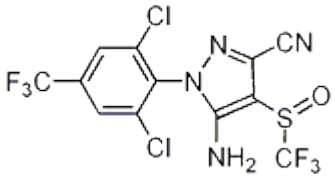
TECHNICAL DATA SHEET
FIPRONIL TECHNICAL 98% MIN

1 GENERAL INFORMATION

Fipronil is a Insecticide which acts as a blocker of the GABA-regulated chloride channel. Insects resistant or tolerant to pyrethroid, cyclodiene, organophosphorus and/or carbamate insecticides are susceptible to fipronila broad-spectrum insecticide, toxic by contact and ingestion.

2 ACTIVE INGREDIENTS

Common name	:	Fipronil (BSI, E-ISO, (*m*) F-ISO)
Chemical Name	:	(±)-5-amino-1-(2,6-dichloro-α,α,α-trifluoro-*p*-tolyl)-4-trifluoromethylsulfinylpyrazole-3-carbonitrile
Chemical Group	:	phenylpyrazole insecticide
CAS Registry No.	:	*120068–37–3*
Molecular Formula	:	$C_{12}H_4Cl_2F_6N_4OS$
Structural Formula	:	



Molecular weight	:	437.2
Technical Purity	:	98% Min

3 PHYSICOCHEMICAL PROPERTIES

Appearance	:	White to yellow crystalline powder
Melting Point	:	198 °C
Kow	:	logP = 4.0 (shake flask method)
S.g./density	:	1.477–1.626 (20 °C)
Vapor Pressure	:	1.37×10^{-4} (25 °C)

Solubility In water	:	1.9 (pH 5), 2.4 (pH 9), 1.9 (distilled) (all in mg/l, 20 °C).
Solubility in solvents	:	In acetone 545.9, dichloromethane 22.3, hexane 0.028, toluene 3.0 (all in g/l, 20 °C).
Stability	:	Stable in water at pH 5 and 7; slowly hydrolysed at pH 9 (DT_{50} *c.* 28 d). Stable to heat. Slowly degrades in sunlight (*c.* 3% loss after 12 d continuous irradiation); rapidly photolysed in aqueous solution (DT_{50} *c.* 0.33 d).

4 MODE OF ACTION & USES

Broad-spectrum insecticide, toxic by contact and ingestion. Limited xylem systemicity in some monocotyledonous crops. Can be used to control insects when applied as a soil or seed treatment. Good to excellent residual control following foliar application. Uses Control of multiple species of Thrips on a broad range of crops by foliar, soil or seed treatment. Control of Corn rootworms, Wireworms and Termites by soil treatment in maize. Control of boll weevils and plant bugs on cotton, Diamond-back moths on crucifers, and Colorado beetle on potatoes, by foliar application. Control of Stem borers,Leaf miners, Planthoppers, leaf folders/rollers and Weevils in rice.

5. TOXICITY

Acute oral	**:**	LD_{50} cut of value 200 mg/kg (Rat)
Acute dermal	**:**	LD_{50} >2000 mg/kg (Rabbits)
Inhalation	**:**	LC_{50} (4 h) for rats 1.02 mg/l (tech.; nose only exposure).
Skin Irritation	**:**	Not a skin irritant to Rabbits
Eye Irritation	**:**	Not a Eye irritant to Rabbits
Skin Senstization	:	Not a skin sensitizer to Guinea Pib
NOEL	**:**	(2 y) for rats 0.5 mg/kg diet (0.019 mg/kg b.w.); (18 mo) for mice 0.5 mg/kg diet; (52 w) for dogs 0.2 mg/kg b.w. daily (combined sexes).
Toxicity class	:	WHO (a.i.**) II** EPA (formulation) **II**

6. CHRONIC TOXICITY

Animals

Investigators fed rats 0.5 ppm (0.019-0.025 mg/kg/day) fipronil in their diets for 52 weeks and observed no signs of systemic toxicity (NOAEL). The lowest dosage at which effects were observed (LOAEL) was 1.5 ppm (0.059 mg/kg/day males, 0.078 mg/kg/day females), and included increased incidence of seizures and death, protein alterations, and alterations in thyroid hormone levels.12 See the text box on **NOAEL**, **NOEL**, **LOAEL**, and **LOEL**.

Researchers fed dogs 0.2 mg/kg/day fipronil (length unknown) and observed no adverse effects. In the same study, researchers observed clinical signs of neurotoxicity at 2.0 mg/kg/day.

Scientists fed rats fipronil-desulfinyl (primary photodegradate) at 0, 0.5, 2.0, or 10.0 ppm for two years (0, 0.025, 0.098, and 0.050 mg/kg/day males, and 0, 0.032, 0.130, and 0.550 mg/kg/day females). The 10 ppm dose was reduced to 6 ppm for female rats after week 26 due to increased mortality. Male and female rats displayed increased incidence of aggression and irritability to touch at the highest doses tested. Female rats also developed bloody tears and increased salivation at 10 or 6 ppm, and convulsions at 2 and 10 or 6 ppm. No effects were seen at or below 0.5 ppm (0.025 mg/kg/day).

Humans

The chronic reference dose (RfD) for fipronil is 0.0002 mg/kg/day based on the NOAEL for chronic toxicity (0.5 ppm or 0.019 mg/kg/day) and an uncertainty factor of 100.
No human data were found on chronic effects of fipronil.

7. ECOTOXICITY

Birds	:	Acute oral LD_{50} for bobwhite quail >2000 mg/kg, mallard ducks >2000, pheasants 31, red-legged partridges 34, house sparrows 1120, pigeons >2000 mg/kg. Dietary LC_{50} (5 d) for bobwhite quail 49, mallard ducks >5000 mg/kg diet.
Fish	:	Acute LC_{50} (96 h) for bluegill sunfish 85, rainbow trout 248, European carp 430 µg/l.
Daphnia	:	LC_{50} (48 h) 0.19 mg/l; for *D. carinata* (48 h) 3.8 mg/l
Algae	:	EC_{50} (96 h) for *Scenedesmus subspicatus* 0.068 mg/l; (120 h) for *Selenastrum capricornutum* >0.16, *Anabaena flos-aquae* >0.17 mg/l
Bees	:	Highly toxic to honeybees, both by direct contact and by ingestion. However, no risk to bees when used as a soil or seed treatment.
Worms	:	Non-toxic.

8 ENVIRONMENTAL FATE

In plants, animals and the environment, fipronil is metabolised via reduction to the sulfide, oxidation to the sulfone, and hydrolysis to the amide. In the presence of sunlight, a photodegradate also forms via sulfoxide extrusion. The sulfide, sulfone and photodegradate are known to act at the GABA receptor site, whereas the amide does not.

Animals In rats, once absorbed, the distribution and metabolism of fipronil is rapid. Elimination is mainly via the faeces as fipronil and its sulfone. The two major urinary metabolites were identified as conjugates of ring-opened pyrazole products. The distribution of radioactive residues in tissues was extensive after seven days. In goats and hens, the sulfone was the only metabolite identified in tissues.

Plants When applied as an incorporated soil treatment to cotton, maize, sugar beet or sunflowers, uptake of fipronil into plants in all cases was low (*c.* 5%). At crop maturity, the major residue components observed in all plants were fipronil, the sulfone, and the amide. Following foliar application to cotton, cabbage, rice and potatoes, at crop maturity, fipronil and the photodegradate were the major residue components.

Soli/Environment Results of lab. and field studies: Readily degraded; major degradates in soil (aerobic) are sulfone and amide, (anaerobic) are sulfide and amide. Photolysis of soil-applied fipronil gives the photodegradate together with sulfone and amide. K_{oc} 427 (Speyer 2.2) to 1248 (sandy loam). Both fresh and aged column leaching studies (5 soils) indicate that fipronil and its metabolites present a low risk of downward movement in soil; this is supported by field dissipation studies. Following soil incorporated in-furrow granular applications, quantifiable residues were confined to the top 30 cm of soil, with no significant lateral movement or residues.

9 SHELF LIFE

Shelf life for Fipronil Tech is 2 years

10 HANDLING & STORAGE

1. The packages containing the Insecticides shall be stored in separate room or premises away from the rooms or premises used for storing other articles particularly articles particularly articles of food or shall be kept in separate almirahs under lock & keys depending upon the quantity & nature of the Insecticides.
2. The rooms or premises meant for storing the Insecticides shall be well built, dry, well lit & ventilated & of sufficient dimension to avoid contamination with vapor.

3. Store in tightly sealed original containers in a dry secure place away from fertilisers, seed, feed and food. Store out of direct sunlight. Keep out of reach of children, unauthorized persons and animals.

11. PACKAGING & DISPOSAL

Packing
Fipronil Tech 92% Min shall be packed in LDPE liner with 25 kg & 50 kg fibre board drum. Material is not corrosive to packages.

Disposal:
1.Do not use this container for any other purpose.

2.Triple rinse containers, add rinsate to the spray tank. Then offer the container for recycling or puncture the container and dispose of in accordance with local regulations.

3.If no landfill is available, bury the containers below the ground in a disposal pit specifically marked and set up for this purpose clear of waterways, desirable vegetation and tree roots.

4.Empty containers and product should not be burnt.