



ChemicalWatch Factsheet

A Beyond Pesticides/ NCAMP Factsheet

Fenthion

Fenthion (trade names include Baytex™, Baycid™, and Tiguvon™, used on livestock) was first registered domestically in 1965 by the Mobay Corp., a U.S. subsidiary of Bayer AG of West Germany. Fifty percent is used as a mosquito adulticide, but significant amounts are used on animals (mostly livestock, but also on pets) and ornamental plants. Fenthion is registered for use in non-food areas of restaurants, commercial buildings and elsewhere. In the field, fenthion can be applied aerially or by ground spray. It is also painted on perches to poison birds like starlings and blackbirds. It is possible for pet owners to obtain fenthion from veterinarians and apply it directly to pets to combat fleas.

EPA's June, 1988 Registration Standard revealed major data gaps for sub-chronic, chronic, carcinogenicity, teratogenicity, and reproductive effects. Data call-ins have been issued and most data should be in by 1990, after which EPA will need still more time for review.

However, one inadequate mouse study found increased incidences of several kinds of malignant skin tumors. Fenthion does not cause birth defects in rabbits, nor is it a mutagen. EPA has made fenthion a restricted use pesticide, for use only by certified applicators or those under their supervision, and has imposed a 24-hour reentry period for unprotected workers in treated ornamentals.

Fenthion is a moder-

sion. The World Health Organization (WHO) noted in 1976 that "symptoms after acute poisoning tend to be prolonged, [and that]...repeated exposure may produce cumulative effects on [AChE]." EPA also reviewed a National Institutes of Occupational Safety and Health (NIOSH) report on adverse neurological effects among veterinary workers thought to be caused by fenthion. However, no evidence of neurological damage was seen among hens

fed 100 mg/kg/day for 30 days. The WHO reported in 1976 that in rats, 85% of an oral dose is eliminated in seven days (urine 45% and feces 40%). The Food & Drug Administration (FDA) notes that "fenthion potentiates [enhances] the acute intraperitoneal toxicity of malathion, dioxathion, and coumaphos in rats."

EPA states, "fenthion is extremely hazardous, especially to birds and aquatic invertebrates... [and its use]...to control mosquitoes may kill fish and blue crabs." Fenthion is known to be highly toxic to honeybees. As little as 1/20 of a pound per acre can kill non-target organisms. Secondary poisonings (when carnivores eat prey) has frequently been reported among raptorial birds, and also with domestic dogs.

chemicalWATCH Stats:

CAS Registry Number: 55-38-9

Chemical Class: Organophosphate insecticide

Use: A restricted use pesticide, fenthion is used to control adult mosquitoes in Florida only and dragonfly larvae in contained ornamental fish production ponds in Arkansas, Florida, and Missouri only.

Toxicity rating: Moderately toxic

Signal Words: Warning

Health Effects: Fenthion can cause cholinesterase inhibition in humans

Environmental Effects: Fenthion is very highly toxic to birds and highly toxic to estuarine/marine invertebrates and nontarget organisms.

ately to acutely toxic organophosphate insecticide (LD50= 250-290 mg/kg), which poisons, in part, by inhibiting the essential nervous system enzyme acetylcholine esterase (AChE). Symptoms of poisoning include: sweating, headaches, weakness, nausea and vomiting, stomach pain, blurred vision, and in extreme cases muscle twitching, excessive salivation, and respiratory depres-

Plants take up fenthion and oxidize it to at least five different (and more toxic) anticholinesterase compounds, including fenoxon sulfone, which is approximately eight times more acutely toxic than fenthion itself. Although the half-life of fenthion and its metabolites is reported to be from 14-40 days in soil, it remains active indoors four to 16 months, and it could still control mosquitoes on the sides of barns after 42 weeks.

Reprinted from Volume 8, No.3, October 1988

UPDATE: *September 2007*

One carcinogenicity test on fenthion indicated that this insecticide may also be a carcinogen in male mice. However, no carcinogenic effects were observed in other 2-year feeding studies of rats and mice. Data are insufficient to permit conclusions about the carcinogenicity of fenthion to humans.

According to the Interim Reregistration Eligibility Decision (IREED) issued by the EPA in January 2001, the dietary exposures from eating food crops exposed to fenthion were above the level of concern for the entire U.S. population, including infants and children. Residential exposure to adults and children can occur because fenthion is used in mosquito control operations that involve wide area adulticide applications to residential areas in Florida (eg. at golf courses and parks).

The mosquito adulticide use of fenthion has been implicated in several bird kill incidents, including bird kills on Marco Island, Florida. All livestock products were voluntarily cancelled (by Bayer) in 2000, as well as an avicide product (Rid-A-Bird Perch), which was cancelled in 1998. As a result, both acute and chronic dietary risks associated with exposure to livestock products were eliminated.

Given the high toxicity of fenthion and potential risks posed to workers, residential bystanders, birds and aquatic invertebrates, a number of mitigation measures were proposed by the EPA in the IRED. To mitigate ecological risk, the IRED proposed to restrict the use of fenthion to certain mosquito control districts in Florida that have developed a plan to identify critical/sensitive bird habitats and endangered species in their counties and address ways to avoid exposure to these areas; only allow the highest use rate for public health use; require certain label changes to improve applications and lessen risk to non-target organisms; and require buffer zones to protect aquatic organisms, especially invertebrates. To reduce occupational exposure to fenthion, the EPA proposed that handlers use closed systems at all times, lower the application rates, except for situations of public health emergency, and eliminate the backpack sprayer method of application.

Fenthion chemicalWATCH Factsheet Bibliography

- DeWeese, L.R., et al. (1983). "Effects on birds of fenthion aerial application for mosquito control." J. Econ. Entomology 76(4):906.
- Dynamac Corp. (1987). Final report to EPA on fenthion: Product and residue chemistry chapters. Rockville, MD.
- MA Audubon Society. (1977). Statement of Dr. L.C.T. Nisbet before the MA Pesticide Control Board. July 20, 1977.
- Rattner, B.A., et al. (1983). "Osmoregulatory function in ducks following ingestion of the organophosphorous insecticide fenthion." Pest. Biochem & Physiol. 20:246-255.
- "Starling poison spreading to other wildlife," The Chicago Tribune, January 29, 1986.
- "State ban on BaytexTM extended for 180 days," The Boston Globe, July 23, 1977.
- Thomson, W.T. (1984). Agricultural Chemicals: Insecticides. Thomson Publications, Fresno, CA.
- U.S. EPA. (2001) Interim Reregistration Eligibility Decision for Fenthion. Office of Prevention, Pesticides and Toxic Substances. Washington DC
- U.S.-EPA. (1988). Guidance for the reregistration of pesticide products containing fenthion as the active ingredient. Office of Pesticide Programs. Washington, DC.
- U.S.-EPA. (1988). Science chapters on fenthion. Office of Pesticide Programs. Washington, DC.
- U.S.-EPA. (1985). Toxicology One-liner. Office of Pesticide Programs. Washington, DC.
- World Health Organization. (1976). Data sheets on pesticides: Fenthion. Geneva, Switzerland.