

Original Research Article

Comparitive Invitro Antihelmintic Activity of Individual and Combined Leaf Extracts (*Syzygium cumini* and *Achras zapota*) Against *Pheritima Posthuma*

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Abstract: *Syzygium cumini* and *Achras zapota* leaves were easily available and commonly used in our day –to-day life. The present study aimed at the in-vitro comparative study of anthelmintic activity of aqueous extracts of leaves of *Syzygium cumini*, *Achras zapota* and mixed. The fruits were extracted separately with distilled water by maceration method. The various concentrations of the extract (50,100, 200mg/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 extract of *Syzygium cumini*, *Achras zapota* and mixed showed anthelmintic activity but mixed extract was more efficient anthelmintic activity against Indian earthworms. The data were found statistically significant by using one way ANOVA ($P < 0.0001$).

Keywords: *Syzygium cumini*, *Achras zapota*, *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 have impact on global economic factor (Kumar, 2014). The worms which cause 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].

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Sapota or sapodilla (*Manilkara achrus* (Mill.) Fosberg) synonym *Achrus sapota* L. is an important tropical fruit also grown in subtropical region of the world. *Sapota* (*Achrus sapota* L.) belongs to the family Sapotaceae. It is a native of tropical America especially South Mexico or Central America from where it spread to other countries. It is cultivated in states of Karnataka, Gujarat, Andhra Pradesh, Maharashtra, West Bengal and Tamil Nadu. The well-established orchard of sapota in India [3, 4].

MATERIALS AND METHODS

Collection of Plant Material

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

Preparation of Aqueous Extract (Maceration Method) [5]

The 500gm of dried leaves of *Syzygium cumini* and *Achrus zapota* was collected and 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 [6-8]

The preliminary phytochemical investigation was carried out with aqueous extracts of *Syzygium cumini* and *Achrus zapota* and mixed leaves for identification of phytochemical constituents. Phytochemical tests were carried out by standard methods.

Test Organism [9]

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 were shaken vigorously. Death was included when the worms lost their motility followed by white secretions and fading away of their body colour.

Evaluation of Anthelmintic Activity

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

Group I: Control Group

Group II: Standard Group – Albendazole [10] -50,100, 200 mg/ml

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

Group IV: Test -II - Aqueous leaves extract of *Achrus zapota* [AZAE- 50,100, 200 mg/ml]

Group V: Test –III- Mixed leaves aqueous extract of *Syzygium cumini*, *Achrus zapota* [MLAE- 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 \pm 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 extract of *Syzygium cumini*, *Achrus zapota* and mixed possess the following chemical constituents (Table 1).

Anthelmintic Activity

The Aqueous extract of *Syzygium cumini*, *Achrus zapota* and mixed produced a significant anthelmintic activity in dose dependent manner as shown in below table.

Table 1: Phytochemical screening of SCAE, AZAE & MLAE

Phytochemical constituents	Aqueous leaves extract of <i>Syzygium cumini</i>	Aqueous leaves extract of <i>Achras zapota</i>	Aqueous mixed leaves extract
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 leaves extract.

AZAE - *Achras zapota* aqueous leaves extract.

MLAE- Mixed leaves aqueous extract.

Table 2: Anthelmintic activity of *Syzygium cumini*, *Achras zapota* and mixed extracts & Standard drug on earth worm

Groups	Concentration	Time Taken in minutes	
		Paralysis (P)	Death (D)
Control		-	-
Standard	50mg/ml	32.6±0.51	56.4±0.50
	100mg/ml	28.8±0.37	50.0±0.71
	200mg/ml	19.2±0.37	29.8±0.31
Test-I [SCAE]	50mg/ml	29.4±0.50	57.2±0.37
	100mg/ml	25.6±0.40	44.0±0.55
	200mg/ml	22.6±0.68	32.4±0.51
Test-II[AZAE]	50mg/ml	26.2±0.37	52.6±0.68
	100mg/ml	22.0±0.32	45.2±0.86
	200mg/ml	14.6±0.50	36.4±0.51
Test-III [MLAE]	50mg/ml	21.6±0.51	37.2±0.37
	100mg/ml	16.6±0.40	32.0±0.32
	200mg/ml	14.2±0.58	26.6±0.51

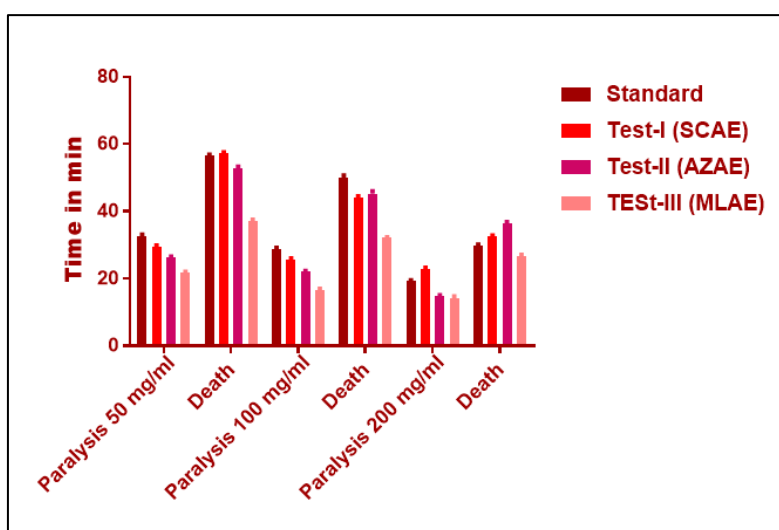


Figure 2: Anthelmintic activity of standard, SCAE, AZAE & MLAE. Values are expressed as Mean ± SEM, P < 0.001

CONCLUSION

In the present investigation, *Syzygium cumini*, *Achras zapota* and mixed leaves possess 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 leaves extract of *Syzygium cumini* and *Achras zapota* and mixed showed the antihelmintic effect by above mentioned mechanisms. From the result shown in table-2 aqueous leaves extract of *Syzygium cumini*, *Achras zapota* and mixed showed anthelmintic activity in dose dependent manner giving shortest time of paralysis and death. The aqueous fruit extract of *Syzygium cumini*, *Achras zapota* and mixed at normal concentration i.e. 50 mg/ml to higher concentration i.e. 200mg/ml showed good anthelmintic activity and this is compared with effect produced by reference standard drug albendazole. The study finally concluded aqueous mixed leaves extract i.e. combination of *Syzygium cumini* and *Achras zapota* showed marked and potent anthelmintic activity than the aqueous extract and standard drug albendazole.

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REFERENCES

1. Baravkar, A. A., Shende, M. V., Nalawade, N. A., & Aher, N. B. (2020). In vitro anthelmintic activity of aqueous and organic extract of roots of Punica granatum linn. *International Journal of Advanced Research*, 8(07), 459-463.
2. Chaudhary, B., & Mukhopadhyay, K. (2012). *Syzygium cumini* (L.) Skeels: A potential source of nutraceuticals. *Int J Pharm Biol Sci*, 2(1), 46-53.
3. Baskar, M., Hemalatha, G., & Muneeshwari, P. (2020). Traditional and medicinal importance of sapota–Review. *International Journal of Current Microbiology and Applied Sciences*, 9(1), 1711-1717.
4. Arbat Shakti, S. (2017). Evaluation of Different Sapota (Manilkara achras (Mill) Fosberg) Varieties for Sundried Sapota Slices on the Basis of Organoleptic Parameters. *International Journal of Agriculture Sciences*, 9(6), 3805-3807. ISSN, 0975-3710.
5. Apte, A. K., Khot, V. S., Biradar, N. S., & Patil, S. B. (2014). Anthelmintic activity of Trachyspermum ammi (l) extract. *International Journal of Pharmacy and pharmaceutical sciences*, 6(2), 236-238.
6. Sharada, L, D. (2018). Pharmacognosy and phytochemistry: A Companion Handbook. *Pharma Med Press*, 2nd edition, 69-77.
7. Beena, P., Rajesh, K. J., & Arul, B. (2016). Preliminary phytochemical screening of Cicer arietinum in folklore medicine for hepatoprotection. *J Innov Pharm Biol Sci*, 3, 153-9.
8. Manohar, V. R., Chandrashekar, R., & Rao, S. N. (2012). Phytochemical Analysis of Ethanolic Extract of Fruits of Terminalia chebula (EEFTC). *Drug Invention Today*, 4(10), 491-492.
9. Durgawale, T. P., Khanwelkar, C. C., Durgawale, P. P., & Kakade, S. V. (2017). Comparative Anthelmintic Activity of Different Extracts of Portulaca Oleraceae L. Whole Plant. *Biomedical & Pharmacology Journal*, 10(4), 2013-2016.
10. John, J., Mehta, A., Shukla, S., & Mehta, P. (2009). A report on anthelmintic activity of Cassia tora leaves. *Songklanakarinn Journal of Science & Technology*, 31(3), 269-271.