DATA EVALUATION RECORD

Releasable

(1) CHEMICAL: Trichlorfon

(2) TYPE OF FORMULATION: Active ingredient labeled with ^{32}P

(3) CITATION: Dedek, W., Wenzel, K., and Schwarz, H. 1975. [In vitro and in vivo studies on the percutaneous absorption of systematically [systemically] phosphorus-^{32}-labeled insecticidal organophosphorus compounds in cattle.] Archiv. Vet 29:857-868 (Translated from German)

(4) REVIEWED BY:

Patricia Noker
Staff Scientist
Southern Res. Inst.
Birmingham, Alabama
(205) 323-6592

Signature: _____

Date: _____

Donald L. Hill
Staff Scientist
Southern Res. Inst.
Birmingham, Alabama
(205) 323-6592

Signature: _____

Date: _____

(32A-0071)

(5) APPROVED BY:

Signature: _____

Date: _____

(6) TOPIC: This study has information pertinent to discipline toxicology, topic metabolism. It relates to the Proposed Guidelines data requirement 163.85-1.

(7) CONCLUSION: The absorption of trichlorfon through cattle skin appears to be influenced by the formulation of the trichlorfon preparation.

CORE CLASSIFICATION: Not applicable

(8) MATERIALS AND METHODS: ^{32}P-Labeled trichlorfon was used. Source and purity of the compound were unspecified.

For the in vitro percutaneous absorption studies, cattle skin was obtained from a local slaughter house. The skin was stored for a maximum of 4 days in physiological saline solution at 4°C. The thickness of the skin was approximated by measurement of the absorption of β-radiations for an Sr-90 preparation (no other details given) using this method. Skin samples were selected that were approximately the same thickness. The skin sample was clamped in a screw device positioned below a brass tube. The free skin surface was 2.83 cm^2. A dose of 1 ml of the trichlorfon solution was applied to the upper side of the skin, and the brass tube was screwed in above this to prevent evaporation of the solution. The underside of the skin sample was in contact with physiological saline solution at 37.5°C, which was stirred continuously.

The total amount of trichlorfon absorbed through the skin was determined by measuring the radioactivity present in the saline solution in the lower part of the diffusion cell after 22 hours. Only ^{32}P-label was measured, not the actual parent compound. For each study, four parallel experiments were run. Error estimation was calculated as statistical error, and the results were reported with a mean and estimated error of about $\pm$15%.

(9) REPORTED RESULTS:

In vitro absorption studies using the diffusion cell: The effect of solvent polarity on the percutaneous absorption of trichlorfon was investigated using trichlorfon solutions prepared in alcohols of graduated polarity (Table 1) and in organic solvents of various polarities (Table 2). In general, the absorption of trichlorfon, a highly polar compound, increased with decreasing polarity of the solvent. The percutaneous absorption of trichlorfon solutions prepared in mixtures of alcohols of different polarities was studied (Table 3). The authors reported that a marked increase in absorption values occurred as the amount of alcohol of low polarity was increased. The skin absorption of trichlorfon also was studied in vitro at various concentrations of compound (Figure 2). At low concentrations of trichlorfon (up to about 4%), the increase in absorption with increasing concentration

approached a linear curve, while from a concentration of about 5%, the shape of the curve became exponential. In vivo experiments: Trichlorfon experiments also were carried out in vivo using cattle and sheep. Blood levels of trichlorfon were measured in these animals following a pour-on application of several different formulations of ^{32}P-labeled trichlorfon. No experimental details were given by the authors. The results showed that blood levels of trichlorfon varied following application of different formulations of trichlorfon.

(10) DISCUSSION: The data reported in this paper are accompanied by only minimal information (in some instances, no information) on experimental protocols, methods of analysis, number of determinations, etc. Although the authors reported means ±standard errors for the results, no confidence limits are given; therefore, the statistical significance of the apparent difference in trichlorfon absorption cannot be deduced.

The authors' conclusion that the percutaneous absorption of trichlorfon increases with decreasing polarity of the solvent in which it is applied is not supported by the data in Table 3. The results in Table 3 indicate that the same amount of trichlorfon is absorbed (5,000 $\mu g/cm^2$) whether the compound is formulated in propanol, hexanol, nonyl alcohol, or dedecyl alcohol.

The authors presented their data so that one is led to believe they are biased in the interpretation of the results. The paper contains vague generalities and deductions that are not supported by data in this paper or by references to published literature.

(11) TECHNICAL REVIEW TIME: 6.5 hours