



ALDICARB

FACT SHEET ON A DRINKING WATER CHEMICAL CONTAMINANT

GENERAL INFORMATION

Synonyms:

- Trade Name: Temik
- Other names: Carbamyl; Carbanolate; Union Carbide 21149; ENT-27093; OMS 771

Chemical Description:

- Carbamate pesticide which is extremely toxic to both humans and animals; aldicarb sulfoxide and sulfone are the two major metabolites of aldicarb degradation

Properties:

- White crystalline solid with slightly sulfurous odor
- Highly soluble in water and most organic solvents
- Very low vapor pressure

Production and Use:

- Used as an insecticide, acaricide, and nematocide for numerous crops
- Used primarily on cotton and potatoes, generally drilled into the soil during planting or during various stages of plant growth

ENVIRONMENTAL PROFILE

Occurrence:

- Results of the 1990 National Pesticide Survey (NPS) indicate that Aldicarb and its metabolites were not present in any rural drinking water wells nor in any Community Water System (CWS) wells
- New York, Florida, Wisconsin, Maine and several other states have restricted its use based upon its potential for ground water contamination

Releases:

- Enters surface water as a result of runoff from treated fields, and enters ground water by leaching of treated crop soils
- May enter ground water from direct entry into a well through accidental chemical spills or improper storage near a well

Environmental Fate:

- **Moderately persistent in the environment:**
 - aldicarb is not likely to volatilize significantly

from surface waters, but is likely to an important removal process from soil

- aldicarb degrades in soil and water under aerobic conditions to the sulfoxide and the sulfone
- aldicarb and its metabolites will be highly mobile in soil, with a high potential to migrate to groundwater
- aldicarb is metabolized rapidly by plants after application to the sulfoxide and then, more slowly, to the sulfone
- aldicarb and its metabolites are degraded by hydrolysis over months or years in most ground and surface waters, but may be more rapid in alkaline environments
- Aldicarb has a low bioaccumulation potential

HEALTH EFFECTS

Humans:

- Occupational exposures and laboratory studies indicate that aldicarb and its metabolites inhibit plasma, erythrocyte (RBC), and brain cholinesterase (ChE) activity
 - symptoms of ChE inhibition include gastrointestinal disturbance, blurred vision, excessive salivation, dehydration, disorientation, seizures, unconsciousness, irregular heartbeat, and sometimes death
- rapid and complete recovery within several hours after exposure has ceased is common

Experimental Animals:

- Results of lethal dose studies indicate that aldicarb has the highest acute toxicity of any widely used insecticide
- Short-term, high-dose studies indicate:
 - principle toxic effect of aldicarb and its metabolites is inhibition of ChE activity
 - absorbed readily and almost completely through the gut; also absorbed through skin
 - rapidly metabolized to aldicarb sulfoxide and then more slowly to aldicarb sulfone
- Long-term, high-dose exposures resulted in symptoms indicative of ChE activity inhibition; neither aldicarb nor its metabolites cause chronic effects
- No conclusive evidence of mutagenicity
- No adverse reproductive, teratogenic, or carcinogenic effects have been demonstrated

REGULATORY PROFILE

Existing Standards:

- **Clean Air Act (CAA):** Not regulated
- **Clean Water Act (CWA):**
No criteria established
- **Resource Conservation and Recovery Act (RCRA):**
Hazardous waste
- **Superfund (CERCLA):**
 - Hazardous substance
 - **SARA:** Not regulated
- **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):**
Registered
- **Toxic Substances Control Act (TSCA):**
Not regulated

HEALTH INFORMATION

Maximum Contaminant Level Goals (MCLG):

- Non-enforceable levels based solely on an evaluation of possible health risks and exposure, and taking into consideration a margin for public safety
- Set at 0.001 mg/L (aldicarb, aldicarb sulfoxide, aldicarb sulfone) to protect against damage to the nervous system

MCLG for Aldicarb = 0.001 mg/L

MCLG for Aldicarb sulfoxide = 0.001 mg/L

MCLG for Aldicarb sulfone = 0.001 mg/L

(all values effective July 1992)

Maximum Contaminant Levels (MCL):

- Legally enforceable levels for contaminants in public drinking water supplies
- Based on health risks associated with the contaminants, analytical methods for their assay, and water treatment feasibility and practicality aspects
- Exceedance of the MCL in drinking water may result in adverse effects which will depend upon the contaminant concentration in water, amount of water/contaminant ingested, length of exposure, and other biological parameters

MCL for Aldicarb = 0.003 mg/L

MCL for Aldicarb sulfoxide = 0.004 mg/L

MCL for Aldicarb sulfone = 0.002 mg/L

(all values effective July 1992)

EPA Health Advisories (HA):

- **Short-term HAs:** Provide acceptable concentrations of contaminants in water for up to 10 day exposures, primarily to evaluate the public health risk resulting from an accidental spill or an emergency contamination situation

- **Longer-term HAs:** Provide guidance for persistent water contamination situations to cover a period of up to 7 years.
- **Lifetime HAs:** Derived in the same way as an MCLG

Health Advisories:

Short-term HA for a child = 0.002 mg/L

Longer-term HA for a child = 0.002 mg/L

Longer-term HA for an adult = 0.001 mg/L

Lifetime HA = 0.001 mg/L

ANALYTICAL METHODS

- Direct Aqueous Injection HPLC with Post-Column Derivatization
EPA Method 531.1

WATER TREATMENT

Permanent Treatment:

- **Best Available Technology (BAT):**
 - Granular Activated Carbon

SHORT-TERM HAZARD ELIMINATION

- If the drinking water standards are exceeded, install BAT or use an alternative drinking water supply such as bottled water

ADDITIONAL HELP

- State or county health officials can indicate a certified laboratory for testing
- Experts in the state Department of Environmental Protection, Natural Resources, or Agriculture may also be of help
- The EPA has toll-free numbers for further information on drinking water quality, treatment technologies, for obtaining Health Advisories, and for other regulatory information
- EPA Hotlines are available Monday through Friday
 - **Safe Drinking Water:** 800-426-4791
 - **National Pesticides:** 800-858-7378
 - **Superfund/RCRA:** 800-424-9346
- For information on the Clean Water Act, call (202) 260-7301
- For information on the Toxic Substances Control Act, call (202) 554-1404
- For information on the Clean Air Act, call (919) 541-2777