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

Yashwant Swarnakar¹*, Minakshi Shroff², AK. Jha¹, Devendra Sahu¹ and Kiran Dhurandhar¹

¹Faculty of Pharmaceutical Sciences, Shri Shankaracharya Group of Institutions, Bhilai Chattisgarh, India.
²Rungata College of Pharmaceutical Sciences & Research, Bhilai, Chattisgarh, India.

**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, etc.¹ 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 than 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 study.  

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 Committee.

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)

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Treatment Vehicle</th>
<th>Time of paralysis (min.) Mean±SEM</th>
<th>Time of death (min.) Mean±SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Albendazole suspension 10.0 mg/ml</td>
<td>22 ± 0.502</td>
<td>49 ± 0.226</td>
</tr>
<tr>
<td>2.</td>
<td>Methanolic extract 50 mg/ml</td>
<td>62 ± 0.688</td>
<td>94 ± 0.726</td>
</tr>
<tr>
<td></td>
<td>100 mg/ml</td>
<td>28 ± 0.434</td>
<td>56 ± 0.336</td>
</tr>
<tr>
<td></td>
<td>150 mg/ml</td>
<td>13 ± 0.849</td>
<td>23 ± 0.277</td>
</tr>
<tr>
<td>3.</td>
<td>Control Normal saline</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>

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

REFERENCES
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