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**Rotterdam Convention on the Prior Informed  
Consent Procedure for Certain Hazardous  
Chemicals and Pesticides in International Trade  
Chemical Review Committee**

First meeting

Geneva, 11–18 February 2005

Item 7 (d) of the provisional agenda\*

**Inclusion of chemicals in Annex III of the Rotterdam Convention:  
review of notifications of final regulatory actions to ban  
or severely restrict a chemical: methamidophos**

## **Methamidophos: supporting documentation from Brazil**

### **Note by the secretariat**

The secretariat has the honour to provide, in the annex to the present note, the supporting documentation provided by Brazil in support of its final regulatory action on methamidophos.

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\* UNEP/FAO/RC/CRC.1/1.

## Annex

### Methamidophos

(Brazil summary data for CRC- based on the notification of final regulatory action for soluble liquid formulations of the substance that exceed 600 g active ingredient/L )

#### Properties

Description of physico-chemical properties of the chemical: Pure methamidophos is a Crystalline solid, with off-white color and pungent odor

Class: organophosphate pesticide

Molecular formula: C<sub>2</sub>H<sub>5</sub>NO<sub>2</sub>PS

Chemical Name: O,S-Dimethylphosphorothioic acid dimethylthioester

CAS Number: 10265-92-6

Molecular Weight: 141.12

Water Solubility: 90g/L (20°C)

Solubility in Other Solvents: Not Available

Melting Point: 112 degrees F, 44.5 degrees C

Vapor Pressure: 3 X 10<sup>-4</sup> mmHg (30 °C)

Partition Coefficient (Log Pow): -1.74

Adsorption Coefficient: Not Available

#### Description of toxicological properties of the chemical Acute Toxicity:

Methamidophos is highly toxic via oral, dermal and inhalation routes of exposure. The oral doses of methamidophos that resulted in the mortality of half of the test organisms (LD<sub>50</sub> values) are 21 and 16 mg/kg body weight for male and female rats respectively, 30-50 mg/kg body weight in guinea pigs and 10-30 mg/kg body weight in rabbits. Dermal LD<sub>50</sub> values include 50 mg/kg body weight in rats and 118 mg/kg body weight in rabbits. Inhalation LD<sub>50</sub> values include 9 mg/kg in rats, and 19 mg/kg in mice.

Chronic Toxicity: A 56-day rat feeding study resulted in a No Observable Effects Level (NOEL) of 0.03 mg/kg/day. The reference dose (RfD) is based on this study. In another study, dogs were fed up to 32 parts per million (ppm) (or 32 mg/1000 g of food per day) methamidophos for 1 year without observed adverse effects on body weights, organ weights, food consumption, blood chemistry, and urine chemistry. Measurable cholinesterase inhibition was found at all treatment levels.

Teratogenic Effects: A 56-day rat feeding study resulted in a No Observable Effects Level (NOEL) of 0.03 mg/kg/day. The reference dose (RfD) is based on this study. In another study, dogs were fed up to 32 parts per million (ppm) (or 32 mg/1000 g of food per day) methamidophos for 1 year without observed adverse effects on body weights, organ weights, food consumption, blood chemistry, and urine chemistry. Measurable cholinesterase inhibition was found at all treatment levels.

Mutagenic Effects: Methamidophos has tested positive for genotoxicity, or ability to induce changes in chromosomes, in some tests and negative in others. It may be weakly mutagenic.

Carcinogenic Effects: There is no evidence of carcinogenicity in tests with rats and mice

Organ Toxicity: The primary target of organophosphate compounds is the nervous system. Some liver damage has been observed in rabbits. Reduced sperm count and reduced sperm viability have been observed in humans.

Fate in Humans and Animals: Methamidophos is rapidly absorbed through the stomach, lungs and skin. It is eliminated primarily in the urine.

Reference: Extension Toxicology Network (Pesticide Information Profiles)

Description of ecotoxicological properties of the chemical

Breakdown of Chemical in Soil and Groundwater:

In aerobic soils, the half-life of methamidophos is as follows: 1.9 days in silt, 4.6 days in loam, 6.1 days in sand, and 10412 days in sandy loam.

Breakdown of Chemical in Surface Water:

The half-life of the chemical in water is 309 days at pH 5.0, 27 days at pH 7.0, and 3 days at pH 9.0. The chemical will break down in the presence of sunlight, and has a half-life of 90 days in water at pH 5 when there is sunlight

Breakdown of Chemical in Vegetation:

Methamidophos is taken up through the roots and leaves. In studies of methamidophos in tomato plants, the half-lives in fruit and leaves were measured as 4.8-5.1 days and 5.5-5.9 days, respectively.

Reference: Extension Toxicology Network (Pesticide Information Profiles)

The final regulatory action was based on informations on environmental persistence and toxicity of Mathamidophos.

Pesticide poisonings, some resulting in death, have become a serious public health problem, requiring intervention across a number of different areas. On the other hand, samples collected from actual users in the countryside, hospital records, programmes for recognition and treatment of poisoning from exposure to pesticides, provide crucial information about danger caused by pesticide use in the field, like the SINITOX (National System of Toxic-Pharmacological Information).

Reference: Toxicology Network (Pesticide Information Profiles) and others.

Methamidophos is a highly active systemic, residual organophosphate insecticide/acaricide/avicide with contact and stomach action. Its mode of action in insects and mammals is by decreasing the activity of an enzyme important for nervous

system function called acetylcholinesterase. This enzyme is essential in the normal transmission of nerve impulses. Methamidophos is a potent acetylcholinesterase inhibitor. Reference: Extension Toxicology Network (Pesticide Information Profiles)

Reference to the relevant documentation

WHO

WHOPEP

IPCS, JNTOX, INCHEM

PANNA

EXTOXNET

OIT

IARC/WHO

ECO/PAHO

IRPTC/UNEP

FAO

OECD/EC

US EPA

Academic studies and researches

The expected effect of the final regulatory action is to avoid exposure of the chemical and the associated risks to human health.

Generally, methamidophos is not considered phytotoxic if used as directed, but defoliation has occurred when applied as foliar spray to deciduous fruit. It is compatible with many other pesticides, but do not use with alkaline materials. Methamidophos is slightly corrosive to mild steel and copper alloys. This compound is highly toxic to mammals, birds, and bees. Do not graze treated areas, and be sure to wear protective clothing including respirator, chemical goggles, rubber gloves, and impervious protective clothing.

Reference to the relevant documentation

FAD, WHO, EPA, PANNA, E X T O X N E T, and others.