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ANTHELMINTIC ACTIVITY STUDIES OF STEM OF *SCLEROPYRUM PENTANDRUM* (DENNST) MABB

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ABSTRACT

Scleropyrum pentandrum (Dennst.) Mabb is a member of family *santalaceae*. This is a small tree of evergreen forests of different parts of the world. It is found in sandy soil of Peninsular India, Western Ghats, South and Central Sahyadris and divine forests of coastal Kerala. Traditionally *Scleropyrum pentandrum* is important in different biological activities and tribal community across the world is exploring the benefit of this medicinally important plant. This present study explains the anthelmintic activity of the stem of the *Scleropyrum pentandrum*. The aqueous and alcoholic extracts of the stem were tested for its anthelmintic activity. The positive results obtained direct the necessity of further study. The chemical identity of various components must be done by isolating and elucidating its medicinally active constituents. Necessary studies are needed to evaluate each compound for its pharmacological identities.

KEYWORDS

Anthelmintic activity, Stem, *Scleropyrum pentandrum*, *Pheretima posthuma* and *Ascaridia galli*.

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INTRODUCTION

Scleropyrum pentnadrum (Dennst) Mabb (syn: *Scleropyrum wallichianum* Am) belongs to the family *santalaceae*. The plant grows to a maximum height of 6 to 7 meters and is normally found on sandy soil, as well as in semi and dry evergreen forests. It is commonly called malayammachi and malayamkki in Kozhikkode and Naikkuli in Kasargod of Kerala and mulkirayan in Tirunelveli of Tamilnadu¹. The whole plant together or parts are applied externally to treat skin irritation in Kani tribal settlement, Agasthyamalai biosphere reserve, Tirunelveli South India². Kurichyas tribal community of Kannur district, Kerala uses the

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crushed roots for stomach ailments³. The decoction prepared by boiling roots is used as a contraceptive by semalaitribal people. It is believed that women will become barren after consuming the decoction. Paste of stem bark and leaf is applied externally to treat skin diseases⁴. Wongsatit Chuakul, Promjit Saralamp and Ampol Boonpleng reported the use of *Scleropyrum pentandrum* as galactagogue⁵ (2002). Gale et al, (2007) presented the cyclo-oxygenase inhibiting, anti-malarial and anti TB activities of *Scleropyrum pentandrum*⁶. Anticaryogenic and cytotoxic activity of methanolic extract of *S. Pentandrum* leaves were carried out by Venugopal et al, (2011)⁷. The extract was found to be having anticaryogenic activity. Five unprecedented furan-2-carbonyl-C-glycosides and two phenolic diglycosides were isolated from leaves and twigs of *Scleropyrum pentandrum* by Tripetch Kanchanapoom et al (2012)⁸.

Fruits and seeds of *Scleropyrum pentandrum* are also called kirinda. It is consumed by Paniya, Kattunaika and Kuruma tribes of Wynad district, Kerala, India⁹. It is also called dirumulli and is used as a mechanical barrier (fencing) in dried or live condition¹⁰. Ajithbabu T K et al, (2013) carried out the anatomical and phytochemical studies and reported the presence of Carbohydrate, Phenols, Flavanoids, alkaloids, Tannins, Glycosides, Sterols, Terpenoids in the alcoholic extract of the plant *Scleropyrum pentandrum*. The anti-inflammatory activity and qualitative and quantitative microscopy studies also reported^{11,12}. Soundarya S et al, reported the phytochemical screening and antibacterial activity of *Scleropyrum pentandrum* stem extract¹³. Extensive literature reviews revealed that much of the bioactivities of this plant remain unexplored.

Helminthiasis is a worldwide and one of the common diseases of all ages especially in third world countries¹⁴. Helminth infections are affecting a large proportion of the world's population¹⁵. Helminthiasis is a disease in which a part of the body is infested with worms such as pinworm, roundworm or tapeworm¹⁶. Parasitic diseases cause

severe morbidity, including filariasis, onchocerciasis, and schistosomiasis¹⁷.

Lewis W H et al, carried out an anthelmintic study with stem bark of *Piliostigma thonningii* (Schum.) Milne-Redh. (Family-Caesalpiniaceae)¹⁸. In another other study, Asuzu IU, Gray AI and Waterman PG reported an active principle D-3-O-Methylchiroinositol was isolated by bioassay guided chromatographic separation technique from methanolic extract of stem bark of plant and screened for anthelmintic activity by larval paralysis using Levamisole as a reference drug. Third stage larvae of *Haemonchis contortus* faecal samples of infected lambs were used in the study¹⁹.

EXPERIMENTAL

Plant materials

Stem of *Scleropyrum pentandrum* were collected from the 12 acre sacred groves of Poyilkavu Durga Devi temple situated at the coastal area of Calicut district, Kerala. The plant specimen was identified at Centre for Medicinal Plants Research, Kottakkal and Dr. A. K. Pradeep, Assistant professor, Department of Botany and the herbarium is deposited at Botany department, Calicut University, Kerala (no: 107864).

Scleropyrum pentandrum stem for anthelmintic activity study are collected in 2019 September last week.

Preparation of extracts

The fresh stem of *Scleropyrum pentandrum* were collected from the same location in a large scale. The collected stem is dried to avoiding direct sun light to protect the metabolites. The dried stem of *Scleropyrum pentandrum* is powdered and soxhlet extraction is carried out with alcohol and water. This extracts were used for the anthelmintic activity study.

Anthelmintic activity

Animals

Earthworm (*Pheretima posthuma*) and Roundworm (*Ascaridia galli*) were used as test animals in this anthelmintic activity in vitro evaluation. Earthworms were collected from nearby paddy fields of Iringadan palli, Calicut. The roundworms

were obtained from intestine of freshly slaughtered fowls. Infested intestines of fowls were collected from the local slaughter house of Vellimadukunnu, Calicut. These were washed with normal saline solution to remove all the faecal matter. The worms were collected from the dissected intestines. The worms were kept in normal saline solution. The average size of earthworm was 4-7 cm. Average size of round worm was 4-6. Earthworm and helminths were identified and services of veterinary practitioners were utilized to confirm the identity of worms.

Drugs and chemicals

Piperazine citrate (Glaxo Smithkline) was used during the experimental protocol. Test samples of the extract were prepared at the concentrations 25mg/ml, and 50mg/ml in distilled water. Six worms of *Pheretima posthuma* and *Ascaridia galli* of approximately equal size (same type) were placed in different Petri dish containing 25ml of above test solutions of extracts. A concentration of (50mg/ml) Piperazine citrate solution as reference standard is used. Distilled water was used as the control solution.

This procedure was selected for other type of worm also. The freshly prepared solutions were used for the experimental evaluation. Observations on time taken for paralysis and time for death were noted down. Time for death of worms were recorded after assuring that worms not moved when they shaken vigorously and dipped in warm water of 50°C. The results were shown as in Table No.1 and No.2^{20,21}.

Statistical analysis

Results obtained were evaluated by unpaired ‘t’ test. The values of p<0.5 for the test were considered statistically significant.

RESULTS AND DISCUSSION

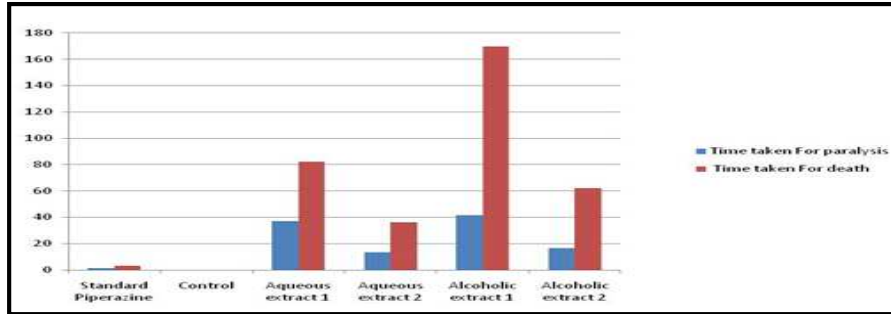
Concentration of 50mg/ml of both aqueous and alcoholic extracts shown a maximum anthelmintic activity compared to the extracts of 25mg/ml.

Table No.1: Anthelmintic activity of *Scleropyrum pentandrum* extract on *Pheretima Posthuma*

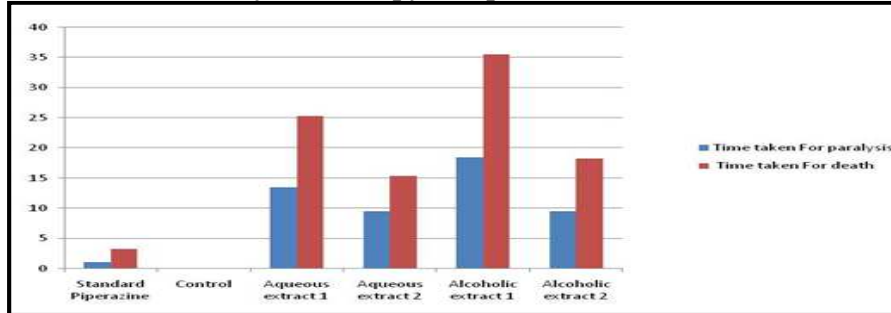
S.No	Treatment	Concentration	Time taken in minutes	
			For paralysis	For death
1	Standard Piperazine	50mg/ml	1.41±.17	3.32±.21
2	Control	Distilled water	0	0
3	Aqueous extract	25mg/ml	37.09±.22	82.13±.31
4	Aqueous extract	50mg/ml	13.36±.20	36.32±.24
5	Alcoholic extract	25mg/ml	41.44±.27	169.56±.32
6	Alcoholic extract	50mg/ml	16.46±.17	62.24±.23

Table No.2: Anthelmintic activity of *Scleropyrum pentandrum* extract on *Ascaridia galli*

S.No	Treatment	Concentration	Time taken in minutes	
			For paralysis	For death
1	Standard Piperazine	50mg/ml	1.1±.12	3.28±.14
2	Control	Distilled water	0	0
3	Aqueous extract	25mg/ml	13.53±.18	25.35±.22
4	Aqueous extract	50mg/ml	9.52±.19	15.34±.21
5	Alcoholic extract	25mg/ml	18.45±.22	35.56±.26
6	Alcoholic extract	50mg/ml	9.54±.15	18.24±.19



Plot No.1: Anthelmintic activity of *Scleropyrum pentandrum* extract on *Pheretima Posthuma*



Plot No.2: Anthelmintic activity of *Scleropyrum pentandrum* extract on *Ascaridia galli*

CONCLUSION

The aqueous extract of the drug at 50mg/ml is found to be more effective than the 25mg/ml concentration. These two methods of anthelmintic activity evaluations are giving similar results with the extracts. Further studies needed to establish the anthelmintic activity of the stem extract with different techniques and different standards. Our future aim is to isolate the chemical constituents responsible for the anthelmintic activity.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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