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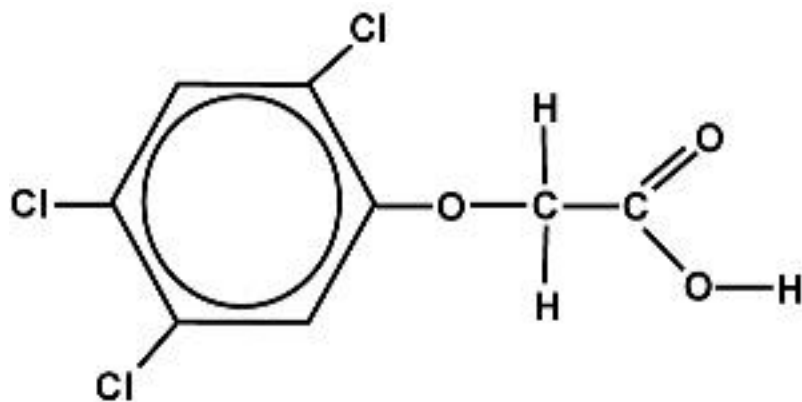
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2,4,5-T

Overview

2,4,5-Trichlorophenoxyacetic acid (2,4,5-T) is a chlorophenoxy acid herbicide that is no longer registered for use in the United States. Ester forms of 2,4,5-T and 2,4-D were used as defoliants in the Vietnam War (e.g., Agent Orange) and concern about contamination with 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) led to the discontinuation of 2,4,5-T use as an herbicide in 1985.

Chemical Description



2,4,5-T is produced commercially by condensation of sodium chloroacetate with sodium 2,4,5-trichlorophenoxide. At high temperatures the action of alkali on 2,4,5-trichlorophenol can produce some 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD, or dioxin). It is impossible for manufacturers to produce 2,4,5-T without some TCDD contamination.

Technical grade 2,4,5-T (94%) takes the form of colorless crystals. Melting point is 153-156 °C. The vapor pressure is 700 nPa at 25°C. It is sparingly soluble in water (150 mg/l), but its salts with alkali metals and amines are water soluble. Esters of 2,4,5-T are insoluble in water but soluble in oils (Rotterdam convention, Annex III).

Uses

It was used for selective control of weeds in cereal crops and lawns, nettles in pasture and woody weeds in forestry, particularly with conifers (INCHEM).

Trade names: Dacamine, Ded-Weed, Farmco Fence Rider, Forron, Inverton 245, Line Rider, T-Nox, Transamine, Brushwood Killer, Brush-Rhap, Brushtox, Esterone, Fruitone A, Reddon, Spontox, Tormona, Tributon, Veon 245, Verton 2T, Visko Rhap Low Volatile Ester, Amine 2,4,5-T for Rice, Super D Weedone, Trinoxol, Weedar, Weedone (Rotterdam convention, Annex III).

Routes of Exposure and Metabolism

The substance can be absorbed into the body by inhalation of its aerosol and by ingestion (ICSC). Once absorbed into the body, 2,4,5-T is eliminated mostly unchanged in the urine, with an elimination half-life of approximately 19 hours (CDC).

2,4,5-T on the soil may be degraded chemically or biologically, volatilized, absorbed in the soil, or leached beyond the depth of plant roots. 2,4,5-T is moderately mobile in sandy and clay soils. Half-life on grass is 8-17 days, in soils 21-24 days. Normally, only small amounts enter water, where it does not persist as it is absorbed by clay or biota within a few days. Esters of 2,4,5-T are usually hydrolyzed within a few days. There is no significant bioaccumulation (Rotterdam convention, Annex III).

Human Health Effects

Acute Health Effects

Inhalation of 2,4,5-T can cause cough and sore throat, and exposure to eyes leads to redness and pain. Ingestion results in diarrhea, drowsiness, headache, nausea, and vomiting (ICSC).

Chronic Health Effects

2,4,5-T is listed as a possible carcinogen on the IARC Carcinogens list. State of California Proposition Carcinogen List ranks 2,4,5-T as a "known" carcinogen (PANNA).

The EU lists it as endocrine disrupting chemical. Also, it is listed as a probable endocrine disruptor by the Illinois EPA (PANNA).

Environmental Health Effects

In general, the long-term ecological impact of 2,4,5-T can be considered low, but increases with the level of TCDD impurity.

2,4,5-T is phytotoxic to almost all broad-leaved crops, especially cotton, tomatoes, ornamentals, grapes, and fruit trees.

Toxicity to organisms

Fish: Eight-day dietary LC50 for bobwhite quail, 2776 mg/kg diet; LC50 for rainbow trout, 350, and for carp, 355 mg/l (96 hours). TCDD level not specified.

Birds: Low toxicity to birds.

Bees: Honey bee LD50 1.01 µg/bee in laboratory (48 hr, 65% relative humidity, 26.7°C) (Rotterdam convention, Annex III).

Precautions

Given the unavailability of 2,4,5-T, the general population is unlikely to be exposed to 2,4,5-T (CDC).

Regulation

Its international trade is restricted by the Rotterdam Convention. In the USA 2,4,5-T is regulated under Air Contaminants (Occupational and Safety Health Act), Hazardous Constituents (Resource Conservation and Recovery Act), Hazardous Substances (Superfund), Registered Pesticides (Federal Insecticide, Fungicide, and Rodenticide Act) (Chemical Profile for 2,4,5-T).

References

Rotterdam Convention. Annex III. 2,4,5-T and its salts and esters. Accessed 3/10/2011.

IPCS International Programme on Chemical Safety. Chemical Safety Information from Intergovernmental Organizations. [2,4,5-T](#)

International Chemical Safety Cards. [\(2,4,5-TRICHLOROPHENOXY\) ACETIC ACID](#). Accessed 3/10/2011.

Pesticide Action Network North America (PANNA). Pesticides Database-Chemicals. [2,4,5-T](#). Accessed 3/10/2011.

[Chemical Profile for 2,4,5-T](#). Scorecard. The pollution information site. Accessed 3/10/2011.

Center for Disease Control and Prevention (CDC). National Report on Human Exposure to Environmental Chemicals. 2,4,5-Trichlorophenoxyacetic Acid. Accessed 3/11/2011.