



ChemicalWatch Factsheet

A Beyond Pesticides/ NCAMP Factsheet

PCNB

(Pentachloronitrobenzene)

In general, on a weight basis, fungicides are less commonly used around gardens than herbicides or insecticides. According to EPA statistics, only about 36,000 pounds of PCNB (pentachloronitrobenzene) are used on home lawns annually, mostly by lawn care operators. Nevertheless, most homeowners would be surprised to learn the regulatory history of this persistent pesticide.

PCNB, a heavily chlorinated, and therefore persistent pesticide, was first made in the 1930's in Germany, and was first registered in the U.S. in 1964 as a fungicide and seed protectant. It is manufactured today by Aceto Chemical, Amvac Chemical, Monsanto, Uniroyal, and Quimica Organica of Mexico. PCNB (trade names include

Terraclor™ and Earthcide™) is also used on cotton, cabbage, peanuts, for seed treatment, on seedlings, as well as on turf. Experimental use of PCNB on stored potatoes is being explored by ICI of Great Britain.

In 1977, EPA initiated a 5-year long Special Review because of data suggestive of carcinogenicity in mice. PCNB had been found to be contaminated with several by-

products and breakdown products of concern, including hexachlorobenzene (HCB) a bioaccumulative liver toxin, teratogen and probable human carcinogen (Class B2). The Special Review concluded in 1982 with the registrants' agreement to certain "risk reduction measures," consisting of label changes, elimination of certain dust formulations,

because EPA had published no risk assessment information resulting from its review, and, as part of the settlement agreement, EPA agreed to reassess its position by December 31, 1986. A 1985 data call-in asked for chronic feeding studies, residues in potatoes after processing, and validation that HCB residue reduction in PCNB products was taking place.

However, five years after the conclusion of the Special Review, according to a 1987 registration standard on PCNB, EPA had not yet received any acceptable information verifying that the 0.1% HCB limit in PCNB products has been reached. The registration standard listed numerous outstanding data gaps including: product chemistry, chronic effects and oncoge-

nicity testing in rodents, teratogenicity, environmental fate (degradation, photodegradation, aerobic and anaerobic soil dissipation, volatility, soil dissipation, accumulation in rotational crops, fish and aquatic non-targets, residue chemistry in plants, animals, birds and fish), and effects on non-target insects. Deadlines for submission of the studies ranged from 4 months to 4.5 years. The new

chemicalWATCH Stats:

Chemical Class: Organochlorine fungicide

Uses: Agriculture, Ornamental (grasses, broadleaf)

Toxicity Rating: Slightly toxic

Signal Word: Caution

Long-term Health Effects: Possible Human Carcinogen (Group C). Suspected endocrine disruptor.

Environmental Effects: Hazardous air pollutant. Highly toxic to freshwater fish and invertebrates and very highly toxic to estuarine/marine fish and invertebrates. PCNB is of particular environmental and ecological concern because of the persistence, bioaccumulative potential and potential for long-range atmospheric transport of the compound and its metabolites.

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Source: Gateway for Pesticide Hazards and Safe Pest Management

etc. Since earlier concerns about carcinogenicity were assumed to be related to extensive contamination with HCB, the manufacturer was also compelled to reduce the HCB concentration from as much as 11% before 1982 to 0.1% in 1988.

The Natural Resources Defense Council (NRDC) initiated a lawsuit against EPA at the culmination of the Special Review. NRDC filed suit

toxicology studies required are to be performed with PCNB containing no greater than 0.1% HCB impurity.

In common with most fungicides, PCNB is not acutely toxic (oral rat LD50=1200 mg/kg in oil to >12,000 mg/kg in water. The mate-

rial is, however, a skin sensitizer in animal tests and in humans, meaning that repeated exposures to small amounts may result in allergic reactions. At the high concentrations employed in animal feeding studies, however, PCNB becomes toxic to

the bone marrow and liver. PCNB impurities can accumulate in fat, and PCNB is metabolized in part to pentachlorophenol, a severely restricted and toxic wood preservative.

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Update, November 2007:

In its June 2006 Reregistration Eligibility Decision (RED), the EPA removed all turfgrass and residential ornamental use and most agricultural uses from the label of PCNB. The only uses eligible for reregistration are cole crops (for treatment of clubroot only), ornamental bulbs in commercial production, and seed treatments.

According to the RED, in February 2005 the chronic dietary risk was above the maximum acceptable dose for the population subgroups children 1-2 years old and children 3-5 years old. PCNB exposure is associated with thyroid hypertrophy and hepatocellular hypertrophy and hyperplasia in rats, and these are the primary effects used to evaluate human health risks. Because of its effects on the thyroid gland, specifically in enhancing secretion of thyroid hormone, PCNB is suspected of being an endocrine disruptor. PCNB is also classified as a possible human carcinogen (Group C). However, no evidence of significant toxicological effects have been found in developmental or reproductive toxicity studies, and no neurobehavioral changes or neuropathological effects have been found in the available data.

PCNB is regulated as one of 188 hazardous air pollutants by the 1990 Clean Air Act, and the EPA is working with State and local agencies to implement control measures and prioritize further research on the chemical. California lists PCNB as a toxic air contaminant, and so the state is evaluating potential control measures for the pollutant and fostering public awareness of potential exposures and control measures.

PCNB *chemicalWATCH* Factsheet Bibliography

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