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ANTHELMINTIC STUDIES ON THE RHIZOMES OF ANAPHYLLUM WIGHTII SCHOTT.

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ABSTRACT

In the present study acetone, water and alcoholic extracts of the rhizome of Anaphyllum wightii Schott. Were investigated for their anthelmintic activity against Ecinia foeitida, Pheretima posthuma and Tubifex tubifex. Three concentrations (50,100,200 mg/ml) of each extract were studied. This study is mainly concerned with the determination of time of paralysis and time of death of the worms. The gradual increase in a dose exhibited, an increase in the activity. The alcoholic extract of the rhizome showed a significant anthelmintic activity at highest concentration of 200 mg/ml

KEYWORDS: Anaphyllum Wightii Schott., Rhizome, Anthelmintic Activity, Ecinia Foeitida, Pheretima Posthuma And Tubifex Tubifex , Albendazole

INTRODUCTION

The genus Anaphyllum comprises of with two species like; Anaphyllum beddomei Engl. and Anaphyllum wightii Schott. both of them belongs to araceae family. These medicinal herbs are not explored properly for their pharmacological actions. To be an effective anthelmintic, a drug must be able to penetrate the cuticle of the worm or gain access to its alimentary tract (1).One of the consequences of nematode infection is the activation of the host immune system.
The process involved are similar to those which take place during protozoal infections. Parasitic worm also infect livestock and crops, affecting food production with a resultant
economic impact. Despite this prevalence of parasitic infections, the research on anthelmintic
drug is poor (2).

Material and Methods

Plant Material

The Fresh rhizomes of Anaphyllum wightii Schott were collected from the Ghatt section of
Sakleshpur, Southern part of Karnataka state. The rhizomes were identified and a voucher
specimen was deposited in the Department of Pharmacognosy of Academy of Pharmaceutical
Sciences, Pariyaram, Kannur District of Kerala, India.

Preparation of Extracts

The collected rhizomes were washed, shade dried, sliced, powdered and were subjected to the
extraction process. Extracts were prepared by using exactly weighed sample of rhizome
powder in the measured volume of various solvents like, acetone, Water and ethanol. The
extracts are vacuum dried and used for the study.

Parasites

Indian earthworm Pheretima posthuma and Eicinia fetida were collected from the water
logged areas of soil in Varkala village of Trivandrum district, Kerala, South India. Tubifex
tubifex were collected from Aquarium of the local market. The authenticity of the parasites
collected were confirmed before the study. Services of veterinary pr actioners were also
utilized to confirm the identity of worms. The average size of Pheretima posthuma and
Eicinia fetida were 5-8 cm and that of Tubifex tubifex was 1-1.2 cm. They were washed with
water to remove the adhering sand and the unwanted materials. Pre treatment with saline has
been done for all the worms before the evaluation.

Experimental

Phytochemical screening

Preliminary phytochemical screening of the rhizome revealed the presence of Flavonoids,
polyphenolic compounds and polysaccharides in the ethanolic fraction.

Anthelmintic assay

The anthelmintic assay was carried as per the method of Ajayieoba E. O. et al. with minor
modifications (3). The experiments were done on adult Indian earth worm Pheretima
posthuma and Eicinia fetida and also in the aquarium worm, Tubifex tubifex, because they
belong to same group of Annelida (Mueller, 1774). Before starting the study, all the test
solutions and standard drug solutions were prepared freshly. Six groups of earth worms of
approximately equal size were released in to 25 ml solutions of three different concentrations (50,100,200 mg/ml) in Petri dishes containing above solutions of extracts. Albendazole was used as reference standard and saline as control. Determination of time of paralysis and time of death of the worms were done. Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Time for death of worms were recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water (50-60°C) followed by observable colour changes in their body.

Results and Discussions

Helminthiasis is one of the most prevalent diseases in the World. Some nematodes that usually lives in the gastro intestinal tract of animals may infect humans and penetrate the tissues. The route and dose of anthelmintic drugs are important and must be chosen carefully since parasitic worms cannot be relied upon to consume sufficient amount of drug to be effective. An anthelmintic drug can act by causing paralysis of the worm or by damaging its cuticle, leading to partial digestion or rejection by immune mechanisms (6).

Anthelmintic drugs can also interfere with the metabolism of the worm and since the metabolic requirements of these parasites vary greatly from one species to other drugs that are highly effective against one type of worm can be ineffective against another (7). The detailed literature survey of the plant reveals its usage among the tribals in treating intestinal worm infections. The data obtained in the study could provide a rationale for the traditional use of this plants as an anthelmintic.

The extracts of the plant displays a significant anthelmintic activity in dose dependent manner. The anthelmintic activity of alcoholic and aqueous extracts of the rhizome were comparable with that of standard drug. Albendazole is effective in a broad range of helminth infections, including round worms, hookworms and pinworms. The drug is poorly absorbed in the gastrointestinal tract. The toxicity is extremely low. Gastro intestinal disturbances may occur during expulsion of the worms, the mechanism of action involves inhibition of the glucose uptake system leading to a lethal depletion of energy reserves in the helminthes. Phytochemical screening of the crude extracts of the rhizome reveals the presence of flavonoids and polyphenolic compound as major chemical constituents. The probable mechanism of action of the rhizomes of Anaphyllum wightii Schott. as an anthelmintic could be due to its flavonoid and poly phenolic content.
Table 1  Anthelmintic Activity results of Anaphyllum wightii Schott. rhizome Extracts.

<table>
<thead>
<tr>
<th>Extracts</th>
<th>Conc. (mg/ml)</th>
<th>Ecinia foetida</th>
<th>Pheretima posthuma</th>
<th>Tubifex tubifex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TP</td>
<td>TD</td>
<td>TP</td>
</tr>
<tr>
<td>Control (Saline)</td>
<td>50</td>
<td>80±0.135</td>
<td>186±0.018</td>
<td>83±0.166</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>65±0.037</td>
<td>87±0.078</td>
<td>70±0.055</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>48±0.045</td>
<td>73±0.034</td>
<td>52±0.024</td>
</tr>
<tr>
<td>Aqueous</td>
<td>50</td>
<td>74±0.067</td>
<td>136±0.060</td>
<td>74±0.019</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>49±0.048</td>
<td>60±0.026</td>
<td>54±0.029</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>34±0.056</td>
<td>54±0.030</td>
<td>33±0.030</td>
</tr>
<tr>
<td>Alcoholic (Ethanol)</td>
<td>50</td>
<td>89±0.056</td>
<td>218±0.056</td>
<td>91±0.089</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>46±0.067</td>
<td>85±0.065</td>
<td>46±0.076</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>39±0.021</td>
<td>66±0.032</td>
<td>42±0.027</td>
</tr>
<tr>
<td>Acetone</td>
<td>50</td>
<td>150±0.028</td>
<td>234±0.011</td>
<td>149±0.034</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>134±0.443</td>
<td>199±0.070</td>
<td>138±0.079</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>119±0.019</td>
<td>162±0.036</td>
<td>121±0.055</td>
</tr>
</tbody>
</table>

Values are mean ± S.E.M. from six observations.

TP: Time for Paralysis (min), TD: Time for Death of worms (min)

**CONCLUSION**

It is concluded based on the findings of the present study that the rhizome of Anaphyllum wightii Schott. possess varying degree of anthelmintic activities. The anthelmintic activities of the extracts are dose dependent. The aqueous and alcoholic extracts exhibited significant anthelmintic activity in Anaphyllum wightii Schott at highest concentration of 200 mg/ml. This study strongly supports the traditional use of the plant as anthelmintic. Further studies must be conducted to establish the anthelmintic activity of the rhizome extract by different techniques and different standards. Our future aim is to isolate the chemical constituents responsible for the anthelmintic activity.
References