TDMS0030 DATA EVALUATION RECORD PAGE 1 OF

CASE GS0014 ENDOSULFAN STUDY 118 PM 11.0 08/20/80

CHEM 079401 ENDOSULFAN

BRANCH EFB DISC 30 TOPIC 1010

FORMULATION 00 = ACTIVE INGREDIENT

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STRACHAN, W.M.J.; HUNEAULT, H. (1979) POLYCHLORINATED BIPHENYLS AND ORGANOCHLORINE PESTICIDES IN GREAT LAKES PRECIPITATION. JOURNAL OF GREAT LAKES RESEARCH 5(1):61-68.

SUBST. CLASS = S.

DIRECT RVW TIME = 8 (MH) START-DATE END DATE

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CONCLUSION:

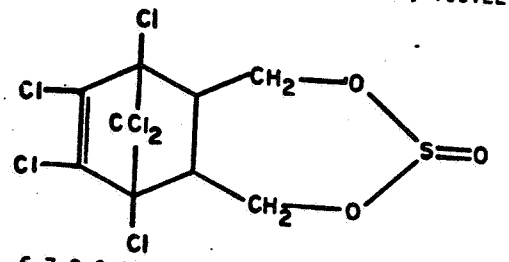
Mobility - Volatilization

1. This study is scientifically valid.

2. α- and β-endosulfan were detected in 36 and 52% of the 50 rainfall samples collected from the Great Lakes region of Ontario in 1976 with mean concentrations of 1.5 and 4.9 ppt, respectively. Traces of β-endosulfan were detected in some snow samples. Endosulfan, rendered atmospheric by volatilization and/or adsorption to airborne particulate matter, may migrate in air currents and will pollute terrestrial and aquatic environments carried by precipitation.

MATERIALS AND METHODS:

ENDOSULFAN, BENZOEPIN, BEOSIT, CHLORTIEPIN, CYCLODAN, INSECTOPHENE, MALIX, THIFOR, THIMUL, THIODAN, THIONEX, THIOSULFAN, TIONEL, TIOVEL



6,7,8,9,10,10-Hexachloro-1,5,5a,6, 9,9a-hexahydro-6,9-methano-2,4, 3-benzodioxathiepin-3-oxide

Rain and snow samples were collected from the Great Lakes region of Ontario, Canada, in 1976. Rain samples were collected in square stainless steel "funnels" with necks fitted into brown glass jars. After each rainfall the glass jar was replaced. The snow samples were collected by taking a uniform column of snow ($\sim$250 cm^2) extending as close to the ground as possible with a thin aluminum sheet. The samples were then transferred to a glass bottle and allowed to melt prior to analysis.

Each sample (rain or melted snow) was added to a column of XAD-2 resin. The adsorbed organics were eluted from the column with ether and benzene, and the eluent was reduced to 1 ml of isooctane solution. High-pressure liquid chromatography (HPLC) was performed by injecting 1-ml extracts onto a stainless steel column packed with Porasil A. Four successive solvent fractions of varying polarity (isooctane, 20% benzene in isooctane, benzene, and finally isooctane) were collected. The cleaned up extracts were then analyzed by gas chromatography (three columns of varying polarity) using an electron-capture detector. Recovery rates were 80-100%. The quantification limit was 1 ng/l (1 ppt) for both α- and β-endosulfan. The minumum level detectable but not quantifiable was 0.2 ppt.

REPORTED RESULTS:

α-Endosulfan and β-endosulfan were found in 36 and 52% of the 50 rainfall samples at mean concentrations of 1.5 and 4.9 ppt, respectively. Maximum concentrations found were 15 ppt for α-endosulfan and 45 ppt for β-endosulfan. α-Endosulfan residues were not detected in any of the snow samples. Mean β-endosulfan concentrations for all 17 snow samples were nondetectable; however, the compound was detected at 0.1 ppt in snow samples from Eastern and Central Ontario.

DISCUSSION:

Commercial endosulfan is commonly a 7:3 mixture of α- and β-endosulfan; however, the ratio of α- and β-endosulfan in the rain samples was 1.5:4.9. This suggests that β-endosulfan may be more volatile or more table (persistent) than α-endosulfan.