



IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

ISSN 2349-7203



Human Journals

Research Article

December 2021 Vol.:23, Issue:1

© All rights are reserved by Praveen Kumar Dasari et al.

Phytochemical Screening and *In-Vitro* Anthelmintic Activity of *Pongamia pinnata* Leaves



IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals



ISSN 2349-7203

Praveen Kumar Dasari*, Karri Triveni, Thopula Poojitha, Thota Divya, Guduru Sai Krishna, Tanuku Satyanarayana

Mother Teresa Pharmacy College, Sathupally, Telangana-507303, India.

Submitted: 25 November 2021
Accepted: 30 November 2021
Published: 30 December 2021

Keywords: *Pongamia pinnata* leaves, Phytochemical screening, *Pheretima posthuma*, Piperazine citrate.

ABSTRACT

The present research work deals with phytochemical screening and anthelmintic activity of *Pongamia pinnata* leaves. Many herbal extractions individual or combination have been recommended in various medical values for the cure of different diseases. Standardization of crude drug extracted from plants plays an important role in identifying the quality and purity of drugs. Phytochemical constituents are extracted by petroleum ether, acetone, chloroform and ethanol from *Pongamia pinnata* leaf belongs to the family *Fabaceae*. This research gave information that ethanolic extracts of *Pongamia pinnata* leaves had the highest number of phytochemicals compared to other solvent extracts. Hence, ethanolic extracts of *Pongamia pinnata* leaves hold the greatest potential to treat various human diseases and have profound medical applicability. *In-vitro* anthelmintic activity was determined by taking adult Indian earthworms, *Pheretima posthuma* having anatomical and physiological resemblance with intestinal roundworms. These earthworms were washed in normal saline solution before they were used. To observe anthelmintic activity, all the investigations were carried out by ethanolic extract with different concentrations of 10, 25, 50mg/ml, significant activity like time of paralysis and time of death were reported. At the highest concentrations of 50mg/ml, significant anthelmintic activity was observed and compared with piperazine citrate as a standard reference with different concentrations 10, 25, 50mg/ml, and distilled water as control. Herbal drugs and synthetic drugs were equally effective in helminthic infestations but an ethanolic extract of *Pongamia pinnata* leaves exhibits potentiality and has maximum anthelmintic activity.



www.ijppr.humanjournals.com

INTRODUCTION

Many herbal extractions individual or combination have been recommended in various medical values for the cure of different diseases. In developing countries, major people are depends on traditional practitioners and using medicinal plant products to get their health in good conditions ^[1,2]. The usage of medicinal products and supplements has increased exceedingly over the past years, not less than 75% of the world population are depends on medicinal plant products for their primary health. *Pongamia pinnata* belongs to the family *Fabaceae*, native to eastern and tropical Asia also found in Southeast Asia, Australia, and Pacific islands, distributed in the greater part of India. In the traditional systems of medicines, the *Pongamia pinnata* plant was used for anti-inflammatory, antiplasmodial, antihyperglycaemics, antidiarrhoeal, antiulcer, antihyperammonic and antioxidant ^[3-6]. In Ayurvedic medicines, *Pongamia pinnata* plant root and bark have anthelmintic activity and are useful in abdominal enlargement, biliousness, eye, skin itching, piles, ulcers, wounds, the sprouts, digestive and laxative, piles, and wounds. Various phytochemical constituents with medicinal properties are used to cure various health illnesses that have been revealed every day by researchers ^[7-13]. Parasitic infections are common in tropical countries that infect humans. Bioactive plant metabolites are cheap, cost, effective and easily affordable drugs against parasitic infections. Helminthiasis is one of the major and common diseases that is widespread to human beings, animals due to poor management. To treat parasitic manifestations in humans and animals, a large number of medicinal plants are being used. On adult Indian earthworms, *Pheretima posthuma*, the anthelmintic activity was observed due to its anatomical and physiological resemblance with the intestinal roundworm parasite of human beings. *Pheretima posthuma* were used for evaluation of anthelmintic activity because of their easy availability, *in vitro*, the present research work deals with evaluation of phytochemical screening and of anthelmintic activity of *Pongamia pinnata* leaves.

MATERIAL AND METHODS

Collection of the Plant Material

Pongamia pinnata leaves were collected from the college ground, Mother Teresa Pharmacy College, Sathupally, Khammam, Telangana.

Preparation of Pongamia pinnata leave powder

Pongamia pinnata plant leaves are collected and naturally dried to prevent it from direct sunlight impact to minimize undesirable chemical reactions of plant metabolites. Drying of plant product is crucial to prevent the formation of artifacts as a result of microbial fermentation and subsequent degradation of the plant metabolites. Hence for the present research, leaves are dried in shade and then powdered in a mechanical grinder. The leave powder was passing through sieve number 44 and was taken for extraction and stored in an air-tight container for further studies.

Preparation of Plant Extract

The finely grounded leave powder was placed in a filter paper bag and placed in soxhlet apparatus. The solvent is heated to get evaporation, vapor moves into a distillation arm, and floods into the chamber housing the thimble of leave powder. The condensed solvent dipped into the filter paper bag containing the leave powder. The compound dissolved in the solvent when the chamber containing the leave powder slowly fills with condensed solvent. When the Soxhlet chamber was filled, the chamber is emptied by the siphon. The solvent is returned to the round bottom flask. The solvent movement does not transport any powdered material to the still round bottom flask. This cycle was repeated many times. Different solvents like petroleum ether, acetone, chloroform, and ethanol are used for the extraction of *Pongamia pinnata* leaves.

Phytochemical Screening

The Phytochemical screening was performed regarding the presence of different compounds possessing therapeutic effects. The different solvent extracts (petroleum ether, acetone, chloroform, and ethanol) of *Pongamia pinnata* leaves were used for screening the presence of carbohydrate, glycosides, alkaloids, flavonoids, steroids, tannins, saponins, phenolic compounds, protein, and triterpenoids according to the standard procedures^[14].

Anthelmintic activity of Pongamia pinnata leaves:

Preparation of earthworms:

Pheretima posthuma (Indian earthworm), were used to observe the anthelmintic Activity of *Pongamia pinnata*, they are collected from the waterlogged areas of soil at Sathupally. The

earthworms *Pheretima posthuma* are one of the most crucial soil in a vertebrate that promotes soil fertility. Earthworm feeding and burrowing activities help to the breakdown of organic matter, improve aeration, release nutrients, aggregation of soil, and improve aeration. The average sizes of *Pheretima posthuma* were 8-11 cm with a weight 0.9-2.30g were used for all experimental work. Earthworms were washed with normal saline to remove all the fecal matter around their body. The earthworms are anatomically and physiologically resemble the intestinal roundworm parasites, hence they are used for the study of anthelmintic activity [15,16].

Experimental method:

Earthworms were segregated into different groups, in each group five earthworms are taken. The leave extract concentrations and the standard drug concentrations were freshly prepared before conducting the experiments. The leave extract was dissolved in a minimum quantity of 2% v/v Tween 80 and the volume was made up to 10ml with normal saline for the preparation of various concentrations like 10, 25, and 50mg/ml. Earthworms were washed with normal saline solution before they were placed into 10ml respective formulation, vehicle (2% v/v Tween 80 in normal saline), leave extract (10, 25, and 50 mg/ml) and Piperazine Citrate as a standard drug (10, 25 and 50mg/ml) were prepared to observe the anthelmintic activity. 10ml formulation containing three different concentrations of ethanolic extract (10, 25, and 50 mg/ml) were prepared and poured in different Petri plates, earthworms were kept in the different solutions. Observations were recorded as the time taken to paralysis and death of individual worms.

RESULTS AND DISCUSSION

Phytochemical screenings of plant extracts were essential to detect bioactive principles which is a new source of industrially and therapeutically valuable compounds that may lead to the discovery of new drugs. In the present research study, the presence of phytochemicals was screened with the petroleum ether, chloroform, acetone, and ethanol extracts of the *Pongamia pinnata* leaves and the results are shown in Table 1. Crude plant extracts and medicines are manufactured based on the principles of natural compounds even by pharmaceutical companies, which may lead to large-scale exposure of humans to natural products. The presence or absence of essential bioactive compounds in extracts was identified by color reactions with specific chemicals, this procedure is simple for preliminary pre-requisite

before going to a phytochemical investigation. Hence, in the present work, the crude extracts obtained by petroleum ether, chloroform, acetone, and ethanol solvents were screened for the presence of phytochemicals. The ethanol extract shows the presence of carbohydrates, glycosides, alkaloids, flavonoids, steroids, tannins, saponins, phenolic compounds, protein, and triterpenoids have health benefits such as anthelmintic activity, eye, skin itching, piles, ulcers, wounds, sprouts, digestive and laxative, piles and wounds^[15].

Table No. 1: Preliminary Phytochemical screening of *Pongamia pinnata* leaves

Test	Petroleum ether	Chloroform	Acetone	Ethanol
Alkaloids	+	+	+	+
Steroids	+	+	+	+
Tannins	-	-	-	+
Saponins	+	-	-	+
Phenols	+	-	-	+
Flavonoids	+	+	+	+
Triterpenoids	-	+	+	+
Carbohydrates	-	-	-	-
Glycosides	-	+	+	+
Proteins	-	-	-	-

+ indicates the presence of the phytochemical;

- indicates the absence of the phytochemical

The present research work finding highlights that ethanolic extracts of *Pongamia pinnata* leave had the highest number of phytochemicals compared with other solvent extracts. Hence, ethanolic extracts of *Pongamia pinnata* leaves hold great potential to treat various human diseases and have profound medical applicability. Due to the presence of secondary metabolites, the plant leaf extract exhibits anthelmintic activity to bind free proteins in the gastrointestinal tract of the host animal and glycoprotein on the cuticle of the parasite. The results of anthelmintic activity on earthworms *Pheretima posthuma* was shown in Table-2. Different concentrations (10, 25, and 50 mg/ml) were prepared for evaluation of paralysis and death of earthworms and it was compared with the same concentration for Piperazine citrate.

Table No. 2: Anthelmintic activity of Methanolic extract of *Pongamia pinnata* leaves

Groups	Dose in Concentration (mg/ml)	Time of paralysis (min)	Time of death (min)
Control	-	-	-
Ethanolic Extract	10	42.18±3.12	58.15 ± 2.44
	25	29.25± 4.59	43.09±2.11
	50	15.37 ± 3.17	23.38 ± 3.47
Standard drug	10	18.32 ± 1.45	23.22 ± 2.62
	25	12.11±1.55	18.26 ± 1.43
	50	9.46 ± 0.35	13.25 ± 0.30

The ethanolic extracts of *Pongamia pinnata* leave and standard drug solution not only illustrate paralysis but also cause the death of worms especially at a higher concentration of 50 mg/ml, in very less time was shown in Fig 1, 2.

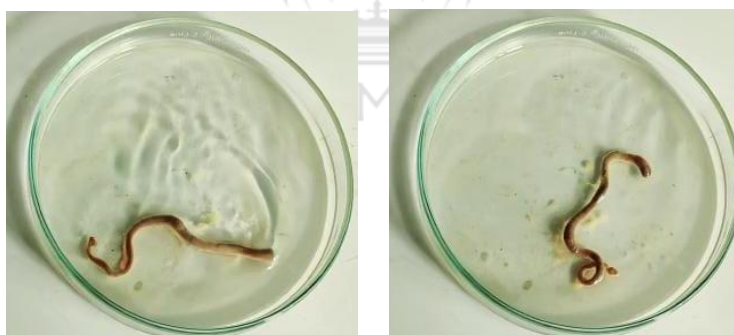


Figure No. 1: Anthelmintic activity of the ethanolic extract



Figure No. 2: Anthelmintic activity of standard drug

In addition, Tannins or their metabolites have an undeviating effect on the possibility of the pre-parasitic stages of helminths and other phytochemical constituents might be responsible for an anthelmintic activity include flavonoids and terpenoids. This present research work shows the presence of different phytochemical constituents like carbohydrates, glycosides, alkaloids, flavonoids, steroids, tannins, saponins, phenolic compounds, protein, and triterpenoids with biological activity that can be valuable therapeutic index. The plant leave extracts can be used for further isolation of compounds for their anthelmintic activity.

CONCLUSION

The present research concludes that *Pongamia pinnata* leaves contain potentially health-protective Phytochemical compounds with a potent source of natural antioxidants and antibacterial activities that may be clinically promising. The presence of phytoconstituents, such as phenolic compounds and flavonoids in plants, indicates the possibility of antioxidant activity and this activity will help in preventing a number of diseases through free radical scavenging activity. Since the plant *Pongamia pinnata* leaves have been used in the treatment of different ailments, the medicinal roles of this plant could be related to identifying bioactive compounds. The present results will form the basis for the collection of new plant species for further investigation in the potential discovery of new bioactive compounds. Further studies are required for *in-vitro* studies to establish the effectiveness and pharmacological rationale for the use of leave extracts as an anthelmintic drug. The present research concluded that the plant *Pongamia pinnata* leaves extract has significant anthelmintic activity.

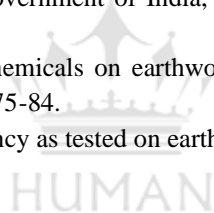
ACKNOWLEDGEMENT

The authors express their sincere thanks to the management, Mother Teresa Pharmacy College, Sathupally, Telangana for providing the necessary facilities to carry out the research work.

REFERENCES:

1. Hooper L, Cassidy A. A review of the health care potential of bioactive compounds. *J Sci Food Agric*, 2006; 86:1805–13.
2. Henneicke-von Zepelin HH, Hentschel C, Schnitker J, Kohnen R, Köhler G, Wüstenberg P. Efficacy and safety of a fixed combination phytomedicine in the treatment of the common cold (acute viral respiratory tract infection): results of a randomized, double-blind, placebo-controlled, multicentre study. *Curr Med Res Opin*. 1999;15: 214–27.
3. Aruoma OI. Free radicals, oxidative stress, and antioxidants in human health and disease. *J Am Oil Chem Soc*, 1998; 75:199–212.

4. Bhargvkrishna P, Gupta MB, Mitra CR, Chittranjan R. Antiinflammatory activity of saponins and other natural products. *Indian J Med Res*, 1970; 58:724–30.
5. Wojdylo, A., Oszmiański, J. and Czemerys, R. Antioxidant activity and phenolic compounds in 32 selected herbs. *Food Chem.*, 2007, 105:940-949.
6. Srinivasan K, Muruganandan S, Lal J. Evaluation of anti-inflammatory activity of *Pongamia pinnata* leaves in rats. *J Ethnopharmacol* 2001; 78: 151-7.
7. Punitha R, Manoharan S. Antihyperglycaemic and antilipidperoxidative effects of *Pongamia pinnata* (Linn.) Pierre flowers in alloxan-induced diabetic. *J Ethon Pharmacol* 2006; 105: 39-46.
8. Brijesh S, Daswani P G, Tetali P. Studies on *Pongamia pinnata* (L.) Pierre leaves: Understanding the mechanism(s) of action in infectious diarrhea. *J Zhejiang Univ. Sci. B* 2006; 7: 665-74.
9. Ekor, M. The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. *Front. Pharmacol.*, 2014, 4:177.
10. Maclaughlin BW, Gutsmuths B, Pretner E, Jonas WB, Ives J, Kulawardane DV, Amri H: Effects of Homeopathic Preparations on Human Prostate Cancer Growth in Cellular and Animal Models. *Integrative Cancer Therapies* 2006; 5 (4): 362-372.
11. Kumar, S. and Pandey, A. K., Chemistry and biological activities of flavonoids: an overview. *Sci. World J.*, 2013, 50, 1-16.
12. Nithya, T.G., Jayanthi, J. and Raganathan, M. G. 2016. Antioxidant activity, total phenol, flavonoid, alkaloid, tannin and saponin contents of leaf extracts of *Salvinia molesta* D. S. Mitchell. *Asian J. Pharm. Clin. Res.*, 1972, 9:200-203.
13. Carcache Blanco EJ, Kang YH, Park EJ, Su BN, Kardono LBS, Riswan S, Fong HHS, Pezzuto JM, Kinghorn AD. Constituents of the stem bark of *Pongamia pinnata* with the potential to induce quinone reductase. *J. Nat. Prods.*, 2003; 66: 1197-1202.
14. Indian Pharmacopoeia. Vol. I and II. Government of India, Ministry of Health and Family Welfare. The Controller of Publications. New Delhi. 1996.
15. Edwards C. A, Testing the effects of chemicals on earthworms. The advantages and limitations of field tests. *Ecotoxicology of earthworms*. 1992, 1, 75-84.
16. Sollmann T, Anthelmintics: Their efficiency as tested on earthworms. *J. Pharm Exp Ther* 1918, 12:129.



Conflict of Interest	No conflict of Interest
Funding Information	No Funding from external source
Authors' Contribution	All authors contributed in the research work
Acknowledgement	The authors express their sincere thanks to the management, Mother Teresa Pharmacy College, Sathupally, Telangana for providing the necessary facilities to carry out the research work.