United States
Environmental Protection
Agency

Office of Pesticides and Toxic Substances
Office of Pesticide Programs (TS-766C)
Washington, DC 20460

EPA

Pesticide Fact Sheet

Name of Chemical: Lead arsenate
Reason for Issuance: Special review
Date Issued: December 1986
Fact Sheet Number: 112

1. DESCRIPTION OF CHEMICAL

Common Name: Lead Arsenate

Chemical Name: Acid Orthoarsenate - $PbHAsO_4$
Basic Orthoarsenate - $Pb_4(PbOH)(AsO_4)_3$

Trade Name: Lead Arsenate, Gypsine, Security, Talbot

EPA Shaughnessy Code: Standard (Acid) 013502
Basic 013503

Chemical Abstracts Service (CAS) Number: 7778-40-9

Year of Initial Registration:

Pesticide Type: Growth Regulator, Insecticide, Herbicide, and Fungicide

Chemical Family: Inorganic Arsenicals

U.S. and Foreign Producers: Mechema Chemicals Ltd. (Great Britian),

2. USE PATTERNS AND FORMULATIONS

Lead arsenate is currently used as a growth regulator on 17% of the U.S. grapefruit crop. 10,000 pounds of lead arsenate are also used annually to control cockroaches, silverfish and crickets. The Agency is unaware of any current use as a foliar insecticide or as a herbicide.

- Types and Methods of Application: Airblast sprayer, foliar aerial dust, bait box.

- Application Rates: Growth Regulator - 1.3 lbs arsenic/A
Foliar Insecticide - 1.7 lbs arsenic/A

Types of Formulations: Dust, flowable liquid, wettable powder, granular, impregnated, wettable powder/dust

3. SCIENCE FINDINGS

° Chemical Characteristics

Lead arsenate is a pentavalent form of inorganic arsenic. It normally exists as white crystals with no discernable odor. Lead arsenate contains 22% arsenic and is very slightly soluble in cold water. The melting point of lead arsenate is 1042°C, the density is 7.80 and the molecular weight is 347.12. Technical lead arsenate consists of 95-98% lead arsenate. Under most conditions basic lead arsenate is more stable than acid lead arsenate.

° Toxicological Characteristics

Inorganic arsenical compounds have been classified as Class A oncogens, demonstrating positive oncogenic effects based on sufficient human epidemiological evidence.

Inorganic arsenicals have been assayed for mutagenic activity in a variety of test systems ranging from bacterial cells to peripheral lymphocytes from humans exposed to arsenic. The weight of evidence indicates that inorganic arsenical compounds are mutagenic.

Evidence exists indicating that there is teratogenic and fetotoxic potential based on intravenous and intraperitoneal routes of exposure; however, evidence by the oral route is insufficient to confirm lead arsenate's teratogenic and fetotoxic effects.

Inorganic arsenicals are known to be acutely toxic. The symptoms which follow oral exposure include severe gastrointestinal damage resulting in vomiting and diarrhea, and general vascular collapse leading to shock, coma and death. Muscular cramps, facial edema, and cardiovascular reactions are also known to occur following oral exposure to arsenic.

° Environmental Characteristics: The environmental fate of lead arsenate is not well documented. Studies to demonstrate its fate must take into account the fact that inorganic arsenicals are natural constituents of the soil, and that forms of inorganic arsenic may change depending on environmental conditions. Based on very limited data lead arsenate is not predicted to leach significantly.

° Ecological Characteristics: Lead arsenate is moderately toxic to birds, slightly toxic to fish and moderately toxic to aquatic invertebrate species.

° Metabolism: The metabolism of inorganic arsenic compounds in animals is well known. The pentavalent form, such as lead arsenate, is metabolized by reduction into the trivalent form, followed by transformation into organic forms which are excreted within several days via the urine. All animals exhibit this metabolism except rats, which retain arsenic in their bodies for up to 90 days.

° Tolerance Assessment: Tolerances were established in 40 CFR 180.194 for residues of lead arsenate.

° Reported Pesticide Incidents: The Agency's Pesticide Incident Monitoring System (PIMS) has many recorded incidents of accidental poisonings from the use of lead arsenate baits. Nine of these incidents involved hospitalizations and 16 involved child poisonings from "roach hive" products.

4. SUMMARY OF REGULATORY POSITION AND RATIONALE

The Agency is proposing to cancel all existing nonwood registrations of lead arsenate, with the exception of the growth regulator use on grapefruit. Measures to mitigate the inhalation risks including dust masks, respirators, which would be expected to reduce inhalation exposure by 80 and 90 percent, respectively, and restricting the use to certified applicators were considered by the Agency during the Special Review. The Agency has determined that these protective measures would not reduce risks to an acceptable level in light of the limited benefits. The Agency has further determined that the toxicological risks from all nonwood uses of lead arsenate, except the grapefruit use, outweigh the limited benefits. The growth regulator use on grapefruit is being deferred pending further evaluation by EPA's Risk Assesment Forum of the carcinogenic potency of inorganic arsenic from dermal and dietary exposure.

° Benefits Analysis: The economic impact from cancellation of the lead arsenate insecticide baits could range from $.84 to $6.7 million, the actual amount depending on whether the alternative chemical is applied by homeowners or professionals. No economic impact is expected as a result of cancellation of the herbicide and foliar insecticide uses of lead arsenate. Viable alternatives are available.

5. CONTACT PERSON

Douglas McKinney
Special Review Branch, Registration Division
Office of Pesticide Programs (TS-767C)
401 M Street, S.W.
Washington, D.C. 20460
(703) 557-5488

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