

Chloropicrin (*Trichloronitromethane*)

Chloropicrin is a nonselective preplant soil fumigant with fungicidal, herbicidal, insecticidal and nematicidal properties. It is added as a warning agent to the odorless preplant soil fumigant methyl bromide and indoor fumigant sulfuryl fluoride. Chloropicrin is also used as an antimicrobial to control internal wood decay in wood poles, timber and glued laminated beams. In 2009, a total of 5,685,770 pounds of chloropicrin was used in California. Chloropicrin-containing products are registered as preplant fumigants for various crops such as asparagus, broccoli, carrots, cauliflower, celery, eggplant, grapes, lettuce, melons, onions, peppers, pineapple, potatoes, raspberries, strawberries, tomatoes, floral crops, nursery crops, and tree fruit and nut crops.

A sensory irritant to the nose, eye, throat and upper respiratory tract, chloropicrin is a gas at room temperature and standard pressure. As a preplant soil fumigant it is either injected into the soil or applied via drip irrigation. Chloropicrin has the potential to move off-site following field applications; exposure may therefore occur to individuals located near treated sites, as well as to pesticide applicators.

Chloropicrin passed the animal data screen, underwent a preliminary toxicological evaluation, and is being brought to the Carcinogen Identification Committee for consultation. This is a compilation of the relevant studies identified during the preliminary toxicological evaluation

Epidemiological data

No cancer epidemiology studies were identified.

Animal carcinogenicity data

- Long-term inhalation studies
 - 78-week studies in male and female CD-1 mice: Burleigh-Flayer *et al.* (1995), as reviewed by CDPR (2010)
 - *Increase in lung adenoma in females (by trend) and combined adenoma and carcinoma (by pairwise comparison and trend)*
 - *No treatment-related tumor findings in males*
 - 107-week studies in male and female CD rats: Burleigh-Flayer and Benson (1995), as reviewed by CDPR (2010)
 - *No treatment-related tumor findings in males or females*

- Long-term gavage studies
 - Male and female B6C3F₁ mice (78-week exposure and additional 13-week observation): NCI (1978)
 - *No treatment-related tumor findings in males or females*
 - Male and female Osborne-Mendel rats (cyclic on/off pattern of exposure for 78 weeks, with additional 32-week observation): NCI (1978)
 - *No treatment-related tumor findings in males or females*
 - *High incidences of early deaths were observed in treated rats of both sexes, and NCI noted that the short survival time of the dosed animals did not permit an evaluation of carcinogenicity*
 - 104-week study in male and female Sprague-Dawley rats: Slauter (1995), as reviewed by CDPR (2010)
 - *Increase in mammary fibroadenoma (by pairwise comparison and trend)*

Other relevant data

- Genotoxicity
 - As reviewed in CDPR (2010)
 - Reverse mutation assay in *Salmonella typhimurium* (positive and negative)
 - Reverse mutation assay in *Escherichia coli* (positive)
 - Mouse lymphoma TK^{+/-} assay (negative)
 - Sex-linked recessive lethal assay in *Drosophila* (positive and negative)
 - *Drosophila* wing-spot test for loss of heterozygosity (negative)
 - Chromosome aberrations in Chinese hamster ovary (CHO) cells (positive), cultured human lymphocytes (negative)
 - Sister chromatid exchange in cultured human lymphocytes (positive)
 - *In vitro* micronucleus assay in peripheral blood erythrocyte, TK6 cells (negative), human lymphocytes (negative)
 - *In vivo* micronucleus assay in mice (negative), newt larvae (negative)
 - Unscheduled DNA synthesis in rat primary hepatocytes with *in vivo* or *in vitro* exposure (negative)
 - DNA damage in *E. coli* SOS chromotest (positive), CHO cells (positive), TK6 cells (positive)

References¹

California Department of Pesticide Regulation (CDPR, 2010). Evaluation of Chloropicrin as a Toxic Air Contaminant. Part B: Human Health Assessment, Medical Toxicology Branch, CDPR, California Environmental Protection Agency, February 2010.

National Cancer Institute (NCI, 1978). *Bioassay of Chloropicrin for Possible Carcinogenicity CAS No. 76-06-2*. Technical Report Series No. 65. NCI, Public Health Service, U.S. Department of Health, Education, and Welfare, Bethesda, MD. NTIS No. PB 282 311.

¹ Excerpts or the complete publication (presenting epidemiology or toxicology information) have been provided to members of the Carcinogen Identification Committee, in the order in which they are discussed in this document.