ANTI-EMETIC ACTIVITY OF SOME LEGUMINOUS PLANTS
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Abstract
Crude methanol extracts of the leaves of Adenanthera pavonina L., Peltophorum roxburghii L., Prosopis cineraria L., and Prosopis juliflora DC., were evaluated for anti-emetic activity. Emesis was induced by the oral administration of copper sulphate 50mg/kg body weight to male chicks of four days age. The anti-emetic activity was determined by calculating the mean decrease in number of retching in contrast with those of control. All extracts (150 mg / kg body weight orally) showed anti-emetic activity when compared with standard drug Chlorpromazine at the same dose. Among all the extracts, Prosopis juliflora showed the highest (73.64%) and Adenanthera pavonina showed the lowest (50.17%) anti-emetic activity.

Introduction
Adenanthera pavonina L., Peltophorum roxburghii L., Prosopis cineraria L., and Prosopis juliflora L., belong to the family Leguminosae. Adenanthera pavonina is widely used in various Ayurvedic herbal preparations for treating diseases such as boils, inflammations and gout (Jayasinghe et al., 2006). A decoction of the leaves is used for gastric complaints such as diarrhoea and dysentery (Holdsworth, 1977). Chemical literature survey of Adenanthera pavonina revealed the presence of triterpenes (Yadav et al., 1976), flavonoids (Gennaro & Nasini 1972) and fatty acids (Kabele-Ngiefu et al., 1975; Balogum & Fetuga, 1985; Sotheeswaran et al., 1994).

The hexane and methanol extracts of Peltophorum roxburghii (G. Don) Degener (syn. Peltophorum pterocarpum (DC.) K. Heyne) showed anti microbial activity (Veeramuthu et al., 2006). The bark of plant is used in dysentery, toothache, pains and sores (Jagessar et al., 2007).

Prosopis cineraria (L.) Druce is beneficial in cough, vertigo, dyspnoea, skin diseases, piles and worms (Bhattacharjee, 2001). Literature survey of P. cineraria revealed the presence of proteins, alkaloids (Rastogi & Mehrotra, 1995), sterols, flavonones, glycosides (Akhtar & Virmani, 1992) and fatty acids (Gangal et al., 2009).

Leaf preparations of Prosopis juliflora (Sw.) DC., are used to mend broken bones, dyspepsia and venereal disease (Pasiecznik et al., 2001). The flavonol glycosides and hydroxycinnamic acid from Prosopis juliflora pollen were reported to possess antioxidant with high free radical scavenging activity (Wierman & Vieth, 1983; Campos et al., 1997). 3-Oxo-juliprosopine and Secojuliprosopinal (SivaKumar et al., 2009) were isolated from Prosopis juliflora.

In present study, we determined the potential of anti-emetic activity in the methanol extracts of Adenanthera pavonina Linn., Peltophorum roxburghii Linn., Prosopis cineraria Linn., and Prosopis juliflora DC. Effect produced by these plant extracts were determined by the decrease in the number of retching after oral administration of copper sulphate.

Materials and Method
Plant material: The leaves of Adenanthera pavonina L., Peltophorum roxburghii L., Prosopis cineraria L., and Prosopis juliflora DC., were collected from Karachi and soaked in methanol for seven days at room temperature, then methanol was evaporated by a rotary evaporator which afforded thick crude extracts.

Animals: Young male chicks 4 days of age, weighing from 32-52 g were taken from the local market.

Anti-emetic activity: The anti-emetic activity was determined by calculating the mean decrease in number of retching in contrast with those of control (Yang et al., 1999). Each chick was set aside for 10 minutes to stabilize in a large beaker. The extracts of Adenanthera pavonina, Peltophorum roxburghii, Prosopis cineraria and Prosopis juliflora were dissolved in 0.9% saline containing 5% DMSO and 1% Tween 80 and administered at a dose of 150 mg / kg abdominally and volume of 10 ml / kg to the test animal on the basis of their body weights.

Control group received only saline 0.9%. After 10 minutes copper sulphate was administered orally at 50 mg / kg, then the number of retching (an emetic action without emitting gastric material) was observed during next ten minutes. Chlorpromazine was used as a standard drug (150 mg/kg.b.w).

The percent inhibition was calculated by the following formula:

\[ \text{Inhibition} \% = \frac{(A-B)}{A} \times 100 \]

where,
A = Frequency of retching in control group
B = Frequency of retching in test group

Statistical analysis: Anti-emetic activity is expressed as mean ± S.E.M (Table). The statistical significance of the difference was determined by an unpaired Student's t-test.

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Table. Anti-emetic effect of some Leguminous plants.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Mean no. of retches ± S.E.M</th>
<th>Inhibition (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>69.28 ± 4.28</td>
<td>-</td>
</tr>
<tr>
<td>Chlorpromazine</td>
<td>46.62 ± 3.84*</td>
<td>32.71</td>
</tr>
<tr>
<td>*A. pavonina</td>
<td>34.52 ± 3.12*</td>
<td>50.17</td>
</tr>
<tr>
<td>P. roxburghii</td>
<td>31.25 ± 3.02*</td>
<td>54.89</td>
</tr>
<tr>
<td>*P. cineraria</td>
<td>21.14 ± 3.12*</td>
<td>69.49</td>
</tr>
<tr>
<td>P. juliflora</td>
<td>18.26 ± 2.12*</td>
<td>73.64</td>
</tr>
</tbody>
</table>

*Significantly different from the control values p<0.05
Dose: 150 mg/kg, N= 6

Results and Discussion

The anti-emetic activity of Adenanthera pavonina, Peltophorum roxburghii, Prosopis cineraria and Prosopis juliflora on young chicks revealed that these extracts have anti-emetic effect. After administration of a dose of 150 mg/kg BW chlorpromazine and the extracts of tested four plants, the numbers of retches were reduced. The group of chicks treated with chlorpromazine was found to have 46 retches as compared to the 69 retches of control group, thus chlorpromazine reduced the retches by 32.71%. The chicks treated with Adenanthera pavonina inhibited the retches up to 50.17%. The extract of Peltophorum roxburghii showed 54.89% inhibition, Prosopis cineraria inhibited retches by 69.49% whereas, Prosopis juliflora showed 73.64% inhibition. Therefore, the extracts of Adenanthera pavonina, Peltophorum roxburghii, Prosopis cineraria and Prosopis juliflora inhibited emesis to an extend greater than chlorpromazine at 150 mg/kg (Table and Fig. 1).

On the basis of these results it may be concluded that all the extracts have anti-emetic potential and are comparable with that of chlorpromazine (the reference drug). Although the results are significant but the mode of action is not known. However, as the oral copper sulphate induces emesis by peripheral action (Hossein et al., 2005), and the extracts were able to effectively prevent its effect, it could be implied that these extracts have a peripheral anti-emetic action. This study also justifies the traditional use of Adenanthera pavonina and Prosopis juliflora in G.I.T complaints. From chemical point of view, both species of Prosopis contain alkaloids and showed highest activity as compared to Adenanthera pavonina and Peltophorum roxburghii. Therefore, it may be said that alkaloidal contents may play some role in anti-emetic effect. Further studies are required to determine the exact mode of action and the active compounds responsible for this effect.

![Fig. 1. Percent inhibition of some Leguminous plants studied for antiemetic effect.](image)

C.P= Chlorpromazine, A.P= Adenanthera pavonina, P.R= Peltophorum roxburghii, P.C= Prosopis cineraria, P.J= Prosopis juliflora

References


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