- Short communication

Evaluation of Anthelmintic Activity of Crude Extracts of *Diospyros peregrina, Coccinia grandis* and *Schima wallichii*

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Helminthes are recognized as a major problem to livestock production throughout the tropics.[1] Parasitic helminthes affect human being and animals by causing considerable hardship and stunted growth. Most diseases caused by helminthes are of a chronic and debilitating in nature. The parasitic gastroenteritis is caused by mixed infection with several species of stomach and intestinal worms, which results weaknesses, loss of appetite, decreased feed efficiency, reduced weight gain and decreased productivity.[2] Although some synthetic drugs are available to control such kind of infections but due to their high cost and untoward effects, the development of more effective and safe drugs from reasonably less expensive natural sources is our main consideration. This can rationally be approached through the study of indigenous traditional plant remedies. We, here in, explore scientifically the anthelmintic potential of three traditionally used medicinal plants of India and substantiate the folklore claims.

Diospyros peregrina Gurke. (Fam. Ebenaceae) is a small middle sized tree of costal West Bengal. The fruits have ethnomedicinal significance for the treatment of diarrhoea, dysentery, cholera, ulcer of mouth and wounds.[3] The unripe matured fruits are successfully used to treat worm infestations of children in costal West Bengal of India. The fruits contain triterpenes, alkanes, flavonoids and tannins.[4,5] *Coccinia grandis* (L.) Voigt. (Fam. Cucurbitaceae) is a climbing perennial herb distributed almost all over the world. The leaves of the plant possess antidiabetic, anti-inflammatory, antipyretic, analgesic, antispasmodic, antimicrobial, anthelmintic, cathartic and expectorant activities.[6] The leaves contain triterpenoids, alkaloids and tannins.[7] *Schima wallichii* Choisy. (Fam. Ternstroemiaceae) is a large evergreen tree of east Himalayan region. The bark is used as an antiseptic for cut and wound, vermicide and to cure gonorrhoea. The bark juice is given to animal infested with liver flukes.[8,9] The bark contains saponins and tannins.[9] The objective of this research was to authenticate the anthelmintic activity of the methanol extracts of unripe matured fruits of *Diospyros peregrina* (DPME), *Coccinia grandis* leaves (CGME) and *Schima wallichii* barks (SWME) against Indian adult earthworms, *Pherentima posthuma.*

Matured unripe fruits of *Diospyros peregrina* and the leaves of *Coccinia grandis* were collected in the month of June, 2006 from the villages of South 24 Parganas, West-Bengal, India; the barks of *Schima*

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wallichii were collected in January 2006, from Majhitar, East Sikkim, India. All three plants were authenticated by the Taxonomist of Botanical Survey of India and the voucher specimens entitled JU/PPRT/DP/PT/01/06, JU/PPRT/DP/PT/05/06 and JU/PPRT/DP/PT/06/06, respectively were deposited at our institute for future reference.

The powdered plant materials (matured unripe fruits of *Diospyros peregrina*, leaves of *Coccinia grandis* and barks of *Schima wallichii*, 600 g each) were extracted separately with 90 % methanol using Soxhlet apparatus. The resulting extracts were evaporated in vacuum and finally lyophilized into solid mass devoid of solvent (yield = 8.75, 13.02 and 3.00 %, respectively) and stored in desiccators for future use.

Albenzazole, the standard anthelmintic drug, was procured from Mankind Pharma Ltd., New Delhi, India. Dimethyl sulphoxide was purchased from BDH, Poole, UK. All chemicals and solvents used in this experiment were of analytical grade.

Adult Indian earthworms, *Pheretima posthuma* were collected from moist soil. Human tapeworm and roundworm, *Taenia solium* and *Ascaris Lumbricoides* respectively were isolated from human feacal matter of infested with the corresponding worms. All three parasites were washed with normal saline to remove all adhering feacal matters and subjected for the anthelmintic study.

All the three extracts were dissolved in minimum amount of dimethyl sulphoxide and then volume was adjusted to 50 ml with saline water. The corresponding concentration was expressed in term of mg of extract per ml of solvent (mg/ml). The drug and extract solutions were freshly prepared before starting the experiment.

The anthelmintic activity of DPME, CGME and SWME was determined by using the method of Tambe.[10] For each selected helminth, eight groups of approximately equal sized worms consisting of six worms in each group were released in 10 ml of desire formulation. Each group was then treated with one of the following: vehicle (5% dimethyl sulphoxide in normal saline), albendazole (5, 10 mg/ml) and three extracts of selected concentrations (5, 10 mg/ml, in normal saline containing 5% dimethyl sulphoxide). The time taken to paralyze and kill individual worms was observed. Paralysis was noted when the worms did not revive even in the normal saline solution. Death was concluded when the worms lost their motility followed by fading away of their body colour.

The results shown in Table 1 depict the time taken for paralysis and death of worms after the treatment with the test extracts at the selected concentrations. The data revealed that DPME, CGME and SWME showed significant anthelmintic activity in a dose dependant manner. The anthelmintic potency of the extracts was inversely proportional to the time taken for paralysis or death of the worms. The extracts caused paralysis followed by death of all selected worms at the selected concentrations. Amongst the three extracts, SWME

Table 1. Anthelmintic activity of extracts and albendazole.

Treatment	Concentration (mg/ml)	Time (min)					
		Earth worm		Tape worm		Round worm	
		Paralysis	Death	Paralysis	Death	Paralysis	Death
Vehicle	Normal saline	-	-	-	-	-	-
Albendazole	10	36.44 ± 0.72	63.82 ± 0.76	73.50 ± 0.48	182.43 ± 0.66	42.32 ± 0.64	78.44 ± 1.12
DPME	5	21.45 ± 0.34	70.45 ± 0.61	112.34 ± 0.23	216.67 ± 0.84	39.67 ± 0.31	98.34 ± 0.31
DPME	10	15.01 ± 0.39	23.6 ± 1.20	75.67 ± 0.92	165.43 ± 1.83	26.04 ± 0.28	32.50 ± 0.36
CGME	5	36.9 ± 0.31	61.5 ± 0.27	123.17 ± 0.16	232.44 ± 1.03	48.33 ± 0.58	85.67 ± 1.28
CGME	10	14.4 ± 0.86	25.9 ± 0.73	82.83 ± 0.37	176.54 ± 1.46	29.44 ± 1.71	39.33 ± 0.78
SWME	5	40.13 ± 1.45	78.4 ± 0.92	116.45 ± 0.56	198.34 ± 0.95	48.34 ± 0.31	89.55 ± 0.88
SWME	10	10.40 ± 0.08	16.60 ± 1.61	88.67 ± 0.67	156.17 ± 0.65	25.54 ± 0.87	36.34 ± 0.85

Results are expressed as mean ± S. E. from six observations; DPME: Methanol extract of *Diospyros peregrina* fruits; CGME: Methanol extract *Coccinia grandis* leaves; SWME: Methanol extract *Schima wallichii* barks

showed best activity in terms of paralysis and death time against all three selected helminthes followed by the other two extracts which showed similar spectrum of activity at the dose of 10 mg/ml. It was observed that the selected extracts were more active against Indian earthworms followed by human roundworms and human tapeworms. The results were compared with the standard drug, Albendazole and it was found that at 10 mg/ml all three extracts were more effective than the selected standard drug.

The present study justifies the folkloric claims of the potential anthelmintic activity of *Diospyros peregrina* fruits, *Coccinia grandis* leaves and *Schima wallichii* barks. These three plants may have different mode of actions against the selected helminthes. Further study is required with the selected plants for the development of novel standardized anthelmintic herbal formulations.

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