ASSESSMENT OF CNS ACTIVITY OF NELUMBO NUCIFERA (RED AND WHITE TYPE) USING ROTAROD

P.K. Deepa, P.T.A. Usha, A.M.C. Nair, and K.T. Prasannakumari*
Department of Pharmacology and Toxicology, College of Veterinary and Animal Sciences, Mannuthy, Kerala-680 651, India

ABSTRACT

The CNS activity of Nelumbo nucifera was assessed in rats using rotarod in which forced motor activity was studied. Forty eight animals were divided into 6 groups (I-VI) of 8 animals each. These groups were administered with gum acacia alone (Group I), standard drug chlorpromazine 7 mg/kg (Group II), alcoholic extract of N. nucifera seed (red type) @ 400 mg/kg (Group III) or 600 mg/kg (Group IV), alcoholic extract of N. nucifera (white type) @ 400 mg/kg (Group V) or 600 mg/kg (Group VI). The forced motor activity was assessed by noticing the time of stay on rotarod in seconds. The decrease in time of stay revealed the CNS depressant activity. All the groups showed significant (P<0.001) reduction in forced motor activity when compared to control. The group IV (alcoholic extract of red lotus seed extract @ 600 mg/kg) showed maximum reduction in forced motor activity among the extract treated group. The standard drug chlorpromazine showed the most potent activity throughout the experiment. Thus it is inferred that alcoholic extract of red lotus (@ 600 mg/kg) showed maximum CNS depressant activity when compared to other extract treated groups.

INTRODUCTION

Plants and plant derived product form part of health care systems since ancient human civilizations. Texts like Charaka Samhitha give a detailed description on the use of herbal medicine for a variety of ailments. Nelumbo nucifera Gaertn. (Nymphaeaceae), the sacred Indian Lotus, is an aquatic herb with white or red coloured flowers. Lotus seeds are commonly used in folk medicine in the treatment of inflammation, cancer, emesis and given to children as diuretic and refrigerant in skin diseases. The seeds have proven antioxidant and antifertility activity (Rai et al., 2006). The present study was undertaken to study the CNS activity using Rotarod.

MATERIAL AND METHODS

Forty eight albino rats of either sex weighing 130-150 g were divided into six groups of eight animals each. Only those rats which could balance themselves for more than three minutes were selected for the study. Rats were placed on the rotarod individually and their time permanence on the rod in seconds was taken as a measure of forced motor activity. Dose of N. nucifera seed was selected based on the dose of N. nucifera rhizome which produced significant tranquillizing property in rats (Mukherjee et al., 1996).

Experimental design:

- **Group I** - Control (0.5 ml of 5 per cent gum acacia alone)
- **Group II** - Chlorpromazine (standard drug) @ 7 mg/kg body weight orally
- **Group III** - Alcoholic extract N. nucifera seeds (red type) @ 400 mg/kg body weight orally
- **Group IV** - Alcoholic extract N. nucifera seeds (red type) @ 600 mg/kg body weight orally
- **Group V** - Alcoholic extract N. nucifera seeds (white type) @ 400 mg/kg body weight orally
- **Group VI** - Alcoholic extract N. nucifera seeds (white type) @ 600 mg/kg body weight orally

The results were analysed using one way ANOVA with Tukeys multiple comparison test described by Hogalin et al. (1991).

* Department of Botany, College of Horticulture, Vellanikkara, Kerala.
RESULTS AND DISCUSSION

The mean time spent on rotarod by animals was measured in seconds. After 30 minutes of drug administration all the groups showed significant \( (P<0.001) \) reduction in forced motor activity when compared with control group (Table 1). At 90 minutes also all the groups showed reduction in forced motor activity but group IV (red lotus seed extract, 600 mg/kg) exhibited maximum reduction. At 90 minutes also the group IV showed maximum reduction in forced motor activity. The standard drug chlorpromazine was exhibited most significant \( (P<0.001) \) reduction in forced motor activity. The mean time spent on rotarod at 120 minute indicated that the forced motor activity was further reduced in chlorpromazine administered group but the other groups remained same as that of 90th minute. At 180th minute the forced motor activity started regaining to normal in Nelumbo treated groups whereas the chlorpromazine treated group continued to have most potent activity. The mean rotarod permanence time after 210 minute indicate the forced motor activity improvement in all the Nelumbo nucifera treated groups. The forced motor activity almost regained at the end of 240th minute and counts were almost similar to 30th minute of the study. The standard drug chlorpromazine still showed potent activity as indicated by reduction in mean time spent on rotarod. The forced locomotor activity can be used as a method of assessing the degree of tranquilization (Turner, 1965) as it directly indicate motor incordination as an effect caused by action of tranquilization on motor centers of the brain. Furiuela et al. (1961) demonstrated that compounds which decrease spontaneous motor activity in doses lower than those required for affecting forced coordinated motor activity presumably acts through sites other than the cortex. The results of the present study are in agreement with the results of similar works conducted by Mukherjee et al. (1996). They observed a significant tranquilizing activity of methanolic extract of rhizomes of Nelumbo nucifera as it inhibited the forced motor activity on the rotarod at dose rates of 200, 300 and 400 mg/kg. Kilkami et al. (1988) conducted

<table>
<thead>
<tr>
<th>Period (min)</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
<th>Group IV</th>
<th>Group V</th>
<th>Group VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>678.00 ± *160.13 ±</td>
<td>343.63 ±</td>
<td>240.00 ±</td>
<td>423.38 ±</td>
<td>329.13 ±</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>641.63 ± *160.13 ±</td>
<td>290.63 ±</td>
<td>211.50 ±</td>
<td>381.88 ±</td>
<td>296.50 ±</td>
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<tr>
<td>90</td>
<td>628.38 ± *131.75 ±</td>
<td>282.63 ±</td>
<td>216.13 ±</td>
<td>396.25 ±</td>
<td>302.63 ±</td>
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<tr>
<td>120</td>
<td>626.00 ± *118.75 ±</td>
<td>288.00 ±</td>
<td>221.75 ±</td>
<td>415.25 ±</td>
<td>306.63 ±</td>
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</tr>
<tr>
<td>150</td>
<td>622.25 ± *128.13 ±</td>
<td>292.14 ±</td>
<td>232.88 ±</td>
<td>412.63 ±</td>
<td>306.25 ±</td>
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<tr>
<td>180</td>
<td>617.88 ± *133.75 ±</td>
<td>307.25 ±</td>
<td>238.50 ±</td>
<td>425.50 ±</td>
<td>316.88 ±</td>
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</tr>
<tr>
<td>210</td>
<td>611.75 ± *137.50 ±</td>
<td>324.88 ±</td>
<td>241.00 ±</td>
<td>421.75 ±</td>
<td>325.00 ±</td>
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<tr>
<td>240</td>
<td>577.63 ± *144.50 ±</td>
<td>326.00 ±</td>
<td>250.33 ±</td>
<td>432.13 ±</td>
<td>331.88 ±</td>
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</table>

Mean ± SE \( n = 8 \) \( * P<0.001 \)
similar work on extract of Clitorea ternatea and found that there was dose dependent reduction in forced motor activity. The present study revealed the CNS depressant activity of Nelumbo nucifera and the potency was less than the standard drug chlorpromazine.

ACKNOWLEDGEMENTS

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REFERENCES