Anticonvulsant Activity of *Peperomia tetraphylla* (G.Forst., Hook. & Arn.)

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**INTRODUCTION**

*Peperomia tetraphylla* belonging to Piperaceae family is commonly known as Ala ala wai nu Kani and tamil name is vanabhrami.1 *Peperomia tetraphylla* is a perennial shrub that is thought to have originated in Africa and is used as a medicinal plant to treat a wide range of disorders. The plant *Peperomia tetraphylla* (G.Forst) Hook & Arn. has been claimed to possess various medicinal properties. The juice of the whole plant is employed in treatment of convulsions, skin diseases, cough, asthma like symptoms and kidney disorders.2,3

From the ethno medical information and folk claims it was observed that the plant *Peperomia tetraphylla* has medicinal properties related to urolithiasis and convulsant which has not been scientifically validated and only some of the phytochemical studies have been carried out and reported for the presence of Bio active compounds, Prenylated quinones, Piperogalins.4,5,6

**MATERIALS AND METHODS**

**Collection and authentication of plant material**

The plant specimen for the proposed study were collected from Trichy, in the month of July 2010, the plant material was identified and authenticated by Dr. P. Jayaraman, Plant Anatomy Research Centre, Pharmacognosy Institute, Chennai.7

**Extraction**

500 g of the powdered material was mixed with absolute alcohol (2.5 litres) and left for 72 h. The mixture was stirred at 6 h intervals using a sterile glass rod, the extract were passed through a filter paper. The filtrates were concentrated with a vacuum pump at 40°C, giving a yield of 3.78%, which was stored in universal bottles and refrigerated at 4°C prior to use.

**Phytochemical screening**

Qualitative tests for the presence of plant secondary metabolites such as carbohydrates, alkaloids, tannins, flavonoids, saponins and glycosides were carried out on the plant powdered using standard procedures.8,9,10,11

**Animals**

Albino Wister rats weighing 50 to 230 gms, with three months of age, were used throughout this study. The animals were randomly housed in appropriated cages at 25 ± 2 °C on a 12 h light/dark cycle (lights on 06:00-18:00) with

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free access to food and water. The protocol of study was approved by animal ethics committee of the department and the experiments were carried out as per the guidelines of CPCSEA.

**Acute toxicity studies**

The acute toxicity studies were tested according to the OECD guidelines. The two extracts i.e. Methanol, chloroform extracts were administered orally with tween 80 suspension. The extracts were administered in doses of 50, 200, 500, 1000, 1800, 2000 mg/kg to different groups of rats, each containing 3 animals and mortality were observed after 24 hrs. LD$_{50}$ cut off values for Methanol, chloroform extracts were found to be 2000 mg/kg.b.w and for methanol extract 1800 mg/kg b.w. The 1/10th of the lethal dose was taken for effective dose (therapeutic dose) for subsequent anticonvulsant activity.

**MES induced convulsions**

Albino wistar rats of either sex weighing 150 to 230 gms were divided into Six groups of Five animals in each. The group-I received vehicle control whereas Group-II received standard drug (Phenytoin, 25mg/kg) intraperitoneally, Group-III, IV, V & VI received 250, 500 mg/kg methanolic and chloroform extract of *Peperomia tetraphylla* (250 and 500 mg/kg body weight) respectively for 14 days. On the 14th day, Seizures are induced to all the groups by using an Electro convulsiometer. Maximal electroshock seizures were elicited by a 60 Hz alternating current of 150 mA intensity for 0.2 sec. A drop of electrolyte solution (0.9% NaCl) with lignocaine was applied to the corneal electrodes prior to application to the rats. This increases the contact and reduces the incidence of fatalities. The duration of various phases of epilepsy were observed. The percentage protection was estimated by observing the number of animals showing abolition of Hindleg Tonic Extension (or) extension not greater than 90°.

**Statistical analysis**

Values were expressed as mean ± SEM from 6 animals. Statistical differences in mean were calculated using one way ANOVA followed by Dunnett’s test. P<0.0001 was considered statistically significant.

**RESULTS**

**Preliminary phytochemical studies**

The preliminary phytochemical screening of ethanolic and aqueous extract shows the presence of alkaloids, glycosides, carbohydrates, tannins, phenolic compounds, proteins, amino acids, saponins and flavonoids.

**Effect on MES induced convulsion**

The poly herbal extract exhibited a dose dependent significant (P<0.0001and P<0.0001) reduction in various phases of epileptic seizure on comparison with the reference standard phenytoin 25 mg/kg, i.p. and the results are shown in Fig 1&2. There was also a significant reduction in the time required for the righting reflex (recovery) in the extract treated groups, the results are shown in Table 1.

### Table 1. Effect of Methanolic and Chloroform Extracts of Whole Plant of *Peperomia tetraphylla* on MES Induced Seizures in Albino Wister Rats.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>TREATMENT (mg/kg bw)</th>
<th>Flexon (Sec)</th>
<th>Extensor (Sec)</th>
<th>Clonus (Sec)</th>
<th>Stupor (Sec)</th>
<th>% Incidence of Convulsions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control (saline 1 ml/rat)</td>
<td>8.45±0.174</td>
<td>15.45±0.177</td>
<td>16.70±0.295</td>
<td>9.30±0.198</td>
<td>209.33±2.654</td>
</tr>
<tr>
<td>2</td>
<td>Standard Phenytoin (25mg/kg)</td>
<td>4.28±0.095***</td>
<td>0</td>
<td>9.23±0.02***</td>
<td>2.13±0.103***</td>
<td>201.00±1.263</td>
</tr>
<tr>
<td>3</td>
<td>Chloroform Extract (250mg/kg)</td>
<td>3.22±0.008***</td>
<td>1.43±0.056***</td>
<td>5.23±0.086***</td>
<td>22.53±1.235***</td>
<td>132.56±2.023</td>
</tr>
<tr>
<td>4</td>
<td>Chloroform Extract (500mg/kg)</td>
<td>2.13±0.075***</td>
<td>1.13±0.032***</td>
<td>18.50±0.425***</td>
<td>18.65±0.425***</td>
<td>114.32±0.652</td>
</tr>
<tr>
<td>5</td>
<td>Methanolic Extract (250mg/kg)</td>
<td>3.517±0.095***</td>
<td>1.98±0.123***</td>
<td>5.63±0.005***</td>
<td>24.36±0.845***</td>
<td>134.60±1.895</td>
</tr>
<tr>
<td>6</td>
<td>Methanolic Extract (500mg/kg)</td>
<td>2.25±0.060***</td>
<td>1.52±0.075***</td>
<td>5.20±0.165***</td>
<td>21.60±0.619***</td>
<td>117.000.896</td>
</tr>
</tbody>
</table>

Values expressed are mean SEM from 6 rats. P<0.0001*** as compared to control group
CONCLUSION
The results obtained in the MES test in rats shows that, the standard drug as well as the different extracts of whole plant of *Peperomia tetraphylla* protected the animals against MES induced seizures. Whole plant extracts of *Peperomia tetraphylla* had a slower onset of action and lesser degree of anticonvulsant activity, (Approximately one fifth the activity of Phenytoin) but the activity lasted for 24 hrs. The results obtained in these studies demonstrated unequivocally that like Phenytoin the plant possessed anticonvulsant activity. In the MES test since, inhibition of the MES test predicts the activity against generalized tonic clonic and cortical focal seizures. Hence it suggests that the Methanolic extract of the whole plant was useful in suppressing generalized tonic clonic seizures. Several drugs are thought to inhibit the seizures by regulating GABA mediated synaptic inhibition through an action at distinct sites of the synapse. Researchers are gaining new insight in to the traditional medicine in assisting the body to maintain its own self healing systems while preventing debilitating effects of chronic diseases, like epilepsy.

Thus Methanolic extracts and Chloroform extracts of the whole plant of *Peperomia tetraphylla* possess anticonvulsant property against the MES in albino Wistar Rats. This effect is more pronounced as compared with the standard – Phenytoin.

REFERENCES
8. Pambasta, The useful plants of India (*Peperomia Pellucida*).