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 overnight 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).

<table>
<thead>
<tr>
<th>Drug &amp; pH of urine</th>
<th>Dosage mg/kg</th>
<th>Urine volume ml/24hr</th>
<th>Electrolytes mEq/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Vehicle 5 ml water</td>
<td>5.2 ± 0.12</td>
<td>Na⁺ 35.5 ± 3.70</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>K⁺ 56.19 ± 5.88</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cl⁻ 50.3 ± 2.73</td>
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<tr>
<td>AEPN pH 8.02 ± 0.08</td>
<td>5 ml water + 200 mg/kg p.o.</td>
<td>8.9 ± 0.01*</td>
<td>Na⁺ 46.2 ± 2.13*</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>K⁺ 87.3 ± 3.81*</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Cl⁻ 69.14 ± 6.4*</td>
</tr>
<tr>
<td>AEPN pH 8.06 ± 0.12</td>
<td>5 ml water + 400 mg/kg p.o.</td>
<td>9.74 ± 0.08*</td>
<td>Na⁺ 49.2 ± 4.54*</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>K⁺ 94.5 ± 10.74*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cl⁻ 74.4 ± 9.31*</td>
</tr>
<tr>
<td>Hydrochlorothiazide</td>
<td>5 ml water + 10 mg/kg p.o.</td>
<td>10.2 ± 0.13*</td>
<td>Na⁺ 51 ± 3.9*</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>K⁺ 79.10 ± 4.97b</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Cl⁻ 79.0 ± 2.87*</td>
</tr>
</tbody>
</table>

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

8. ACKNOWLEDGEMENTS
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REFERENCES