

Dicofol

Dicofol is an organochlorine miticide that is used on a wide variety of crops, including cotton, citrus, tree nuts, beans, apples, stonefruit, cucurbits, wine grapes, strawberries, mint, and peppers. It is moderately persistent in the environment (U.S. EPA, 1998, p. 74). Workers involved in the manufacture and application of dicofol, and those working in fields treated with dicofol, may be exposed. People that live in the vicinity of agricultural application sites may be exposed. Exposures to the general public may occur through consumption of treated produce.

Dicofol passed the human 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

- Case control study
 - Population-based case-control study of early childhood cancer (age 0-4 years) among California children born between 1990 and 1997: Reynolds *et al.* (2005a)
- Ecologic study
 - Childhood lymphoma and acute lymphoblastic leukemia in California and neighborhood pesticide use: Reynolds *et al.* (2005b)

Animal carcinogenicity data

- Long-term diet studies in mice
 - Male and female B6C3F₁ mice (78 week treatment period + 14-15 weeks on control diet): NCI (1978)
- Long-term diet studies in rats
 - Male and female Osborne-Mendel rats (78 week treatment period + 34 weeks on control diet): NCI (1978)
 - Male and female CRL:CD BR rats (two-year exposure): as reviewed in U.S. EPA (1998, pp. 13-14)

Other relevant data

- Genotoxicity
 - *Salmonella* mutagenicity assay: Mortelmans *et al.* (1986)
 - Reviews: IARC (1983, p. 95), U.S. EPA (1998, pp. 17-18)

- Hormonal Effects
 - Inhibition of adrenocorticotrophic hormone (ACTH) stimulated cortisol release: U.S. EPA (1998, pp. v, 13)
 - Alterations in the estradiol:testosterone ratio: U.S. EPA (1998, p. 19-20)
- Mechanistic studies
 - Inhibition of gap junction intercellular communication: Flodström *et al.* (1990)
 - Altered hepatic foci: Flodström *et al.* (1990)
- Structure activity considerations
 - Structural analog of DDT, a Proposition 65 carcinogen: U.S. EPA (1998, p. 10)
 - Structurally similar to other organochlorine pesticides, including:
 - Methoxychlor,¹ a chemical with positive evidence of carcinogenicity: U.S. EPA (1998, p. 2)
 - The following Proposition 65 carcinogens: lindane, dieldrin, chlordane, heptachlor, aldrin, chlordecone (kepone), and toxaphene: U.S. EPA (1998, p. 2)

Reviews

- IARC (1983)
- US EPA (1998)

References²

Flodström S, Hemming H, Wärngård L, Ahlborg UG (1990). Promotion of altered hepatic foci development in rat liver, cytochrome P450 enzyme induction and inhibition of cell-cell communication by DDT and some structurally related organohalogen pesticides. *Carcinogenesis* **11**(8):1413-7.

International Agency for Research on Cancer (IARC, 1983). *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Miscellaneous Pesticides.* Volume 30. IARC, Lyon, France.

Mortelmans K, Haworth S, Lawlor T, Speck W, Tainer B, Zeiger E (1986) Salmonella mutagenicity tests: II. Results from the testing of 270 chemicals. *Environ Mutagen* **8**(Suppl 7):1-119.

¹ See material prepared for this chemical, also in this CIC consultation package

² Copies of these listed references, as either the abstract, the relevant sections of the publication, or the complete publication, have been provided to members of the Carcinogen Identification Committee. These references have been provided in the order in which they are discussed in this document.

National Cancer Institute (NCI, 1979). *Bioassay of dicofol for possible carcinogenicity*. Technical Report Series No. 90. National Institute of Health, Public Health Service, U.S. Department of Health, Education, and Welfare.

Reynolds P, Von Behren J, Gunier RB, Goldberg DE, Harnly M, Hertz A (2005a). Agricultural pesticide use and childhood cancer in California. *Epidemiology* **16**(1):93-100.

Reynolds P, Von Behren J, Gunier RB, Goldberg DE, Hertz A (2005b). Agricultural pesticides and lymphoproliferative childhood cancer in California. *Scand J Work Environ Health* **31**(suppl 1):46-54.

U.S. Environmental Protection Agency (U.S. EPA, 1998). Reregistration Eligibility Decision (RED) for Dicofol. EPA 738-R-98-018. Prepared by Office of Prevention, Pesticides and Toxic Substances, Washington, DC.