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EVALUATION OF ANTHELMINTIC ACTIVITY OF KODAGASALAI CHOORANAM (RUNGIA REPENS) A SIDDHA SINGLE HERBAL FORMULATION USING PHERITIMA POSTHUMA MODEL

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ABSTRACT
Development of anthelmintic resistance and high cost of conventional anthelmintic drugs lead to the evaluation of medicinal plants which acts as an alternative source of anthelmintics. The present study has been undertaken to perform the evaluation of anthelmintic activity of Rungia repens belonging to family Acanthaceae. In the current study, experiments were conducted to evaluate the possible anthelminitic effects of various powder of the whole parts of Rungia repens. Evaluation of the activities of medicinal plants claimed for anthelmintic property is getting attention these days. Natural compounds from plants provide a unique opportunity in the search for new, effective and safe anthelmintic agents. Siddha is one of the oldest systems of healthcare system adopted by ancient traditional healers like siddhars. Siddha system has marked best in recent times because of known resistance and side effects caused by conventional synthetic anthelmintics. One such potential herb is Rungia repens (RR) known by its vernacular name Kodaga salai, a spreading herb found throughout India mostly as a weed in moist soil. It was claimed to have significant activities such as anti-microbial, diuretic, anti-inflammatory, analgesics and anti-pyretic etc. The main aim of the present work is to evaluate anthelmintic activity of the herb RR on the Pheritima Posthuma model. The results were expressed in terms of time in minutes to report the paralysis and time of death of the earthworms. Maximum time take for the test drug RR at the dose of 1 gm to cause paralysis of worms is about 362.3 ± 26.11 mins, similarly the time taken of RR at the dose of 2 gm would be 216.3 ± 16.44mins for standard drug albendazole it was 81.5 ± 11.27 mins at the concentration of 200mg/ml. It was concluded from the datas obtained from the present study that the herb Rungia repens reveals potential anthelmintic property in the tested in-vitro model, further studies which elaborates the exact mechanism by which the drug acts needs to be ascertained through proper experimental model in near future.

KEYWORDS: Anthelmintic activity, Rungia repens, Pheritima Posthuma, Aalbendazole, Siddha, Traditional medicines, Medicinal plants.

1. INTRODUCTION
Helminth infections are among the commonest infections in man, affecting a large proportion of the world's population. In developing countries they pose a major threat to public health and contribute to the prevalence of malnutrition, anemia, eosinophilia, and pneumonia. Anthelmintics are drugs that either kill or expel infesting helminths and the gastrointestinal tract is the abode of many helminths, although some also live in tissues, or their larvae migrate into tissues. They harm the host by depriving him of food, causing blood loss, injury to organs, intestinal or lymphatic obstruction and by secreting toxins. Helminthiasis is rarely fatal, but is a major cause of morbidity.[1]

Rungia repens known as Kodaga salai in tamil belongs to the family Acanthaceae, *is a* potential medicinal herb spreading through out India.[2,3] The herb is dried and pulverized and traditionally used for treatment of cough and fever; it is also credited with vermifugal and diuretic properties.[4] Fresh, bruised leaves are mixed with castor oil and applied to scalp to cure *Tinea capitis*, a scaly

fungoid infection, usually occurring amongst children.[5,8] Investigation on the flavonoid pigments in ivory-white and pale yellow flowers showed the presence of luteolin and chrysoeriol (3'-o-methylluteolin) and their glucosides.[9] It was reported for the presence of isosalipurposide, luteolin and delphinidin-3,5-diglucoside.[10]

In the last few years there has been an exponential growth in the field of herbal medicine and these drugs are gaining popularity both in developing and developed countries because of their natural origin and less side effects. Many traditional medicines in use are derived from medicinal plants, minerals and organic matter.[11] A number of medicinal plants, traditionally used for over 1000 years named rasayana are present in herbal preparations of Indian traditional health care systems.[12] In Indian systems of medicine most practitioners formulate and dispense their own recipes.[13]

Humans began using plants for medicinal purposes as early as middle Paleolithic age, approximately 60,000 years ago, and now the World Health Organization estimates that over 80% of the people in developing nations rely on traditional remedies such as herbs, for food and healing sickness.[14,15] The use of medicinal plants has been developed over a long period of time and now plays a critical role in favorable health outcomes. Today, a number of pharmaceuticals currently approved by the Food and Drug Administration (FDA) have originated from plants; natural products (and their derivatives and analogs) represent over 50% of all drugs in clinical use.[16,17] The main aim of the present work is to evaluate anthelmintic activity of the herb *Rungia repens* on the Pheritima Posthuma model.

2. MATERIALS AND METHODS

2.1. Anthelmintic activity using Pheretima posthuma Model

2.1.1. Earthworm

Indian adult earthworms (Pheretima posthuma) were collected from local vendor and washed with normal saline were used for the anthelmintic study. The earthworms of 4-6 cm in length and 0.1-0.2 cm in width were used.

2.1.2. Methodology[18]

The worms were acclimatized to the laboratory condition one week prior to the experimentation. The earthworms were divided into three groups of four earthworms in each group of two per petri dish. Albendazole at the concentration of 200mg/ml was served as standard. Clean and sterile petri plates were used for the study. Group I served as low dose treated group of which the worms were exposed to 1 gm of the test formulation RR and Group II served as high dose treated group of which the worms were exposed to 2 gms of the test drug RR .Group III served as standard drug treated group of which the worms were exposed to Albendazole 200mg/ml.

2.2. Grouping

Group I – Worms exposed to RR 1 gm per dish
Group II – Worms exposed to RR 2 gms per dish
Group III – Worms exposed to Albendazole 200mg/ml

Earthworms of nearly equal size in length and width are taken for each concentration and placed in Petri dishes at room temperature. The time taken for complete paralysis and death are recorded. The mean paralysis time and mean death time for each dose was calculated .The time taken for worms to become motionless was noted as paralysis time and to ascertain death, each worm was frequently applied with external stimuli, which stimulates and induce movement in the earthworms.

3. RESULTS

3.1. Effect of Rungia repens on duration of paralysis in Earth worms

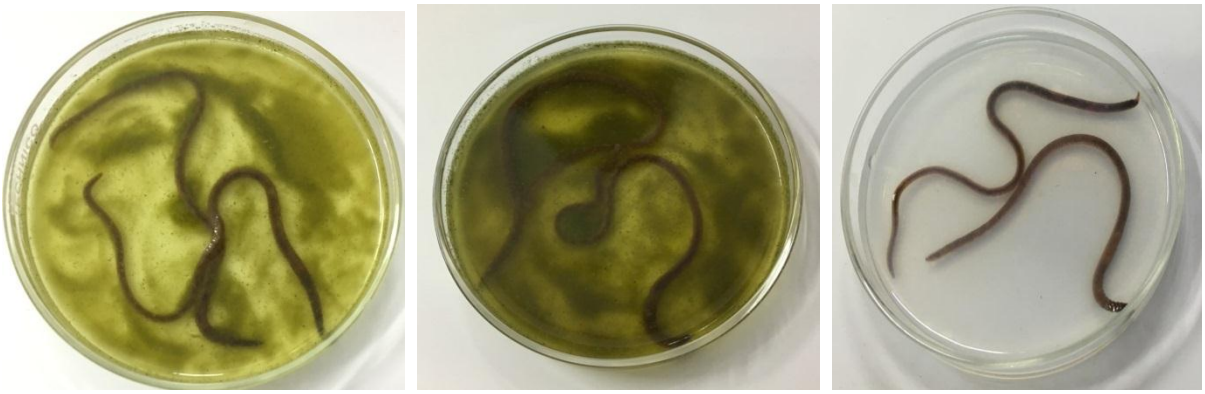
The result obtained from the present clearly indicates that the test drug RR possess significant anti-helminthic property. The result obtained from the present clearly indicates that the test drug RR possess significant anti-helminthic property. Maximum time take for the test drug RR at the dose of 1 gm to cause paralysis of worms is about 362.3 ± 26.11 mins, similarly the time taken of RR at the dose of 2 gm would be 216.3 ± 16.44mins for standard drug albendazole it was 81.5 ± 11.27mins at the concentration of 200mg/ml. As shown in table 1.

Table 1: Effect of Rungia repens on Paralysis duration in Earth worms.

Group	Treatment	Time taken for paralysis (min)
I	RR 1 gm	362.3 ± 26.11
II	RR 2 gms	216.3 ± 16.44
III	Albendazole 200mg/ml	81.5 ± 11.27

3.2. Effect of Rungia repens on death induction time in Earth worms

Maximum time take for the test drug RR at the concentration of 1gm to cause death of worms is about 456.8 ± 27.8 mins, similarly the time taken of RR at the dose of 2gm would be 275.5 ± 11.82 mins for standard drug albendazole it was 130 ± 10.68 mins at the concentration of 200mg/ml. As shown in figure 1 and table 2.



Group I **Group II** **Group III**

Figure 1: Anthelmintic activity of Rungia repens in Earth worms.

Table 2: Effect of Rungia repens on death induction time in Earth worms.

Group	Treatment	Time taken for death (min)
I	RR 1 gm	456.8 ± 27.8
II	RR 2 gms	275.5 ± 11.82
III	Albendazole 200mg/ml	130 ± 10.68

4. DISCUSSION

Helminthiasis is a disease caused by infestation with one or more intestinal parasitic worms. The worms usually reside in the gastrointestinal tract but may pose a threat to other organs by burrowing into them. Helminth infections cause many acute and chronic diseases among human beings as well as cattle. In developing countries, they pose a large threat to public health and contribute to the prevalence of malnutrition, anaemia, eosinophilia and pneumonia.[19] Anthelmintics are drugs that expel parasitic worms from the body by either stunning or killing them and are therefore also called vermifuges or vermicides. The most commonly used anthelmintic drug, piperazine, relaxes the large intestinal round worms and pinworms of man and domesticated animals so that they are eliminated with the faeces. A number of medicinal plants have been used to treat parasitic infections in man and animals,[20,21] *Rungia repens* is one such potential herb with multiple pharmacological actions due to its versatile phytocomponents.

Anthelmintic is the term used to describe a drug used to treat infections of animals with parasitic worms. This includes both flat worms, e.g., flukes (trematodes) and tapeworms (cestodes) as well as round worms (nematodes). The parasites are of huge importance for human tropical medicine and for veterinary medicine. The World Health Organization estimates that 2 billion people harbour parasitic worm infections causing increased morbidity and mortality, while parasitic worms that infect livestock are an important animal welfare issue and place a major economic burden on food production. Domestic pets are also susceptible to parasitic worm infection and it is of note that the companion animal market is a key economic consideration for animal health companies undertaking drug discovery programmes.[22] The result obtained from the present clearly indicates that the test drug RR possess significant anti-helminthic property. Maximum time take for the test drug RR at the dose of 1 gm to cause paralysis of worms is about 362.3 ± 26.11 mins, similarly the time taken of RR at the dose of 2 gm would be 216.3 ± 16.44mins for standard drug albendazole it was 81.5 ± 11.27mins at the concentration of 200mg/ml.

Control of helminths relies almost exclusively on a limited number of synthetic anthelmintic drugs. The limitations of this reliance on chemotherapy are the threat of parasites developing resistance to drug treatment (already widespread in some livestock production systems).[23,24] , The use of natural plant extracts as de-wormers for humans and livestock has long been practiced, however scientific validation of these practices and identification of active compounds has been lacking.[25-27] In the present investigation it was observed that the maximum time take for the test drug RR at the concentration of 1gm to cause death of worms is about 456.8 ± 27.8 mins, similarly the time taken of RR at the dose of 2gm would be 275.5 ± 11.82 mins for standard drug albendazole it was 130 ± 10.68 mins at the concentration of 200mg/ml.

5. CONCLUSION

The study has concluded as maximum time take for the test drug RR at the concentration of 1gm to cause death of worms is about 456.8 ± 27.8 mins, similarly the time taken of RR at the dose of 2gm would be 275.5 ± 11.82 mins for standard drug albendazole it was 130 ± 10.68 mins at the concentration of 200mg/ml. Hence the single herbal formulation kodagasalai chooranam (RR) shown anthelmintic activity on Indian adult earthworms (*Pheretima posthuman odel*). Further studies are necessary to identify the chemical moieties responsible for anthelmintic activity and also to evaluate mechanism of action at cellular and molecular level.

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6. REFERENCES

1. Bundy DA. Immunoepidemiology of intestinal helmintic infection I: The global burden of intestinal nematode disease. Trans R Soc Trop Med Hyg., 1994; 8: 259–61.
2. Gamble JS. Flora of the Presidency of Madras. Vol II. London: Published Under the Authority of the Secretary of States For India in Council, 1921; 1069–72.
3. Saxena HO, Brahman M. The Flora of Orissa. Vol. 3. Bhubaneswar (India): RRL, 1995; 1381–2.
4. Trease GE, Evans WC. Pharmacognosy. 15th ed. Philadelphia: WB Saunders, Elsevier Science Limited, 2002; 471.
5. Anonymous. Indian Medicinal Plants. Vol. III. Hyderabad (India): Orient Longman Ltd, 1996; 123.
6. Anonymous. The Wealth of India (Raw Materials). CSIR. Vol. 9. New Delhi: Publication and Information Directorate, 1999; 93–4.
7. Kirtikar KR, Basu BD. Indian Medicinal Plants. 2nd ed. Vol. 3. Dehradun (India): International Book Distributors, 1994; 1908–9.
8. Nadkarni KM, Nadkarni AK. Indian Materia Medica. Vol. 1. Mumbai: Popular Prakashan, 2002; 1081.
9. Sankar SS, Joseph KJ, Nair AG. Occurrence of isosalipurposide in the flowers of Rungia repens. Indian J Chem, 1964; 8: 338–9.
10. Seshadri TR, Vydeeswaran S. Chrysoeriol glycosides and other flavonoids of Rungia repensflowers. Phytochemistry, 1972; 2: 803–6.
11. Grover J.K., Yadav S., Vats V. Medicinal plants of India with antidiabetic potential. J. Ethnopharmacol, 2002; 81: 81–100.
12. Scartezzini P., Sproni E. Review on some plants of Indian traditional medicine with antioxidant activity. J. Ethnopharmacol, 2000; 71: 23–43.
13. Seth S.D., Sharma B. Medicinal plants of India. Indian J. Med. Res., 2004; 120: 9–11.
14. Maridass M., De Britto A.J. Origins of plant derived medicines. Ethnobot. Leafl, 2008; 2008: 44.
15. Hong L., Guo Z., Huang K., Wei S., Liu B., Meng S., Long C. Ethnobotanical study on medicinal plants used by Maonan people in China. J. Ethnobiol. Ethnomed, 2015; 11: 32.
16. Licciardi P.V., Underwood J.R. Plant-derived medicines: A novel class of immunological adjuvants. Int. Immunopharmacol, 2011; 11: 390–398.
17. De Smet P.A.G.M. The role of plant-derived drugs and herbal medicines in healthcare. Drugs, 1997; 54: 801–840.
18. Das SS, Dey M, Ghosh AK. Determination of anthelmintic activity of the leaf and bark extract of tamarindus indica linn. Indian J Pharm Sci., 2011 Jan; 73(1): 104-7.
19. Bundy DA. Immunoepidemiology of intestinal helminthic infection I: The global burden of intestinal nematode disease. Trans Royal Soc Trop Med Hyg, 1994; 8: 259–61.
20. Chopra RN, Nayar SL, Chopra IC. New Delhi: Publications and Information Directorate, CSIR; Glossary of Indian Medicinal plants, 1992; 132–210.
21. Akhtar M, Iqbakhan MN, Lateef M. Anthelmintic activity of medicinal plants with particular reference to their use in animals in the Indo-Pakistan sub-continent. Small Ruminant Res., 2000; 38: 99–107.
22. Lindy Holden-Dye and Robert J. Walker. Anthelmintic drugs and nematicides: studies in Caenorhabditis elegans, 2005-2018.
23. Sutherland IA, Leathwick DM. Anthelmintic resistance in nematode parasites of cattle: a global issue? Trends Parasitol, 2011; 27(4): 176–181.
24. Sargison ND. Pharmaceutical treatments of gastrointestinal nematode infections of sheep—Future of anthelmintic drugs. Vet Parasitol, 2012; 189(1): 79–84.
25. Githiori JB, Höglund J, Waller PJ. Ethnoveterinary plant preparations as livestock dewormers: practices, popular beliefs, pitfalls and prospects for the future. Anim Health Res Rev., 2005; 6(01): 91–103.
26. Athanasiadou S, Githiori J, Kyriazakis I. Medicinal plants for helminth parasite control: facts and fiction. Animal, 2007; 1(09): 1392–1400.
27. Tolossa K, Debela E, Athanasiadou S, Tolera A, Ganga G, Houdijk J. Ethno-medicinal study of plants used for treatment of human and livestock ailments by traditional healers in South Omo, Southern Ethiopia. J Ethnobiol Ethnomed, 2013; 9(1): 32.