

## ORIGINAL RESEARCH ARTICLE

**Evaluation of Diuretic Activity of *Phyllanthus fraternus* Web Aerial Parts On Albino Rats.****Biradar Kalyani<sup>1\*</sup>, Khavane K.<sup>2</sup>, Payghan Santosh<sup>3</sup>, Setty Ramchandra S.<sup>1</sup>.**

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Received 28 Aug 2010; Revised 22 Sep 2010; Accepted 2 Oct 2010

**ABSTRACT**

The Study was designed to evaluate the diuretic activity of *Phyllanthus fraternus* web (Euphorbiaceae). The 70% methanolic extract of aerial parts of *Phyllanthus fraternus* were tested by using Wister albino rats. The animals were grouped into 4 groups containing 6 animals in each. All animals were hydrated with normal saline at a dose of 25ml / kg orally 30sec prior to treatment. The group I served as control, group II & III were treated with 100mg/kg and 200mg/kg of 70% methenolic extract respectively. Group IV treated with the standard frusemide 20mg/kg. The volume of urine measured at the end of 6 hrs. The Na<sup>+</sup>, K<sup>+</sup> & Cl<sup>-</sup> ion concentration in the urine samples were determined. The volume of urine (7.38 ± 0.18 & 9.11 ± 0.14) and urinary Na<sup>+</sup>, K<sup>+</sup> & Cl<sup>-</sup> ionic concentrations (3.15 ± 0.15 & 6.15 ± 0.24, 2.50 ± 0.10 & 3.57 ± 0.10) and 5.60 ± 0.13 & 7.39 ± 0.13) were found to rise in test group II and III.

**Key words:** *Phyllanthus fraternus*, Diuretic & Urinary volume.**INTRODUCTION:**

Diuretics agents are very useful in treatment in the situation of Acute and Chronic renal failure, cirrhosis of liver, *diabetes insipidus*, and hypocalcaemia. In addition to hypoalbuminia and as a antihypertensive in the clinical practice<sup>1</sup>. Now a day's several synthetic potent diuretics are very much in clinical practice however very less number of herbal drug research has been done in relatives with diuretics. *Phyllanthus fraternus* in a widespread tropical genus and has been much employed in traditional medicines<sup>2</sup>. The plant is distributed throughout India as a weed in cultivated and wasteland the herb is however collected round the year but good quality herb can be obtained after sept-oct month. It is a branching annual glabrous herb, 30-60 cm light with slender spreading leaf-bearing branchlets leaves numerous, distichous, subsessile, elliptic oblong, obtuse, base rounded flowers yellowish green or whitish, maxillary, males in groups of 1-3 females solitary fruits globular, trilocular, up to 2mm in diameter, pale green in color occurring in axial of leaves most restricting to the lower side of stem<sup>3</sup>.

The plant *Phyllanthus fraternus* Web. A (Euphorbiaceae) aerial part has been claimed as diuretic profile in an ancient literature<sup>4</sup>. The present study was designed to investigate a diuretics activity of 70% methenolic extract of aerial parts of *Phyllanthus fraternus* Web on normal healthy Wister albino rats.

**Materials and methods**

**The plant material and preparation of extracts:** *Phyllanthus fraternus* web aerial parts was collected from the surrounding villages of Harapanahalli in the month of Sept-Oct. The plant was identified and authenticated by Department of Pharmacognosy, S.C.S. College of Pharmacy, Harapanahalli. The plant specimen has been deposited at the herbarium of the college. The aerial part of the plant was shade-dried and crushed at room temperature and pulverized. The powder obtained was subjected to soxhlet extraction with 70% methanol which was used for diuretic activity<sup>5</sup>. The extract were concentrated under reduced pressure and stored in a dedicator until further use.

**The Experimental animals and Acute toxicity studies:**

Adults Wister albino rats weighing between 140-190gms and adult Swiss albino mice weighing between 20-25gms of either sex were used for the study. The animals were housed in standard polypropylene cages at room temperature and provided with standard diet (gold Mohr Lipton India Ltd) and water was given *ad libitum* under strict hygienic conditions and ethical clearance for animal use was obtained from institutional animal ethical committee prior to the activity <sup>6</sup>. The acute toxicity for 70% metabolic extracts of *Phyllanthus fraternus* Web. were determined on albino mice, the selected animals were divided in to eight group of six in each .the control group received 2ml per kg of vehicle orally, other groups received the extract as test drug in one of dose 100, 200, 400, 800, 1000, 2000&3000mg per kg in a similar manner, after dosing the animals were observed continuously for first behavioral changes and mortality if any at the end of 24 hrs, 48 hrs and 72 hrs respectively <sup>7</sup>.

**Diuretic Activity:**

The test extract were evaluated for the diuretic activity according to the method of P. Selvamani et al <sup>8</sup>. Albino rats of either sex deprived form food and water 18 hrs prior to the experiment. All animals were hydrated with normal saline at a dose of 25 ml/kg orally prior to drug treatments. Group I served as control. Group II and III received test extract of 100 and 200 mg/kg i.p.respectively. and Group IV standard drug frusemide 20 mg/kg i.p. was given. The animals

were housed in metabolic cages specially designed to collect urine and to retain feces. The volume of urine collected was measured at the end of 6 hrs. The Na<sup>+</sup> and K<sup>+</sup> ion concentration in the urine samples were determined using Flame Photometer. The Cl<sup>-</sup> ion concentration was found by titration of samples with 0.02 N AgNO<sub>3</sub> using 5% potassium chromate solutions as indicator. The result obtained was compared with the control and analysed by Students‘t’ test.

**RESULTS:**

An attempt was made to identify LD<sub>50</sub> of 70% methanolic extract of *Phyllanthus fraternus* Web. aerial parts. Since no mortality was observed at 2000 mg/kg. It was thought that 2000mg/kg was the cut off dose. Therefore 1/10<sup>th</sup> and 1/20<sup>th</sup> dose (i.e. 200mg/kg and 100mg/kg) were selected for the study. The volume of urine, urinary sodium, potassium and chloride of the animals was assessed. It was observed that the volume of urine (7.38 ± 0.18 & 9.11 ± 0.14) was found and urinary concentrations of sodium is (3.15 ± 0.15 & 6.15 ± 0.24) µmol/lit, potassium µmol/lit and chloride 3.97 ± 0.07 µmol/lit. Upon administration of frusemide in standard group are increased all the parameters of our study.

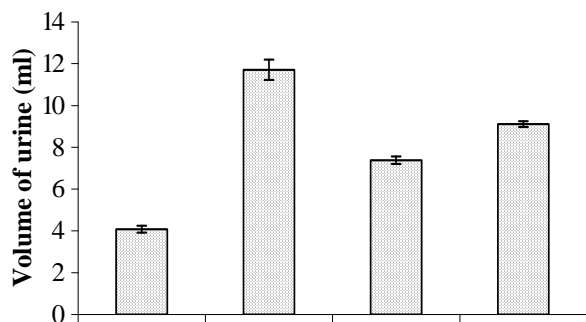
However the rise in potassium concentration was in significant in treatment with 70% methanolic extract of 100 mg/kg and 200 mg/kg, there was increased all parameters as shown in upon the results compelled in Table and graphically depicted in Fig. No. 1, 2, 3 and 4.

**Diuretic effect of 70% alcoholic extracts of *Phyllanthus fraternus* Web. (aerial parts) in healthy albino rats.**

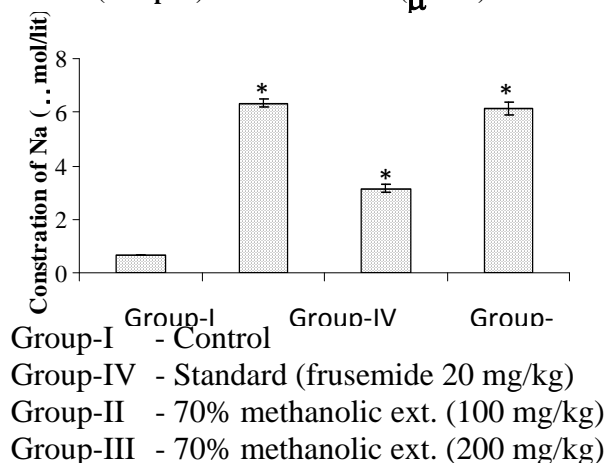
Groups	Dose (mg/kg)	Volume of Urine (ml)	Urinary ionic concentrations		
			Na <sup>+</sup> (µmol/lit)	K <sup>+</sup> (µmol/lit)	Cl <sup>-</sup> (µmol/lit)
I (Control)	vehicle	4.08 ± 0.17	0.67 ± 0.01	2.28 ± 0.20	3.97 ± 0.07
II (test)	100 mg/kg	7.38 ± 0.18*	3.15 ± 0.15*	2.50 ± 0.10	5.60 ± 0.13*
III (test)	200 mg/kg	9.11 ± 0.14*	6.15 ± 0.24*	3.57 ± 0.10*	7.39 ± 0.13*
IV (Standard)	20 mg/kg	11.71 ± 0.49*	6.33 ± 0.14*	2.58 ± 0.12	9.45 ± 0.13*

\*P<0.001 (vs. Control).

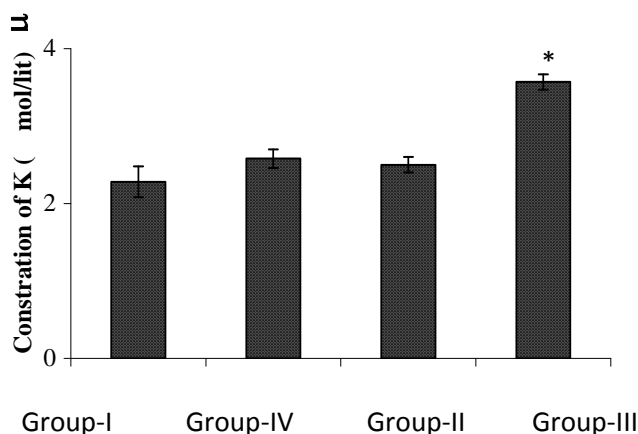
**Fig No. 1**  
Effect of 70% alcoholic extract of *Phyllanthus fraternus* Web. (aerial parts) on volume of urine (ml)



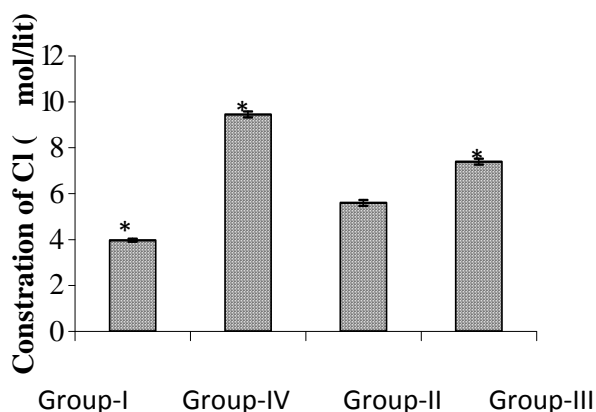
**Fig No. 2**  
Effect of 70% alcoholic extract of *Phyllanthus fraternus* Web. (aerial parts) on concentration of Na ( $\mu$ mol/lit) in urine



**Fig No. 3**  
Effect of 70% alcoholic extract of *Phyllanthus fraternus* Web. (aerial parts) on concentration of K<sup>+</sup> ( $\mu$ mol/lit) in urine



**Fig No. 4**  
Effect of 70% alcoholic extract of *Phyllanthus fraternus* Web. (aerial parts) in Diuretic in rats, increased Cl ( $\mu$ mol/lit)



Group-I - Control  
Group-IV - Standard (frusemide 20 mg/kg)  
Group-II - 70% methanolic ext. (100 mg/kg)  
Group-III - 70% methanolic ext. (200 mg/kg)

From the study the exact site of action of test drug is difficult to explore, thus it has been need to undertake further studies to isolate phytoconstituents responsible for diuresis so as to identify the lead molecule responsible for diuretic activity.

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**Discussion:**

The study revealed that the diuretics and acute toxicity studies was observed that the 70% alcoholic extract at tested dose levels were increased in urination and no mortality was observed with the animals even after observation for a period of 72hrs.

The extract showed dose dependent significant diuretic activity. However less potent than standard drug. The extract increased the volume of urine and cation excretion at tested doses level. The result showed that significantly increased ionic concentration of sodium and potassium levels in urine as compared with control group.

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