

TOXICITY OF SD 8447 AND DICHLORVOS
TO LARVAE OF THE HORN FLY,
HAEMATOBIA IRRITANS, (DIPTERA: MUSCIDAE)
IN MANURE OF INSECTICIDE-FED CATTLE¹

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ABSTRACT

SD 8447 (2-chloro-1-(2, 4, 5-trichlorophenyl) vinyl dimethyl phosphate) used as a feed additive for cattle caused significant ($p < .01$) mortality of horn fly, *Haematobia irritans* (Linnaeus), larvae in manure samples from cattle. At levels of 0.1, 0.15, and 0.20 mg/kg/day, the percent mortality was respectively 63, 85, and 97.6. Similarly dichlorvos pellets (Atgard™) fed at 2.25 mg/kg/day produced 98.3% mortality, while 7.2 mg added to 100g manure from untreated animals resulted in 99% mortality ($p < .01$) of horn fly larvae.

The use of feed additives for the control of flies breeding in dung has been investigated for many years. Knipling (1938) and Bruce (1939) tested phenothiazine for control of the horn fly, *Haematobia irritans* (L). Drummond (1963) found that insecticides fed to Holstein cattle could control horn fly and house fly, *Musca domestica* L., larvae breeding in the cattle manure. House fly control using coumaphos as a feed additive was reported by Skaptason and Pitts (1962) and Miller et al. (1970a). Anthony et al. (1961) found that Holstein cattle fed coumaphos at 1 mg/kg/day produced mortality to larvae of the house fly and the face fly, *Musca autumnalis* De Geer. Feed additives for face fly control were also reported by Treece (1962), Ode and Matthyse (1964), and Treece (1964). Miller et al. (1970b) found that Gardona™ fed to dairy cattle successfully controlled house fly larvae. Miller and Gordon (1972) found that feeding encapsulated Rabon™ to dairy cattle would control house fly larvae and that more Rabon™ was present in the feces than when unencapsulated formulations were used.

METHODS AND MATERIALS

Five yearling heifers were kept in an enclosed barn and fed a fattening cattle ration. Initially, 2 animals were fed 0.1 mg/kg/day of SD 8447, [2-chloro-1-(2, 4, 5-tri = chlorophenyl) vinyl dimethyl phosphate, Rabon™, Shell Chemical Company], 2 animals were fed 0.2 mg/kg/day of SD 8447, and 1 animal was used as a check. After 10 days, the dosage rates were changed from 0.1 and 0.2 mg/kg/day of SD 8447 to 0.05 and 0.15 mg/kg/day respectively and fed for 10 days. The animals were then held on untreated rations for 5 days. Two of the animals were then fed dichlorvos (Atgard™, Shell Chemical Company) at the rate of 2.25 mg/kg/day, the 3 remaining animals being untreated. Chemicals were used as calculated technical concentrations of the formulations. Manure samples taken from 2 of the untreated animals had 7.2 mg dichlorvos added to 100g manure in the laboratory. The same check animal was used during the entire test. Manure samples used for the bioassay were collected at least 5 days after initiation of a feeding trial.

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TABLE 1. CONTROL OF HORN FLY LARVAE (100/REPLICATION)* IN MANURE OF INSECTICIDE-FED CATTLE CONTAINING SD 8447, DICHLORVOS, OR DICHLORVOS ADDED TO MANURE IN THE LABORATORY.

No. completing Larval stage	Treatment					
	Check	SD 8447	(ppm)	in feed	added at 7.2 mg to 100g manure	dichlorvos
		2.5	5.0	7.5	10.0	fed at 0.45 g/day
Rep. 1	43	30	9	0	0	3
Rep. 2	79	48	27	0	2	0
Rep. 3	46	67	26	25	2	0
Total	168	145	62	25	4	3
% larval mortality**	0	14	63	85	97.6	98.3
mg/kg/day/animal	0	0.05	0.10	0.15	0.20	2.25

*As larvae surviving to pupal stage
 **Corrected % mortality by Abbott's formula

Horn fly eggs were obtained from wild flies. Twenty-five first instar larvae were added to 50g manure placed over 3g wood chips in styrofoam cups. Four cups containing 100 larvae were used for each replication. Pupae were extracted from the cups on the sixth day by water flotation. Statistical analysis was by analysis of variance and Duncan's multiple range test.

RESULTS AND DISCUSSION

Horn fly control in manure of cattle fed SD 8447 and dichlorvos is shown in Table 1.

Horn fly mortality was calculated from the number of larvae successfully pupating. Corrected percent mortality was calculated by a modification of Abbott's formula used by Drummond et al. (1967).

SD 8447 fed at levels of 0.1, 0.15, and 0.2 mg/kg/day significantly ($p < .01$) reduced larval survival in collected manure samples. Manure of animals fed SD 8447 at 0.05 mg/kg/day showed no significant effect on horn fly survival. Dichlorvos fed at 2.25 mg/kg/day (0.45g/day) or 7.2 mg added to 100g manure significantly ($p < .01$) reduced horn fly survival. SD 8447 at 0.2 mg/kg/day produced a significantly greater fly mortality than when fed at 0.15 mg/kg/day. No animal toxicity from either SD 8447 or dichlorvos was observed during the study. The results showed that SD 8447 fed daily at 0.1 to 0.2 mg/kg/day significantly reduced larval survival of the horn fly. Similarly, dichlorvos fed at 2.25 mg/kg/day produced significant control of horn fly larvae.

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