EVALUATION OF ANTHELMENTIC ACTIVITY OF THE LEAVES OF
AILANTHUS EXCELSA ROXB. (SIMAROUBACEAE)

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Summary

Ailanthus excelsa Roxb. is a large deciduous tree of up to 24 m height with a straight
cylindrical bole. It grows well in semi-arid and semi-moist regions and has been found
suitable for planting in dry areas with annual rainfall of about 400 mm. It is commonly found
in mixed deciduous forests and some sal forests, but is rare in moist areas with high
monsoons. Traditionally plant was known to have activity against worms and have been used
in the treatment of dysentery caused by worms. Thus the present study aims to evaluate the
traditional anthelmetric properties of the plant. Petroleum ether extract, ethyl acetate extract
and methanol extract of the leaves of A. excelsa were screened for anthelmetric activity.
Results showed that methanol extract of the leaves of A. excelsa is having potent
anthelmetric activity. Thus we can conclude that, the anthelmetric property of the plant is
due to the polar phytoconstituents present in the leaves.

Key Words: Ailanthus excelsa, Anthelmetric activity, Pherotima posthuma.

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Introduction

*Ailanthus excelsa* Roxb. (Simarubaceae) is lofty deciduous tree 22-25m in height and 2-5m in girth. The tree is frequently found on dry stony hills and on laterite soil. Grows well in semi-arid and semi-moist regions and has been found suitable for planting in dry areas with annual rainfall of about 400 mm. It is commonly found in mixed deciduous forests and some forests, but is rare in moist areas with high monsoons. In its natural habitat the absolute maximum temperature varies from 40°C to 46°C, and the absolute minimum temperature from 0°C to 10°C. The normal rainfall is from 65 to 150 cm.\(^1\)\(^2\). The world health organization estimates that a staggering two billion people harbor parasitic worm infection. Parasitic worm also infects liver stocks and crops; affecting food production with a resultant economic impact. Despite this prevalence of parasitic infection the research of anthelmentic drug is poor. As per WHO, only few drugs are frequently used in the treatment of helminthes in human beings. Anthelmints from natural source may play a key role in treatment of these parasitic infections. In view of this an attempts has been made to study the anthelmentic activity of leaves of *A. excelsa* Roxb. Traditionally plant was known to have activity against worms and have been used in the treatment of dysentery caused by worms\(^1\). In this study petroleum ether, ethyl acetate and methanol extracts of leaves of *A. excelsa* Roxb. were used and observed for paralysis and death of earthworm.

Materials and methods

Plant material
The leaves of the plant was collected from Nashik district of Maharashtra and was authenticated by Mr. P. G. Diwakar, Joint Director, Botanical Survey of India, Koregaon road, Pune. (Voucher Specimen no. SGAIEPL1).

Test animal
Earthworms (*Pherotima posthuma*) of about 3-5 cm long were used for anthelmentic activity, collected from vermiculture plant, Kopergaon, Dist-Ahmednagar (Maharashtra).

Drugs and Chemicals
Petroleum ether (PCL), ethyl acetate (PCL), methanol (PCL), albendazole (Intas),

Preparation of extract
Dried and coarsely powdered leaves of *A. excelsa* was subjected to successive solvent extraction in Soxhlet extractor using petroleum ether, ethyl acetate, and methanol as solvent\(^3\). All the extracts were vacuum dried to produce PEE (1.21%), EAE (2.58%), ME (6.94%) extracts respectively.

Evaluation of anthelmentic activity\(^4\)
Five groups of approximately equal size earthworms consisting of six earthworms in each group were used for the present study. Group first serve as control, receive only normal saline; Group second serve as standard, receives standard drug albendazole 10mg/ml. Group third serve as petroleum ether; Group fourth serve as ethyl acetate, Group fifth serve as methanol extract of 20mg/ml. each. Observations were made for the time taken to paralysis and death of individual worms. Paralysis was set to occur when the worms do not revive even in normal saline. Death was concluded when the worms lost their motility followed with fading away of their body color.
Phytochemical screening of extracts
Various phytochemical studies including test for carbohydrates, proteins, alkaloids, glycosides, steroids, flavonoids, tannins and phenolic compounds were carried out.

Statistical Analysis
The extract treated groups were treated with one way ANOVA followed by Dunnett’s test and compared with vehicle treated group.

Results and Discussion
In the present study it was observed that, methanol extract (ME) was more potent than the other extract (table 1.). Methanol extract at the dose of 20 mg/Kg shows significant anthelmentic activity (graph 1 and 2).

Table 1: Evaluation of anthelmentic activity:

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Time for Paralysis (min)</th>
<th>Time for death (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Control</td>
<td>No paralysis (up to 15min)</td>
<td>No death (up to 15min)</td>
</tr>
<tr>
<td>II</td>
<td>Albendazole (10 mg/ml)</td>
<td>3.22 ± 1.30</td>
<td>6.21 ± 2.01</td>
</tr>
<tr>
<td>III</td>
<td>PEE (20 mg/ml)</td>
<td>22.24 ± 7.09</td>
<td>43.11 ± 9.43</td>
</tr>
<tr>
<td>IV</td>
<td>EAE (20 mg/ml)</td>
<td>18.20 ± 4.17</td>
<td>38.14 ± 11.05</td>
</tr>
<tr>
<td>V</td>
<td>ME (20 mg/ml)</td>
<td>9.13 ± 3.23</td>
<td>15.12 ± 6.51</td>
</tr>
</tbody>
</table>

Graph 1. Time for paralysis

*P<0.01 compared to vehicle treated group (One way ANOVA followed by Dunnett’s test
Graph 2. Graph showing death time

![Graph showing death time]

*P<0.01 compared to vehicle treated group (One way ANOVA followed by Dunnett’s test)

**Phytochemical screening**

<table>
<thead>
<tr>
<th>Tests</th>
<th>PEE</th>
<th>EAE</th>
<th>ME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steroids</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alkaloids</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Glycosides</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Tannins and phenolic compounds</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

**Conclusion**

Phytochemical screening performed on various extracts of *A. excelsa* shows that methanol extract of the leaves contains glycosides, flavonoids, tannins and phenolic compounds. Thus, we can conclude that the polar constituents in the plants like glycosides, flavonoids, tannins and phenolic compounds may be responsible for the anthelmentic activity of the plant.

**References**