

WHO/VBC/DS/87.78

ORIGINAL: ENGLISH

Distr.: LIMITED

DATA SHEET ON PESTICIDES

No. 78

PROPACHLOR

*acetanilides*



CLASSIFICATION:

Primary Use: Herbicide

Secondary Use:

Chemical Group: Acetanilide

1.0 GENERAL INFORMATION

1.1 COMMON NAME: Propachlor (BSI, ISO and WSSA)

1.1.1 Identity:

IUPAC: 2-chloro-N-isopropylacetanilide

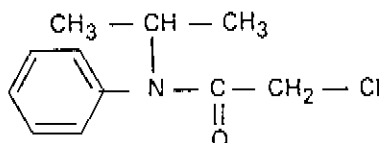
CAS: 2-chloro-N-(1-methylethyl)-N-phenylacetamide

CAS Reg. No.: 1918-16-7

Molecular formula: C<sub>11</sub>H<sub>14</sub>ClNO

Molecular weight: 211.7

Structural formula:



- 1.1.2 Synonyms: Bexton<sup>R</sup>; Bexton 4L<sup>R</sup>; Kartex A<sup>R</sup>; Niticid<sup>R</sup>; propachlore; Ramrod<sup>R</sup>; Satecid<sup>R</sup>; CP 31393.
- 1.2 SYNOPSIS: Propachlor is a pre-emergence herbicide used against annual grasses and certain broad-leaved weeds. Soil persistence can range from 28 to 42 days post-spraying. Propachlor is slightly toxic and the technical product is listed in WHO Hazard Class III.
- 1.3 SELECTED PROPERTIES
- 1.3.1 Physical characteristics - Propachlor is a light tan or white crystalline solid. It has a melting point of 67-76°C, a boiling point of 110°C at 0.03 mmHg and a density of 1.13 g/ml at 25°C.
- 1.3.2 Solubility - Its water solubility is 700 mg/l at 20°C; readily soluble in most organic solvents except aliphatic hydrocarbons.
- 1.3.3 Stability - Indefinitely stable, not sensitive to light; resistant to photo-decomposition.
- 1.3.4 Vapour pressure -  $2.3 \times 10^{-4}$  mmHg at 25°C.
- 1.4 AGRICULTURE, HORTICULTURE AND FORESTRY
- 1.4.1 Common formulations - These include a wettable powder (650 g a.i./kg) and granules (200 g a.i./kg).
- 1.4.2 Pests controlled - Annual grasses and certain broad-leaved weeds.
- 1.4.3 Use pattern - Used on maize, cotton, soyabeans, sugarcane, sorghum, sugar beets and vegetable crops at 3.5-5.0 kg a.i./ha.
- 1.4.4 Unintended effects - No information available.
- 1.5 PUBLIC HEALTH USE - No recommended use.
- 1.6 HOUSEHOLD USE - No recommended use.
- 2.0 TOXICOLOGY AND RISKS
- 2.1 TOXICOLOGY - MAMMALS
- 2.1.1 Absorption - Propachlor may be absorbed through the gastrointestinal tract; through the intact skin; or by inhalation of dust or spray mist.
- 2.1.2 Mode of action - Propachlor has been reported to cause dystrophic changes in liver and kidneys of rats, mice and rabbits at oral doses of 100-1800 mg/kg, accompanied by decreased enzyme activities.
- 2.1.3 Excretion products - Propachlor is metabolized via the mercapturic acid pathway. Eleven urinary metabolites, six of which are 2-methylsulfonylacetalides have been isolated. The major fecal metabolite is identified as the cysteine conjugate. Rats given <sup>14</sup>C propachlor orally excreted 98.6% of dose in the urine and feces within 48 hours.

#### 2.1.4 Toxicity, single dose -

##### Oral LD<sub>50</sub>:

Rat 710 mg/kg b.w.

Mouse 290 mg/kg b.w.

Rabbit 710 mg/kg b.w.

Following oral and percutaneous administration of propachlor, increased bromosulphalein retention was seen. The liver demonstrated leukocyte infiltration in peripherolobular zones and focal necrosis.

##### Dermal LD<sub>50</sub>:

Rabbit 380 mg/kg b.w. (10.4% suspension in water)

Propachlor causes severe dermatitis, ulceration and necrosis of the skin in rabbits and mice.

##### Inhalation LC<sub>50</sub>:

Rats 3580 mg/m<sup>3</sup> (60% w.p.)

Inhalation of w.p. dust for four hours caused inflammation of tracheal mucosa, 25% mortality, and haemorrhagic<sup>3</sup> secretions in lungs and bronchi. Effective threshold concentration was 136-456 mg/m<sup>3</sup>.

Eye irritation: Minimum concentration of 0.01% 6.5g/kg w.p. in rats caused conjunctivitis.

#### 2.1.5 Toxicity, repeated doses - No information available.

#### 2.1.6 Dietary studies -

Short term: Ninety-day rat and dog studies showed no observable effects at 1.3, 13.3 and 133.3 mg/kg bw/day except for a 9% reduction in weight gain in rats at 133.3 mg/kg bw/day.

Four and six month studies in white rats with 1/20, 1/100 and 1/200 of the LD<sub>50</sub> inhibited spermatopoiesis at the phase of spermatid formation and caused histomorphologic changes in the spermatopoietic epithelium.

Long term: No information available.

#### 2.1.7 Supplementary studies of toxicity -

Carcinogenicity: No information available.

Teratogenicity: No information available.

Reproduction: See section 2.1.6.

Mutagenicity: No induction of recessive lethality was observed in Drosophila. Propachlor at 10 mg/kg b.w. caused increased aberrant metaphases (3 x control level) in mouse bone marrow cells.

2.1.8 Modification of toxicity - No information available.

2.2 TOXICOLOGY - MAN

2.2.1 Absorption - Propachlor may be absorbed through the gastrointestinal tract, through the intact skin or by inhalation of dust or spray mist.

2.2.2 Dangerous doses -

Single: Toxicity rating 2 (Gosselin), probably oral lethal dose (man) 5-15 g/kg b.w.

Repeated: No information available.

2.2.3 Observations on occupationally exposed workers - Exposure to propachlor for eight days caused erythematopapular contact eczema on hands and forearms of workers.

2.2.4 Observations on exposure of the general population - No information available.

2.2.5 Observations on volunteers - No information available.

2.2.6 Reported mishaps - No information available.

2.3 TOXICITY - NON-MAMMALIAN SPECIES

2.3.1 Fish -

Fathead minnows 96 hr TLM 0.49 mg/l

Bluegill fingerlings 96 hr TLM 1.30 mg/l

2.3.2 Birds -

Oral LD<sub>50</sub> pheasants 735 mg/kg b.w.

Oral LC<sub>50</sub> mallard ducks 5000 mg/l

bobwhite quail 5000 mg/l

2.3.3 Other species - No information available.

3.0 FOR REGULATORY AUTHORITIES - RECOMMENDATION ON REGULATION OF COMPOUND

3.1 RECOMMENDED RESTRICTIONS ON AVAILABILITY

(For definition of categories see Introduction to Data Sheets)

All solid formulations over 38%, category 3

All other solid formulations, category 4

3.2 TRANSPORT AND STORAGE -

Formulations in all categories: Should be transported in clearly labelled, rigid and leakproof containers out of reach of children, away from food and drink. Storage should be under lock and key and secure from access by children and other unauthorized persons.

### 3.3 HANDLING

Formulations in all categories: Protective clothing to shield skin and eyes should be used by all handling the compound. Adequate washing facilities should be available at all times during handling and they should be close to the site of handling. Eating, drinking and smoking should be prohibited during handling and before washing hands and face.

### 3.4 DISPOSAL AND/OR DECONTAMINATION OF CONTAINERS

All formulations: Containers may be decontaminated (for method see paragraph 4.3 of Part 4). Decontaminated containers should not be used for food and drink. Containers that are not decontaminated should be burned or should be crushed and buried well below topsoil. Care must be taken to avoid subsequent contamination of water sources.

### 3.5 SELECTION, TRAINING AND MEDICAL SUPERVISION OF WORKERS

Formulations in all categories: Special account should be taken of the worker's ability to comprehend and follow instructions. Training of workers in techniques to avoid contact is essential. Pre-employment and periodic medical examinations are not required.

### 3.6 ADDITIONAL REGULATIONS RECOMMENDED IF DISTRIBUTED BY AIRCRAFT

All formulations: Pilots and loaders should have special training in application methods.

### 3.7 LABELLING

Formulations in categories 3 and 4, minimum cautionary statement:

CAUTION - POISON

(skull and cross bones insignia)

This formulation contains propachlor which is a skin and eye irritant, a dermal sensitizer and it may be poisonous if swallowed. Keep the material out of reach of children and well away from foodstuffs, animal feed and food containers.

### 3.8 RESIDUES IN FOOD - Maximum residue limits have been recommended by the Joint FAO/WHO Meeting on Pesticide Residues.

### 4.0 PREVENTION OF POISONING IN MAN AND EMERGENCY AID

#### 4.1 PRECAUTIONS IN USE

4.1.1 General - Propachlor is an acetanilide compound, a chlorinated tertiary amide of slight toxicity to mammals. It is a skin and eye irritant, a dermal sensitizer, and probably inhibits various enzymes at the cellular level. It may be absorbed by inhalation of dust or spray mist; through the gastrointestinal tract; and, through the intact skin.

4.1.2 Manufacture and formulation - T.L.V. - No information. Closed systems and forced ventilation may be required to reduce as much as possible the exposure of workers to the chemical.

4.1.3 Mixers and applicators - When opening the container and when mixing, protective impermeable boots, clean overalls, safety glasses, and gloves should be worn. Mixing, if not mechanical, should always be carried out with a paddle of appropriate length.

The applicator should avoid working in spray mist and avoid contact with the mouth. Care is needed when equipment is being washed after use. All protective clothing should be washed immediately after use, including the insides of gloves. Splashes must be washed immediately from the skin or eyes with large quantities of water. Before eating, drinking or smoking, hands and other exposed skin should be washed.

- 4.1.4 Other associated workers (including flagmen in aerial operations) - Persons exposed to the compound and associated with its applications should wear protective clothing and observe the precautions described above in 4.1.3 under "Mixers and applicators".
- 4.1.5 Other populations likely to be affected - With good application practice subject to 4.2 below, other populations should not be exposed to hazardous amounts of propachlor.
- 4.2 ENTRY OF PERSONS INTO TREATED AREAS - Unprotected persons should be kept out of treated areas until the compound is dry.
- 4.3 SAFE DISPOSAL OF CONTAINERS AND SPILLAGE - Residues in containers should be emptied in a diluted form into a deep pit taking care to avoid contamination of ground water. The empty container may be decontaminated by rinsing two or three times with water and scrubbing the sides. Impermeable gauntlets should be worn during this work and a soakage pit should be provided for the rinsings. Refill container with water and allow to stand 24 hours. Repeat twice. Obliterate label. Spillage of propachlor and its formulations should be removed by washing with 5% sodium hydroxide solution and then rinsing with large quantities of water.
- 4.4 EMERGENCY AID
- 4.4.1 Early symptoms of poisoning - Symptoms of poisoning include irritation and inflammation of the skin, eyes, and mucous membranes. Other effects are unknown.
- 4.4.2 Treatment before a person is seen by a physician, if these symptoms appear following exposure - The person should stop work immediately, remove contaminated clothing and wash the affected skin with water and soap, if available, and flush the area with large quantities of water. Take to a physician. If swallowed call a physician and transport to nearest hospital immediately.
- 5.0 FOR MEDICAL AND LABORATORY PERSONNEL
- 5.1 MEDICAL DIAGNOSIS AND TREATMENT IN CASES OF POISONING
- 5.1.1 General information - Propachlor is an acetanilide of moderate toxicity. It is absorbed from the gastrointestinal tract, by inhalation and through the intact skin. The mode of action is probably by inhibition of various hepatic enzymes at the cellular level. This chlorinated tertiary amide is a skin and eye irritant as well as a dermal sensitizer.
- 5.1.2 Symptoms and signs - Except for dermatitis, no clinical or laboratory signs of toxicity to man are known. Propachlor can be irritating to the skin and eyes as well as a dermal sensitizer.
- 5.1.3 Laboratory - No information available.
- 5.1.4 Treatment - If the pesticide has been ingested, unless the patient is vomiting, rapid gastric lavage should be performed with water, followed by activated charcoal and a mild laxative. For skin contact, the skin should be washed with soap and water. If the compound has entered the eyes they should be washed with isotonic saline or water. There is no specific antidote for propachlor poisoning.

- 5.1.5 Prognosis - If the acute toxic effect is survived, recovery will be uneventful.
- 5.1.6 References of previously reported cases - There have been no published reports of propachlor poisoning.
- 5.2 SURVEILLANCE TESTS - None indicated.
- 5.3 LABORATORY METHODS
- 5.3.1 Detection and assay of compound -
- Caverley, D. J. and Denney, R. C. (1978), Analyst (London) 103 (1225), 368
- Worley, J. W. et al. (1980), Anal. Chem. 52 (12), 1845
- Ambrus, A. et al. (1981), J. Assoc. Off. Anal. Chem. 64(3), 743

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