



IN VITRO ANTHELMINTIC POTENTIAL OF DIFFERENT EXTRACT OF *CUCURBITA MAXIMA* LEAVES

¹ANU P M, ²CLARIYA RAPHEAL, ³SANGEETHA M, ⁴GREESHMA U NAIR, ⁵Dr. V SIVAJOTHI,

⁶Dr. ANIL BABU A

¹Associate Professor, ²Assistant Professor, ³Assistant professor, ⁴Lecturer, ⁵Professor, ⁶Professor

Department of Pharmaceutical Chemistry, West Fort College of Pharmacy, Thrissur, India.

ABSTRACT

Pumpkin (*Cucurbita maxima*) is a creeper and is extensively found all over India. Anthelmintics are a group of ant parasitic drugs that expel parasitic worm and other internal parasite from body. Studies have shown the decreased effect of currently available anthelmintic drugs in market mainly due to resistance by parasite. The purpose of this project was to provide a comprehensive overview on anthelmintic potential of *Cucurbita maxima* (Cucurbitaceae) leaf extracts. Four different extracts (petroleum ether, ethyl acetate, methanol, water) of shade dried pumpkin leaves were prepared by maceration technique and their different concentrations (50mg/ml, 10 mg/ml) were prepared. These extracts were tested for their anthelmintic potential by noting the time of paralysis and inhibition on *Pheretimaposthuma* species, and it was compared with standard Albendazole. The current investigation showed that all the extracts have anthelmintic property where water extract being the most effective..

Index Terms:

Cucurbita maxima, Anthelmintics property, Leaf extracts. *Pheretimaposthuma*, Albendazole.

1. INTRODUCTION

Anthelmintics are a group of antiparasitic drugs that expel parasitic worm (helminthes) and other internal parasites from the body by either stunning or killing them without causing significant damage to the host ⁽¹⁾. Anthelmintics are used to treat Helminthiasis, which is also known as worm infection, is any macro parasitic disease of human and other animals in which a part of body is infected with parasitic worms, known as helminths ⁽²⁾. Helminthiasis has been found to result in poor birth outcome, poor cognitive development, poor school and work performance and poverty ⁽³⁾. Chronic illness, malnutrition, and anemia are further examples of secondary effect ⁽⁴⁾. Soil transmitted helminthiasis are responsible for parasitic infection in as much as quarter of the human population worldwide ⁽⁵⁾. One well known example is ascaris. The worms compete directly with their host for nutrients but the magnitude of this effect is less because worms are relatively small ⁽⁶⁾.

An ideal anthelmintic must have a wide margin between its toxicity to the worm and its toxic effect on the host. The drug must be effective in one dose.⁽⁷⁾ Pumpkin (*Cucurbita maxima*) leaves are orbicular in outline and not pointed or much lobed, with deep sinus at base. The pumpkin varies greatly in shape, ranging from oblate to oblong. The rind is smooth and usually lightly ribbed. Although pumpkins are usually orange or yellow, some fruits are dark green, pale green, orange-yellow, white, red and gray. Corolla prevailing with soft obtuse more or less crinkly revolute or hanging lobes, the tube with parallel sides or bulging at base, peduncle short, spongy, nearly cylindrical, not expanded at attachment to fruit.⁽⁸⁾

2. EXPERIMENTAL

2.1 MATERIAL

The leaves of *Cucurbita maxima* were collected from Palakkad in the month of August-September. The plant material was authenticated from SreeNeelakantan Sanskrit college, Pattambi, Kerala, India. The collected leaves were washed with sterile water and dried under sun shade for two weeks.

2.2 Worm collection and authentication

Indian adult earthworm *Pheretima posthuma* were collected from the local vermicompost shop and washed with normal saline to remove the fecal matter. Experiments were carried out in adult earthworm due to its structural resemblance with the intestinal roundworm parasites of human beings. Indian adult worms of about 5 to 7 cm long were used to evaluate the anthelmintic activity. The earthworms were acclimatized to the laboratory conditions before experimentation.⁽⁹⁾

2.2 CHEMICALS.

Ethyl Acetate, Water, Petroleum Ether And Methanol, Tannins, Albendazole, Normal Saline

3. METHODS

3.1 Extraction and fractionation of *Cucurbita maxima* leaves

Extraction of leaves of *Cucurbita maxima* was carried out using ethyl acetate, water, petroleum ether and methanol by maceration method. 20g of dried powder of leaves of *Cucurbita maxima* were taken and macerated with 250ml solvents in the increasing order of polarity i.e. petroleum ether, ethyl acetate and water for two days (for each solvent) in an iodine flask. Each day clear solution was decanted off and fresh solvent added. The extracts obtained were then concentrated under reduced pressure into a dark brown sticky mass.⁽¹⁰⁾

3.2 UV SPECTROSCOPY

30mg of Petroleum ether, water, Ethyl acetate and methanol extract of *Cucurbita maxima* leaves were dissolved in 25 ml of methanol. Standards of tannins were prepared by dissolving 10mg in 25ml of methanol. After that solutions were diluted with same solvent (1:100) and the spectrophotometric measurements were recorded.⁽¹¹⁾

3.3. ANTHELMINTIC STUDY-

The Ethyl acetate, methanol, water and petroleum ether extract of *Cucurbita maxima* of two different concentrations (10 and 50 mg/ml) were prepared by using normal saline as suspending agent and volume was made up to 10 ml for respective concentrations.

Albendazole was used as standard. All the experiments were made in triplicate. The assay was performed on adult Indian earthworm, *Pheretima posthuma*, collected from moist soil and washed with normal saline to remove all fecal matter. The earthworms of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocol. Three earthworms were released in to 10 ml of solutions of standard and different extract solution in normal saline.

Observations were made for the time taken to paralysis and death of individual worms. Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Death was concluded when the worms lost their motility followed with fading away of their body colors. The test results were compared with standard drug albendazole. ⁽⁹⁾

4. RESULTS

4.1 EXTRACTIVE VALUE

The dried powder of Cucurbita maxima (20g) was extracted with petroleum ether, ethyl acetate, methanol and water based on their increasing order of polarity. The calculated percentage yield of different extracts was tabulated below.

$$\text{Percentage yield} = (\text{weight of extract} \div \text{weight taken}) \times 100$$

table no: 1 - percentage yield

SL.NO	EXTRACTS	YIELD(g)	PERCENTAGE YIELD (%w/w)
1	Petroleum ether	4.2	21
2	Ethyl acetate	4.8	24
3	Methanol	3.1	15.5
4	Water	5.46	27.3

4.2 UV SPECTROSCOPY

The absorbance of different extracts was taken using UV spectrophotometer and the readings are given below.

table no:2- absorbance of different extracts

Wavelength (nm)	Tannic acid	Pet.Ether extract	Ethyl acetate Extract	Methanol extract	Water extract
200	2.3872	0.7791	0.6549	2.004	1.7801
205	2.2082	0.7125	0.3000	1.9300	1.5469
215	2.0191	0.6998	0.2265	1.8880	1.500
220	1.9795	0.6784	0.1607	1.8420	1.1980
225	1.8900	0.5567	0.1638	1.3424	0.9654
230	1.5341	0.5189	0.1706	0.6235	0.6548
235	1.0103	0.4889	0.1771	0.3338	0.6345
240	0.6293	0.4567	0.1563	0.3926	0.3300
245	0.4475	0.1794	0.9999	0.4008	0.3230
250	0.4027	0.1665	0.1282	0.2098	0.2999
255	0.4294	0.3750	0.1197	0.2134	0.2748
260	0.4807	0.1654	0.1125	0.2229	0.3098
270	0.9876	0.1549	0.0992	0.6187	0.7687
275	0.1294	0.1330	0.0961	0.2316	0.3750
280	0.1332	0.0383	0.0877	0.1943	0.3218
290	0.1553	0.0110	0.0743	0.0089	0.2630

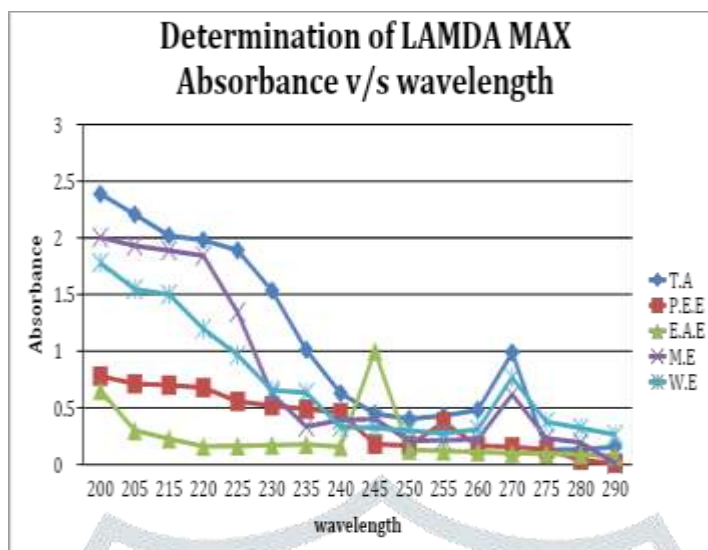


Figure 1 determination of lamda max by UV SPECTROSCOPY

4.3ANTHELMINTICACTIVITY

Anthelmintic activity of different extracts and standards (albendazole) were studied.

table no3:anthelmintic activity of extracts and standard

GROUPS	CONCENTRATIO N ($\mu\text{g/ml}$)	TIMETAKENFOR PARALYSIS (min)	TIME TAKEN FOR DEATH (min)
Control	—	—	—
Petroleum ether	50	70.46 ± 0.06	228.34 ± 0.09
	10	90.45 ± 0.056	287.6 ± 0.01
Ethylacetate	50	71.87 ± 0.089	189.98 ± 0.034
	10	96.88 ± 0.009	288.03 ± 0.04
Methanol	50	58 ± 0.089	73 ± 0.011
	10	74 ± 0.0593	89 ± 0.098
Water	50	32 ± 0.044	53 ± 0.028
	10	55 ± 0.039	70 ± 0.13
Albendazole	10	39 ± 0.0014	56 ± 0.009

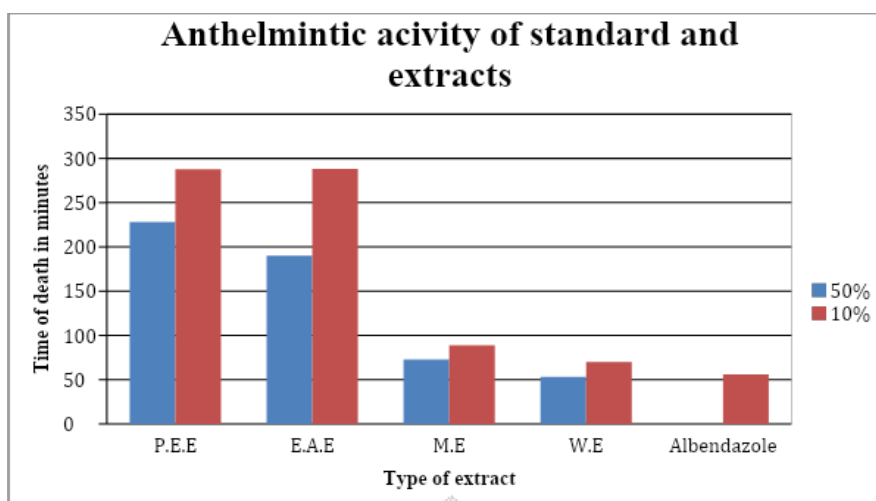


fig no :2 anthelmintic activity of extracts and standard

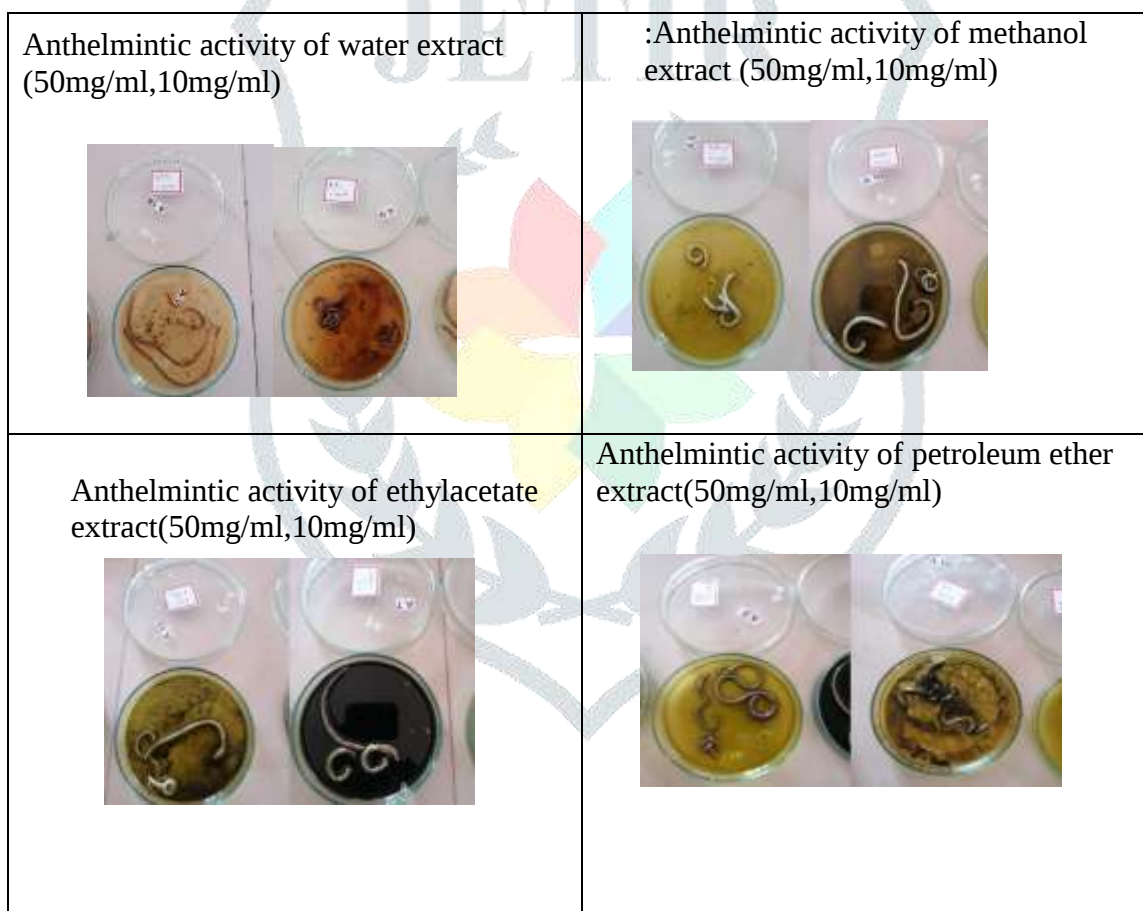


Fig No 3: Diagrams for different extract

CONCLUSION

- The dried powder leaves of *Cucurbitamaxima* were extracted and percentage yield of extract were calculated.
- The preliminary phytochemical screening was performed.
- The components were identified and then confirmed by TLC studies.

- In anthelmintic study the water extract showed significant activity when compared with standard. So, it can be used as an alternative for synthetic drugs in various worm infections with minimum side effects.

REFERENCE

1. Fact sheet ., Soil transmitted helminth infection . May 2015.
2. Watkins.W.E, Politt E. (1997) . Stupidity on worms .No intestinal worms impair mental performance? (PDF). Psychological bulletin, 1997; 121 (2) : 171 _91 .
3. Crompton D W .T. (1993) Human nutrition and parasitic infection .Cambridge university press, May 2015
4. Crompton D.W.T (1993) Human nutrition and parasitic infection .Cambridge university press.
5. The World Bank. “World development report 1993: Involving in health.” . May 2015.
6. Dale M M , Ritter J M , Fowler RJ , Rang NP , Rang of Dale’s. pharmacology.Edinburgh : Churchill Livingstone 2008 (6 th edition); P 712_713.
7. Nitinkumar Upwar, Roshan Patel, Naheed Waseem1 and Naveen Kumar Mahobia.. In vitro anthelmintic activity of Brassica nigra Linn. Seeds, International Journal of Natural Products Research., 2011; vol 1 (1); PP No: 1-3
8. Kirtikar K.R, Basu B.D. Indian medicinal plants, oriel enterprises, 2nd edition, vol9, p.1607
9. Eldin Hussein Elgilanind Christian Yacoub Ishak. Methods of Extraction and Characterisation of Tannins from Some Acacia Species of Sudan Isam.
10. Bartin,Heidelberg,Springer Barton,,Heidelberg. Paper chromatography Technique application in natural product isolation (second). Pg no.50
11. Mehta Sanam,Rana Pawan Singh, Sakhlani Pooja. Phytochemical screening and TLC profiling of various extracts of Reinwardtia indica