

Residues in Fat of Steers Sprayed with a Dieldrin-Contaminated Fly Control Product

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A horn fly (*Haematobia irritans* (L.)) control concentrate was intentionally contaminated with dieldrin to result in levels of 1, 5 and 10 ppm in the diluted spray. Two steers were sprayed at three week intervals with each level of contamination. Samples of tissues were then analyzed for dieldrin. Dieldrin was detectable in the fat but not the meat of steers after 6, 7 and 8 treatments.

Residues of organochlorine pesticides in the meat of beef animals result from contaminated feed and/or water in most instances. Occasionally, unlawful direct application by the producer or cross-contamination by faulty formulation of pesticides registered for control of animal ectoparasites do occur. GANNON *et al.* (1959) reported results of low level feeding of dieldrin to livestock and poultry, including steers. They showed that at levels of 0.1 ppm or higher in feed, dieldrin residues stored in the tissues of steers appeared to be proportional to the rate of intake. In a previous study (THOMAS and MEDLEY 1971) the use of a concentrated malathion formulation contaminated with chlordane at most frequent levels detected in commercial products did not result in residues in eggs.

The chemistry laboratories of the Pesticides Regulation Division routinely check pesticide formulations for contamination by other pesticides. A number of these products, including malathion concentrates, have directions for direct and frequent application to cattle for horn fly control. Occasionally, such products are found contaminated with organochlorine pesticides such as dieldrin, but when they are used properly they are considered to cause no residue problem.

Horn flies (*Haematobia irritans* (L.)) are a pest of cattle in Texas from early May to late October. During early and late season, they may require only monthly application of pesticides to obtain control. During mid summer and early fall population pressures become so high that economic levels (50 or more horn flies/head in local area) cannot be maintained even with a two week spraying regimen. This is especially true when rainfall is heavy during June MEDLEY *et al.* (1963).

The purpose of this study was to determine if use of pesticide concentrates recommended for frequent two-week applications for horn fly control, if contaminated at levels of 0.01% or more, would cause residues in the tissues of beef animals.

METHODS

Eight Hereford steers averaging 371 pounds with no previous history of pesticide application were placed in newly constructed pens, two to a pen.

The steers were fed a complete ration stored in an 11-ton bin sufficient to last the length of the study. The ration, analyzed to ensure that it bore no dieldrin residues (sensitivity down to 0.01 ppm) consisted of 10 parts regular feed mix, 1 part molasses, and 5 parts of Hegari hay.

A cattle insecticide "Ortho Malathion 50 EC" containing approximately 50% malathion (0.0-dimethyl dithiophosphate of dimethyl mercaptosuccinate) and with claims and directions for use on cattle for horn fly control, was contaminated with dieldrin, not less than 85% of 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo-exo-5,8-dimethanonaphthalene at 0.01, 0.05, and 0.10% levels. These are representative of levels that have been found in contaminated commercial malathion concentrations. The product was diluted according to label directions (1:100 in water) giving 1, 5 and 10 ppm dieldrin in the spray. The contaminated 0.5% malathion sprays were applied with a power sprayer at 250 PSI using a trigger-type spray gun with a No. 5 flat disc nozzle. Averaging out actual field treatments, the sprays were applied every three weeks in simulation of spraying for horn fly control as recommended on the product label.

One week prior to each spray treatment, omentectomy samples were taken. Animals were slaughtered at four-week intervals, beginning four weeks after the first spray treatment. All analytical procedures conformed to the FDA Pesticide Analytical Manual (1968) and results were confirmed by electron capture gas chromatography, microcoulometric gas chromatography, and thin-layer chromatography.

RESULTS AND DISCUSSION

Two steers treated with uncontaminated 0.5% malathion spray were slaughtered, one at the beginning and one at the end of the study, and residues of dieldrin in tissues were not detectable. As shown in Table I, steers sprayed 6, 7 and 8 times during the season with a contaminated horn fly spray had dieldrin residues in the fat but not in the meat. GANNON et al. (1959) showed that steers given 0.75 ppm or more dieldrin in feed do have residues in their meat and

substantial residues in their fat after 12 weeks or longer. Aldrin and dieldrin have been cancelled but not suspended for crop use and are still manufactured in this country. This study indicates that treatment of steers with a horn fly control concentrate contaminated with low levels of dieldrin results in low levels of dieldrin in the fat but not in meat. However, should animals also be subjected to dieldrin residues in feed and/or water, a contaminated spray concentrate would add to the dieldrin intake in steers.

TABLE I

Dieldrin residues in tissues of steers sprayed with one gallon per head of 0.5% malathion at three-week intervals.

Dieldrin in spray (ppm)	No. of treat- ments	Omentec- tomy samples <u>a/</u>	Dieldrin content (ppm)			
			Renal fat	Back fat	Omen- tal fat	Other tissues <u>b/</u>
None	0	<0.01	<0.01	<0.01	<0.01	<0.01
1.0	6	0.01	<0.01	0.02	0.04	<0.01
5.0	7	0.02	<0.01	0.02	0.02	<0.01
10.0	8	---	0.13	0.12	0.31	<0.01
None	8	---	<0.01	<0.01	<0.01	<0.01

a/ Omentectomy samples were taken from live animals one week prior to the number of treatments indicated.

b/ Brain, heart, liver, kidney, loin, round and flank steak were analyzed for residues but none could be detected.

References

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