

Anthelmintic Activity of Parts of *Psidium Guajava* Extracts Against *Pheritima Posthuma*

CHALUVARAJU. KC*, KHAJAPHIR MAKRABBI, ZARANAPPA AND NAVEEN KUMAR. KL

Department of Pharmaceutical Chemistry, Government College of Pharmacy, Bengaluru-27

ABSTRACT

It is interesting to note that folk medicines have contributed to modern medicine in almost all parts of the world and *Psidium guajava* is one such important medicinal plant used in folk medicine. The present paper communicates the anthelmintic potentials of ethanolic extracts of leaves, roots, and barks of *Psidium guajava* against Indian adult earthworm *Pheritima posthuma*. The study indicates the comparative evaluation of three extracts and found that all the extracts exhibited anthelmintic activity and the maximum activity was observed in ethanolic extracts of leaves. Piperazine citrate was used as standard drug.

Key Words: Anthelmintic activity, Piperazine citrate, *Psidium guajava*, Ethanolic extract.

INTRODUCTION

Infections due to worms are increasing worldwide and needs to be treated effectively. Most diseases caused by helminthes are of a chronic, debilitating in nature; they probably cause more morbidity and greater economic and social deprivation among humans and animals than any single group of parasites^[1]. Chemical control of helminthes coupled with improved management has been the important worm control strategy throughout the world. Piperazine, its related compounds and benzimidazole heterocycles were found to possess anthelmintic activity and are associated with the side effects headache, dizziness, abdominal discomfort, diarrhoea, drowsiness, rash, hallucinations, crystalluria and leucopenia^[2] etc., Hence there is a need for the search of an anthelmintic drug devoid of side effects. However, development of resistance in helminthes against conventional anthelmintics is a foremost problem in treatment of helminthes diseases^[3]. Henceforth it is important to look for alternative strategies against gastrointestinal nematodes, which have led to the proposal of screening medicinal plants for their anthelmintic activity.

Plants are one of the major sources since the dawn of human civilization, though there are various sources of drugs. Ethnobotanical survey revealed that medicinal plants have played tremendous role in the treatment of various ailments such as cancer, diabetes, hypertension, malaria^[4] etc., The active principles of plants responsible for biological activity were found to present in seeds, roots, stems, barks, leaves, flowers, fruits, etc., About 75% of the Indian population

*Address for correspondence:
chaluvarajukc@gmail.com

relies heavily on use of herbal drugs for the treatment of diseases because of their effectiveness, easy availability, low cost, less toxic effect^[5] etc., *Psidium guajava* is one such medicinal plant used due its hypoglycemic^[6], antimicrobial^[7] antiallergic^[8], antioxidant^[9], hepatoprotective^[10], anti-inflammatory activities^[11], Cardio active^[12] etc., However there is a scarcity of literature on the anthelmintic potentials of *Psidium guajava*.

In view of the above observations and importance of plants, in the present study an attempt has been made to screen the anthelmintic activity of ethanolic extracts of leaves, roots and bark of *Psidium guajava* against Indian earthworm *Pheritima posthuma* due to its anatomical and physiological resemblance to intestinal roundworm.

MATERIALS AND METHODS

Collection of plant

The plant *Psidium guajava* were collected from local areas of Mandya district and authenticated by Sri Lingaraju D P, Assistant professor, Department of Botany, A V K College for women Hassan and voucher specimen is deposited in our laboratory.

Preparation of plant extracts

The fresh leaves, barks and roots of the plant collected were dried. 100gm of each were chopped into pieces and subsequently blended. 200ml of 95% w/v alcohol (Ethanol) was added to each and the mixtures were refluxed in soxhlet extractor for about 24 hours individually. Cooled, filtered through Whatman filter paper and the filtrates were concentrated using Rota evaporator at 45°C. Chemical tests

were conducted on the extracts using standard procedures to detect the presence of tannins in each of the extracts^[13].

Anthelmintic activity

Anthelmintic activity was carried out according to the method of Ajaiyeoba^[14] using Indian earth worm *Pheritima posthuma* due to its anatomical and physiological resemblance with the intestinal round worm parasites of human beings. *Pheritima posthuma* of nearly equal size (6 ± 1 cm) were collected from moist areas and washed with normal saline.

Preparation of sample solutions

The suspensions of the samples (50mg, 100mg and 200mg) were prepared by triturating the extracts (leaves, barks and root extracts) with distilled water and 0.5% w/v ethylene glycol and further transferred to a beaker labeled as 50mg, 100mg and 200mg respectively, stirred for about 30 min at room temperature. The resulting solutions were then used for anthelmintic studies.

Method of testing

Thirteen groups of approximately equal-sized (6 ± 1 cm) Indian earthworms *Pheritima posthuma* consisting of six earthworms in each group were placed in Petri dishes (4" size) containing suspensions of specific concentration (50 mg, 100 mg, 200 mg) at room temperature. Each group was treated with one of the following: control (0.5% w/v ethylene glycol in normal saline), Piperazine citrate (50 mg, 100mg, 200mg in normal saline) different concentrations of extracts (50 mg, 100 mg, 200 mg) respectively. The time taken for complete paralysis and death were recorded using a stopwatch. The mean paralysis time and mean lethal time for each sample was recorded (each reading was taken in

triplicate). The time taken by worms to become motionless was noted as paralysis time and to note the death time the earthworms were frequently applied with external stimuli by transferring them to a beaker containing hot water in order to check its mortality. The anthelmintic activities of the tested compounds on *Pheritima posthuma* are indicated in **Table 1**.

RESULTS AND DISCUSSION

The data revealed that total ethanolic extracts of various parts (leaves, barks and roots) of the plant *Psidium guajava* showed significant anthelmintic activity at 200 mg/ml concentration. Three extracts showed anthelmintic activity in dose-dependent manner giving shortest time of paralysis and death with 200 mg/ml concentration, for all three parts of plant used. The anthelmintic activities of the extracts were compared with reference standard Piperazine citrate. From the results obtained, it can be concluded that ethanolic leaf extracts of the plant *Psidium guajava* exhibited maximum anthelmintic activity which may be due to the presence of maximum amount of tannins^[15]. Also the study correlates the traditional use of *Psidium guajava* leaves by tribals to cure intestinal worm infections.

ACKNOWLEDGEMENT

The authors would like to thank the Principal, Govt. College of Pharmacy, Bengaluru for providing laboratory facilities to carry out the present work.

REFERENCES

- Sharma A, Gupta S, Sachan S, Mishra A, Banarji A. Anthelmintic activity of the leaf of *Saraca indica* Linn. Asian J Pharm Life Sci 2011;1(4):391-5.

Table - 1
Anthelmintic activity of ethanolic extracts of leaves, barks and roots of *Psidium guajava*.

Test Compound	Concentration	Time in minutes	
		For paralysis	For death
Control (Normal saline)	0.9 %	-	-
Piperazine citrate (Standard)	50 mg/ml	09	16
	100 mg/ml	05	11
	200 mg/ml	02	08
Ethanolic of extract leaves	50 mg/ml	12	18
	100 mg/ml	07	13
	200 mg/ml	03	07
Ethanolic extract of barks	50 mg/ml	17	22
	100 mg/ml	11	15
	200 mg/ml	05	09
Ethanolic extract of roots	50 mg/ml	24	29
	100 mg/ml	17	21
	200 mg/ml	08	13

2. K. D. Tripathi, 1985. Essentials of Medical Pharmacology. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.
3. Partap S, Kumar S, Kumar A, Sharma NK, Jha KK. In-Vitro Anthelmintic Activity of *Luffacylindrica* Leaves in Indian Adult Earthworm. J PharmacogPhytochem 2012;1(2):27-30.
4. Ilyas M, Begum ATN. Biological Potential and Phytopharmacological Screening of *Gomphrena* Species. Global JPharmacol 2013;7(4):457-64.
5. Kumar S, Shukla Y. Herbal Medicine: Current Status and the Future. Asian Pacific J Cancer Prevention 2003;4:281-8.
6. Mukhtar HM, Ansari SH, Ali M, Naved T, Bhat ZA. Effect of water extract of *Psidium guajava* leaves on alloxan-induced diabetic rats. Pharmazie 2004;59:734-5.
7. Qa'dan F, Thewaini AJ, Ali DA, Afifi R, Elkhawad A, Matalka KZ. The Antimicrobial Activities of *Psidium guajava* and *Juglansregia* Leaf Extracts to Acne-Developing Organisms. The American J Chinese Med 2005;33(2):197-204.
8. Seo N, Ito T, Wang N, Yao X, Tokura Y, Furukawa F, Takigawa M, Kitanaka S. Anti-allergic *Psidium guajava* Extracts Exert an Antitumor Effect by Inhibition of T Regulatory Cells and Resultant Augmentation of Th1 Cells. Anticancer res 2005;25:3763-70.
9. Thaiponga K, Boonprakoba U, Crosbyb K, Cisneros-ZevallosL, Byrned DH. Comparison of ABTS, DPPH, FRAP, and ORAC assays for estimating antioxidant activity from guava fruit extracts. J Food Compos Analysis 2006;19:669-75.
10. Roy CK, Kamath JV, Asad M. Hepatoprotective activity of *Psidium guajavalinn*. Leaf extract. Ind Jexpboil 2016;44:305-311.
11. Sen T, Nasralla HSH, Nag Chaudhuri AK. Studies on the antiinflammatory and related pharmacological activities of *psidium guajava*: A preliminary report. Phytotherapy res 2006;9(2):118-122.
12. Conde Garcia EA, NascimentoVT, Santiago Santos AB. Inotropic effects of extracts of *Psidium guajava* L. (guava) leaves on the guinea pig atrium. Braz J Med Biol Res 2003;36(5):661-8.
13. Min B R, Pinchak W E, Merkel R, Walker S, Tomita G, Anderson R C. Comparative antimicrobial activity of tannin extracts from perennial plants on mastitis pathogens. Scientific Res Essay 2008;3(2):66-73.
14. Deore SL, Khadabadi SS, Kamdi KS, Ingle VP, KawalkarNG, Sawarkar PS, Patil UA, Vyas AJ. In vitro Anthelmintic activity of *Cassia tora*. Int J chemtech Res 2009;1(2):177-9.
15. Ozele, Obaineh M, Agunbiade, Shadrach. Phytochemical Constituents and Medicinal Properties Of Different Extracts of *AnacardiumOccidentale* and *Psidium guajava*. Asian J Biomed pharmaceutsci 2013;3(6):20-3.

