

Diuretic activity of *Phyllanthus niruri* (Linn.) in rats

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ABSTRACT

Aqueous extract of *Phyllanthus niruri* (200 mg/kg and 400 mg/kg, p.o. single dose) was tested for its diuretic activity and compared with the standard drug hydrochlorothiazide (10 mg/kg p.o.; single dose). Significant increase in the volume of urine and excretion of sodium, potassium and chloride was recorded when aqueous extract of *Phyllanthus niruri* was administered to hydrated albino rats.

Keywords: *Phyllanthus niruri*; Diuretic action

1. INTRODUCTION

Phyllanthus niruri [1] is claimed to have diuretic and antilithiatic activity in indigenous system of medicine. A survey of the literature revealed the absence of any systematic study on diuretic activity of the plant. Hence a study has been taken up to verify the claims made in the indigenous Ayurvedic system of medicine.

2. MATERIALS AND METHODS

The plant material—*phyllanthus niruri* was collected locally during the month of July to December. The botanical identity was confirmed by the Department of Botany Sri Poornaprajna college Udupi. Institutional Ethical Committee clearance was obtained for the experiment.

3. EXTRACTION

The shade dried plant (2 kg) was boiled with water in batches of 600 gm each. The aqueous extract was concentrated and dried on water bath (yield = 10%).

4. ACUTE TOXICITY STUDY [2]

Aqueous extract of *Phyllanthus niruri* was administered

orally in varying doses of 1, 2, 4 and 8 g/kg to Wister strain albino rats of either sex (n = 6/group, 180-250 g).

Animals were observed for acute toxic effect initially continuously for two hours and thereafter at frequent intervals for 24 hours and thereafter once daily for 14 days.

5. DIURETIC ACTIVITY [3,4]

Albino rats of either sex (180-250 g) fasted over night were used, each group consisting of 10 animals. The animals were orally hydrated with 5 mL water, immediately before starting the procedures. Rats were placed individually in a metabolic cage and the urine was collected in tubes containing two drops of liquid paraffin to prevent evaporation. The urine collected over a period of 24 hours was measured, pH was noted and sodium, potassium, chloride, magnesium, phosphate and uric acid concentrations were determined.

Each animal was given three trials at biweekly intervals and the average was taken as the reading for calculation. The tests were done with single oral dose of aqueous extract of *Phyllanthus niruri* (200 mg and 400 mg/kg p.o.) and hydrochlorothiazide (10 mg/kg p.o.). These results were then compared with the diuretic activity of the orally administered vehicle as control. This was repeated with single oral dose of aqueous extract of *Phyllanthus niruri* (200 mg and 400 mg/kg p.o.) and hydrochlorothiazide (10 mg/kg p.o.) and compared with that of the orally administered vehicle as control.

6. STATISTICAL ANALYSIS

Student 't' test was used for statistical analysis.

7. RESULTS AND DISCUSSIONS

Acute toxicity studies did not show any toxic effect up to 4 g/kg p.o. in a single dose up to 14 days. In 8 g/kg p.o.

Table 1. Urine volume and concentration of electrolytes (mEq/L).

Drug & pH of urine	Dosage mg/kg	Urine volume ml/24hr	Electrolytes mEq/L		
			Na ⁺	K ⁺	Cl ⁻
Control pH – 8.24 ± 0.26	Vehicle 5 ml water	5.2 ± 0.12	35.5 ± 3.70	56.19 ± 5.88	50.3 ± 2.73
AEPN pH – 8.02 ± 0.08	5 ml water + 200 mg/kg p.o.	8.9 ± 0.01 ^c	46.2 ± 2.13 ^a	87.3 ± 3.81 ^c	69.14 ± 6.4 ^a
AEPN pH – 8.06 ± 0.12	5 ml water + 400 mg/kg p.o.	9.74 ± 0.08 ^c	49.2 ± 4.54 ^a	94.5 ± 10.74 ^b	74.4 ± 9.31 ^a
Hydrochlorothiazide pH – 8.5 ± 0.21	5 ml water + 10 mg/kg p.o.	10.2 ± 0.13 ^c	51 ± 3.9 ^b	79.10 ± 4.97 ^b	79.0 ± 2.87 ^c

n = 10; a = P < 0.05; b = p < 0.01; c = p < 0.001; AEPN = Aqueous extract of *Phyllanthus niruri*.

dose some animals showed drowsiness and reduced spontaneous activities. So one tenth of the highest tolerated dose (*i.e.* 400 mg/kg and one lower dose *i.e.* 200 mg/kg) was used for diuretic activity studies. The pH of the urine was not significantly altered with the drug and it varied between 8.2 in control to 8.5 with hydrochlorothiazide. The results (**Table 1**) show that aqueous extract of *Phyllanthus niruri* has significant diuretic activity and it has significantly increased the excretion of sodium, potassium and chloride as compared to that of the vehicle control and the volume of urine and electrolyte excretion pattern was comparable to that of the standard drug chosen *i.e.* hydrochlorothiazide.

These results substantiate the claims made in indigenous system of medicine.

8. ACKNOWLEDGEMENTS

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