



Pesticide Fact Sheet

Name of Chemical: Imiprothrin
Reason for Issuance:
Date issued: March 1998

Description of the Chemical:

Generic Name: [2,5-dioxo-3-(2-propynyl)-1-imidazolidinyl] methyl (1RS)- cis- trans-chrysanthemate

Common Name: imiprothrin

Trade Name: Pralle

EPA Shaughnessy Code (OPP Chemical Code): 004006

Chemical Abstracts Service (CAS) Number: 72963-72-5

Year of Initial Registration: MARCH 1998

Pesticide Type: Insecticide

Chemical Family: Synthetic Pyrethroid

Producer: Sumitomo Chemical Company Limited

Use Patterns and Formulations

Application Sites: Indoor, non- food use (residences homes, non- food areas of restaurants, schools, warehouses, hotels)

Type and Method of Application: Crack and crevice and spot application.

Types of Formulation: 50.5% Manufacturing Use Product (MUP); 16.0% intermediate product (plus d-phenothrin and MGK 264); 0.4% aerosol spray (plus d-phenothrin and MGK 264); 0.1% aerosol spray (plus cypermethrin).

Target Pest: Roaches, Waterbugs, Ants, Silverfish, Crickets and Spiders

Science Findings:

Summary Statement: Imiprothrin technical grade and MUP are of a low acute toxicity profile i.e. all toxicity categories are either III/IV (Caution). Although imiprothrin enlisted a mild sensitization based upon the results of a guinea pig maximation test with the technical grade active ingredient it was negative in a second study with the technical and negative in two sensitization studies with the MUP. The end use (EP) products all have a low order of acute toxicity and were assigned a Toxicity Category III (Caution) based on the acute dermal and primary eye or skin irritation routes of exposure.

Subchronic oral, dermal and inhalation studies have been submitted and found acceptable in the rat. The NOEL's were 100 ppm, 300 mg/kg/bw and 22.0 mg/m³ respectively. Based on the results of developmental toxicity studies in rabbits imiprothrin is not a developmental toxicant at dose levels which did not also produce maternal toxicity. A range of mutagenicity tests revealed no evidence that imiprothrin has mutagenic potential. Chronic feeding, carcinogenic reproduction and metabolism studies were not submitted since these studies are not required for a non- food use registration.

Based upon relevant toxicity studies noted above and the proposed use pattern the Toxicology Endpoint Selection Committee(TEESC) concluded that the only risk assessment required was for inhalation exposure. The occupational inhalation exposure for the use of this chemical was calculated to be 0.000143 mg/kg/day. Therefore, using the TEESC recommended NOEL of 22.0 mg/m³ from the 28 day inhalation study in the rat, the Margin of Exposure (MOE) for occupational inhalation is greater than 25,000. A MOE of this size is sufficiently large to alleviate concern for exposure from the indoor uses of imiprothrin. Due to the conservative exposure assumptions (six hours for five days per week) used in the calculation of occupational inhalation exposure, no calculation was done for residential exposure. The MOE for residential inhalation would be even larger than 25,000 MOE for occupational inhalation.

Two avian dietary, and three fresh- water aquatic acute toxicity studies were submitted to support the proposed end-use and manufacturing use product. The submitted toxicity studies are adequate to satisfy the basic ecological toxicity data requirements except for a data gap of an avian acute oral toxicity study. However, the study is waived due to the unlikeliness of exposure from this indoor use pattern and the low toxicity to birds. The chemical is practically non-toxic to birds based on the results of the subacute dietary toxicity studies. The LC₅₀ values for mallards and bobwhite quails are both greater than 5620 ppm.

Due to the indoor use pattern environmental persistence (soil and water), mobility in soil and water and bioaccumulation are not of concern at this time. The only environmental fate data submitted was an hydrolysis study conducted on imiprothrin at pH 5, 7 and 9. Additional outdoor uses of imiprothrin will require additional supporting environmental fate data.

The proposed uses (residential homes, non-food areas of restaurants, schools, warehouses, hotels, etc.) of this new active ingredient are such that the only risk concern is through the inhalation route in an occupational and residential setting. A food-use registration has not been requested at this time for this chemical and therefore, no concern from dietary (food and water) risk is anticipated.

CHEMICAL CHARACTERISTICS: Technical Grade imiprothrin

Physical: Liquid

Color: Golden yellow (amber)

Odor: Sweet (Slightly sweet)

Melting Point: NA

Density: 0.979 g/ml (1.122 g/ml)

Molecular Formula: C₁₈H₂₂N₂O₃

Vapor Pressure: 1.39 mm Hg at 25 degrees C

8.64 mm Hg at 35 degrees C

Octanol/Water Partition Coefficient: P= 7.92 x 10² at 25 degrees C

Log K_{ow} = 2.9

pH: 5.22 (5.95)

Stability: Stable to metals, metal ions, sunlight and elevated temperature

Oxidizing or Reducing Action: Product does not contain oxidizing or reducing agents.

Flammability: Flash Point= 110 degrees C

Explosibility: Product does not contain explosive materials

Storage Stability: Stable when stored in commercial package (steel cans) for one year.

Viscosity: 60 centipoise

Corrosion Characteristics: Non corrosive to its commercial packaging, steel cans.

Dielectric Breakdown Voltage: NA

Toxicology Characteristics: Technical Grade imiprothrin

Acute Toxicity

Guideline No.	Study Type	MRID #(S).	Results	Toxicity Category
81-1	Acute Oral	43750718	Rat LD ₅₀ =1800 mg/kg for males and 900 mg/kg for females; neurological signs (tremor, ataxic gait and decreased spontaneous activity) within 30 mts. of exposure	III
81-2	Acute Dermal	43750720	Rat LD ₅₀ =>2000 mg/kg for males and females. No clinical signs of toxicity observed.	III
81-3	Acute Inhalation	43750722	Rat LC ₅₀ =>1.2 mg/l for males and females;at 0.418 mg/L (LTD); neurological signs (ataxic gait and tip toe gait) seen 1 hour post-exposure	III
81-4	Primary Eye Irritation	43750724	Rabbit: Non-irritating	IV
81-5	Primary Skin Irritation	43750724	Rabbit: Non-irritating	IV
81-6	Dermal Sensitization	43750726; 43750727	Guinea pig: Mild-sensitizer using Magnusson and Kligman test;non-sensitizer using Buehler method	NA

Subchronic Toxicity:

A 13-week oral rat study showed significantly body weight loss and suppression of feeding rate at doses of 3000, 6000 or 10000 ppm. Hematology and blood chemistry values were also altered at these doses as compared to the lowest dose (100 ppm) and the control group. The weights of the liver and other organs increased in the three higher dose groups. The NOEL was judged to be 100 ppm and the LOEL to be 3000 ppm.

A 21 day dermal study with rats conducted at 100, 300 or 1000 mg/kg body weight showed an increase in the incidence of dermal acanthosis and hyperkeratosis in the high dose group. The NOEL was 300 mg/kg body weight based on these effects and the LOEL was 1000 mg/kg body weight/day.

A 4- week inhalation study exposed rats to 2.4, 22.0 or 186 mg/m³ of imiprothrin with a median aerodynamic diameter of 0.80 to 0.86 μ m. The NOEL was 22.0 mg/m³ based on lower total body weight gain, changes in hematology and clinical chemistry parameters, and changes in liver and the salivary glands. The LOEL was 186 mg/m³.

Developmental Toxicity

Rabbits were fed with imiprothrin at 30, 100 or 300 mg/kg body weight/day. The maternal NOEL was 30 mg/kg/body weight/day based upon suppressed body weight gain and food consumption, while the LOEL was 100 mg/kg body weight/day. At 300 mg/kg body weight/day premature labor, abortion and mortality were noted. The developmental NOEL was not determined (i.e. it was less than 100 mg/kg body weight/day), on the basis of decreased fetal body weight and frontal bone hypoplasia. An increased incidence of the 27th pre- sacral vertebra occurred in all treatment groups. The LOEL was not determined.

An additional developmental study was conducted on rabbits at doses of 3, 10 or 30 mg/kg body weight/day to determine the developmental end points which the earlier study had not been able to define. This study showed no treatment related developmental effects. The developmental NOEL, based on both studies, was 30 mg/kg/body weight/day while the LOEL was 100 mg/kg/body weight/day.

Mutagenicity

Imiprothrin was subjected to Ames tests with Salmonella and with E. coli. Both tests showed imiprothrin not to be mutagenic. An in vitro gene mutation assay with Chinese hamster cells showed that this chemical does not have the potential to cause gene mutations. An in vitro chromosome aberration assay showed that imiprothrin did have the potential to cause chromosome aberrations in Chinese hamster lung cells in the presence of S9 metabolic activation. An in vivo mouse bone marrow micronucleus test did not show chromosome damage. Two in vivo/in vitro unscheduled DNA synthesis tests were conducted with primary rat hepatocytes; time course and dose response. Neither UDS test showed an increase in such synthesis. The weight- of- evidence indicates imiprothrin is not genotoxic.

Toxicology Characteristics

End- Use Formulations:

A. Pralle (50.5% imiprothrin)

Acute Oral Toxicity (Rats: male and female): The acute oral LD₅₀ was 4500 mg/kg for males and 2400 mg/kg for females. Toxicology Category III

Acute Dermal Toxicity (Rats: male and female) The acute dermal LD₅₀ is greater than 2000 mg/kg. Toxicity Category III.

Acute Inhalation Toxicity (Rats: male and female) The acute inhalation LC₅₀ is greater than 2 mg/L for male and female rats. Toxicity Category IV.

Primary Eye Irritation (Rabbits) non- irritating. Toxicity Category IV.

Primary Dermal Irritation (Rabbits) non- irritating. Toxicity Category IV.

Dermal Sensitization- Not a sensitizer.

B. Multicide Intermediate 2734 (16% imiprothrin, 11.2% d-phenothrin, 52.8% MGK 264)

Acute Oral Toxicity (Rats: male and female): Combined LD₅₀ is greater than 5 g/kg. Toxicology Category IV.

Acute Dermal Toxicity (Rabbits: male and female) Combined LD₅₀ is greater than 2 g/kg. Toxicity Category III.

Acute Inhalation Toxicity (Rabbits: male and female) Combined LC₅₀ is greater than 2.69 mg/L. Toxicity Category IV.

Primary Eye Irritation (Rabbits) mild irritant. Toxicity Category III.

Primary Dermal Irritation (Rabbits) non- irritating. Toxicity Category IV.

Dermal Sensitization- Sensitizer.

C. Multicide Pressurized Roach Spray 27341 (0.4% imiprothrin, 0.5% d- phenothrin, 1% MGK 264)

Acute Oral Toxicity (Rats: male and female): Combined LD₅₀ is greater than 5 g/kg. Toxicology Category IV.

Acute Dermal Toxicity (Rabbits: male and female) Combined LD₅₀ is greater than 2 g/kg. Toxicity Category III.

Acute Inhalation Toxicity (Rabbits: male and female) Combined LC₅₀ is greater than 3.82 mg/L. Toxicity Category IV.

Primary Eye Irritation (Rabbits) Mild irritant. Toxicity Category III.

Primary Dermal Irritation (Rabbits) moderate irritation. Toxicity Category III.

Dermal Sensitization- Sensitizer.

D. Raid Ant & Roach 17 (0.1% imiprothrin, 0.1% cypermethrin)

Acute Oral Toxicity (Rats: male and female): Combined LD₅₀ is greater than 5 g/kg. Toxicity Category IV.

Acute Dermal Toxicity (Rabbits: male and female) Combined LD₅₀ is greater than 5 g/kg. Toxicity Category IV.

Acute Inhalation Toxicity (Rabbits: male and female) Combined LC₅₀ is greater than 5.1 mg/L. Toxicity Category IV.

Primary Eye Irritation (Rabbits) No corneal irritation. Toxicity Category IV.

Primary Dermal Irritation (Rabbits) moderate irritation. Toxicity Category III.

Dermal Sensitization- Not a dermal sensitizer.

ENVIROMENTAL FATE CHARACTERISTICS: Technical Grade imiprothrin

Hydrolysis Data- Imiprothrin degrades by pH sensitive hydrolysis with calculated half-lives of less than one day at pH 9 and approximately 59 days at pH 7. Degradation did not occur

at pH 5. There was only one degradate which accounted for more than 10% of the radioactivity at pH 7 and 9. this compound was identified as N-carbamoyl- N- propargyglycine (CPC).

ECOLOGICAL EFFECTS CHARACTERISTICS: Technical Grade imiprothrin

Freshwater Fish

Rainbow trout: $LC_{50} = 0.038$ ppm.

Aquatic Invertebrate

Daphia magna: $EC_{50} = 0.051$ ppm.

Avian Dietary

Bobwhite quail and mallard ducks: LC_{50} = are both greater than 5620 ppm.

Warmwater Fish

Bluegill: $LC_{50} = 0.07$ ppm.

SUMMARY OF DATA GAPS: There are no data gaps for this use.

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