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Research Article

PRELIMINARY PHYTOCHEMICAL INVESTIGATION AND ANTHELMINTIC ACTIVITY OF *MORINGA OLEIFERA* LEAVES

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ABSTACT
Petroleum ether, chloroform, methanol and aqueous extracts of leaves of *Moringa oleifera* were screened for various bioactive constituents like glycosides, carbohydrates, tannins, flavonoids, triterpenoids and alkaloids. The chloroform and methanol extracts were evaluated for anthelmintic activity on adult Indian earthworms *Pheritima postuma* using Piperazine citrate and Rajah Pravartani Vati (Ayurvedic preparation) as a reference standards. The results obtained indicated that the chloroform extract was more potent compared to other extracts.
KEY WORDS: Anthelmintic, *Moringa oleifera,* Piperazine citrate, Rajah Pravartani Vati, *Pheritima postuma,* Bioactive constituents

INTRODUCTION

Moringa oleifera is most widely cultivated plant in Moringaceae family. It grows at a height of 25 to 30 feet. It is widely grown in Sub-Himalayan range and commonly cultivated in India, Burma, Ethiopia, Philippines and Sudan. The bark, root, fruit, flowers, leaves, seeds and gum of this plant are traditionally used as antispasmodic, stimulant, expectorant, diuretic, anti-inflammatory and hypoglycemic. The plant is a cardiac and circulatory tonic and antiseptic. In Ayurveda and Siddha, leaves and root are used as anthelmintic, to treat nausea, giddiness, tuberculosis etc.[1,2] It also has been shown to exhibit anti-inflammatory[3], wound healing[4], antioxidant[4], analgesic activity[5]. However, so far no scientific study on phytochemical characterization and anthelmintic activity has been reported in the literature. The present study was focused to evaluate phytochemical characterization and anthelmintic activity of *Moringa oleifera* leaves.

MATERIALS AND METHOD

Plant material

The leaves of *Moringa oleifera* were collected from the Karnataka Ayurvedic Medical College, Mangalore in the month of February and were taxonomically identified by an eminent Pharmacognosist Dr. Ummanabad Srinivasa, Professor, Department of Pharmacognosy and Phytochemistry, Srinivas college of Pharmacy, Mangalore. A voucher specimen USMO-1/ 2011 is preserved in our research laboratory for future reference. The collected leaves were shade dried, coarsely powdered and stored in a closed container for further use.

Preparation of Extract

500gm of powdered leaves were subjected to each solvent extraction by Soxhlet apparatus using petroleum ether, chloroform, methanol and distilled water.[6-8]solvents were then removed by distillation and residue of 5.2% and 8% of chloroform and methanol extract respectively were obtained. Due to high percentage yield chloroform and methanolic extracts were selected for screening. It was stored in the desiccator until further use. For experimental method the dried extracts were suspended in 1% Tween 80 in normal saline and used for anthelmintic activity.

Phytochemical Studies

Preliminary phytochemical screening was performed for various phytoconstituents such as carbohydrates, tannins, flavonoids, triterpenoids, saponins, and alkaloids[8]. The results obtained are given in Table1.

Drugs and Chemicals

Piperazine citrate (GlaxoSmithKline Pharmaceutical Limited, Mumbai, India), Rajah Pravartani vati (Zandu Emami Limited, Kolkatta, India), Petroleum Ether (60-80), Chloroform, Methanol and other chemicals were procured from different suppliers.

Evaluation of Anthelmintic Activity

The anthelmintic activity was evaluated on adult Indian earthworms *Pheretima posthuma* (obtained from Horticulture Department, Mangalore) due its anatomical and physiological resemblance with the intestinal round worms in human beings.[9-11] Each petridis consisted of six

earthworms of approximately equal size (8 ±1cm) were released into the 50 ml of desired formulation at room temperature.

Earthworms were divided into 10 groups. Each group was treated with one of the following: vehicle (1% Tween 80 in normal saline), Piperazine citrate (15 mg/ml), Rajah Pravartani Vati (15 and 30 mg/ml), and extracts of 15, 30 and 50 mg/ml in normal saline containing 1% Tween 80. Observations were made for the time taken to paralysis and/or death of individual worm up to four hours of test period. The paralysis time and lethal time for each extract was recorded. Paralysis was said to occur when the worms did not revive even in normal saline. Death was concluded when the worms lost their motility followed by fading away of their body colour.[12] The mean values are given in Table 2.

RESULT AND DISCUSSION

The phytochemical investigation revealed the presence of phytoconstituents such as carbohydrates, tannins, flavonoids, triterpenoids, and alkaloids in chloroform and methanol extracts.

The present investigation revealed that the chloroform extract of *Moringa oleifera* leaves was more potent than methanol extract, even though both the extracts were endowed with anthelmintic activity. The activity of extracts was compared with the standard drug piperazine citrate and Rajah Pravartani Vati. It caused paralysis followed by death of worms at all tested dose levels. By taking anthelmintic activity of Piperazine citrate and Rajah Pravartani Vati as 100%, methanol and chloroform extracts at the dose of 50mg/ml showed the activities compared to Piperazine citrate up to 50%, 52% and Rajah Pravartani Vati up to 80% and 84% respectively. Potency of the extract was inversely proportional to the time taken for paralysis or death of the worms.

CONCLUSION

In conclusion, the results have established pharmacological evidence for the folklore claim of the plant as an anthelmintic agent. The plant may be further explored for isolation of the active constituents responsible for its anthelmintic activity.

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Table-I: Preliminary qualitative investigation of extracts of *Moringa oleifera* leaves

Bioactive constituents	Petroleum	Chloroform	Methanol	Aqueous
Alkaloids	—	+	+	—
Amino acids	—	—	—	—
Carbohydrates	—	+	+	+
Fats & Oils	+	—	—	—
Flavonoids	-	—	+	+
Glycosides	+	—	+	+
Saponins	—	—	+	+
Tannins	—	—	-	+
Triterpenoids	—	+	+	—

+ = Present, — = Absent.

Table- II: Anthelmintic activity of various extracts *Moringa oleifera* leaves

GROUP	TREATMENT	CONC. (mg/ml)	PARALYSIS TIME(P) in Min	DEATH TIME(D) in Min
1	Vehicle	-	-	-
2	Piperazine citrate	15	17.83±2.78	41.17±3.06
3	Rajah vati	15 30	28.67±1.75 11.17±2.48	61.67±4.32 23.17±3.31
4	Methanolic extract	15 30 50	104.0±3.57 53.33±4.27 36.00±2.28	149.7±5.71 96.17±3.19 68.33±5.50
5	Chloroform extract	15 30 50	96.67±2.87 65.17±2.78 34.00±2.89	138.7±4.50 105.5±3.93 72.83±3.18

All the values are express in Mean ±SEM (n=6)

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