DATA EVALUATION RECORD

TRICHLORFON

Metabolism in Cow

CITATION: Robbins WE, Hopkins TL, Eddy GW. 1956. The metabolism of P-32-labeled Bayer L 13/59 in a cow. J. Econ. Entomol. 49:801-806.

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DATA EVALUATION RECORD

STUDY TYPE: Metabolism in Cow.

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ACCESSION NUMBER: Not available.

MRID NUMBER: 00005297.

LABORATORY: Entomology Research Branch, USDA. [Location not specified].

TEST MATERIAL: [^{32}P]Trichlorfon (90.1 percent purity).

PROTOCOL:

1. [^{32}P]Trichlorfon (Bayer L13/59, 0,0-dimethyl-2,2,2-trichloro-1-hydroxyethylphosphonate, 90.1 percent pure) with a specific activity at dosing = 9.07 x 10^8 cpm/gram, was used.

2. The animal used was a lactating Hereford cow weighing 220 kg.

3. The compound was administered orally at a dosage of 25 mg/kg in 100 ml of distilled water. Urine and feces were collected manually so that near-quantitative total urine and feces for the first 12 hrs was obtained. After that, sampling intervals were at 18 and 24 hrs. Blood and milk samples were also collected at various intervals and radioassayed.

4. Radioassays were made by a windowless, gas-flow proportional counter. Paper chromatography was used to separate and identify trichlorfon and its metabolites. Radioactive spots were then radioassayed.

5. In addition, female houseflies, aged 3-4 days were used to evaluate the toxicity of the various radioactive compounds present in milk.

RESULTS:

Radioactivity in cow blood reached a peak (15 µg equivalent/ml) approximately 2 hrs after dosing, followed by a gradual decline until about 24 hrs (0.55 µg equivalent/ml). Chromatographic analysis indicated the absence of unchanged trichlorfon in the blood.

Radioactivity in milk samples reached a peak (2.3 µg equivalent/ml) at 18 hrs posttreatment followed by a gradual decrease similar to that seen for the blood. Only trace amounts of the radioactivity from milk corresponded with trichlorfon, and none of the radioactive spots present corresponded with Dichlorvos. None of the metabolic products were toxic to houseflies.

Trichlorfon and/or its metabolites were excreted in urine very rapidly, with about 66 percent of the administered dose excreted by 12 hrs. Radioactivity was highest at 2.5 hrs with 1.4 mg equivalents/ml and declined to 0.26 mg equivalents/ml in 24 hours. Only 0.17 percent of the administered dose was excreted as unchanged trichlorfon. The metabolites stayed at the origin in both the benzene-triethylene glycol and xylene-carbowax chromatographic systems. Using an ethanol-HCl system, however, 16.8 percent had an R_f value of 0.47 and nearly 77 percent had a mean R_f value of 0.23. The minor peak was tentatively identified as dimethyl hydrogen phosphate or dimethyl hydrogen phosphite whereas, the major peak was not identified.

The feces accounted for less than 3 percent of the total ^{32}P-trichlorfon. Radioactivity, reached a peak concentration at about 18 hrs, followed by a rapid decline after 24 hrs. Chromatographic analyses of feces was not performed.

CONCLUSIONS:

Trichlorfon was rapidly metabolized by the cow and eliminated primarily via the urine. The minor metabolite was tentatively identified as the dimethyl hydrogen phosphate or dimethyl hydrogen phosphite. The major metabolite was positive by the Haynes-Isherwood (Nature 164:1107-12, 1949) color test technique. Collectively, these data and additional chemical tests, suggested that the P-C bond was not enzymatically cleaved and was not involved in the major metabolic pathway of trichlorfon. Dichlorvos was not detected in blood, milk, or urine.

In the opinion of this reviewer the report provides adequate evidence that trichlorfon is rapidly metabolized by the cow. However, none of the metabolites were identified.

CORE CLASSIFICATION: Supplementary data.

The distribution of radioactivity in the tissues was not determined, and none of the metabolites were identified.