



Current Report

Dioxin

ONE DOSE OF TAINTED SOIL HARMS ANIMALS; INGESTION POSES HUMAN HAZARD, NTP REPORT SAYS

RESEARCH TRIANGLE PARK, N.C. — (By a BNA Staff Correspondent) — Soil contaminated with 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) "presents a potential hazard to humans if ingested," based on the results of a study released by the National Toxicology Program.

NTP scientists, using soil samples from Times Beach, Mo., demonstrated that soil containing TCDD is absorbed in the gastrointestinal tract of rats and guinea pigs and causes significant adverse health effects after only one dose.

Humans ingest "significant amounts" of dirt from contaminated foods, hands, and other sources, according to the report. Children also may swallow dioxin-contaminated soil while playing, it continued.

Results of the bioavailability studies were described in a report and background statement released Nov. 10. NTP later attempted to withdraw the report and the statement in order to publish them in a scientific journal.

Binds to Soil

Some scientists had assumed that areas contaminated with dioxins are relatively safe since TCDD binds tightly to soil. The NTP study showed, however, "that significant amounts of TCDD are absorbed if soil contaminated with dioxins is ingested," according to the background statement.

Scientists at the National Institute of Environmental Health Sciences administered by gavage dioxin-contaminated soil from two Missouri sites to Hartley guinea pigs and to Sprague-Dawley rats.

The samples were collected by the Environmental Protection Agency from Times Beach soil which was contaminated by waste oil containing TCDD and other chlorodibenzo-*p*-dioxins (CDDs). Samples also came from the Minker-Stout site, two homes in the area where soil contaminated with TCDD had been deposited.

The guinea pig was selected for the study because of its "exquisite sensitivity" to CDDs, and the rat was chosen because CDDs induce arylhydrocarbon hydroxylase (AHH), a liver enzyme, in that species at low doses. AHH induction is one of the most sensitive and well-characterized indicators of TCDD exposure in rats, according to the report.

Guinea Pig Study

In the guinea pig study, a TCDD-contaminated mixture containing equal amounts of soil and water was administered to males by gavage at doses of 0, 1, 3, and 10 micrograms of TCDD per kilogram body weight. The soil samples contained 0, 770, or 880 parts per billion (ppb) of TCDD. For comparison, pure TCDD in corn oil was given at levels of either 0, 1, or 3 micrograms per kilogram.

The guinea pigs were given a single dose, then observed for 30 days. Toxic effects were observed in the spleen, adrenal glands, bone marrow, testicles, and bladder of dosed guinea pigs, but not in controls receiving uncontaminated soil. The changes were similar to those seen in the guinea pigs exposed to oral doses of pure TCDD.

Rat Study

In the rat study, groups of females were exposed to a single dose of TCDD-contaminated soil or to TCDD in corn oil, then were sacrificed six days later. Controls were fed uncontaminated Times Beach soil.

TCDD was administered in corn oil at doses of 0, 0.04, 0.2, 1, and 5 micrograms per kilogram of body weight. Soil samples were calculated on a contamination level of 880 ppb.

A 40-fold increase in the production of liver enzymes was observed in dosed rats. The increase indicates that ingested TCDD-contaminated soil produces the same changes in animals that are seen when pure TCDD is given by the oral route, according to NTP.

A four-fold increase in enzyme activity was seen in rats fed contaminated soil at the lowest dose of 0.04 micrograms per kilogram.

The studies indicate that TCDD in dirt is biologically available in two animal species using two different measurements — clinicopathological syndrome in guinea pigs and hepatic enzyme induction in rats, the report concluded.

Formaldehyde

MIT ARTICLE CRITICIZES TODHUNTER, FAULTS AGENCY ACTIONS IN 1982 REGULATORY DECISION

Decisions not to regulate formaldehyde made by the Environmental Protection Agency and, to a lesser extent, the Occupational Safety and Health Administration failed to use sound technical reasoning and established administrative procedures, according to a Nov. 25 *Science* magazine article.

Written by the director and two staff members of Massachusetts Institute of Technology's Center for Policy Alternatives, the article specifically criticized decisionmaking steps taken by John A. Todhunter, former EPA assistant administrator for pesticides and toxic substances.

According to the magazine, Todhunter's decision not to regulate formaldehyde under the significant risk provisions of the Toxic Substances Control Act (Current Report, Feb. 19, 1982, p. 1205) was flawed because he allegedly:

- Used "methodologically inadequate epidemiologic studies;"

- Presumed site and species specificity for the substance's carcinogenicity;

- Presumed that formaldehyde's carcinogenicity was based on its irritant properties;

- Assumed that humans will avoid formaldehyde exposures above 2 parts per million; and

- Concluded that "formaldehyde exposure levels in homes with urea-formaldehyde foam insulation are no higher than those in other homes."

The authors concluded that "while we express no opinion here as to the appropriate regulatory response to formaldehyde under the Toxic Substances Control Act, it appears that section 4(f) requires something more of EPA than the agency's actions to date."

Under TSCA Section 4(f), the agency must take action under other parts of the law on chemicals which new data