

Efficacy of albendazole and levamisole at different dose levels against *Ascaridia galli*.

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Abstract

Different dose rates of albendazole (3.5 mg kg⁻¹, 7 mg kg⁻¹, b.w.) and levamisole (10 mg kg⁻¹, 20 mg kg⁻¹, 40 mg kg⁻¹, b.w.) were evaluated against experimental infection of *Ascaridia galli* in poultry. Albendazole @ 14 mg kg⁻¹ b.w. was found 100% effective in reducing the EPG and 100% effective in reducing the post-mortem worm count, respectively. Levamisole @ 10 mg kg⁻¹, 20 mg kg⁻¹, 40 mg kg⁻¹ b.w. was found 100% effective in reducing the EPG and removing the matured worms at all three dose rates.

Key words :

Introduction

Ascaridia galli is one of the most common and highly pathogenic nematode of poultry in India. Several anthelmintics have been tried to control *Ascaridia galli* infection, however, information on the efficacy and dose rates of albendazole and levamisole is scanty. Different workers have reported varying doses of albendazole (Han *et al.*, 1982; Jiang and Lee, 1984; Padmaja and Sathianesan, 1993) and levamisole (Jiang *et al.*, 1984; Pankavich *et al.*, 1973); Verma *et al.*, 1991) to be effective against *Ascaridia galli*. The margin of profit in poultry industry is low using costly chemotherapeutic agents, hence got economic significance. Keeping in view the above facts, the study was planned to assess the minimum effective dose of the above mentioned drugs, as these compounds are easily available in the market.

Materials and Methods

Experimental birds: A total of 56 one day old chickens were procured from the hatchery. They were maintained in the brooder with *ad libitum* supply of feed and water in parasite free condition.

Infective dose of *Ascaridia galli*: Fully mature *A. galli* worms were collected from the intestines of naturally infected birds. The culture was prepared according to the technique of Riedel (1951). The uteri containing fertile eggs were separated by teasing the gravid females. The eggs were separated and washed 5-6 times in distilled water before placing them in clean petri dishes at 30 ± 1°C for embryonation. These embryonated eggs were used for infecting the birds.

Experimental infection: The culture was mixed thoroughly to get a uniform suspension of eggs. Each bird was administered 500 infective eggs of *Ascaridia galli*, per os on the 10th day of age with help of a dropper. The birds were then divided in seven groups i.e. I, II, III, IV, V, VI and VII of 8 birds each. After the appearance of *Ascaridia galli* eggs in the droppings of the infected birds (between 55-62 days post infection), the EPG of the pooled sample of each group was done thrice at weekly interval.

Anthelmintic treatment: The birds of group I, II and III were administered albendazole at the dose rate of 3.5 mg kg⁻¹, 7 mg kg⁻¹, 14 mg kg⁻¹ b.w. respectively. The birds of group IV, V and VI were administered levamisole at the dose rate of 10 mg kg⁻¹, 20 mg kg⁻¹, 40 mg kg⁻¹ b.w. respectively. Group VIII served as the infected untreated control. EPG of the pooled sample of each group was determined in the post treatment period for three weeks at weekly interval. The efficacy of each dose rate of both drugs in reducing the faecal egg counts was determined as per the method of Taylor *et al.* (1993) :

$$AE \% = \frac{\text{Mean EPG (pre-treatment)} - \text{Mean EPG (post-treatment)}}{\text{Mean EPG (pre-treatment)}} \times 100$$

On day 21 post-treatment, the birds were sacrificed and the worms were counted. The efficacy of the drug on the basis of PM worm count was evaluated as per the method of Soulsby (1982):

$$AE \% = \frac{A - B \times 100}{A}$$

Where AE = Anthelmintic efficacy

A = Number of parasites in infected untreated (control) birds

B = Number of parasites in treated birds

Results and Discussion

Albendazole @ 3.5 mg kg⁻¹, 7 mg kg⁻¹, 14 mg kg⁻¹ b.w. was found to be 61.37%, 95.23% and 100% effective respectively in reducing the EPG of the infected birds (Table 1). The efficacy of the albendazole, at the above mentioned doses, in reducing the postmortem worm count was recorded to be 69.13%, 94.87% and 100% respectively (Table 2). The findings were almost similar to those of Han *et al.* (1982) who also reported albendazole @ 5-10 mg kg⁻¹ b.w., in feed as 100% effective. However, Jiang and Lee (1984) reported a dose of 10-30 mg kg⁻¹ b.w. of albendazole as 100% effective whereas Padmaja and Sathianeshan (1993) reported a very high dose of albendazole (50 mg kg⁻¹) to be 100% effective against *A. galli*. In this study, the dose rate of 7 mg kg⁻¹ b.w. of albendazole was found to reduce the average EPG by 95.23% and the postmortem worm burden by 94.87%. These observations provide a base for further studies to establish a minimum effective dose of albendazole in between 7 mg kg⁻¹ and 14 mg kg⁻¹ b.w. in birds against *A. galli*. In this experiment, two higher doses of levamisole (20 mg kg⁻¹ and 40 mg kg⁻¹ b.w.) were found 100% effective in reducing the faecal egg count and postmortem worm count

Table 2: Effect of albendazole and levamisole on post mortem worm count in fowls experimentally infected with *A. galli*

Group	Dose (mg kg ⁻¹ b.w.)	Average worm count	Range of worms	Anthelmintic efficacy (%)
I Albendazole	3.5	6.75 ± 1.164	5-8	69.13
II Albendazole	7	1.12 ± 0.877	0-7	94.87
III Albendazole	14	0	-	100
IV Levamisole	10	0	-	100
V Levamisole	20	0	-	100
VI Levamisole	40	0	-	100
VII Control	-	21.87 ± 4.50	6-40	-

(Table 1 and 2). However, levamisole at dose rate of 10 mg kg⁻¹ b.w. was found 100% effective in reducing the EPG and removing the mature worms but 5 out of 8 birds showed immature worms on post mortem examination. These findings nearly corroborated with those of Jiang *et al.* (1984) who observed levamisole @ 20 mg kg⁻¹ b.w. to be 100% effective against immature and mature *Ascaridia galli*, respectively. Verma *et al.* (1991) at the same dose rate (20 mg kg⁻¹ b.w.) reported 92% and 96% efficacy against fourth larval stages and adults of *A. galli*, respectively. Pankavich *et al.* (1973)

Table 1: Efficacy of albendazole and levamisole in fowls experimentally infected with *Ascaridia galli*

Group	Dose (mg/kg)	Pre-treatment average EPG	Post treatment EPG and anthelmintic efficacy				
			EPG	Day 7	Day 14	Day 21	Average
I Albendazole	3.5	1800	EPG	800	400	600	600
	AE	55.55	71.42	57.14	61.37		
II Albendazole	7	22000	EPG	0	200	0	66.66
	AE	100.00	85.71	100.00	95.23		
III Albendazole	14	1200	EPG	0	0	0	0
	AE	100.00	100.00	100.00	100.00		
IV Levamisole	10	2000	EPG	0	0	0	0
	AE	100.00	100.00	100.00	100.00		
V Levamisole	20	1400	EPG	0	0	0	0
	AE	100.00	100.00	100.00	100.00		
VI Levamisole	40	1800	EPG	0	0	0	0
	AE	100.00	100.00	100.00	100.00		
VII Control	-	1400	EPG	1800	1400	1400	1533.3
	AE	-	-	-	-	-	

AE= anthelmintic efficiency in per cent.

reported levamisole to be 98% and 100% effective @ 18 and 36 mg kg⁻¹, respectively, in drinking water. A further higher dose of levamisole (40 mg kg⁻¹ b.w. twice at weekly interval) was found to be 100% effective against *A. galli* by Kuczynska *et al.* (1994).

Amongst the three different doses of levamisole used in the present study, a minimum dose of 10 mg kg⁻¹ b.w. was found 100% effective in reducing the EPG and removing the mature worms. However, next higher dose (20 mg kg⁻¹ b.w.), used in the present trial, removed 100% immature worms. These findings also provide a scope for further studies to evaluate a minimum effective dose against immature worms in between 10 and 20 mg kg⁻¹ b.w.

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