

Acephate

O,S-Dimethyl acetylphosphoramidothioate

Acephate is an organophosphate insecticide used on a variety of crops, including lettuce, celery, peppers, cotton, and beans. It is also used to control ants, wasps, cockroaches, earwigs and other insects in and around residences, institutions, and other buildings. Exposure may occur to agricultural workers, pesticide applicators and consumers using the insecticide, and the general public as a result of residential application and ingestion of residues present in food and water.

Acephate 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

- 105-week feeding studies in mice
 - Male and female CD-1 mice: as reviewed in U.S.EPA (2003), CDPR (2008)
 - *Increase in hepatocellular adenoma and carcinoma (combined) in females (by pairwise comparison and trend)*
 - *No treatment-related tumor findings in males*
- 28-month feeding studies in rats
 - Male and female Charles River Sprague-Dawley rats: as reviewed in CDPR (2008), U.S. EPA (2003)
 - *Increase in adrenal medullary adenoma and carcinoma (combined) (pheochromocytomas) in males (by pairwise comparison)*
 - *No treatment-related tumor findings in females*

Other relevant data

- Genotoxicity
 - Mutagenicity in *Salmonella typhimurium* reverse mutation (*positive and negative*) and *E. coli* (*positive*) assays: Hanna and Dyer (1975); Moriya *et al.* (1983); CDPR (2008)
 - Mutagenicity in *Saccharomyces cerevisiae* reverse mutation and mitotic recombination assays (*positive*): CDPR (2008)

- Mutagenicity in mouse lymphoma cell assays (*positive*): U.S. EPA (2003); CDPR (2008)
- Sister chromatid exchange (SCE) in Chinese hamster ovary cells (*positive*), mitotic recombination in *Saccharomyces* (*positive*): U.S. EPA (2003); CDPR (2008)
- Unscheduled DNA synthesis in human fibroblasts *in vitro* (*positive*): CDPR (2008)
- *In vivo* tests in mice, including bone marrow chromosome aberrations (*positive*) and sister chromatid exchange (*negative*), micronucleus (*positive and negative*), dominant lethal tests (*positive and negative*), and somatic cell mutations (*negative*): Behera and Bhunya (1989); CDPR (2008)
- *In vivo* tests in monkeys, including SCE and chromosome aberrations in peripheral lymphocytes (*negative*): CDPR (2008)
- BALB/c 3T3 cell transformation (*positive*): Perocco *et al.* (1996)

Review

- U.S. EPA (2003)

References¹

Behera BC, Bhunya SP (1989). Studies of the Genotoxicity of asataf (acephate), an organophosphate insecticide, in a mammalian *in vivo* system. *Mutat Res* **223**:287-293.

CDPR (2008). *Acephate Risk Characterization Document (draft)*. Medical Toxicology Branch, California Department of Pesticide Regulation, California Environmental Protection Agency. May 8, 2008.

Hanna PJ, Dyer KF (1975). Mutagenicity of organophosphorus compounds in bacteria and *Drosophila*. *Mutat Res* **28**:405-420.

U.S. Environmental Protection Agency (U.S. EPA, 2003). Integrated Risk Information System (IRIS). <http://toxnet.nlm.nih.gov> (assessed on March 5, 2009).

Moriya M, Ohta T, Watanabe K, Miyazawa T, Kato K, Shirasu Y (1983). Further mutagenicity studies on pesticides in bacterial reversion assay systems. *Mutat Res* **116**:185-216.

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

Perocco P, Ciello CD, Colacci A, Pozzetti L, Paolini M, Cantelli-Forti G, Grilli S (1996). Cytotoxic activity and transformation of BALB/c 3T3 cells in vitro by the insecticide acephate. *Cancer Lett* **106**:147-153.