

Ronnel Residues in Adult Sheep

Two adult ewes and two adult rams were administered 100 mg of ronnel per kilogram of body weight orally and the levels in omental fat were determined by gas chromatography 3 days prior and 4, 7, 14, and 21 days after administration. On Day 4, there was considerable variation in the levels among the test animals with the ewes having

higher levels. By Day 7, the difference within sex disappeared while the difference between sex persisted. The ewes consistently had higher residue levels until ronnel could no longer be detected on Day 21. However, the rate of excretion was essentially similar for both the ewe and the ram.

The organic phosphate insecticides usually do not leave highly persistent residues on treated plants or animals and are less likely to accumulate in animal tissue (USDA Agricultural Handbook No. 331, 1968). Ronnel, *O,O*-dimethyl *O*-(2,4,5-trichlorophenyl) phosphorothioate, is one organic phosphate which will accumulate in the tissues, particularly fatty tissue (Radeleff, 1964). Plapp and Casida (1958) have reported on the metabolic fate of ronnel in rats and a cow and gave tissue values 7 days following the oral administration of 100 mg of ronnel per kilogram body weight. The USDA Agricultural Handbook No. 331 (1968) lists a 21-day minimum waiting period from the last application when ronnel is fed continuously for not less than 75 days to cattle at the level of 8 mg/kg per day in blocks or granules. No data are available for the residue levels of ronnel in sheep. The purpose of this paper is to report the levels of ronnel in omental fat of ewes and rams following an oral administration of ronnel.

METHODS

Three rams and three ewes were used as experimental subjects with one animal of each sex serving as controls. The sheep were of mixed breeding but primarily Hampshire-Delaine cross. They were all about nine months old, weighed about 36 kg, and were in good flesh. The sheep were sheltered in a common pen with feed, water, and salt continuously available. The diet was a fattening ration and consisted of 50% ground sorghum grain, 35% ground alfalfa hay, 10% cottonseed meal, and 5% molasses.

The ronnel was used as commercially available Trolene FM (Dow Chemical Company, Midland, Mich.) consisting of 40% active ingredient and 60% inert ingredients consisting of diatomaceous earth, synthetic cellulose gum, and calcium aluminum silicate. The Trolene was mixed in water with 0.5 ml of a detergent and given at a rate of 100 mg of ronnel per kilogram of body weight in a drench.

Omental fat biopsies were taken employing the method of Radeleff (1950) three days prior to drenching and 4, 7, 14, and 21 days post-drenching. The ronnel level in the tissue was determined by gas-liquid chromatography using a modification of the procedure of Samuel (1966).

RESULTS AND DISCUSSION

Levels of ronnel in omental fat tissue on days -3, 4, 7, 14, and 21 after administration of ronnel are shown in Table I. To be certain that no further "clean up" or extraction procedures were required prior to chromatography, a known amount of ronnel was added to fat samples known to be ronnel free, and the samples were subjected to the extraction procedure and analyzed. Recovery of the added ronnel was approximately 95%. Under our conditions, ronnel peaked

Table I. Ronnel Levels in Omental Fat (ppm)

Day after Administration	Control, No Ronnel		Experimental, 100 mg ronnel/kg body weight			
	Female 1001	Male 1002	Female 1000	Female 1007	Male 1008	Male 1012
-3	0	0	0	0	0	0
4	0	0	32.4	43.2	22.3	6.8
7	0	0	22.3	21.4	5.5	5.0
14	0	0	2.3	2.0	1.0	0.4
21	0	0	0	0	0	0

about 8 minutes after the sample was injected into the column. No other peaks were observed in the samples which were chromatographed for 25-30 minutes.

While there was considerable individual variation among the four test animals at Day 4 (Table I), the level was much higher in the ewes. This difference between sexes held through the Day 7 and 14 levels. However, at Day 7 difference within sex had largely disappeared. Although values of the ronnel in omental fat were considerably higher in the female than in the males, the rate of excretion was essentially similar. No ronnel was detected in the fat tissue on Day 21.

The Day 7 levels for the rams were about 50% of that reported by Plapp and Casida (1958) for the Skelly B soluble fraction of mesenteric fat in the cow while the level for ewes at this time was about double the level they reported in the cow. The difference between sexes was in good agreement with data reported for other insecticides.

LITERATURE CITED

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