



RESEARCH ARTICLE

PHARMACOGNOSY

COMPARATIVE EVALUATION OF *PUNICA GRANATUM* AND *PERGULARIA DAEMIA LINN* FOR ITS ANTHELMINTIC POTENTIAL.*Corresponding Author***RAMAN R CHANDAK**

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Methanolic extracts from the leaves of *Pergularia daemia Linn.* and leaves of *Punica granatum* are investigated for their anthelmintic activity against the earthworm *Pheretima posthuma*. Three concentration (50,100 and 150 mg/ml) of each extracts studies for anthelmintic activity, which involves the determination of time of paralysis and time of death of the worm. Both the extracts exhibit significant anthelmintic activity at highest concentration of 150 mg/ml. Albendazole in concentration of 25 mg/ml has been used as standard reference. Determination of paralysis time and death time of the worms were recorded. Dose dependent activity was observed in both plant extracts but *Pergularia daemia Linn* shows more activity as compared to *Punica granatum*.



KEYWORDS

Punica granatum, *Pergularia daemia* Linn, Anthelmintic activity, Albendazole.

INTRODUCTION

Pergularia daemia Linn. {Asclepiadaceae} Vernacular name .English: Pergularia, MarathiUtarni.^[1-3]A foetid smelling lactiferous twinner found in the plains throughout the hotter parts of the India, ascending to an altitude of 1,000 m. in the Himalayas. Widely distributed in the Old World tropics and sub-tropics from southern and tropical Africa through Arabia to Afghanistan, India and Sri-lanka.^[4-5] Flowering may occur many times each year between Aug. and Jan. in central India.^[6-7] Juice of leaves-used as expectorant in catarrhal affections, in infantile diarrhoea.given in asthma; applied to rheum. Swellings in combination with lime or ginger; in snake-bite. ^[8-9] Decoction of leaves used in asthma, their juice in infantile diarrhoea combined with lime A numbers of modern drugs have been isolated from natural sources and many of these isolations were based on the uses of the agents in traditional medicine^[11-13]. The use of medicinal plants to treat human diseases has its roots in pre-historical times. Medicinal plants are used by 80% of the world population as the only available medicines especially in developing countries. Among the most widespread of all chronic infection are those caused by various species of parasitic helminthes (worms). Inhabitants of tropical or subtropical, low income countries are most at risk; children often become infected with one or more species almost as soon as they are born and may remain infected throughout their lives^[14-15]. Anthelmintics has two properties either vermifuge which kill the worm or vermifuge which promotes expulsion of worms.^[16-17] The present study was done with the aim to investigate the anthelmintic activity of different natural drugs such as *Punica granatum* and leaves of *Pergularia daemia* Linn. In this experiment we performed the *in vitro* study of

anthelmintic activity of natural drug and compared with the standard drug Albendazole.^[18]

2. MATERIAL AND METHODS

2.1. Plant Material

Both the natural drugs i.e. *Punica granatum* and *Pergularia daemia* Linn were collected from the local area & market of Aurangabad, & authenticated from the botanical survey of India, Pune, (MH).

2.2. Worm Collection and Authentication

The earthworms adult *Pheritima posthuma* were collected from pond area of around Yash institute of pharmacy and washed with normal saline to remove all fecal matter were used for the anthelmintic study.

2.3. Extraction Method

The collected material leaves of *Punica granatum* was washed thoroughly in water, crushed in mortar pestle and exhaustively extracted by percolation using water as solvent hot extraction process. The leaves of *Pergularia daemia* Linn were first grinded in mortar pestle and extracted from water as a solvent by percolation method. The extracts were concentrated with the help of water bath and made suitable Semi solid mass for further studies. These extracted semisolid mass further diluted with distilled water as 50, 100 and 150mg/ml concentration.

2.4. Evaluation of Anthelmintic activity

Anthelmintic activity of the plant materials was evaluated by exposing the adult *Pheritima posthuma* to different plant extracts. For each extract, three petri dishes were used i.e. two



for extracts to be tested and one for normal as control. Observations were made on the basis of motility/survival of worms. The anthelmintic activity was performed according to the method of Ghosh *et al.* [21] on adult Indian earthworm *Pheritima posthuma* as it has anatomical and physiological resemblance with the intestinal roundworm parasites of human beings. Eighteen groups of approximately equal sized Indian earthworms consisting of six earthworms in each group were released into 50 ml each extract of three concentration (50, 100 and 150 mg/ml) prepared in distilled water. These three concentration (50, 100 and 150 mg/ml) of each extracts studies for anthelmintic activity. Third group were prepared as control i.e. Albendazole

in concentration of 25 mg/ml has been used as standard reference. Observations were made on the basis of time taken for paralysis and death of individual worm. Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Death was confirmed when the worms lost their motility followed by fading away of their body colors. Observations were made for the time taken to paralyze or death of individual worm. Death was confirmed when the worms lose their motility followed by fading away of their body colors. Results are shown in table 1.

Table 1
Anthelmintic Activity of Pergularia daemia Linn and Punica granatum.

| Plant Extracts | Conc (mg/ml) | Time taken for paralysis (min) | Time taken for death of worms (min) |
|-------------------------------|--------------|--------------------------------|-------------------------------------|
| <i>Pergularia daemia Linn</i> | 50 | 25.30±2.2 | 64.57±11.4 |
| | 100 | 17.11±1.6 | 55.33±3.3 |
| | 150 | 15.08±1.2 | 53.07±10.3 |
| <i>Punica granatum</i> | 50 | 34.65±1.6 | 80.5±5 |
| | 100 | 30.65±3.7 | 75.24±5.5 |
| | 150 | 28.25±4.2 | 66.5±12.7 |
| <i>Albendazole</i> | 25 | 24.36±1.5 | 60±6.8 |

All values expressed as mean ±SD; n= 6 in each group

3. RESULTS AND DISCUSSION

Increasing chloride ion conductance of worm muscle membrane produces hyperpolarisation and cause a flaccid paralysis that result in expulsion of the worm by peristalsis by Albendazole . This action is mediated by its agonistic effects upon the inhibitory GABA (γ -aminobutyric acid) receptor. It was selectivity for helminths is because vertebrates only use

GABA in the CNS and the helminthes. Albendazole reduces the worm excitability that leads to muscle relaxation and flaccid paralysis. The aqueous leaves extract of *Pergularia daemia Linn* demonstrated paralysis as well as death of worms in a less time as compared to Albendazole especially at higher concentration of 150 mg/ml. In conclusion, the traditional use of leaves of *Pergularia daemia Linn* as an anthelmintic have been confirmed



as the leaves extracts displayed activity against the worms used in the study. From the results, it is observed that *Pergularia daemia* Linn showed potent anthelmintic activity while the *Punica granatum* has taken long time for death of worms. Both plants show dose dependent anthelmintic activity. *Pergularia daemia* Linn has shown paralysis within 25 to 27, 17 to 19 and 15 to 17 min and death within 64, 55 and 50 min at concentration of 25, 50 and 100 mg/ml respectively, while *Punica granatum* has shown paralysis within 34 to 36, 30 to 32, 28 to 30 min and death within 80, 75 and 66 min at 50, 100 and 150 mg/ml respectively. Death of worm was comparable

with that of Albendazole which shows paralysis within 24 to 26 min death within 60 min.

4. CONCLUSION

The anthelmintic activity of *Pergularia daemia* Linn leaves extract and *Punica granatum* leaves extract have been tested against the worms *Pheritima posthuma*. It has been seen from the Table 1 that both the extracts require higher concentration as compared to Albendazole as standard drug for anthelmintic activity. Both the extracts showed a dose dependent anthelmintic activity but the leaves of *Pergularia daemia* Linn shown better activity than leaves of *Punica granatum*.

REFERENCES

1. The wealth of India, Volume (N-Pe). In: A dictionary of Indian raw materials and industrial products, Vol- 7: New Delhi, CSIR, 2001, p. 311.
2. Parotta JA, Healing Plants of Peninsular India, CABI Publishing Company, Bangalore, 2001, p.131.
3. Prajapati DN, Kumar T, Purohit SS, Sharma AK, A Handbook of Medicinal Plant, A Complete Source of Book, Agrobois, Jodhpur, 2003, p. 386-387.
4. Adhav VM, Khan A, Khanum A, Role of Biotechnology In Medicinal and Aromatic Plants", Vol-7, Ukaaz Publication, Hyderabad, 2003, p. 92-106.
5. Tatiya AU, Hatapakki BC, Anti-Inflammatory Activity of Bark of *Michilus Macrantha* Nees (Lauraceae), Indian Journal of Pharmaceutical Sciences, 2003; 65(5):532-533. Cook. T, Flora of Presidency Of Bombay, Vol-2, BSI, Culcutta, 1906, p.219.
6. Chatterjee A, Chandra S, The Treatise of Indian Medicinal Plant Vol.4, National institute of science and communication and information resources, New Delhi, 2003, p.135-136.
7. Rastogi, P.M., Mehrotra, B.N., Sharma, In., Compendium of Indian Medicinal Plant Vol.2, CDRI, New Delhi, 1999, 124-126.
8. Chopra RN, Nayar SL, Chopra IG, In; Glossary of Indian Medicinal Plant. CSIR, New Delhi, 1956, p.188.
9. Siddhu AS, In; The Useful Plant of India, Publication and information direct CSRI, New Delhi, 1992, p.440.
10. Singh VK, Zaher AA, In; Herbal Drugs of Himalaya Aspect of Plant Science, Vol-15, Today and Tomorrow Printer and Publisher, New Delhi, 1998, p.148-149.
11. Agarwal R, Kharya MD and Shrivastava R. Antimicrobial and antihelminthic
12. Akhtar MS and Rifat S. Field trial of saussured lappa roots against nematodes, and *Nigella sativa* seeds against cestodes in children. Journal Pakistan Medical Association. 1991; 41: 185-187.
13. Bonnefont -Rousselot D, Bastard JP, Jaudon MC and Delattre J. Consequences of the diabetic status on the oxidant/antioxidant balance. Diabetes and Metabolism. 2000; 26:163-176.



14. Burits, M and Bucar F. Antioxidant activity of *Nigella sativa* essential oil. *Phytotherapy Research*. 2000; 14: 323-328.
15. Chung LY. The antioxidant properties of garlic compounds: allyl cysteine, alliin, allicin, and allyl disulfide. *Journal of medicinal Food*. 2006; 9: 205-213.
16. Draper HH and Hadley M. Malonaldehyde determination as index of lipid peroxidation. *Methods in Enzymology*. 1991; 186: 421-443.
17. El-sokkary GH, Omar HM, Hassanein AF, Cuzzocrea S and Reiter RJ. Melatonin reduces oxidative damage and increases survival of mice infected with *Schistosoma mansoni*. *Free radical Biology Medicine*. 2002; 32: 319-332.
18. Arnold MD and Harry L. *Poisonous Plants of Hawaii*. Charles E. Tuttle Co. Tokyo, Japan. 1968.
19. Awad HA and Herrik MK. The effects of *Nigella sativa* L extraction experimental giardiasis. *New Egypt Journal of Medicine*. 2000; 7: 602- 608.
20. Bonnefont-Rousselot D, Bastard JP, Jaudon MC and Delattre J. Consequences of the diabetic status on the oxidant/antioxidant balance. *Diabetes and Metabolism*. 2000; 26:163-176.
21. Ghosh T, Maity TK, Bose A and Dash GK. Anthelmintic activity of *Bacopa monierri*, *Indian Journal of Natural Products and Resources*. 2005; 21: 16-19.