

Research Article

Evaluation of Anthelmintic Potential in Fruit Peel of *Punica granatum* Linn. (Pomegranate)

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ABSTRACT

Punica granatum Linn. (Pomegranate) commonly known as Anar is an ancient fruit with great medicinal importance related to *Punicaceae* family. Pomegranate is a high value crop and cultivated throughout India. Apart from its demand for fresh fruits and juice, all parts of pomegranate tree have great therapeutic value. The peel of Pomegranate is an inedible part of fruit but used in traditional medicine for treatment of various diseases. The present study was undertaken to evaluate the anthelmintic activity of methanolic extract of peel of Pomegranate fruit against *Pheretima posthuma* (earthworm). Various concentration (50, 100 & 150mg/ml) of methanolic extract were evaluated in the bioassay involving determination of time of paralysis (P) and time of death (D) of the worms. Albendazol was used as standard anthelmintic drug. The results of present study indicated that the methanolic extract of peel shows significantly dose dependent anthelmintic activity.

Keywords: *Punica granatum*, Anthelmintic activity, *Pheretima posthuma*, Albendazole.

INTRODUCTION

Modern synthetic medicines are very effective in treatment of diseases but also cause a number of side effects. Herbal drugs are less effective with respect to dose for treatment of diseases but are relatively safe from side effects. *Punica granatum* Linn. (Pomegranate) is a member of family *Punicaceae* which is a deciduous spreading shrub or small tree and has thorns with it. This plant is found all over India. Pomegranate peel is an inedible part obtained during processing of Pomegranate juice. Pomegranate peel is a rich source of tannins, flavonoids, polyphenols and some anthocyanins as Delphinidins, Cyanidins, etc¹. Pomegranate fruit products have been used for centuries since ancient civilizations for medicinal purposes. Stomachic, inflammation, fever, bronchitis, diarrhea, dysentery, vaginitis, urinary tract infection, and, among others, malaria have been treated using various parts of pomegranate including fruit peels. Moreover, increasing numbers of

pomegranate supplements and products (functional foods, therapeutic formulae and cosmetics) are also available in markets²⁻⁵. The fruits of *Punica granatum* (pomegranate) have been used to treat acidosis, dysentery, microbial infections, diarrhoea, helminthiasis, haemorrhage, and respiratory pathologies⁶. Melendez and Capriles⁷ have also reported that extracts from *Punica granatum* fruits possess strong *in vitro* antibacterial activity against many bacterial strains tested. Many studies have shown that the pomegranate peel extract has wound healing properties⁸, antibacterial activity⁹, antifungal activity¹⁰ and antimicrobial effect¹¹.

Helminth infections are among the commonest infections in man, affecting a large proportion of the world's population. So in present study anthelmintic potential of *Punica granatum* Linn. (Peel) is studied¹².

EXPERIMENTAL

Plant Material

The fruit peel of plant *Punica granatum Linn.* was collected from local fruit market of Durg (Chhattisgarh). Peels were then cut into smaller pieces and then first washed with tap water followed by washing with distilled water. It was then dried under sunlight until water droplets got completely evaporated. Peels were then kept in hot air oven for 3-4 days so that it could get dried. Dried peels were then taken for grinding by the help of mixer grinder. Then powdered form of plant sample was then used throughout the study.

Preparation of extract

The plant material was extracted with methanol in a soxhlet apparatus, methanol was removed under vacuum and semi-solid extract obtained was kept under refrigerator for further use. The methanolic extract of *Punica granatum Linn.* (Peel) is taken as test drug and used for the evaluation of anthelmintic activity.

Selection of Worms

Adult Indian earthworms, *Pheretima posthuma* having anatomical and physiological resemblance with intestinal roundworm parasite of the human being. So *Pheretima posthuma* were used for present study¹³.

Anthelmintic activity

Indian adult earthworms were collected from the moist soil and washed with normal saline. The earthworms of 6-8 cm were used for the experimental protocol. The worms were divided into 5 groups containing six earthworms in each group and were released into 50 ml of desired formulation. First group was treated as control and were given only normal saline. Second group was treated as standard and were given albendazole suspension. Further three groups were treated as test and were given methanolic extract of peel

in three different concentrations. All the test suspensions were prepared freshly before starting the experiment. 2% Gum acacia was used as a suspending agent in all formulations including normal saline. Observations were made for the paralysis time (PT) & subsequently for death time (DT). Time of paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Death time was noted when worms lost their motility followed with fading away of their body colours. All experiments were carried out in accordance with the guideline of the Institutional Bio safety and Ethical Committee¹⁴.

RESULT AND DISCUSSION

The perusal of the data reveals that the methanolic extract at the concentration of 50 mg, 100 mg, 150 mg/ml showed both paralysis and death time in 62, 28, 13 & 94, 56, 23 Min. respectively. The effect increased with concentration. The extract caused paralysis followed by death of the worms at all tested dose levels. The above findings justify the anthelmintic properties of this extract.

CONCLUSION

Anthelmintics or antihelmintics are drugs that expel parasitic worms (helminths) from the body, by either stunning or killing them (Dwivedi *et. al*, 2009). The gastrointestinal helminthes becomes resistant to currently available anthelmintic drugs; therefore, there is a foremost problem in treatment of helminthes diseases (Kosalge *et. al*, 2009). Moreover, these drugs are unaffordable because of their high cost. These factors paved the way for herbal remedies as alternative anthelmintics. In present study non-edible portion of fruit was selected and studies for its anthelmintic activity and the experimental results concluded that *P.granatum* peel showed significant anthelmintic activity.

Table 1: Anthelmintic Activity of Methanolic Extract of fruit peel of Punica granatum Linn. (Pomegranate)

| S.No. | Treatment Vehicle | Time of paralysis (min.) Mean±SEM | Time of death (min.) Mean±SEM |
|-------|--|--|--|
| 1. | Albendazole suspension 10.0 mg/ml | 22 ± 0.502 | 49 ± 0.226 |
| 2. | Methanolic extract 50 mg/ml 100 mg/ml 150 mg/ml | 62 ± 0.688 28 ± 0.434 13 ± 0.840 | 94 ± 0.726 56 ± 0.336 23 ± 0.277 |
| 3 | Control Normal saline | Nil | Nil |

Each value represent the mean ± SEM (n = 6)

REFERENCES

- Li Y, Guo C and Yang. Evaluation of antioxidant properties of pomegranate peel extract in comparison with pomegranate pulp extract. *Food Chem.* 2006;96:254-260.
- Negi P and Jayaprakasha J. Antioxidant and Antibacterial Activities of Punica granatum Peel Extracts. *Journal of Food Science.* 2003;68(4):1473-1477.
- Reddy M, Gupta S and Jacob M. Antioxidant, Antimalarial and Antimicrobial Activities of Tannin-Rich Fractions, Ellagitannins and Phenolic Acids from Punica granatum L. *Planta Medica.* 2007;73(5): 461-467.
- Iqbal S, Haleem S and Akhtar M. Efficiency of Pomegranate Peel Extracts in Stabilization of Sunflower Oil under Accelerated Conditions. *Food Research International.* 2008;41(2): 194-200.
- Madriral-Carballo S, Rodriguez G and Krueger C. Pomegranate (Punica granatum) Supplements: Authenticity, Antioxidant and Polyphenols Composition. *Journal of Functional Foods.* 2009; 1(3):324-329.
- Fuentes VR and Exposito A. Las encuestas etnobotánicas sobre plantas medicinales en Cuba. *Rev. Jard. Bot. Nacion. Univ. Habana.* 1995;16:77-144.
- Melendez PA and Capriles VA. Antibacterial properties of tropical plants from Puerto Rico. *Phytomedicine* 2006;13:272-76.
- Chidambara MK, Jayaprakasha GK and Singh RP. Studies on antioxidant activity of Pomegranate (punica granatum) peel extract using in vivo models. *J Agric Food Chem.* 2002;14(50):4791.
- Prashanth D, Asha MK and Amit A. Antibacterial activity of Punica granatum. *Fitoterapia.* 2001;72: 171.
- Dutta BK, Rahman I and Das TK. Antifungal activity of Indian plant extracts. *Mycoses.* 1998;41:11-12.
- Navarro V, Villarreal M and Rojas G. Antimicrobial Evaluation of some plants used in Mexican traditional medicine for the treatment of infectious diseases. *J Ethnopharma.* 1998;53(3):143.
- Bundy DA. Immunoepidemiology of intestinal helminthic infection I: The global burden of intestinal nematode disease. *Trans R Soc Trop Med Hyg.* 1994;88(3):259-61.
- Das R, Mehta DK and Gupta A. In Vitro Anthelmintic Activity of Leaves of Juglans regia L Against Pheretima posthuma. *Sci. Revs Chem Commun.* 2011; 1(1):78-82.
- Chandrashekhar CH, Latha KP, Vagdevi HM and Vaidya VP. Anthelmintic activity of the crude extracts of *Ficus racemosa*. *Int. J. Green Pharm.* 2008;2:100-3.
- Aiyelero OM, Abdu-Aguye SN and Yaro AH. Behavioural studies on the methanol leaf extract of *Securinega virosa* (Euphorbiaceae) in mice. *Journal of Pharmacognosy and Phytotherapy.* 2012;4(2):12-15.
- Dwivedi A, Dwivedi S and Siteke AK. Anthelmintic Activity of

- a Polyherbal Preparation. Ethnobotanical Leaflets. 2009;13:259-62.
17. Kosalge SB and Fursule RA. Investigation of in Vitro Anthelmintic Activity of Thespesia Lampas (cav.). Asian J Pharm Clin Res. 2009;2(2):69-71.