In vitro Anthelmintic Property of Various Seed Oils Against *Pheritima posthuma*

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Seed oils of *Gynandropsis gynandra, Impatiens balsamina, Celastrus paniculata, Embelia ribes* and *Mucuna pruriens* were investigated for their anthelmintic property against *Pheritima posthuma*. Three concentrations (10, 50 and 100 mg/ml) of each oil were studied in a bioassay, which involved the determination of time of paralysis and time of death of the worm. All the oils exhibited moderate to significant anthelmintic activity. *Embelia ribes* showed the best anthelmintic activity in both the parameters. Piperazine citrate (10 mg/ml) was included in the assay as standard reference drug.

Diseases caused by helminth parasites in livestock continue to be a major productivity constraint, especially in small ruminants in the tropics and subtropics[1]. In the developing world, the greatest impact of parasitic diseases is indirect and potential productivity losses[2]. Infections by gastrointestinal helminth parasites of livestock are among the most common and economically important diseases of grazing livestock[3]. Adulteration of anthelmintics has been found to be a common practice[4]. Illiteracy and unfamiliarity with synthetic anthelmintics, resulting in incorrect usage, are also a problem leading to the same consequences. Moreover, these drugs are relatively expensive. As a consequence of these problems and difficulties, pastoralists and small holder farmer have continued to use indigenous plants as livestock dewormers[5]. Considerable research has shown that some plants not only affect the nutrition of animals, but also have antiparasitic effects[6]. For example, plants that contain condensed tannins, a class of phenolic secondary metabolites, have these effects.

Oil of chenopodium (frequently combined with a laxative) derived from *Chenopodium ambrosioides*[7], was used for many years in the United Kingdom and United States to treat nematode parasite infections (*Strongylus*, *Parascaris* and *Ascaris* sp.) in monogastric animals including humans[8]. Embelin extracted from *Embelia schimperi*, which was evaluated *in vivo* in mice and rats infected with the cestodes *Hymenolepis microstoma* and *H. diminuta*, and mice infected with the trematode *Echinostoma caproni*, and the nematode *Heligmosomoides polygyrus*[9].

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Gynandropsis gynandra belonging to family Capparidaceae is commonly known as *Caravella*. Seeds of *Gynandropsis gynandra* are anthelmintic, carminative and antispasmodic. Decoction of root is useful in fever[10]. Methanol extracts from the leaves and stems of *Gynandropsis gynandra* and *Buchholzia coriaceae* were investigated for their anthelmintic activity[11].

Impatiens balsamina belongs to a family Balsaminaceae, commonly known as garden balsam. Flavonol from the seeds of *Impatiens balsamina* showed antipyretic effect[12]. The seeds of *Impatiens balsamina* have been shown to inhibit the growth of wide range of fungi and bacteria without harming human cells[13].

Celastrus paniculata belonging to family Celastraceae is commonly known as Black oil plant. The seeds of *Celastrus paniculata* are aphrodisiacal and stimulant, useful both as an external, and internal remedy in gout, paralysis, leprosy and other disorders which are supposed to be caused by cold humors[14].

Embelia ribes belongs to family Myrsinaceae. The dried fruit of the plant is considered as anthelmintic, astringent, carminative, alternative and stimulant. It has been employed in India, since ancient times, as anthelmentic and is administered as powder, usually with milk, followed by a purgative[15].

Mucuna pruriens belonging to family Leguminosae is commonly known as Cowhage. *Mucuna pruriens* seeds are astringent, laxative, anthelmintic, aphrodisiac and tonic. Roots are used as purgative, diuretic, anthelmintic and antipyretic. Externally *Mucuna pruriens* is a

cutaneous stimulant and rubefacient. The drug is used externally for rheumatic disorders and muscular pain, and internally, it has an anthelmintic effect[16].

In the present study, the seeds of *Gynandropsis gynandra*, *Impatiens balsamina*, *Celastrus paniculata*, *Embelia ribes* and *Mucuna pruriens* were collected carefully in the month of April from Tukanatti, near Gokak, Belgaum District, Karnataka State, India, and were authenticated at FRLHT, Bangalore and voucher specimens are kept in our departmental museum.

The collected seeds were air-dried under the shade in laboratory for 7-12 days. After complete drying, seeds were powdered and extracted thoroughly with light petroleum ether (40-60°) in a Soxhlet extractor for 24-48 h in each case. Once more the remaining powdered seed was extracted to collect all oil in the seeds. Combined petroleum ether (40-60°) extract was dried over anhydrous sodium sulphate and solvent was removed in vacuum at 40° by using rotary evaporator (Rotavapour Buchii, Switzerland) to recover oil. The seed oils were filtered through Whatman filter paper No.1 to remove any foreign particles and pure oils preserved in cold storage properly before subjecting to anthelmintic activity.

Pheritima posthuma was collected from the water-logged areas from the forte lake in Belgaum, Karnataka, India. Various oils tested were evaluated at 10, 50 and 100 mg/ml and the standard compound was tested at 10 mg/ml.

Pheritima posthuma was placed in nine-centimetre Petri dish in three different concentrations of oils (10, 50 and 100 mg/ml in Tween 80). This was done in duplicate for all the oils. Mean time for paralysis (P, in min) was noted when no movement of any sort could be observed, except when the worm was shaken vigorously; time of death of worm (D, in min) was recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water (50°). Piperazine citrate (10 mg/ml) was included as reference compound.

The oil samples, which were used to evaluate anthelmintic activity, showed variable results at different concentrations. The mean±SEM values (statistical analysis) were calculated for each parameter[17]. The oil sample of *Embelia ribes* showed the significant anthelmintic effect causing death of worm at the concentrations 10 mg/ml, 50 mg/ml and 100 mg/ml as compared to worms, which were treated with standard at the concentration 10 mg/ml. But when we observed the response of worms in case of paralysis, there was significant variation among the results produced by the oil samples at the concentrations like 10 mg/ml, 50 mg/ml and 100 mg/ml.

TABLE 1: EFFECT OF DIFFERENT CONCENTRATIONS OF SEED OILS ON *PHERITIMA POSTHUMA*

Groups	Concentration (mg/ml)	Time of Paralysis (P) and death (D) of *Pheritima posthuma* in min (Mean±SEM)	
		P	D
Piperazine citrate	10	1.6±0.06	41±0.006
Gynandropsis gynandra	10	48±0.60	73±0.01
	50	41±0.17	64±0.19
	100	31±0.12	51±0.33
Impatiens balsamina	10	24±0.12	>90
	50	18±0.12	>90
	100	13±0.13	62±0.12
Celastrus paniculata	10	45±0.12	73±0.13
	50	36±0.13	60±0.12
	100	25±0.12	48±0.21
Embelica ribes	10	1.5±0.14*	42±0.05*
	50	1.2±0.12*	39±0.61*
	100	0.9±0.13*	38±0.06*
Mucuna pruriens	10	2.1±0.08*	57±0.08
	50	1.8±0.10*	51±0.07
	100	1.3±0.10*	48±0.07

*Significantly different from control

The oil sample of *Mucuna pruriens* showed the significant effect on the paralysis of worms at 10 mg/ml and 50 mg/ml of sample as compared to standard at concentration 10 mg/ml. But the oil sample of *Embelia ribes* showed significant anthelmintic activity. Because it is able to exhibit most significant anthelmintic effect in both i.e. paralysis and death of the worms at the concentrations 10 mg/ml, 50 mg/ml and 100 mg/ml as compared to standard at 10 mg/ml. Other oils showed comparable anthelmintic effect as shown in the Table 1. From the results and discussion it has been concluded that seed oils chosen for the evaluation, showed moderate to significant anthelmintic activity.

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REFERENCES

1. Perry, B.D., Randolph, T.F., McDermott, J.J., Sones, K.R. and Thornton, P.K., In; Veterinary Parasitology, International Livestock Research Institute, Nairobi, Kenya, 2002, 148.

2. Perry, B.D. and Randolph, T.F., In; Veterinary Parasitology, International Livestock Research Institute, Nairobi, Kenya, 1999, 84, 145.
3. Monteiro, A.M., Wanyangu, S.W., Kariuki, D.P., Bain, R., Jackson, F. and McKellar, Q.A., **Veterinary Record**, 1998, 142, 396.
4. Dano, A.R. and Bogh, H.O., **World Animal Review**, 1999, 93, 60.
5. Waghorn, G.C. and McNabb, W.C., **Proceedings of the Nutrition Society**, 2003, 62, 383.
6. De Bairacli., Levy, J., Eds., In; The Complete Herbal Handbook for Farm and Stable, 4th Edn., Faber and Faber, London, 1991, 471.
7. Gibson, T.E., Eds., In; Veterinary Anthelmintic Medication, 2nd Edn., Technical Communication No.33 of the Commonwealth Bureau of Helminthology, St. Albans, Herts, 1965, 206.
8. Bogh, H.O., Andreassen, J. and Lemmich, J., **J. Ethnopharmacol.**, 1996, 50, 35.
9. Joshi, S.G., Eds., In; Medicinal Plants of India, Vol. II, Indian Council of medical research, New Delhi, 1987, 128.
10. Burkill, I. and Walandow, **J. Sci. Res**., (Indonesia) 1952, 1, 201.
11. Ajaiyeoba, E.O., Onocha, P.A. and Olarenwaju, O.T., **Pharm. Biol.**, 2001, 39, 217.
12. Ishiguro, K. and Oku, H., **Phytotherapy Res.**, 1997, 1, 343.
13. Tailor, R., Acland, D.P., Attenborough, S., Cammue, B.P. A., Evans, I. J., Osborn, R.W., Ray, J., Rees, S.B. and Broekaert, W.F., **J. Biol. Chem.**, 1997, 272, 24480.
14. Ahmad, F., Khan, R. and Rashad, S., **J. Ethnopharmacol.,** 1994, 42, 193.
15. Anonymous, In; The Wealth of India: a Dictionary of Indian Raw Materials and Industrial Products, Vol. III, CSIR, New Delhi, 1952, 167.
16. Fleming, T., Eds., In; Physicians Desk Reference for Herbal Medicines, 2nd Edn., 2000, 230.
17. Kulkarni S.K., In; Handbook of Experimental Pharmacology, 3rd Edn., Vallabh Prakashan, Delhi, 1999, 179.

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