

Diazinon is a commonly used organophosphate insecticide. It acts by interfering with nerve impulse transmission.

Acute Toxicity

Diazinon is very acutely toxic to mammals. It can also be effectively absorbed through the skin in lethal doses. It is highly acutely toxic to fish, birds, freshwater invertebrates, bees, and some predaceous insects. One granule of diazinon (14.3% active ingredient) killed 40% of test House Sparrows. Five granules killed 100% of test Red-winged Blackbirds.

Chronic toxicity

There is no evidence of carcinogenic effects. Based on the existing limited information on reproductive effects, it would be considered a reproductive toxin under our review criteria. The information on developmental toxicity is mixed. Older studies found specific developmental effects. Newer studies have not repeated the same effects in rats and mice. In chick embryos, vertebrae and leg formation were effected. EPA has stated there is some evidence that diazinon may be a behavioral teratogen (the evidence is not conclusive and an additional test is being required.) Positive mutagenic results have been obtained in a wide variety of test systems, with some negative results as well. Chronic effects on fish include higher incidences of scoliosis, reduced hatching, growth inhibition, and neurological symptoms at 2.4 ug/l (equivalent to parts per billion).

Environmental Fate

Diazinon is expected to be moderately mobile based on its chemical characteristics. In 30 cm soil column tests, about 33% of the applied material leached through sandy soil after application of 50.7 cm of water (most leached through after initial application of less than 30 cm water). In a field study, after application at 4-6 lb of active ingredient per acre, variable concentrations were found at 15 cm (the deepest sample taken). Another study found a maximum runoff of 17 ppb in surface water.

The half-life of diazinon in field plots of silt loam soil was 4-8 weeks. Microbial degradation is an important pathway, but chemical hydrolysis may also be significant. Volatilization should account for only minor losses. In water, the half-life was over one month.

In soil, diazinon degrades primarily into oxyprimidine, which is more persistent and more mobile than diazinon. There is little information about the toxicity of oxyprimidine. RTECS had a

single citation, of questionable significance, reporting a positive mutagenic assay testing for phage inhibition capacity in *E. coli* at 1 mg/L reported in 1972. In the body, diazinon has reportedly metabolized to hydroxydiazinon, diazoxon, hydroxydiazoxon, diethyl phosphoric acid, and oxypyrimidine. The biological half-life of diazinon varies from 7 - 12 hours in rats. Bioaccumulation ratios are generally low.

Contaminants

Contaminants of diazinon include various TEPP compounds. Sulfotepp, one of the compounds found in recent sampling of technical diazinon, is highly acutely toxic to rats (LD50 is 10 mg/kg). The high sulfotepp concentrations may be due to degradation resulting from storage and the presence of small amounts of water.

Sulfotepp is highly acutely toxic, well below the 50 mg/kg threshold identified in the policy. Little information on chronic toxicity was available, other than a single positive mutagenic test reported in RTECS (microsomal assay in *S. typhimurium* at 1 mg/plate, 1988 study).

TEPP, also found in recent sampling, is extremely acutely toxic. The oral rat LD50 is 500 ug/kg; the skin rat LD50 is 2400 ug/kg. Behavioral effects were reported in humans at 71 to 309 ug/kg.

Exposure Concerns

Diazinon is a potential dermal sensitization agent. It may be dermally adsorbed to a greater extent than other more toxic organophosphorus insecticides. A safe reentry level for grassy applications has not been determined, but will likely exceed 5 days. Diazinon was the number one cause of systemic poisoning in California and ranked fifth in terms of number of individuals hospitalized.

Conclusions

Diazinon is acutely toxic. It contains contaminants which are far more toxic. Extremely low doses of diazinon can cause lethal effects in a variety of species, including birds, predacious insects, bees, and fish. It is relatively mobile and can persist in some environments. Its degradation products are even more persistent and mobile. It has caused reproductive and mutagenic effects in lab studies and may be a developmental toxin as well.

Many of the chemicals reviewed in the past fail for one or two of the review criteria. Diazinon has several characteristics of significant concern. Given the available information, diazinon does not pass the review criteria.