SAR Journal of Pathology and Microbiology

Abbreviated Key Title: *SAR J Pathol Microbiol*
Home page: https://sarpublication.com/journal/sarjpm/home
DOI: 10.36346/sarjpm.2022.v03i04.004

OPEN ACCESS

ISSN 2707-7756 (P)
ISSN 2709-6890 (O)

Original Research Article

Invitro Antihelmintic Activity of Aqueous Seed Extract of *Syzygium cumini* against Indian Earthworms

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Article History: | Received: 30.06.2022 | Accepted: 02.08.2022 | Published: 06.08.2022 |

Abstract: *Syzygium cumini* (L.) Skeels, commonly known as Jamun, is a widely distributed forest tree in India and other tropical and sub tropical regions of the world. The tree has a great economic importance since most of the parts like the bark, leaves, seed and fruits are used as an alternative medicine to treat various diseases. The present study aimed at the in-vitro anthelmintic activity of aqueous fruit seed extract of *Syzygium cumini*. The fruit seeds were extracted separately with distilled water by maceration method .The various concentrations of the extract (50,100, 200,300,400mg/ml) respectively were screened for their anthelmintic activity using Pheritima posthuma. The activity was comparable with the standard drug albendazole. When the concentrations of the extract are increased, a gradual increase in anthelmintic activity is observed. The study involved the determination of time of paralysis (P) and time of death (D) of the worms. Aqueous fruit seed extract of *Syzygium cumini* showed anthelmintic activity against Indian earthworms. The data were found statistically significant by using one way ANOVA (P< 0.001).

Keywords: *Syzygium cumini*, *Pheretima posthuma*, Anthelmintic activity, Albendazole.

INTRODUCTION

Helminthiasis is a worm infestation of humans and other animals even life stock and crops affecting health and food production respectively and has impact on global economic factor (Kumar, 2014). The worms which causes helminthiasis are called as helminths and the drugs which are used for treating helminthiasis are nothing but anthelmintics (Abongwa, 2017). There are various types of worms such as hook worms, fluke worms, round worms, tape worms which causes helminthiasis. The names are given according to their shapes. The major organs which get affected in helminthiasis are stomach and intestine and major symptoms of sever helminthiasis include diarrhea, abdominal pain, general malaise and impaired cognitive development. Chronic helminthiasis by hook worm lead to intestinal bleeding and anemia (Hedley, 2015). Pheretima is a genus of earthworms. *Pheretima posthuma* are long cylindrical shaped worms having length of 15-30cm. they are mostly found in moist soil and responsible for vegetables and humus. Their life span is 3 to 10 years (Kutschera, 2010) [1].

Syzygium cumini L., (syn. *Eugenia jambolana, Eugenia cumini* and *Syzygium jambolana*) a polyembryonic species (family Myrtaceae) 7, is a tropical fruit tree of great economic importance. The fruit is commonly known as jamun (Hindi), java plum, black plum, jambul and Indian blackberry. It is a large, evergreen widely distributed forest tree of India, Sri Lanka, Malaysia and Australia which is also cultivated for its edible fruits. The tree was introduced from India and tropical Asia to southern Africa for its edible and attractive fruits [2].

Citation: Kakunuri Lakshmi, Adapa Sowmya, Kokkiligadda Akhila, Jaggavarapu Pavani, Nowdu Punya Keerthi, Ailapogu Jyothi, Battu Anupama, Alladi Sailaja (2022). Invitro Antihelmintic Activity of Aqueous Seed Extract of *Syzygium cumini* against Indian Earthworms. *SAR J Pathol Microbiol*, 3(4), 59-62.

Figure 1: *Syzygium cumini* fruit seeds

MATERIALS AND METHODS

Collection of plant material

The fruits of *Syzygium cumini* was identified and purchased from local market of Nuzvid.

Preparation of aqueous extract (Maceration method) [3]

The 500gm of dried seeds of *Syzygium cumini* was collected, powdered to get a coarse powder and was kept for maceration with 1000 ml of distilled water for 7 days. The extract was double filtered by using muslin cloth and Whatman no.1 filter paper and concentrated by evaporation on water bath. The extract was dried and used.

Preliminary phytochemical screening [4-6]

The preliminary phytochemical investigation was carried out with aqueous extract of *Syzygium cumini fruit seed* for identification of phytochemical constituents. Phytochemical tests were carried out by standard methods.

Test organism [7]

Indian adult earthworms (*Pheretima posthuma)* were used during the experiment. The earthworms were collected from a local supplier. Worms were washed with normal saline to remove all fecal matter .The earthworms of 8-10 centimeter (cm) in length and 0.2 -0.5 cm width were used for all the experiment protocol. Ready availability, anatomical and physiological resemblance of (*Pheretima posthuma)* made it to be used initially for *in-vitro* evaluation of anthelmintic activity. Time for paralysis was noted either when any movement could not be observed except when the worms where shaken vigorously. Death was included when the worms lost their motility followed by white secretions and fading away of their body colour.

Evaluation of Antihelmintic activity

The antihelmintic activity was evaluated on adult Indian earthworm. The earthworms were randomly chosen and divided into 3 groups having five earthworms in each as follows:

Group I: Control Group

Group II: Standard Group – Albendazole **[8]** -50,100, 200 mg/ml

Group III: Test-I -Aqueous fruit seed extract of *Syzygium cumini* [SCAE- 50,100, 200 mg/ml]

Observations were made for the time taken by worms to paralyze and death was observed. Time for paralysis was noted when no movement could be observed with a slight pin prick method. Death was ascertained by applying external stimuli which stimulate and induce movements in worms as well as fade of the body color was noted.

Statistical analysis

The values are expressed as mean± SEM. The statistical analysis was performed using one way analysis of variance (ANOVA) followed by Dunnett's multiple comparison test. Comparisons were made between control group and test/standard groups. P-values <0.05 was considered statistically significant. The statistical analysis was done by using Graph pad prism version no: 6.0.

RESULTS AND DISCUSSION

In this study, we found that aqueous fruit seed extract of *Syzygium cumini* possess the following chemical constituents (Table 1).

Table 1: Phytochemical screening of SCAE

Phytochemical constituents	Aqueous fruit seed extract of *Syzygium cumini (SCAE)*
Alkaloids	+
Carbohydrates	+
Flavonoids	+
Phenols	_
Saponins	+
Terpenoids	_
Sterols	_
Tannins	+
Proteins	_
Amino acids	_
Glycosides	+
Fixed oils and fatty acids	+

+ indicate the compulsory present and – indicate the absent.

SCAE- *Syzygium cumini* aqueous fruit seed extract.

Antihelmintic activity

The Aqueous fruit seed extract of *Syzygium cumini* produced a significant antihelmintic activity in dose dependent manner as shown in below table.

Table 2: Anthelmintic activity of aqueous fruit seed extract of *Syzygium cumini* & Standard drug on earth worm

Groups	Concentration	Time Taken in minutes	
		Paralysis (P)	Death (D)
Control		-	-
Standard (Albendazole)	50mg/ml	31.6±0.40	53.6±0.51
	100mg/ml	28.2±0.37	49.2±0.36
	200 mg/ml	26.6±0.40	39±0.32
	300 mg/ml	25.4±0.25	30.2±0.37
	400 mg/ml	19.8±0.20	10.2±0.37
Test-I [SCAE]	50 mg/ml	35.8±0.37	55.8±0.36
	100 mg/ml	28.2±0.37	48.2±0.37
	200 mg/ml	27.2±0.66	38±0.84
	300 mg/ml	25.4±0.25	29±0.32
	400 mg/ml	21.8±0.37	10.8±0.36

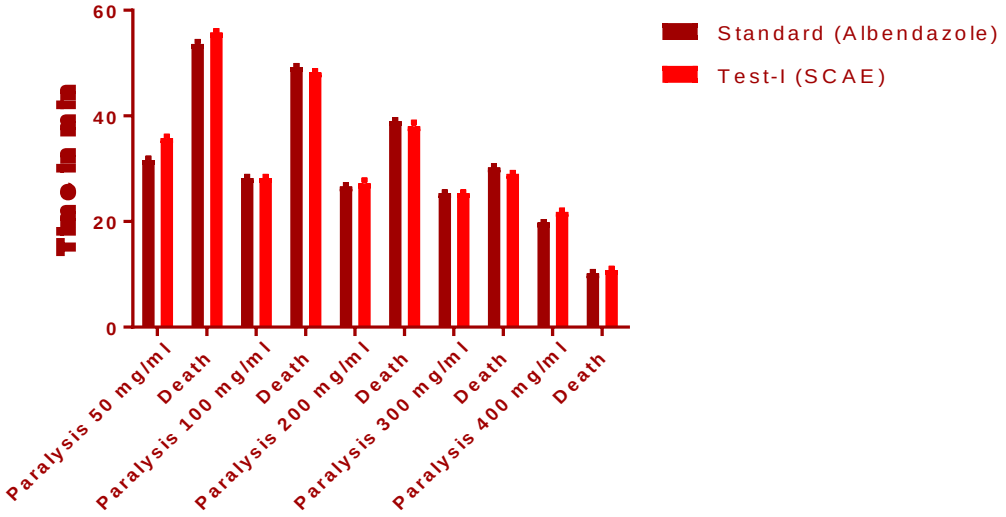

Figure 2: Anthelmintic activity of standard, SCAE, Values are expressed as Mean ± SEM, P < 0.001

CONCLUSION

In the present investigation, Aqueous fruit seed extract of *Syzygium cumini* posses the presence of alkaloids, carbohydrates, saponins, tannins, Flavonoids and glycosides. Tannins are chemically polyphenolic compound and where shown to produce anthelmintic activities and reported the effect of tannin can bind to free proteins in gastro intestinal tract of host animal or glycoproteins on the cuticle of parasite and may cause death. These facts suggest that tannins present in the aqueous fruit seed extract of *Syzygium cumini* showed the antihelmintic effect by above mentioned mechanisms. From the result shown in table-2 aqueous fruit seed extract of *Syzygium cumini* showed anthelmintic activity in dose dependent manner giving shortest time of paralysis and death. The aqueous fruit seed extract of *Syzygium cumini* at normal concentration i.e. 50 mg/ml to higher concentration i.e. 400mg/ml showed good anthelmintic activity and this is compared with effect produced by reference standard drug albendazole. The study finally concluded aqueous fruit seed extract of *Syzygium cumini* showed marked and potent anthelmintic activity than the standard drug albendazole.

ACKNOWLEDGMENT

Authors express their sincere thanks to Principal and Management of Sri Siddhartha Pharmacy College, for providing necessary facilities to conduct this research work. They also express their thanks to teaching and nonteaching faculty of division of pharmacology for their support.

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