

# METALDEHYDE

## Just the facts

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### Physical Information

Common Name: Metaldehyde

Chemical Name: 2,4,6,8-tetramethyl-1,3,5,7-tetraoxycyclooctane

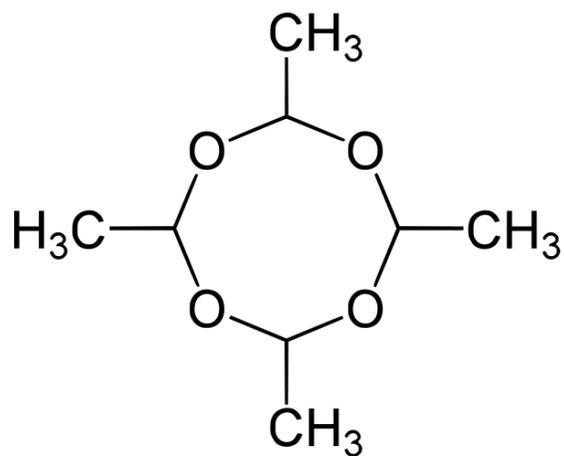
Molecular Weight: 176.20

CAS Registry Numbers: 9002-91-9 (monomeric form), 108-62-3 (polymeric form)

Regulatory facts: reregistered for use in 2006

### Chemical Structure

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Structure received from [Wikimedia Commons](#)

## Overview

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**Metaldehyde** is a contact and systemic molluscicide used to both attract and kill slugs and snails in agricultural settings. First registered in 1967, metaldehyde is currently used for a wide range of agricultural crops, as well as in household settings . The compound is a pure tetramer that forms colorless and tasteless white crystals, which give metaldehyde the appearance of a powder. The WHO has classified metaldehyde as a class II toxin, and therefore it can be moderately hazardous for acute health effects (#PAN). Reported cases of metaldehyde poisoning via ingestion are characterized by convulsions and depression of the central nervous system. According to the EPA, major gaps in the toxicological literature make a full assessment of the risks presented by metaldehyde impossible.

## Uses

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Metaldehyde is used as a molluscicide, especially against slugs and snails. Some common trade names of the compound include, but are not limited to, the following: Antimillace, Ariotox, Deadline, Halizan, Limatox, Namekil, and Slug-Tox. Metaldehyde is used for a range of agricultural products: ornamental greenhouse crops, fruit trees, small-fruit plants, avocado and citrus orchards, and berry plants. The chemical is also applied to a number of commercial vegetable crops: artichokes, broccoli, cauliflower, lettuce, cabbage, and tomatoes. The chemical is applied to the sediment around these crops, typically through sprays, pastes, foams, particulates, or protein baits. As metaldehyde is effective by both ingestion and absorption through the skin, it can also be used on the target organisms' migratory routes away from crop. It can be formulated with or without [calcium arsenate](#) and is also available in a mixed formulation with [Thiram](#). Metaldehyde is also used in tablet form, substituting for alcohol, as a solid fuel source for small heaters and fire starters.

## Pharmacology and Metabolism

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Metaldehyde can be absorbed gastrointestinally into the bloodstream or through contact with an organism's skin and lungs. The most common route of human exposure is through the ingestion of fuel tablets or inhalation of the fumes from fire-starters containing metaldehyde; there have been several documented cases of children ingesting these pellets. Upon entering the body, metaldehyde decomposes into acetaldehyde, which can cross the blood-brain barrier. This is the likely cause of the chemical's effect

on the mental states of several animals (#EXTOXNET).

From the [International Program on Chemical Safety Report](#):

*"The toxicologically active substance in metaldehyde intoxication is mainly the degradation product acetaldehyde, which is formed at a low pH in the stomach. Other toxic products are probably also formed. Acetaldehyde acts as a releasing factor for 5-hydroxytryptamine (5-HT) and noradrenaline (NA). It also competitively inhibits biogenic amine oxidation which, in turn, decreases 5-hydroxyindoleacetic acid (5-HIAA), a metabolite of 5-HT by competitively inhibiting 5-HT-oxidation. Acetaldehyde also increases monoamine oxidase activity and decreases central serotonin levels (Booze & Oehme, 1985)."*

## Health Effects

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Although metaldehyde is not thought to be carcinogenic by several standards, the EPA has categorized the chemical as suggestive of such (#PAN). It is not listed as an endocrine disruptor nor has been found to be reproductively and developmentally toxic, but data suggest that the decomposition of metaldehyde to acetaldehyde could be responsible for effects on the central nervous system . Laboratory studies of mice, for example, have demonstrated metaldehyde to be a [neurotoxicant](#) that may cause [central nervous system](#) depression, convulsions, and violent muscular contractions that lead to fractured or dislocated vertebrae. Mice that were given an oral dose of 1000 mg/kg died within two hours of exposure. Mild poisoning doses in cattle, horses, and dogs has been found to produce salivation, ataxia, hypernea, convulsions, and further muscle spasms.

### Acute Human Effects

<b>Oral LD50</b>
<b>Estimated minimum oral LD human</b> = 50-500 mg/kg
<b>Rat:</b> 227-690 mg/kg b.w.
<b>Mouse:</b> 200 mg/kg b.w.
<b>Guinea pig:</b> 175 - 700 mg/kg b.w.
<b>Rabbit:</b> 290 - 1250 mg/kg b.w.

*"The following relationships between clinical effects and ingested dose have been suggested: salivation,*

*facial flushing, fever, abdominal cramps, nausea, and vomiting from a "few" mg/kg; drowsiness, tachycardia, spasms, irritability, salivation, abdominal cramps, facial flushing, and nausea from up to 50 mg/kg; ataxia and increased muscle tone from 50-100 mg/kg, convulsions, tremor, and hyperreflexia from 100-200 mg/kg; and coma and death from about 400 mg/kg."*

## **Environmental Effects**

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Metaldehyde does not present a direct environmental risk to water and soil quality; the compound has a half-life of only several days in soil and is soluble in water. Because it rapidly decomposes to acetaldehyde, it is not persistent in groundwater either. However, metaldehyde does pose risks to the health of wildlife.

In addition to laboratory studies on mice and rats, data indicate that the compound is toxic to various other organisms. Although LD50 values, the median lethal dosages, are unavailable for birds, several cases of death have been reported for birds feeding in metaldehyde-treated areas. Likewise, poultry living in exposed areas have shown tremors, muscle spasms, difficulty breathing, and diarrhea. Metaldehyde does not seem to affect aquatic. Pelleted baits have been reported to be toxic to multiple organisms. Likewise, these baits are appealing to dogs, and therefore numerous agencies recommend that pets be confined during the application of the chemical.

Source : <http://www.toxipedia.org/display/toxipedia/Metaldehyde>