

# PURGATIVE AND ANTHELMINTIC EFFECTS OF MALLOTUS PHILIPPINENSIS IN RATS AGAINST TAPE WORM

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**Summary :** A resin isolated from *Mallotus philippinensis* (Kamala) caused a significant purgative effect after an oral dose (120 mg/kg) in rats as assessed from the weight of faeces as well as from the surface area of blotting paper soaked by liquid faeces. The anthelmintic effect of the resin was evaluated in albino rats found to be infested with tape worms. The resin in 60 and 120 mg/kg dose had a lethal effect on 35.69% and 78.21% population of tape worms respectively, in small intestine.

**Key words :** purgative                                  anthelmintic                                  mallotus philippinensis

## INTRODUCTION

*Mallotus philippinensis* (Kamala) has been used in indigenous medicine as purgative and anthelmintic for a long time (1, 5). The constituent resins obtained from the hairy capsule of the plant have been found active in expelling tape worms (4), while Gupta and Bhagwat (3) have reported increased gut motility due to marked cholinergic activity present in the water soluble fraction of the ripe capsule. The chloroform extract of the fruit has been observed to cause dose dependent inhibition of the transformation of *Haemonchus contortus* eggs to infective larvae (2). In view of these observations, we investigated the purgative and anthelmintic activity of the resin of *M. philippinensis* in rats.

## MATERIAL AND METHOD

Capsules of *Mallotus philippinensis* were obtained from the local market and brick red powder was separated from the ripe capsules. The powder was extracted with alcohol and a resinous substance (5-6%) separated out as precipitate on addition of water. A suspension of the resin in milk (20 mg/ml) was used for oral administration in rats. Adult male rats (150-180 g) maintained on bread and milk diet were used for the experiment.

**Purgative effect :** Groups of 3 rats were housed in separate cages after fasting overnight. A thick blotting paper was placed below the bottom of each cage to absorb

liquid and collect the faeces. Only water was allowed during the experiments. The control group was given only vehicle, while the test groups were given the suspension of the resin (120 mg/kg) orally in milk.

After 2nd and 3rd hr, the blotting papers were replaced and the wet areas were marked by a pencil for measuring the areas soaked by wet faeces. The papers were weighed and the weight of the faeces was calculated for each observation period. Faeces were also examined microscopically for epithelial cells and red blood cells to know if there was any untoward effect of the resin on the intestine. The test was repeated twice at intervals of four days. Further, cross over between control and treated rats was also done twice after giving a gap of one week after each test.

*Anthelmintic activity* : Rats found to be naturally infested with *Taenia solium* were isolated from the local animal house after microscopic detection of ova in faeces. A group of 10 rats thus selected was kept for observation for assessment of the severity of infestation using saline suspension of faecal matter and iodine staining. The ova were counted in 20 microscopic fields under low magnification. The average oval count for each rat was assessed for 10 days during control period. These rats were then given the milk suspension of *M. philippinensis* resin (120 mg/kg) orally every day for 10 days and oval count was assessed daily.

In the next series of experiments, another batch of 9 infested rats were selected and the rats were divided into 3 groups. Group I was given only the vehicle (control) while Groups II and III were given the suspension of resin of *M. philippinensis* in doses of 60 and 120 mg/kg, respectively, on day 1, 3, 5, 7. All animals were sacrificed on 8th day to examine the dead worms in small intestine and live worms in small as well as large intestine and faeces. The assessment of anthelmintic activity was made on the percentage of worms mass affected by the resin of *M. philippinensis* (i.e. weight of dead worms in small intestine + live worms in large intestine and faeces in relation to total weight of worms)

## RESULTS AND DISCUSSION

The purgative effects of the resin of *M. philippinensis* in rats is summarised in Table I.

It will be observed from the cross over study that (a) a significantly larger area was soaked by faeces in the treated rats at all observation periods, showing passage of liquid stools and (b) the weight of wet faeces passed by treated rats was significantly

more at each observation period. Thus the treated passed about 3 times the bulk of stools than the control rats. Further, the microscopic examination of faecal samples revealed no evidence of epithelial cells/red blood cells or pus cells in treated rats, indicating that the resin has no untoward effect on intestinal mucosa.

TABLE I : Purgative effect of *Mallotus philippinensis* in rats.

	Group	Hour after administration			Total
		2	3	4	
Weight (mg) of wet faecal matter	Control rats	0.31 ± 0.04	0.28 ± 0.03	0.30 ± 0.05	0.89 ± 0.01
Mean ± S.E.M.	Treated rats	0.79 ± 0.08	1.27* ± 0.11	0.82* ± 0.09	2.88** ± 0.15
Area (cm <sup>2</sup> ) of blotting paper soaked	Control rats	4.38 ± 0.32	5.33 ± 0.55	5.27 ± 0.62	14.98 ± 0.30
Mean ± S.E.M.	Treated rats	13.11* ± 1.37	14.99* ± 0.18	9.65 ± 0.97	37.75** ± 1.56

Drug was administered in milk (120 mg/kg) per os to group of 3 rats each. Figures are means from 3 separate experiments each performed 4 days apart. Groups were also crossed over with one week of intervening rest periods. Mean value significantly differs from control (\*P < 0.05, \*\*P < 0.01)

TABLE II : Anthelmintic activity of *Mallotus philippinensis* resin in rats infested with tape worms. Mean wet weight of worms (mg) in the intestinal lumen of the following groups of rats (±SE).

	Control	<i>Mallotus philippinensis</i> per os	
		60 mg/kg	120 mg/kg
Living worms in faeces and large intestine	Nil	296.66 ± 48.76	386.66 ± 118.67
Dead worms in small intestine	Nil	273.33 ± 20.62	666.66** ± 137.86
Living worms in small intestine	1253.33 ± 291.15	1026.66 ± 98.49	293.44* ± 41.14
Total weight of worms	1253.33 ± 291.15	1596.60 ± 141.09	1346.66 ± 180.81
Total weight of worms affected by the drug		570.00 ± 107.63	1053.33** ± 38.09
Percentage of worm mass affected by the drug		35.69	78.21

- Mean weight of living worms in small intestine differs significantly from control (P < 0.05).
- \*\* Weight of worms affected (killed or expelled) was significantly more (P < 0.05) after higher dose (120 mg) as compared to lower (60 mg) of *M. philippinensis*.

As regards the anthelmintic activity, the average number of eva present in the faeces was about 5–10 per field during the control observation period of 10 days, but with the start of treatment, the number of ova in the faeces markedly increased (12–15 per field) for the first few days and then decreased to 0–2 eva per field by about 10th day. It seems that the drug caused expulsion of worms as well as ova to a good extent since the oval count decreased on prolonged treatment.

The observations of the second experiment are summarised in Table II. It was observed that in the untreated infested rats, the living worms were only present in small intestine, whereas in treated rats, there has been a considerable increase in live worms in large intestine. This suggests that the drug shifted the worms from small intestine to large intestine. Further, the quantity of the dead worms in the small intestine was found to increase with the increase in dose of the drug from 60 to 120 mg/kg, thus reversing the ratio of the dead to living worms in small intestine in each dose. These results indicate that the resin of *M. philippinensis* has a definite dose related vermucidal effect and the purgative effect of the drug apparently helps in expelling the worms from intestine. The data seem to suggest a clinical trial of the drug in tape worm infestation in man.

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