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Preliminary screening of diuretic activity of *Triumfetta rhomboidea* Jacq leaves extracts in rats

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ABSTRACT

The methanol and petroleum ether extracts of dried leaves of *Triumfetta Rhomboidea* Jacq (Family: Tiliaceae) were evaluated for diuretic activity. Both the extracts (100 and 200 mg/kg, o.p.) significantly increased the total volume of urine as compare to control. Excretion of electrolytes (sodium, potassium and chloride) in urine was appeared to be similar to that of furosemide (20 mg/kg) taken as standard drug. The extracts exhibited dose dependent diuretic effect, highest dose of methanol extract showed maximum diuretic activity. These results substantiate the folklore claim of *Triumfetta Rhomboidea* Jacq for its diuretic activity.

Keyword: *Triumfetta Rhomboidea* Jacq, Diuretic, flavonoid, frusemide

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INTRODUCTION

Triumfetta Rhomboidea Jacq (Family: Tiliaceae) is perennial herb, which is distributed throughout tropical and subtropical part of India up to an elevation of 1,200 m in the Himalayas. It is also available in Ceylon, Malay, China, Africa and America. The Bark and Fresh Leaves of this plant are used in traditional medicine for the treatment of diarrhea, diuretic and used as poultice on Tumors [1]. However, as yet, the diuretic potential of this plant is not investigated by scientifically controlled studies. In the present investigation, diuretic activity of *Triumfetta Rhomboidea* Jacq is screened in rats based on the use in traditional folk medicine. For this purpose, methanol and petroleum ether extracts of leaves were taken.

MATERIAL AND METHODS

Plant material

The *Triumfetta rhomboidea* Jacq (Tiliaceae) was collected in the month of October from Yercaut hills of Salem (District), Tamilnadu, India. It was authenticated by Dr. G. Murthy Botonical survey of India, Chennai University. A voucher specimen (BSI/SC/5/23/05.06/Tech/132) has been deposited in the Herbarium of department of pharmacy, Chennai University, Tamil nadu.

Preparation of extracts

The leaves were shade dried and coarsely powdered and Soxhlet extracted successively with petroleum ether and methanol. Extracts were concentrated in vacuo and evaporated using rotary flash evaporator giving a petroleum ether extract of *Triumfetta rhomboidea* (PEETR, yield: 2.25%w/w) and methanolic extract of *Triumfetta rhomboidea* (METR, yield: 4.65% w/w).

Phytochemical screening

Preliminary phytochemical screening of both the extracts utilizing standard methods of analysis [2] revealed the presence of steroid, triterpenoids, glycosides, flavonoids[Table1].

Assessment of diuretic activity

The method of Lipschitz *et al* [4] was employed for the assessment of diuretic activity. The experimental protocols have been approved by the institutional Animal Ethical Committee. In this method, male rats weighing between 150-200 g, deprived of food and water for 18 h prior to the experiment were divided in six groups of six rats in each. The first group of animals, serving as control, received normal saline (25 ml/kg, p.o.); the second group received furosemide (20 mg/kg, i.p.) in saline. The third and fourth groups received METR at doses of 100 and 200 mg/kg, p.o. respectively while fifth and sixth group received PEETR at doses of 100 and 200 mg/kg, p.o. respectively.

Immediately after administration, the animals were placed in metabolic cages (2 per cage), specially designed to separate urine and faeces, kept at 20±0.5°. The volume of urine collected was measured at the end of 5 h. During this period, no food and water was made available to animals. The parameters taken were total urine volume, concentration of Na^+, K^+ and Cl^- in the urine. Na^+ and K^+ concentrations was determined by flame photometer [5] and Cl^- concentration was estimated by titration [6] with silver nitrate solution (N/50) using 3 drops of 5% potassium chromate solution as indicator. All results were expressed as mean±standard error. The data was analyzed for statistical significance and the level of probability was set at $P<0.05$ [Table2].

Acute toxicity test

The LD 50 of the extract was determined in mice using method of Lorke [3].

Table 1 : Data showing the preliminary phytochemical screening of METR and PEETR

Constituents	Petroleum Ether Extract (80% v/v)	Methanolic extract (95% v/v)
Carbohydrate	-	+
Glycosides	+	+
Alkaloids	-	-
Phytosterol and steroids	+	+
Flavonoids	+	+
Protein&Amino Acid	-	+
Tannin	-	-
Resins	-	-
Gum of mucilage	-	-
Triterpenoids	+	+

+ Present; – Not detected.

Statistical analysis

All data for antidiarrheal activity is expressed as mean ± SEM and analyzed by one-way ANOVA followed by Dunnett's *t*-test using computerized GraphPad InStat version 3.05 (Graph Padsoftware, U.S.A). $P<0.05$ was considered statistically significant in all the cases.

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Table 2: Diuretic activity of Methanolic (METR) and Petroleum ether extract (PEETR) in rats

Treatment Dose	Urine volume (ml)	Na^+ (MEq/Lt)	K^+ (MEq/lt)	Cl^- (MEq/Lt)	Na^+/K^+ ratio
Control 25 ml/kg (Saline)	1.283±0.3280	95.40±0.77	87.13±1.15	85.17±1.065	1.09
METR 100 mg/kg	2.100±0.3483*	101.7±1.73*	89.35±1.67	88.25±0.7558	1.14
METR 200 mg/kg	3.333±0.084***	123.2±2.02***	94.20±1.13**	85.58±1.216	1.31
PEETR 100 mg/kg	2.125±0.09106*	96.58±0.84	86.45±2.36	83.43±1.402	1.12
PEETR 200 mg/kg	2.455±0.1094**	102.9±1.78**	88.93±0.95	80.92±1.576	1.16
Furosemide 20 mg/kg	3.500±0.057***	136.8±0.91***	93.03±0.82*	94.18±1.041***	1.47

Values are expressed as mean ± S.E.M. (n=6). *p<0.05, **p<0.01, ***p<0.001 when compared with control.

RESULTS

The preliminary pharmacological screening of the METR and PEETR revealed that both the extracts have diuretic activity. METR extract at dose of 100 and 200 mg/kg increases excretion of sodium and potassium ion compared to the control in a dose dependent manner while PEETR at dose of 200 mg/kg showed significant excretion of sodium in urine. Both the extracts showed significant increased total volume of urine in a dose dependent manner. METR at dose of 200mg/kg exhibited maximum diuretic activity.

The onset of this diuretic action was extremely prompt (within 1 h) and lasted throughout the studied period (up to 5 h). The obtained effect was comparable to that of furosemide (20 mg/kg, i.p.) taken as potent diuretic drug. It was also observed that the extract increases the ratio of concentration of excreted sodium and potassium ion compared to the control. The preliminary acute toxicity test in showed that both extracts are safe up to a dose of 2000mg/kg (data is not shown).

DISCUSSION

The preliminary study supported the presence of effective diuretic constituents in the both the extract of *Triumfetta rhomboidea* Jacq. It is reported previously that the flavonoid glycosides are endowed with diuretic activity [7]. It may therefore be presumed here that the diuretic activity is due to presence of flavonoids in the test extracts. The data allowed with the conclusion that the extract acts as a diuretic because of increased urinary electrolyte concentration with significant increase in the urinary output [8]. The increase in the ratio of concentration of excreted sodium and potassium ion for the tested extract, compared to control, indicates that the extract increases sodium ion excretion to a greater extent than potassium, which is a very essential quality of a good diuretic with lesser hyperkalaemic side effect.

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REFERENCES

[1] Kirtikar KR and Basu BD. Indian medicinal plants. 2nd ed., Vol.1. Dehradun: International Book Distributors;1975 p. 395.
[2] Trease GE and Evans WC. Pharmacognosy. Pharmacognosy. 15th ed. Saunders Publishers, London; 2002.
[3] Lorke D. Arch Toxicol1983; 54:275-278.
[4] Lipschitz WL, Haddian Z, Kerpscar A. J Pharmcol Exp Ther1943; 79:110-116.
[5] Vogel's Textbook of Quantitative Chemical Analysis. 5th ed, England; Addison Wesley Longman publishers; 1989 p 801.
[6] Beckette AH and Stenlake JB. In; Practical Pharmaceutical Chemistry Part-I. 1st ed. CBS Publishers & Distributors, New Delhi; 1997 p 197.
[7] Sayed NHEL, Awaad AS, Mabry TJ. J Pharmcol Exp Biol2004; 42: 186-189.
[8] Kavimani S, Ilango R, Thangadurai JG, Jaykar B, Majumdar UK, Gupta M. Indian J Pharm Sci1997; 59:96-98.