EFFICACY OF LEVAMISOLE (TRAMISOL®)[1] IN DRINKING WATER AGAINST SOME NEMATODES OF CHICKENS

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Levamisole given in drinking water to chickens at dosages of 18 or 24 mg/kg body weight was 100% efficacious against *Ascaridia galli*. Dosages of 6 mg/kg body weight were less than 17% efficacious. This anthelmintic was 100% efficacious against *Heterakis gallinarum* at 48 mg/kg body weight, 88% efficacious at 36 mg/kg body weight and ineffective at 12 and 24 mg/kg body weight. At least 88% of *Capillaria obsignata* were eliminated from birds given 48 mg/kg body weight and an average of 76% by 36 mg/kg but less than 5% were eliminated at levels of 12 mg/kg body weight.

The anthelmintic activity of optically inactive *dl*-tetramisole has been shown to reside primarily in the levo isomer (1). The *l*-isomer (levamisole) has a lower effective dosage and a greater margin of safety than the racemic mixture of tetramisol (2). Data are available about the optically active levamisole (3, 4, 5). The present study was done to evaluate the anthelmintic efficacy of levamisole HCl[1] against nematodes of chickens.

MATERIALS AND METHODS

One-day-old Babcock pullets and cockerels obtained from a local hatchery were vaccinated with Newcastle vaccine (B_1 types, B_1 strain) and given an antibiotic-free ration and water *ad libitum*. Two-week old birds were inoculated *per os* with 170 ± 10 embryonated eggs of *Ascaridia galli* or *Heterakis gallinarum*. Birds to be infected with *Capillaria obsignata* were similarly inoculated with 1000 ± 10 embryonated eggs. Twenty-eight days later the birds were banded, weighed, divided into groups of equal weight according to the method of Gardiner and Wehr (6), and caged in groups comprised of five pullets and five cockerels per group. Levamisole was administered in the drinking water. To insure intake of levamisole in drinking water, the daily intake for each group of birds was determined. Unmedicated water was removed one day before treatment, then a half-day's supply of medicated water was given to them. Either critical or controlled efficacy tests were done according to the experimental design and drug regimens given in Tables 1 and 2.

Critical Test—The feces were checked for voided *Ascaridia* and *Heterakis* for five consecutive days after treatment beginning the day following treatment. All worms (pre-adults and adults) voided in the feces were collected and counted. On the sixth day after treatment the birds were necropsied and gastrointestinal contents were passed through sieves to recover worms not voided. Percent efficacy was equal to the number of worms voided divided by the number of worms voided plus the number of worms recovered at necropsy times 100.

Control Test—A group of untreated birds was maintained as a control group. Birds infected with *Capillaria* were necropsied five days after treatment and the worm burdens estimated using the methods of Pankavich *et al.* (5). Percent efficacy was equal to the number of worms recovered at necropsy in the treated groups divided by the number of worms recovered from the untreated group times 100.

RESULTS

Ascaridia galli (Table 1)

Levamisole at dose levels of 18 and 24 mg/kg of body weight was 100% efficacious in removing ascarids. Efficacy varied from 20 to 86% at a dose level of 12 mg/kg and from 0 to 17% at a dose level of 6 mg/kg. Anthelmintic activity was maximized within one day following treatment.

[1] Tramisol®, American Cyanamid Company, Princeton, N.J.

TABLE 1. *Efficacy of Tramisol® levamisole in drinking water against Ascaridia galli and Heterakis gallinarum (critical testing)*

Trial	Parasite	Group	Number of Birds	Group Weight (gms)	Dosage of Tramisol® Levamisole Soluble Powder (mg/kg body wt.)	Number of Worms Recovered in Feces for 5 Consecutive Days Post-Treatment Days 1	2	3	4	5	Worms Recovered at Necropsy (No.)	Efficacy[a] Critical Test (%)
1	*A. galli*	1 (Control)	10	5401	0	0	0	0	0	0	9	—
		2	10	5379	6	1	0	0	0	0	5	17
		3	10	5427	12	6	0	0	0	0	1	86
		4	10	5458	18	7	0	0	0	0	0	100
		5	10	5474	24	1	0	0	0	0	0	100
2	*A. galli*	6 (Control)	10	5510	0	0	0	0	0	0	6	—
		7	10	5425	6	0	0	0	0	0	2	0
		8	10	5446	12	1	0	0	0	0	4	20
		9	10	5463	18	3	0	0	0	0	0	100
		10	10	5486	24	3	0	0	0	0	0	100
1	*H. gallinarum*	1 (Control)	10	4810	0	0	0	0	0	0	6	—
		2	10	4390	12	0	0	0	0	0	7	0
		3	10	5000	24	1	0	0	0	0	2	33
		4	10	5010	36	3	0	0	0	0	1	75
		5	10	5000	48	3	0	0	0	0	0	100
2	*H. gallinarum*	6 (Control)	10	4390	0	0	0	0	0	0	16	—
		7	10	4440	12	0	0	0	0	0	5	0
		8	10	4430	24	0	0	0	0	0	10	0
		9	10	4520	36	2	0	0	0	0	0	100
		10	10	4450	48	6	0	0	0	0	0	100

[a] Rounded off at 0.5 or larger.

TABLE 2. *Efficacy of Tramisol® levamisole in drinking water against Capillaria obsignata (control testing)*

Trial	Parasite	Group	Number of Birds	Group Weight (gms)	Dosage of Tramisol® Levamisole Soluble Powder (mg/kg body wt.)	Estimated Total Worm Burden[a]	Efficacy[b] (%)
1	*C. obsignata*	1 (Control)	10	4631	0	260	
		2	10	4674	12	255	2
		3	10	4688	24	110	58
		4	10	4669	36	85	68
		5	10	4627	48	25	90
2	*C. obsignata*	6 (Control)	10	5697	0	215	
		7	10	5655	12	205	5
		8	10	5654	24	70	68
		9	10	5716	36	35	84
		10	10	5635	48	25	88

[a] Based on a 20% sample, e.g. trial 1, group 1, 52 worms in sample x 5 = 260 worms.
[b] Rounded off at 0.5 or larger.

Heterakis gallinarum (Table 1)

Levamisole at a dose level of 48 mg/kg of body weight was 100% efficacious in removing *Heterakis*. Efficacy varied from 75 to 100% at a dose level of 36 mg/kg, and from 0 to 33% at a dose level of 24 mg/kg. There was no apparent efficacy against *Heterakis* at a dose level of 12 mg/kg of body weight. Anthelmintic activity was maximized within one day following treatment.

Capillaria obsignata (Table 2)

Levamisole efficacy at a dose of 48 mg/kg of body weight varied from 88 to 90% in removing capillarids. Efficacy varied from 68 to 84% at a dose level of 36 mg/kg and from 58 to 68% at a dose level of 24 mg/kg of body weight. The drug was only slightly efficacious (2 to 5%) at a dose level of 12 mg/kg of body weight.

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