Study on the effect of different parts of *Nyctanthes arborotristis* linn. on the hematological parameters of mice
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**ABSTRACT**

Hematological effect of the ethanolic extracts of the flowers, barks, seeds and leaves of *Nyctanthes arborotristis* Linn were estimated at the dose levels of 200, 400 and 600 mg/kg body weight (I.P.), which were selected from the study of their LD\(_{50}\) value. From the overall study it was observed that the ethanolic extracts have antianemic, hematostatic effect and are hematologically nontoxic. Whereas the ethanolic extracts of the seeds and leaves at the dose of 600mg/kg may possess immunostimulatory effect.

**Key words:** Ethanolic extract, Nyctanthes arborotristis, heamatology.

**INTRODUCTION**

*Nyctanthes arborotristis* Linn. (Fam.Oleaceae), commonly known as Harsingar or Night Jasmine, is a common wild hardy large shrub or small tree. It is a native of India, distributed wild in sub-Himalayan regions and southwards to Godavari. It is also found in Indian gardens for ornamental purposes. *Nyctanthes arborotristis* L is used to cure various ailments in Ayurveda, Sidha and Unani systems of medicines along with several phytochemical and pharmacological investigations. Its Different parts are known to possess different pharmacological properties. Keeping in view of the medicinal importance of this plant the present study was carried out to know the effect of the ethanolic extracts of its flowers, barks, seeds and leaves on the hematological parameters of mice.

**EXPERIMENTAL**

The different plant parts (flowers, seeds, leaves and barks) of *Nyctanthes arborotristis* L. were collected from the gardens and forests of Orissa. The flowers were collected during the month of September to October. The seeds were collected during the month of December to February. Its leaves and barks were collected during the month of March to May. The herbarium of the plant was authenticated from Botanical Survey of India, Kolkata. After drying them properly, the leaves, barks and seeds were powdered coarsely and than they were extracted successively with petroleum ether, chloroform and ethanol (90%) respectively in a soxhlet apparatus. Its fresh flowers were extracted with ethanol (50%). The ethanolic extracts of leaves, barks, seeds and flowers were evaporated to dryness till these got concentrated to dark gummy masses, having yield value 14%, 12.5%, 26.5% and 13% respectively. The water soluble-portions of the extracts were subjected to further pharmacological screening.

Adult inbred male albino mice weighing between 20-30gm, obtained from the animal house of S.I.P.S., Jharpokharia, Orissa, were used for the experiment. They were kept under controlled environmental conditions (30\(^\circ\) C + 2 \(^\circ\) C and normal humidity) with natural light and dark cycle and allowed free access to food and water and acclimatized for at least a week before the commencement of the experiment. The animals were randomly distributed in control and test groups of six animals in each group. The experiments were approved by the Institutional Animals Ethics Committee.

‘Up and down or Stair case’ method was followed for the estimation of acute toxicity of the water soluble portion of the ethanolic extracts of different plant parts of *Nyctanthes arborotristis* L. The dose was increased from 400 mg/kg to 2.0 gm/kg, body weight in intraperitoneal route of administration and found to be free from mortality.

After 15 days of daily treatment with the water soluble fraction of the ethanolic extracts and saline water to the test and control groups respectively, blood was withdrawn from tail veins and by cardiac puncture for the study of following hematological parameters by respective methods.

1. Clotting time of the whole blood following capillary glass method.
2. Bleeding time following Duke’s method.
3. Hemoglobin content following Sahli Hellige method.
4. Total count of RBC using hemocytometer containing RBC diluting pipette and Neubers slide with counting chamber.
5. Total count of WBC using haemocytometer containing WBC diluting pipette and Neubers slide with counting chamber.

Results were subjected to statistical analysis. ANOVA was used to determine significance of the present pharmacological screening where p<0.01 and p<0.001 were considered to be significant.

RESULTS AND DISCUSSION

The ethanolic extracts were found not to cause any mortality up to the dose of 2.0 gm/kg which reflects that the LD₅₀ value of the extracts may be more than that of 2.0 gm/kg, i.p. From which it was decided to test the hematological study at three dose levels of 200, 400 and 600 mg/kg body weight intraperitoneally.

The results of the present study are summarized in table-I and figure-I, II and III. From the statistical analysis of the overall study it has been found out that the ethanolic extracts cause significant dose dependent rise in RBC count. The hemoglobin content was significantly increased by the extracts at higher doses of 400 and 600mg/kg body weight. The clotting time was reduced by the extracts dose dependently. Whereas the ethanolic extract of the barks was only found to decrease the bleeding time as compared to that of the control, which may be due to some factors involved in hemostasis. The WBC count was found to rise only by the ethanolic extracts of barks. Neutrophil count was decreased by the extracts except barks extract. Lymphocyte count was increased significantly only by the extracts of the leaves and barks at 600mg/kg, whereas it was decreased by the ethanolic extract of the flowers. Monocyte count was increased by the ethanolic extracts of the seeds and leaves, whereas the barks and flowers of Nytanthes arbortristis L. decreased the monocyte count. Eosinophil content of the test groups was found to be less than that of the control group of animals.

Table 1. Effect of different parts of Nytanthes arbortristis L. on the hematological parameters in mice

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dose (mg/kg)</th>
<th>Clotting Time (Sec)</th>
<th>Bleeding time (Sec)</th>
<th>Hb(%)</th>
<th>RBC Count (10⁶/mm³)</th>
<th>WBC Count (10⁶/mm³)</th>
<th>Differential count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saline water</td>
<td>1ml</td>
<td>217.6± 0.837</td>
<td>51.0± 1.118</td>
<td>15.5± 0.123</td>
<td>6.46± 0.18</td>
<td>5.0± 0.1</td>
<td>N: 44.4± 0.76</td>
</tr>
<tr>
<td>NAF</td>
<td>200</td>
<td>184.0± 3.255</td>
<td>55.0± 2.5</td>
<td>13.16± 0.125**</td>
<td>9.92± 0.14**</td>
<td>3.92± 0.082</td>
<td>4.3± 1.37</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>124± 3.26*</td>
<td>60.0± 0.0</td>
<td>15.8± 0.058**</td>
<td>12.7± 0.49**</td>
<td>4.5± 0.137</td>
<td>43.4± 1.73</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>108.8± 0.548*</td>
<td>54.0± 2.093</td>
<td>16.5± 0.006**</td>
<td>13.4± 0.11**</td>
<td>4.68± 0.185</td>
<td>51.6± 1.71</td>
</tr>
<tr>
<td>NAB</td>
<td>200</td>
<td>128± 3.79*</td>
<td>45.0± 0.0</td>
<td>13.16± 0.51**</td>
<td>10.88± 0.19**</td>
<td>5.4± 0.0</td>
<td>40.8± 0.63</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>114± 3.26*</td>
<td>39.0± 4.108*</td>
<td>15.3± 0.502**</td>
<td>11.48± 0.43**</td>
<td>6.82± 0.09**</td>
<td>47.4± 0.975</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>110± 3.062*</td>
<td>29.0± 1.12*</td>
<td>16.95± 0.022**</td>
<td>13.98± 0.75**</td>
<td>7.9± 0.09**</td>
<td>37.4± 0.975</td>
</tr>
<tr>
<td>NAS</td>
<td>200</td>
<td>175± 4.677</td>
<td>45.0± 0.0</td>
<td>15.78± 0.023**</td>
<td>12.4± 0.33**</td>
<td>4.7± 0.045</td>
<td>55.6± 0.823**</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>120± 1.118*</td>
<td>39.0± 2.072</td>
<td>16.75± 0.075**</td>
<td>12.98± 0.36**</td>
<td>4.82± 0.14</td>
<td>47.6± 0.23</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>107± 1.37*</td>
<td>39.0± 2.091*</td>
<td>17.55± 0.167**</td>
<td>13.42± 0.17**</td>
<td>4.98± 0.06</td>
<td>40.2± 0.67</td>
</tr>
<tr>
<td>NAL</td>
<td>200</td>
<td>142± 4.189*</td>
<td>54.0± 1.05</td>
<td>15.88± 0.09*</td>
<td>7.67± 0.137</td>
<td>3.9± 0.137</td>
<td>49.2± 0.57</td>
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<tr>
<td></td>
<td>400</td>
<td>143± 3.354*</td>
<td>57.0± 3.354</td>
<td>16.65± 0.015**</td>
<td>9.9± 0.144</td>
<td>5.76± 0.144</td>
<td>49.6± 0.57</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>120± 3.536*</td>
<td>42.0± 3.354</td>
<td>17.65± 0.015**</td>
<td>13.89± 0.6**</td>
<td>4.54± 0.65</td>
<td>36.6± 1.255</td>
</tr>
</tbody>
</table>

Values are expressed in Mean±SEM; *p<0.01, **p<0.001.

NAF, NAB, NAS and NAL represent the ethanolic extracts of flowers, barks, seeds and leaves of Nytanthes arbortristis L. respectively.
CONCLUSION

From the overall study it has been concluded that the ethanolic extracts of different plant parts of *Nyctanthes arbor-tristis* Linn have antianemic effect and are hematologically nontoxic. Whereas the ethanolic extracts of the seeds and leaves at the dose of 600mg/kg may possess immunostimulatory effect. The ethanolic extracts were found to have hemostatic effect.

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