CODEN [USA]: IAJPBB ISSN : 2349-7750
INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
SJIF Impact Factor: 7.187
https://doi.org/10.5281/zenodo.22901379

Available online at: http://www.iajps.com Research Article

IN VITRO ANTHELMINTIC ACTIVITY OF *PSIDIUM GUAJAVA* L. EXTRACTS AGAINST *PHERETIMA POSTHUMA*

Amena banu, Poonam, Mohammed Younus, Bibi sara, Nazaneen and Hanamanth
Aryan College of Pharmacy, Kalaburagi, Karnataka, India.

Abstract:
Background: Helminthic infections remain an important parasitic health problem, while resistance to established anthelmintic agents has encouraged investigation of plant-derived alternatives. Psidium guajava L. (Myrtaceae) is a medicinal plant reported in the source study to contain flavonoids, tannins, saponins, triterpenoids and other bioactive constituents. Objective: To evaluate the in vitro anthelmintic activity of petroleum ether and aqueous extracts of P. guajava against Pheretima posthuma using paralysis time (PT) and death time (DT) as outcome measures. Methods: Plant material was shade-dried, powdered and extracted using petroleum ether and water. Physicochemical parameters, preliminary phytochemical screening and an acute oral toxicity assessment were reported. Adult P. posthuma were exposed to extract concentrations of 25, 50, 75 and 100 mg/mL and compared with albendazole (10 mg/mL) and control treatment. Results: Petroleum ether extract produced PT/DT values of 90.3/100.0, 70.3/90.3, 65.8/85.8 and 56.1/70.3 min at 25, 50, 75 and 100 mg/mL, respectively. The aqueous extract produced PT/DT values of 81.3/90.1, 49.3/60.2, 44.8/55.8 and 26.1/30.9 min at the same concentrations. Albendazole produced PT/DT values of 20.1/26.4 min. Conclusion: Both P. guajava extracts demonstrated concentration-associated reductions in paralysis and death times in the reported assay, with the aqueous extract showing the shorter times at the tested concentrations. The findings support further investigation of P. guajava constituents and mechanisms responsible for the observed activity.
Keywords:Psidium guajava; anthelmintic activity; Pheretima posthuma; aqueous extract; petroleum ether extract; albendazole; phytochemical screening.

Corresponding author:
Amena Banu,
Aryan College of Pharmacy,
Kalaburagi, Karnataka, India

QR CODE

Please cite this article in press ***Amena Banu*** *et al.,* ***In vitro anthelmintic activity of psidium guajava l. Extracts against pheretima posthuma..,****. Indo Am. J. P. Sci, 2026; 13(09).*

1. INTRODUCTION:

Medicinal plants have long been used as sources of therapeutic agents, and plant-derived preparations continue to be investigated for pharmacological activity. The source document emphasizes the medicinal importance of plants and the continuing search for naturally derived compounds with therapeutic potential.

Helminths are parasitic worms that may inhabit the intestinal tract or tissues. Anthelmintic resistance is described in the source study as the ability of parasites to survive treatment with an anthelmintic chemical that had previously been effective. The development of resistance is an evolutionary process influenced by selection pressure and management practices. The source document also notes the relevance of zoonotic parasites to human health.

Psidium guajava L. (guava), belonging to the family Myrtaceae, is a tropical medicinal plant. The reviewed material describes leaves containing flavonoids, particularly quercetin, together with tannins, triterpenoids, saponins and essential oils, and reports antioxidant, antimicrobial, anti-inflammatory, antidiabetic, antidiarrheal and anthelmintic-related pharmacological interest.

.

The study was therefore designed to investigate the anthelmintic effect of P. guajava extracts using Pheretima posthuma as an in vitro experimental model, with paralysis and death times used to assess activity.

2. Aim and Objectives

The stated aim was to scientifically evaluate the anthelmintic potential of P. guajava extracts against P. posthuma and compare their effects with a standard anthelmintic drug. The reported objectives included plant collection and authentication, preparation of petroleum ether and aqueous extracts, preliminary phytochemical analysis, collection of worms, acute toxicity assessment according to OECD Guideline 423, evaluation of anthelmintic activity and data collection.

3. MATERIALS AND METHODS:

3.1 Plant material and authentication

The source document reports collection of P. guajava from local fields in Gulbarga. The plant material was washed, shade-dried, powdered and passed through sieve No. 40. Authentication was reported to have been performed by Prof. Dr. (Mrs.) Rasika Kapale, Department of Botany, VG Women's Degree College, Gulbarga, with a voucher specimen retained in the herbarium

Leaves of *Psidium guajava*.

Project group with guide and Principal

Specimen of plant for authentication.

3.2 Physicochemical evaluation

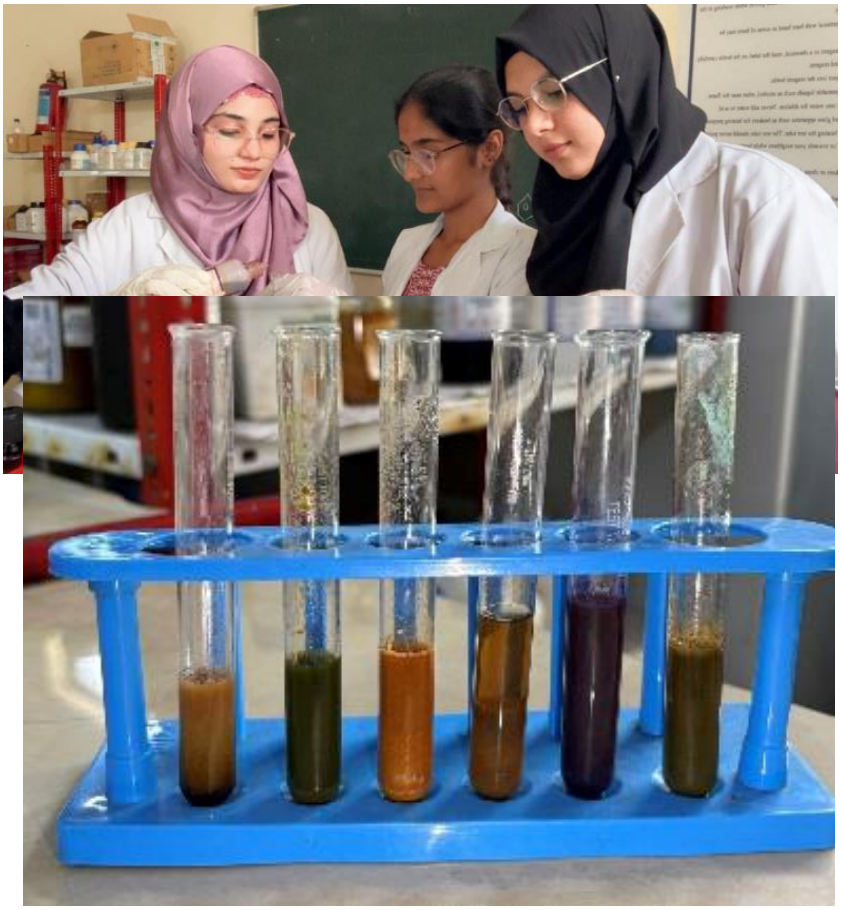
The reported physicochemical parameters included total ash, acid-insoluble ash, water-soluble ash, loss on drying and solvent-soluble extractive values. The source describes standard ashing, loss-on-drying and extractive-value procedures.

3.3 Preparation of extracts

For petroleum ether extraction, powdered plant material was subjected to Soxhlet extraction with petroleum ether. The filtrate was evaporated under reduced pressure and the dried extract was preserved at 4°C. For the aqueous extract, 1000 g of powdered material was macerated with 3000 mL distilled water and 100 mL chloroform as preservative for seven days with daily shaking. The marc was separated and the extract concentrated at 50°C on a water bath.

3.4 Preliminary phytochemical screening

The source document reports qualitative testing for carbohydrates, proteins, steroids, amino acids, glycosides, flavonoids, alkaloids, tannins/phenolic compounds, saponins and vitamins using the chemical reactions described in the original project.



Phytochemical screening

3.5 Acute oral toxicity

An acute oral toxicity assessment is reported according to OECD Guideline 423 using female mice at 5, 50, 300 and 2000 mg/kg body weight. The source document reports no mortality or morbidity at 2000 mg/kg and records normal findings for several observed parameters.

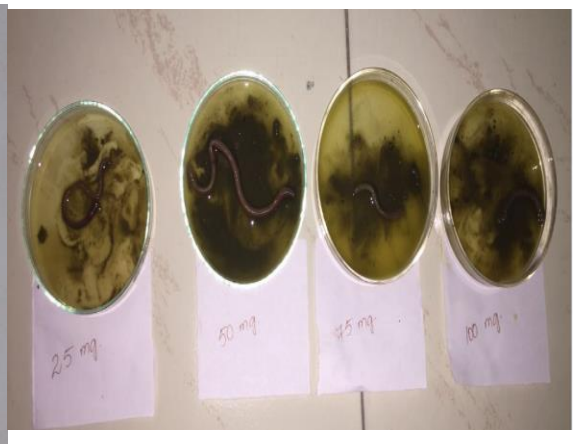
3.6 Experimental worms

Healthy adult Pheretima posthuma of approximately 6–10 cm length were collected from moist soil/vermicompost areas, washed and acclimatized under laboratory conditions. Worms of approximately uniform size were selected.

3.7 In vitro anthelmintic assay

The source protocol used a control treatment, albendazole as the standard and petroleum ether and aqueous P. guajava extracts at graded concentrations. The reported assay observed time to complete paralysis (PT) and death (DT). Paralysis was considered when the worm did not revive after stimulation in normal saline, while death was associated with loss of motility and fading of body colour, followed by confirmation as described in the source protocol.

Control group



Extract group

4. RESULTS:

4.1 Physicochemical characteristics

Parameter	Result (% w/w)
Total ash	8.14
Acid-insoluble ash	0.70
Water-soluble ash	4.50
Loss on drying	6.31
Petroleum ether-soluble extractive	0.16
Water-soluble extractive	0.36

4.2 Extract yield

Extract	Nature	Colour	Weight (g)	Yield (%)
Petroleum ether	Semi-solid	Yellowish green	22.5	2.25
Aqueous	Semi-solid	Dark brown	28.0	2.80

4.3 Phytochemical screening

Constituent	Petroleum ether extract	Aqueous extract
Alkaloids	–	–
Flavonoids	–	–
Saponins	–	++
Tannins	–	++
Phenolics	–	++
Glycosides	–	–
Carbohydrates	–	++
Amino acids	–	–

In the source table, '+' denotes presence, '–' absence and '++' high concentration. The discussion section of the source separately mentions alkaloids, phenols, flavonoids, steroids and tannins; this discrepancy should be resolved against the original laboratory records before journal submission.

4.4 Acute toxicity

At 5, 50, 300 and 2000 mg/kg, the source reports no mortality and records normal motor activity, pain response, righting reflex, gripping strength, pupils, urination, salivation, skin colour and lacrimation. Tremors, convulsions and writhing were reported as absent at all tested doses.

4.5 Anthelmintic activity

Treatment	Conc. (mg/mL)	Paralysis Time (PT) (min)	Death Time (DT) (min)	Reported observation
Normal saline control	–	–	–	Control
Albendazole	10	20.1 ± 0.7	26.4 ± 0.5	Standard
Petroleum ether extract	25	90.3 ± 1.4	100.0 ± 2.1	Extract
Petroleum ether extract	50	70.3 ± 1.5	90.3 ± 1.2	Extract
Petroleum ether extract	75	65.8 ± 1.7	85.8 ± 1.8	Extract
Petroleum ether extract	100	56.1 ± 1.0	70.3 ± 1.2	Extract
Aqueous extract	25	81.3 ± 1.9	90.1 ± 0.2	Extract
Aqueous extract	50	49.3 ± 1.0	60.2 ± 0.1	Extract
Aqueous extract	75	44.8 ± 1.1	55.8 ± 0.6	Extract
Aqueous extract	100	26.1 ± 1.0	30.9 ± 0.3	Extract

The reported data show shorter paralysis and death times with increasing extract concentration for both extracts. At 100 mg/mL, the aqueous extract produced PT and DT values of 26.1 ± 1.0 and 30.9 ± 0.3 min, respectively, compared with 56.1 ± 1.0 and 70.3 ± 1.2 min for the petroleum ether extract.

5. DISCUSSION:

The study reports measurable in vitro anthelmintic activity for both P. guajava extracts, as demonstrated by paralysis and death of P. posthuma. The response was concentration-associated in the reported dataset: increasing extract concentration was accompanied by reductions in both PT and DT.

The aqueous extract showed shorter PT and DT values than the petroleum ether extract at each corresponding concentration. At 100 mg/mL, its PT and DT approached the values reported for the Albendazole standard, although the standard remained faster for both endpoints. These findings indicate activity in the experimental model but do not by themselves establish clinical efficacy in humans or therapeutic equivalence to Albendazole.
The source document associates the observed activity with plant phytoconstituents. The qualitative screening table reports high levels of saponins, tannins, phenolics and carbohydrates in the aqueous extract, while the petroleum ether extract was recorded as negative for the listed constituents. Because the discussion section contains a different description of detected constituents, the original laboratory observation sheets should be checked before final publication.

The acute toxicity results reported in the source document showed no mortality or morbidity up to 2000 mg/kg in the described acute study. This finding is supportive of the reported experimental safety observation, but it should not be interpreted as proof of safety in humans or as evidence for chronic toxicity, reproductive safety or clinical tolerability.

6. CONCLUSION:

Within the limits of the reported in vitro model, petroleum ether and aqueous extracts of Psidium guajava demonstrated anthelmintic activity against Pheretima posthuma, with activity increasing across the tested concentration range. The aqueous extract produced shorter paralysis and death times than the petroleum ether extract at corresponding concentrations. Further work should identify the active constituents, investigate mechanisms of action, confirm findings using appropriately controlled and replicated experiments, and evaluate pharmacological and toxicological profiles before any clinical application is considered.

REFERENCES:

1. Kirtikar KR, Basu BD. Indian Medicinal Plants. 2nd ed. Dehradun: International Book Distributors; 1999.
2. World Health Organization. WHO traditional medicine strategy 2002–2005. Geneva: World Health Organization; 2002.
3. Fabricant DS, Farnsworth NR. The value of plants used in traditional medicine for drug discovery.

Environ Health Perspect. 2001;109(Suppl 1):69–75.
4. Balunas MJ, Kinghorn AD. Drug discovery from medicinal plants. Life Sci. 2005;78(5):431–441.
5. Rates SMK. Plants as source of drugs. Toxicon. 2001;39(5):603–613.
6. Farnsworth NR, Akerele O, Bingel AS, Soejarto DD, Guo Z. Medicinal plants in therapy. Bull World Health Organ. 1985;63(6):965–981.
7. Hotez PJ, Fenwick A, Savioli L, Molyneux DH. Rescuing the bottom billion through control of neglected tropical diseases. Lancet. 2009;373(9674):1570–1575.
8. Kaplan RM. Drug resistance in nematodes of veterinary importance: a status report. Trends Parasitol. 2004;20(10):477–481.
9. Kaplan RM, Vidyashankar AN. An inconvenient truth: global warming and anthelmintic resistance. Vet Parasitol. 2012;186(1–2):70–78.
10. Gutiérrez RMP, Mitchell S, Solis RV. Psidium guajava: a review of its traditional uses, phytochemistry and pharmacology. J Ethnopharmacol. 2008;117(1):1–27.
11. Metwally AM, Omar AA, Harraz FM, El Sohafy SM. Phytochemical investigation and antimicrobial activity of Psidium guajava L. leaves. Pharmacogn Mag. 2010;6(23):212–218.
12. Joseph B, Priya RM. Review on nutritional, medicinal and pharmacological properties of Psidium guajava. Int J Pharm Bio Sci. 2011;2(1):53–69.
13. Kamath JV, Rahul N, Ashok Kumar CK, Mohana Lakshmi S. Psidium guajava L.: a review. Int J Green Pharm. 2008;2(1):9–12.
14. Gupta GK, Chahal J, Arora D. Psidium guajava: current research and future prospects. J Pharm Res. 2010;3(1):42–46.
15. Dakappa SS, Adhikari R, Timilsina SS, Sajjekhan S. A review on the medicinal plant Psidium guajava Linn. (Myrtaceae). J Drug Deliv Ther. 2013;3(2):162–168.
16. Díaz-de-Cerio E, Verardo V, Gómez-Caravaca AM, Fernández-Gutiérrez A, Segura-Carretero A. Health effects of Psidium guajava L. leaves: an overview of the last decade. Int J Mol Sci. 2017;18(4):897.
17. Rao KVB, et al. Evaluation of phytochemical composition and antioxidant activity of aqueous extract of Barleria mysorensis and Psidium guajava leaves. Res J Pharm Technol. 2012;5(12):1503–1508.
18. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 56th ed. Pune: Nirali Prakashan; 2021. p. 6.1–6.15.
19. World Health Organization. Quality Control Methods for Herbal Materials. Geneva: World Health Organization; 2011. p. 23–31.
20. OECD. Guideline No. 423: Acute Oral Toxicity—Acute Toxic Class Method.
21. Ajaiyeoba EO, Onocha PA, Olarenwaju OT. In vitro anthelmintic properties of Buchholzia coriaceae and Gynandropsis gynandra extracts. Pharm Biol. 2001;39:217–220.
22. Mohammed Sayeed, Bakshi V, Boggula N. Phytochemical and anthelmintic screening of Moringa oleifera stem ethanolic extract. Indo Am J Pharm Res. 2017;7(12):981–991.
23. Puntawong S, Okonogi S, Pringproa K. In vitro antibacterial activity of Psidium guajava Linn. leaf extracts against pathogenic bacteria in pigs. Chiang Mai Univ J Nat Sci. 2012;11:127–134.
24. Rahman Z, Siddiqui MN, Khatun MA, Kamruzzaman M. Effect of Guava (Psidium guajava) leaf meal on production performances and antimicrobial sensitivity in commercial broiler. J Nat Prod. 2013;6:177–187.