

Anthelmintic Efficacy of *Butea monosperma* Against *Syphacia muris* in Mice

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Abstract: The objective of this study was to investigate the anthelmintic efficacy of drug (*Butea monosperma*) in *Syphacia muris* infected mice. The drugs were administered to the infected mice on 18th, 19th and 20th post infection days. The % efficacy due to test drug was observed on Larva and Adult worm recovery response. Larval and Adult worm recovery were found to be directly proportional to the doses of drug. Larval and Adult worm recovery response was maximum (42 and 30) and minimum (18 and 11) in *Butea monosperma* treated mice. Significant decrease in worm recovery (larval and adult) due to test drug indicates stimulated cell mediated as well as humoral immunity. Obtained results indicate that studied drug can be good anthelmintic/ nematocidal agent.

Key words: *Butea monosperma* • *Syphacia muris* • Adult Worm Recovery and Anthelmintic Efficacy

INTRODUCTION

Syphacia muris (Nematoda: Oxyuridae) is a ubiquitous nematode that commonly infects rats in the laboratory and can interfere with the development of unrelated biological assays [1]. Although infection is generally nonpathogenic in immunocompetent animals, pinworm infections may have deleterious effects on behavior, growth, intestinal physiology and immunology [2]. Clinical signs associated with heavy infestations include rectal prolapse, in tissue caption, faecal impaction and diarrhea [3]. *Syphacia muris* is considered to be common in the laboratory rats and the wild rats [4]. Gravid female worms migrate from the cecum or the colon to the perianal region of the host, deposit adhesive coated embryonated eggs on the skin, then dry up and die. The eggs become infective within 6–24 h and they are very light and will aerosolize, resulting in widespread environmental contamination.

Helminthiasis is one of the most important animal diseases worldwide, inflicting heavy production losses in grazing animals. The disease is especially prevalent in developing countries [5-6] in association with poor management practices and inadequate control measures. An integrated approach is required for the effective control of helminthes which includes strategic and tactical

use of anthelmintics and careful management of grazing lands, including control of stocking rates and appropriate rotation strategies. Vaccination may also play a role, as in the case of lungworms. However, problems have emerged with the use of anthelmintics, notably the development of resistance in helminthes [7-10] to various anthelmintic compounds and classes, as well as chemical residue and toxicity problems [11-12]. In addition, recognition of the antigenic complexity of parasites has slowed vaccine development. For these various reasons, interest in the screening of medicinal plants for their anthelmintic activity remains of great scientific interest despite extensive use of synthetic chemicals in modern clinical practices all over the world. The plant Kingdom is known to provide a rich source of botanical anthelmintics, antibacterial and insecticides [13-15]. A number of medicinal plants have been used to treat parasitic infections in man and animals [16-17]. In this paper, we studied on anthelmintic evaluation of *Butea monosperma* plants indigenous to India have been reviewed.

MATERIALS AND METHODS

Experimental Animals: The mice were obtained from the College of Veterinary Science and Animal Husbandry, Mhow (M.P.) and were kept in the animal house under

local conditions of light, temperature and ventilation. Inbred Swiss albino mice, *Mus musculus albinus*, 7-9 weeks old and 18-20 gms in weight were selected as the experimental animals. Only those animals which were not having any kind of helminthic infection were selected for the present study. These were kept in sterilized cages with dry husk padding and were fed daily with standard balanced diet.

Maintenance of *S. Muris*: *Syphacia muris* was selected as a test parasite. It was obtained from Helminthology laboratory, Department of Zoology, Govt. Model Autonomous Holkar Science College, Indore. *S. muris* is being maintained in the helminthology laboratory by serial passage in healthy mice. The worms were recovered from these infected mice after every 21st day post infection.

Experimental Groups: Experiments were carried out in the following three groups of mice:

- Control Group I: Non infected and non treated.
- Control Group II: Infected and non treated.
- Experimental Groups: Infected and treated with the test drugs.

Test Drugs: *Butea monosperma* (Palash flower powder) were selected as the test drug. The different doses of proposed drug were administrated in powdered form to the infected mice to assess their chemotherapeutic efficacy in experimental *S muris* infection. The drug treatment was given on 18th, 19th and 20th post infection days [18].

Evaluation of the Efficacy of Drug: Efficacy of the drug was evaluated on the basis of reduction in the worm burden. The worm burden recovered from experimental and control groups were noted and the percent efficacy of

the drug was calculated. The efficacy of the drug was determined according to the method of Steward [19] applying the following formula:

$$\text{Percent efficacy of the drug} / \text{percent protection} = \frac{N - n}{N} \times 100$$

Where,

N = Mean worm recovery in control mice.

n = Mean worm recovery in experimental (drug treated) mice.

RESULTS

Larval and Adult Worm Recovery: The level of therapeutic efficacy was assessed on the basis of reduction in worm-burden in various experimental groups treated with *Butea monosperma* (Palash) drug. Results of larval and adult worm recovery in various experimental groups are summarized in table (1). The mean recovery and per-cent efficacy deferred significantly when treated with various doses of drugs. In control i.e., infected and non treated mice worm burden was found to be (68 and 54) on 10th and 21st day post infection.

When infected mice treated with palash (*Butea monosperma*), maximum larval and adult worm burden (42 and 30) and minimum (18 and 11) were found at the doses of 0.005 mg/ml and 0.02 mg/ml on 10th and 21st days post infection. Per-cent efficacy was found to be (38, 60 and 73%) on 10th day post infection and (44, 64 and 79%) on 21st days post infection at the doses of 0.005 mg/ml, 0.01 mg/ml and 0.02 mg/ml respectively.

Thus a remarkable decrease in larval and adult worm burden was observed in all the experimental mice treated with herbal drug. Obtained results indicate that studied drug can be good anthelmintic/ nematocidal agent.

Table 1: Worm recovery from *S. muris* infeted mice, treated with different doses of *Butea monosperma* (Palash)

Group No.	Groups	Doses in mg/ml	Average no. of larva recovered on 10 th p.i. days ± S.D.			Average no. of adult recovered on 21 st p.i. days		
			Mean recovery ± S.D.	% Infection	% Efficacy	Mean recovery ± S.D.	% Infection	% Efficacy
1	NINTC ₁	-	-	-	-	-	-	-
2	INTC ₂	-	68 ± 3.61	68	-	54 ± 2.65	54	-
3	ITPL ₁	0.005	42 ± 3.61	42	38	30 ± 1.73	30	44
4	ITPL ₂	0.01	27 ± 2.65	27	60	19 ± 3.61	19	64
5	ITPL ₃	0.02	18 ± 1.73	18	73	11 ± 4.58	11	79

NINTC₁ -Non infected non treated control-1.

INTC₂ -Infected non treated control-2.

ITPL₁ -Infected and treated with 0.005 mg/ml. *Butea monosperma* (Palash) on 18th 19th and 20th p.i. days.

ITPL₂ -Infected and treated with 0.01 mg/ml. *Butea monosperma* (Palash) on 18th 19th and 20th p.i. days.

ITPL₃ -Infected and treated with 0.02 mg/ml. *Butea monosperma* (Palash) on 18th 19th and 20th p.i. days.

DISCUSSION

The pinworm, *Syphacia muris*, *Syphacia obvelata* and *Aspicularis tetraptera*, are common parasites of laboratory rodents. The innocuous reputation of pinworms in rodents is at least questionable as they have been thought to affect weight gain and growth rate, in addition various disorders of the intestine have been attributed to pinworm [20-25] Immunocompromised to large worm burdens, sequelae or death [26]. The degree of infestation appears also to be dependent on host age, sex, strain and breeding techniques [27].

Despite the wide prevalence of pinworm infection, its chemotherapy has remained surprisingly backward during the past decade. No dependable and effective drug has yet been discovered against the pinworm. Majority of the available anticestode agents do not fulfill the requirement of an ideal drug.

Several workers reported the Anthelmintic activity of *Butea monosperma* [28-36]. During the present investigation *Butea monosperma*'s flower powder was found to be effective in the eradication of larva (10th days) and adult (21st days) p.i. at the dose of 0.02 mg/ml. Thus the results of present study also correlate with those of observations of the above mentioned authors.

Thus, in the light of available literature and result of present investigation it can be derived that *Butea monosperma* is an ideal drug for the treatment of wide variety of nematode infections. Thus it can be used as broad-spectrum anthelmintic. It can also be used in controlling the spread of mixed helminthic infections as it exhibited excellent prophylactic potential too.

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