alertness) of mental activity (Kulkarni SK 1999).

An analysis of literature revealed some distinguished

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Table No. 1: For Locomotor Activity

Sr. No.	Group	Doses (mg/kg)	No. of Animals	Route of Administration
1	Control (vehicle)	0.5 ml	5	Intraperitoneally
2	Diazepam	3	5	Intraperitoneally
3	TP	4.2	5	Intraperitoneally
4	TP	8.4	5	Intraperitoneally
5	TP	12.6	5	Intraperitoneally

TP- Aqueous extract of Tridax Procumbens Linn.

pharmacological activities of the plant such as Wound healing activity (Udupa A.K., 1995), Depression of wound healing activity of steroid and TP (Diwan P.V., 1983), Bioactivity studies of extracts from TP (Taddei A., 2000), Influence of TP on Lysil oxidase and wound healing activity (Udopa Sl., 1991), Immunomodulatory effects of aqueous extract of TP (Tiwari U., 2004), Hepatoproctective activity of TP (Saraf S., 1991) (Part II Saraf S., 1992), Effect of aqueous leaves extract of TP on blood pressure and heart rate in rats (Salahdeen H.M., 2001), Antiinflammatory profile of TP in animal of fibroblast cell model (Margaret I., 1998).

MATERIALS AND METHODS

Plants and Preparation of Extract: *Tridax Procumbens* leaves were collected from the campus of the college in month of June and July and shade dried. Plant was identified Agharkar institute of Pune. The drugs *Tridax Procumbens* Linn. is extracted by Percolation method. Moisten 1000gm powered of *Tridax Procumbens* Leaves with a sufficient of the prescribed menstruum (solvent) to render it events and distinctly damp and macerate for 6 hr in a tight covered container. This will enable the leaf cells to absorb the menstruum. Then pack it in a cylindrical percolator. The packing of the percolator is very important. If packed too tightly, the product will not percolate; or, if packed too loosely, the menstruum will channel, giving a week extract. Add enough of the menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator close the orifice, cover the percolator, and macerate for the prescribed time, usually 48 hr. then open the (Hoffman clamp) valve and all the percolation to proceed slowly. Collect and reserve the first 850 ml percolate. Continue percolation by gradually adding more menstruum over the herb until the botanical is exhausted. The percolation is usually tested for remaining actives. When no more actives remains, the botanical is considered exhausted. Recover the menstruum from the remainder of the percolate and concentrate to a soft extract in a vacuum apparatus at a temperature not exceed 45^0C (Frank S.D' Amelio, Sr. 1999).

Animals: Male/ Female albino mice weighing 20-25 gm and male/ female albino rats weighing 180- 250 gm were obtained from National Institute of Toxicology, Pune. Animals were housed in groups of five per cage under standard laboratory conditions with food and water continuously available. A 12 h: 12 h (light: dark) cycle was used with the light on from 7:00 to 19:00 h. All behavioral testing was done during the day light period between 10:00 and 17:00 h. Animals were tail marked and handled daily for 5 min during the last 3 days before the experiment.

Drugs and Chemicals: The following drugs was used for study and procured as gift sample; Piracetam (Standard nootropic drug) from UCB India Ltd, India, Scopolamine (Muscarinic antagonist) from Buscopan, German Remedies, India, Diazepam (CNS Depressant) from Ranbaxy, India, and Phenytoin (Antiepileptic) from Zydus Pharmaceuticals, and these all drugs were dissolved and /or diluted with distilled water (vehicle). *Tridax Procumbens* was dissolved in distilled water and administered intraperitonially.

Phytochemical Screening of Crude Drug: Various chemical tests were carried out to identify the phytoconstituents as described by Khandelwal (2003).

METHODS

Evaluation of Locomotor Activity Using Isolated Mice and Rat

Actophotometer: Most of the central nervous system acting drugs influence the locomotor activities in man and animals. The CNS depressant drugs such as barbiturates and alcohol reduce the motor activity while the stimulants such as caffeine and amphetamines increases the activity can be an index of wakefulness (alertness) of mental activity.

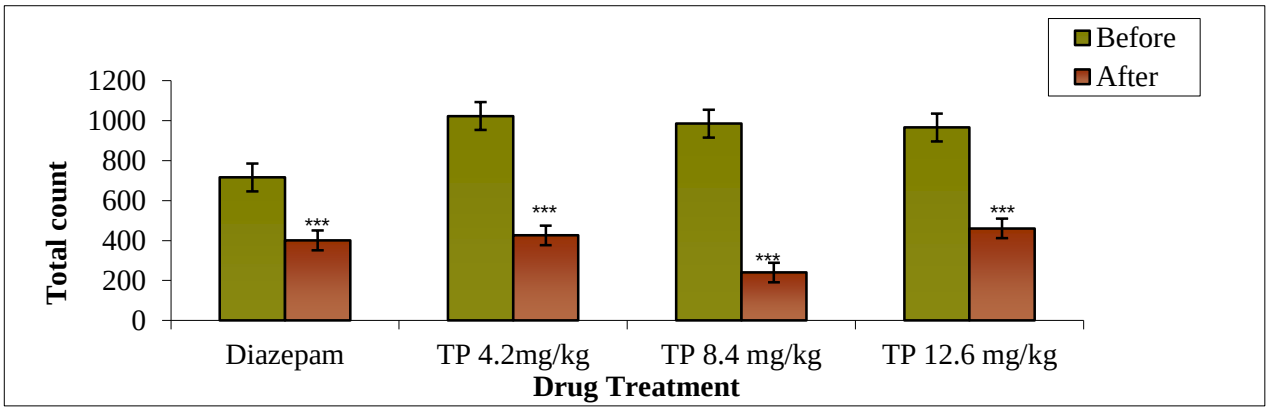
The locomotor activity (horizontal activity) can be easily measured using an actophotometer, which operates on photoelectric cells, which are connected in circuit with a counter. When the beam of light falling on the photocell is cut off by the animal, a count is recorded. An actophotometer could have either circular or square arena in which the animal moves. Weigh the animals and number them. Turn on the equipment (check and make sure that the photocells are working for accurate recording) and place individually each mouse in the activity cage for 10 min. Note the difference in the activity, before and after drugs administered (Kulkarni S.K., 1999).

Hole Board: The hole board apparatus consisted of square wooden board (50 × 50 cm.) with 16 equally spaced hole of 3-cm. diameter each. The board was held 20 cm. above the ground with the help of 4 legs at the corners. The board was divided into 25 squares to measure the locomotor

Table 2: Effect of aqueous extract of TP on locomotor activity using Actophotometer:

Sr. no.	Treatment (mg/kg) (i.p.)	Locomotor Activity	
		Before	After
1	Diazepam (0.3)	716.6±1.96	401.8±3.30***
2	TP (4.2)	1023.6±8.84	426.2±3.99***
3	T.P (8.4)	985.2±2.55	240 ± 3.80***
4	TP (12.6)	966.6±2.70	461.6 ± 3.14***

n=5, Values are Mean ± SEM; TP- aqueous extract of Tridax Procumbens Linn.
**** p<0.001, as compared Vs self control treated group (Paired t - test).*



Graph: 4: Screening of Locomotor activity of aqueous extract of Tridax Procumbens using Actophotometer
TP- Aqueous Extract of Tridax Procumbens
**** p<0.001, as compared with self control treated group (unpaired t - test)*

Table 3: Effect of aqueous extract of TP on locomotor activity using Hole board

Sr. no.	Drug Treatment (mg/kg) (i.p.)	Head pocking		Square cross	
		Before drug	After 30 min	Before drug	After 30 min
1	Diazepam (0.3)	38.6±0.87	12±0.44***	47±0.70	29.6±0.81***
2	TP (4.2)	40±0.7	28.8±0.48***	53.8±0.4	41±1.78***
3	TP (8.4)	40.6±1.07	19.4±0.24***	31.6±0.74	16.2±0.58***
4	TP (12.6)	42.2±0.96	10.2±0.37***	35.8±1.06	8.4±1.43***

n=5, Values are Mean ± SEM; TP- aqueous extract of Tridax Procumben .
****p<0.001 as compare to self control (Paired t - test).*

activity. The animal was placed in the center of the board and allowed to adopt for 5 min. the number was heads dipped in next 5 min. Was taken as the exploration score and the number of squares crossed by hind legs during this period was taken as the locomotion score of the animal. Every care was taken to avoid any sort of light of sound stimulus during the experiment. (Jaiswal A.K., 1992)

RESULTSN AND DISCUSSION

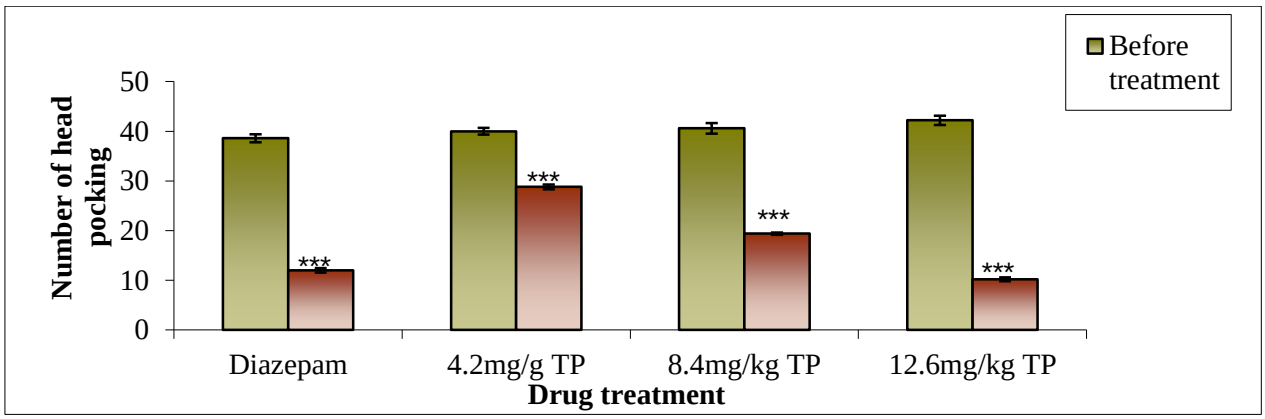
Central nervous system is complex, regulating/controlling various body functions through the balance of variety of stimulating and inhibitory neurotransmitters. Any drug that alters the action of any of the neurotransmitters may affect various neurobehavioral and neuroendocrinal functions.

In the present study leaf extract of '*Tridax Procumbens*' (TP) Linn. Family Asteraceae was screened for its pharmacological action on Central Nervous System. To access the preliminary activity of TP leaf on CNS, locomotor activity using Actophotometer and Hole- board as locomotor activity is the index of wakefulness (alertness) of mental activity.

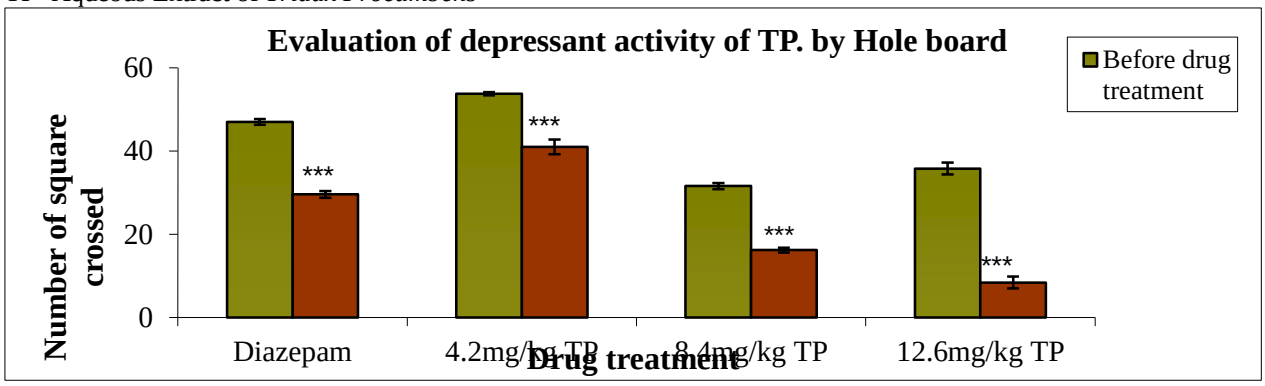
Locomotor Activity: In actophotometer, preliminary attempts were made to assess the stimulant or depressant effect of *Tridax Procumbens.* In the present study diazepam, *Tridax Procumbens* 4.2, 8.4 and 12.6 mg/kg (i.p.) significantly ($p<0.001$) decreased the locomotor activity. Thus the results of the present investigation indicate that *Tridax Procumbens* extract dose dependently depresses the central nervous system, which is evident from *Tridax Procumbens* induced decrease in locomotor activity. In present study, Diazepam, *Tridax Procumbens* 4.2, 8.4 and 12.6 mg/kg (i.p.) significantly ($p<0.001$) produced decrease in the number of head dipping and also decrease in the exploratory behavior as compared with the self-control treated group in the hole board test.

CONCLUSION

The aqueous extract of leaf '*Tridax Procumbens*' (TP) Linn. Family Asteraceae was extracted by Percolation method, for the study of Locomotor activity in mice and rat by using two methods are i.e. Actophotometer method and Hole Board method. The results of the present investigation indicate that *Tridax Procumbens* extract dose dependently depresses the central nervous system, which



Graph 5: Screening of locomotor activity of aqueous extract of *Tridax Procumbens* using Hole Board
*** p<0.001 as compare to self control (Paired t - test).
TP- Aqueous Extract of *Tridax Procumbens*



Graph 6: Screening of Locomotor activity of aqueous extract of *Tridax Procumbens* using Hole Board.
***p<0.001 as compare to self control (Paired t - test).
TP- Aqueous Extract of *Tridax Procumbens*

is evident from *Tridax Procumbens* induced decrease in locomotor activity. Therefore it can be concluded that the plant *Tridax Procumbens* is said to possess the locomotor activity.

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