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Research Article

ANTHELMINTIC ACTIVITY OF SESAMUM INDICUM (L.) SEEDS EXTRACT ON INDIAN EARTHWORM

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ABSTRACT

Sesamum indicum L., popularly known as black sesame in India, belongs to family pedaliaceae. The objective of the present work was to evaluate the In-*vitro* anthelmintic potency of the ethanolic extract of *Sesamum indicum* L. seeds using Indian earthworms (*Pheretima posthumad)*. The various concentrations (25,50,75, 100, 150 and 200mg/ml) of the petroleum ether and ethanolic extracts extract were tested *In-vitro* for anthelmintic potency by determination of time of paralysis and time of death of worm. Piperazine citrate (15mg/ml) used as standard. The result of present study indicates that *Sesamum indicum* potentiate to paralyze earthworm and also caused its death after some time. The shortest time of paralysis was observed at higher dose (200 mg/ml) of both ethanolic and petroleum ether extract were found to 18.01 min and 95.67 min respectively. The results of the study are comparable to standard piperazine citrate. The result showed alcoholic extracts of *Sesamum indicum* L. seeds took less time to cause paralysis of the earthworm than that of petroleum extract *Sesamum indicum* L. seeds. Thus the present study demonstrate that the traditional claim of *Sesamum indicum* L. as an anthelmintic has been confirm as the ethanolic and petroleum ether extracts of seeds displayed activity against the earthworm used in study.

Keywords: Earthworm, Ethanolic, Paralysis, Petroleum Extract, Piperazine citrate.

INTRODUCTION

Helminthiasis or infections with parasitic worms are pathogenic for human beings. Immature forms of the parasites invade human beings via the skin or gastrointestinal tract (GIT) and evolve into well differentiated adult worms that have characteristic tissue distribution. Anthelminthics are drugs that may act locally to expel worms from the GIT or systemically to eradicate adult helminthes or development forms that invade organs and tissues. Most of the existing anthelminthics produces side effects such as abdominal pain, loss of appetite, nausea, vomiting, head ache and diarrhoea. Chemotherapy is the only treatment and effective tool to cure and control helminthes infection, as effective vaccines against helminthes have not been developed so far. Indiscriminate use of synthetic anthelmintics can lead to resistance of parasites. Herbal drugs have been in use since ancient times for the treatment of parasitic diseases in human and could be of value in preventing the development of resistance. Most diseases caused by helminthes are of a chronic; debilitating nature they probably cause more morbidity and greater economic and social deprivation among humans and animals than any single group of parasites. The major control strategy adopted against helminthes parasite is the use of anthelminths *Sesamum indicum* L. commonly known as Black Sesame, Beni seeds belongs to family pedaliaceae. Traditionally it is used as tonic, anthelmintic, antibacterial, stomachic, and carminative. Medicinally it has antibacterial, anti-inflammatory, analgesic, antitumor and antioxidant properties[1-5].

In ancient system of medicine *Sesamum indicum* L. claim as anthelmintic but scientifically it is not reveled still thus the present study was design to evaluate the in-vitro anthelmintic activity of ethanolic and

petroleum ether extract of *Sesamum indicum* L. seeds.

MATERIAL AND METHODS

Plant

The seeds of *Sesamum indicum* L. were collected in the month of August 2010 from Agroagency at Pusad town in Yavatmal region, Maharashtra, India. The plant was authenticated by Dr. A. Chaturvedi of Botany Department; RTM Nagpur University, Nagpur, India. A voucher specimen (No: 9595) was deposited at Herbarium, Department of Botany, RTM Nagpur University Nagpur.

Experimental worms

All the experiments were carried out in Indian adult earthworms (*Pheretima posthumad*), they were collected from the moist soil and were washed with normal saline so as to remove all fecal matter present on them. These adult earthworms (*Pheretima posthumad*) were used for anthelmintic activity.

MATERIAL

Ethanolic extracts of *Sesamum indicum*, Petroleum ether (60 grade) extracts of *Sesamum indicum*, Piperazine citrate as standard drug (GSK. Ltd, Mumbai).

Preparation of extracts of sesamum indicum seeds

The collected seeds of *Sesamum indicum* L. were crushed in an electric blender to form a powder and this powder was then subjected to extraction by using Soxhlet's extractor. The percent yield of ethanolic extract and petroleum ether extracts were found to be 14.18% w/w and 42.8 % w/w. Both the extracts were concentrated by complete evaporation of ethanol and petroleum ether at room temperature and were used for pharmacological studies.

Administration of extract

The suspension of both the extracts of *Sesamum indicum* L. at different concentration (25-200mg/ml) were prepared by using 0.2% v/v of Tween 20 as a suspending agent and final volume was made upto 10 ml by 0.5% CMC for respective concentration of *Sesamum indicum* L. seeds. Piperazine citrate (15mg/ml) was used as standard. Fourteen groups of approximately equal size worms consisting of six earthworms individually in each group were selected for the activity and in them 10 ml of desired concentration of extracts were administered.

Administration of Piperazine citrate

Piperazine citrate (15mg/ml) was prepared by using 0.2% w/v of Tween 20 as a suspending agent. It was taken as a standard drug in the activity.

Experimental Design

Indian adult earthworms (*Pheretima posthumad*) were collected from the moist soil and were washed with normal saline so as to remove all fecal matter. They were used for anthelmintic activity.

The anthelmintic assay was carried out as per the method of Ajaiyeoba et.al, 2001[8] with minor modification[6,7]. The worms were divided into fourteen groups containing six earthworms each exposed to different concentration of extracts and standard drug solution were poured in different Petri dishes. Observations were made for the time taken for paralysis (Paralysis was said to occur when worm did not revive in normal saline) and death (Time for death of worms was recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water (500c), followed with their body colors fading away)[9,10]. All the results were expressed as Mean ± S.D. of six animals in each group.

RESULT AND DISCUSSION

Helminthiasis or infections with parasitic worms are pathogenic for human beings. Immature forms of the parasites invade human beings via the skin or gastrointestinal tract (GIT) and evolve into well differentiated adult worms that have characteristic tissue distribution. Anthelmintics are drugs that may act locally to expel worms from the GIT or systemically to eradicate adult helminthes or development forms that invade organs and tissues[11,12].

The ethanolic and petroleum ether extracts of *Sesamum indicum* L. seeds showed anthelmintic activity when compared to the standard drug. Ethanolic extract of *Sesamum indicum* L. seeds of concentration (25, 50, 75, 100, 150 and 200 mg/ml) showed paralysis at 153.33, 115.33, 70.33, 65.66, 34.16 and 18.01 min and death at 162.66, 150.00, 112.00, 90.22, 44.49 and 29.33 min respectively while petroleum ether extract of *Sesamum indicum* L. *seeds* of concentration (25, 50, 75, 100, 150 and 200 mg/ml) paralysis at 150.00, 145.66, 141.66, 132.66, 107.66 and 95.67 min and death at 157.33, 151.66, 148.33, 146.00, 141.33, and 109.37 min respectively. The standard drug piperazine citrate showed paralysis at 21.66 min and death after 72.33 min at 15mg/ml concentration (Table 1. and Figure 1.). From the above result, it is clear

that ethanolic and petroleum ether extracts of *Sesamum indicum* L. seeds have significant anthelmintic activity in dose dependent manner when compared with standard anthelmintic drug. Data in the (figure 1.) reveals that the alcoholic extracts of *Sesamum indicum* L. seeds took the less time to cause paralysis of the earthworm than that of petroleum extract. It can be concluded that the active constituents responsible for anthelmintic activity present in the ethanol and petroleum ether extract of Sesamum indicum L. seeds. Thus from results the traditional claim of *Sesamum indicum* L. as an anthelmintic have been confirm as seeds extract displayed activity against the worm used in present study. The *Sesamum indicum* L. extracts may kill worms by either starving them to death or paralyzing them. Because worms have no means of storing energy, they must eat almost continuously to meet their metabolic needs. Any disruption in this process results in energy depletion. Interfering with feeding for 24 hours or less is sufficient to kill most adult parasites. Parasites will also die if they become paralyzed and temporarily lose their ability to maintain their position in the gut[13]. The outer layer of the earthworm is a mucilaginous layer and composed of complex polysaccharides. This layer being slimy, enables the earthworm to move freely. Any damage to the mucopolysaccharide membrane will expose the outer layer and this restricts its movement and can cause paralysis. This action may lead to the death of the worm by causing damage to the mucopolysaccharide layer. This causes irritation leading to paralysis[14].

Preliminary phytochemical screening petroleum ether of *Sesamum indicum* L. revealed the presence of Proteins, Sterols and Triterpenoids, Alkaloid, Flavonoids, Glycoside, Tannins and Phenolic Compounds and ethanolic extracts of *Sesamum indicum* L. shown presence of Alkaloid, Flavanoid, Glycosides, Coumarin, Tannins, Phenols, Saponines and Triglyerides[15]. The presence of alkaloids, glycosides and tannins may be the responsible for demonstrating anthelmintic activity. The possible mechanism of tannins may to interfere with energy generation by uncoupling oxidative phosphorylation or they may interfere with glycoprotein of cell surface. It was also possible that alkaloids may act on central nervous system and caused paralysis[16,17]. The effect would be due to presence of steroidal alkaloid oligoglycosides which in a optimal concentration may suppress the transfer of sucrose from the stomach to the small intestine which could diminish the support of glucose to helminthes together with its antioxidant effect which is capable of reducing the nitrate generation which could be used in the protein synthesis as well as the possible inflammatory effect induced by the extract in the gastric and intestinal mucosal which could interfere in local homeostasis which is essentially to the develop of helminthes[18].

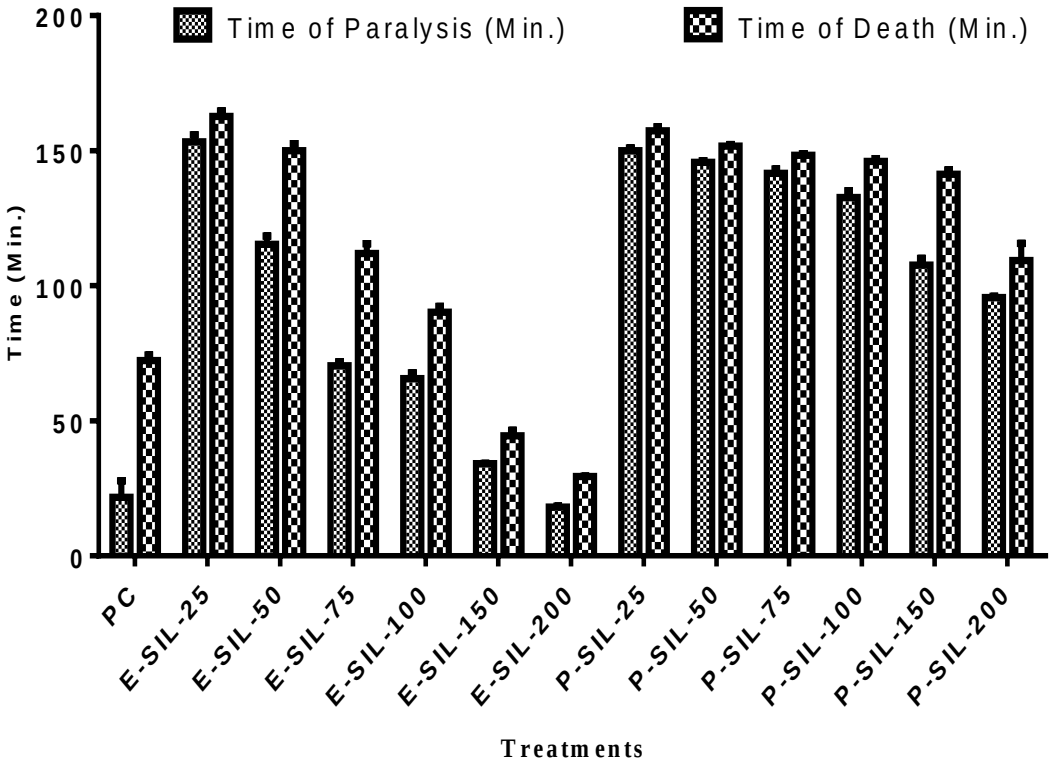
CONCLUSION

From the results it conclude that, both extracts of *Sesamum indicum* L. (ethanolic and petroleum ether) demonstrate to possess dose dependant anthelmintic activity when compared to piperazine citrate. The results also revealed that the alcoholic extracts of *Sesamum indicum* L. seeds took the less time to cause paralysis of the earthworm than that of petroleum extract thus it conclude that alcoholic extracts of *Sesamum indicum* L. possess potent anthelmintic activity compared to petroleum extract. From results the traditional claim *Sesamum indicum* L. as an anthelmintic have been confirm as a it displayed activity against the worm used in present study.

Table 1: Anthelmintic effect of *Sesamum indicum* L. seeds extracts on Indian helminthes

Treatment	Group	Concentration (mg/ml)	Time of paralysis (min) (Mean±S.D.)	Time of death (min) (Mean±S.D.)
Control	1.	-	-	-
Piperazine citrate(Std.)	2.	15	21.66± 6.18	72.33±2.054
Ethanolic extract of *Sesamum indicum* L. seeds	3.	25	153.33±2.51	162.66±2.08
	4.	50	115.33±3.05	150.00± 2.64
	5.	75	70.33±1.52	112.00±3.60
	6.	100	65.66±2.08	90.22±2.11
	7	150	34.16±0.15	44.49±1.99
	8	200	18.01±0.44	29.34 ±0.17
Petroleum ether extract of *Sesamum indicum* L. seeds	9.	25	150.00±1.00	157.33±1.52
	10.	50	145.66±0.57	151.66±0.57
	11.	75	141.66±1.52	148.33±0.57
	12.	100	132.66±2.51	146.00±1.00
	13	150	107.66±2.51	141.33±1.52
	14	200	95.67±0.39	109.37±6.36
The results are expressed as mean ± SD of six helminthes in each group.PC- piperazine citrate; E-SIL- Ethanolic *Sesamum indicum* L. ; P-SIL- Petroleum *Sesamum indicum* L. Note: Experiments were carried out at room temperature; The control group containing 0.2% w/v of Tween 20 all the worms were alive even after 24 hrs.				

Fig 1. Anthelmintic activity of Sesamum indicum L. seeds extracts on Indian helminthes.



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Note: Experiments were carried out at room temperature; The control group containing 0.2% w/v of Tween 20 all the worms were alive even after 24 hrs.

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