chemicalWATCH **Factsheet**

TRICLOPYR

Originally developed for woody plant and broadleaf weed control along rights-of-way and on industrial sites, triclopyr is also used in forest site preparation, replacing the banned 2,4,5-T. Dow registered triclopyr in 1973, and several formulations are now available. The triethylamine salt (Garlon 3A™) is used to control woody plants when applied to cut surfaces by means of tree injection, girdle, or stumpspray. The butoxyethyl ester (Garlon 4™) is used as a basal spray or in aerial applications. M4450™ contains a mixture of triclopyr and picloram, a restricted use herbicide with a history of groundwater contamination.

Structurally, triclopyr resembles 2,4,5-T and, like this phenoxy herbicide, mimics plant growth hormones called auxins, interfering with the normal plant growth response. It is readily absorbed through both roots and leaves, and translocates throughout the plant.

Triclopyr is of low to moderate acute toxicity in mammals. The rat oral LD50 for technical triclopyr is reported to be 630-720 mg/kg, and is higher, 2000-3000 mg/kg, for formulated products. Triclopyr and its products are reported to be slightly to moderately irritating to the skin. Of greatest concern, Garlon 3A™ can cause permanent impairment of vision. Effects on the eye can include severe conjunctival irritation, moderate internal redness, and moderate to severe corneal injury. Washing is not effective in preventing these effects. Garlon 4™ is not an eye irritant.

Subchronic and chronic feeding studies in dogs and rodents found kidney and liver effects.

Mutagenicity testing in bacterial systems has yielded negative results, although bacterial mutagenicity screens are thought to be invalid for predicting the carcinogenicity of chlorinated hydrocarbons. A dominant lethal test in rats indicated a weakly positive mutagenic effect, but no similar effect was seen in mice.

The two existing rodent cancer studies submitted to EPA are considered inadequate and new studies are required. However, the mouse study results show a statistically significant increase in benign pulmonary tumors, while malignant tumor increases were not statistically significant. An independent pathologist, Ruth Shearer, Ph.D., reviewed this data and noted that the dose levels used were 8-fold less than usually deemed appropriate for testing oncogenicity.

Birth defect studies on rats and rabbits showed no birth defects in pups, but the rat study reported fetotoxicity including delayed skull bone ossification. This effect may be secondary to maternal toxicity. The fetotoxic NOEL (No Observable Effect Level) in this study was 50 mg/kg, and the maternal NOEL is <50 mg/kg.

Environmental degradation of triclopyr is due primarily to photodegradation and microbial decomposition. Somewhat persistent, soil half-life is strongly dependent on specific soil type and climatic conditions. Garlon labels suggest that conifer seedlings not be planted in soil sprayed within six months, suggesting that the soil will remain toxic to conifers in that period. A Swedish study found residues persisting for 1 to 2 years, and in some cases beyond 2 years. Under favorable degradation conditions, 95˚F and high moisture, Dow reports a half-life of 46 days. The breakdown products, trichloropyridinol and trichloromethoxypyridine, are generally more persistent than the parent compound, with half-lives ranging from 8-279 days and 50-300 days respectively. The toxicity of these metabolites has not been studied.

Triclopyr is considered mobile based on its ability to desorb from soil particles and organic matter, as well as its solubility in water. While degradation is rapid in water exposed to sunlight with a reported half-life of 10 hours in 25˚C water, triclopyr is stable for up to nine months, the length of the study, in the absence of light (i.e. ground or well water). Contamination of surface waters is also a concern. Runoff-monitoring studies in Oregon found residues of 6 ppb in runoff water 5 months after treatment at 3 lb/acre.

Garlon 4™ is extremely toxic to rainbow trout and bluegills, with LC50s over 500 ppm. Studies on mallard ducks indicate triclopyr is of low acute oral toxicity, and subchronic studies on quail and ducks also report low toxicity. There are no bird field studies.

Triclopyr is on EPA's Reregistration List B. It was due to be through Phase IV, where EPA determines what data are needed for reregistration and issues Data Call In (DCI) notices to the registrants. However, EPA has missed its congressionally mandated list B Phase IV deadline of October 24, 1990 and, as of November 1990, could not say when they will meet this requirement.

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Triclopyr *chemicalWATCH* Factsheet Bibliography

EPA. 1984 Toxicology One-liner for Triclopyr. Office of Pesticide Programs. Washingtoon, DC.

Harrison-Biotect. 1983. Control of Vegetation on Utility and Railroad-Rights-of-Way. Prepared for the Commonwealth of Massachusetts Generic Environmental Impact Report. Cambridge, MA.

Personal communication with Tom Luminello. Special Review and Reregistration Division. EPA Office of Pesticide Programs. Washington, DC. 11/20/90.

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