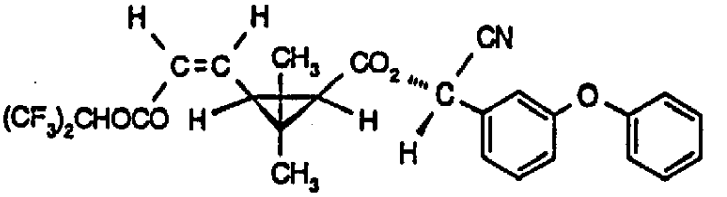
ITIC SUMMARY SHEET # 2
(PESTICIDES)

ACRINATHRIN

CLASS
pyrethroid
acaricide, insecticide



NOMENCLATURE
Common name:
acrinathrin (BSI, draft E-ISO); acrinathrine (draft F-ISO).
IUPAC name:
(S)-α-cyano-3-phenoxybenzyl (Z)-(1*R*,3S)-2.2-dimethyl-3-[2-(2.2.2-trifluoro-1 -trifluoromethylethoxycarbonyl)vinyl]cyclopropanecarboxylate.
Roth: (S)-α-cyano-3-phenoxybenzyl (Z)-(1*R*-cis)-2.2-dimethyl-3-[2-(2.2.2-trifluoro-1 -trifluoromethylethoxycarbonyl)vinyl]cyclopropanecarboxylate.
Chemical Abstracts name:
cyano(3-phenoxyphenyl)methyl 2.2-dimethyl-3-[3-oxo-3-[2.2.2-trifluor-1-(trifluorometyl) ethoxy]-1-propenyl]cyclopropanecarboxylate.
CAS RN:
[101007-06-1] as defined; [103833-18-7] unstated stereochemistry.
Development codes:
RU 38 702, HOE 076003; AE F 076003; NU 702.
Codex Alimentarius code # (none).

PHYSICAL CHEMISTRY
Composition: single isomer; colorless crystals (tech. grade).
Molecular weight: 541.4.
Molecular formula: $C_{26}H_{21}F_6NO_5$.
Melting point: 81.5 °C (pure); 82 °C (tech.) .
Vapor pressure: 4.4x10-5mPa(20 °C) .
K_{ow}logP= 5 (a.i.,25 °C).
Henry: $4.8x10^{-2}$ Pa m^3 mol^{-1} (calc.).
Solubility : water: 50.02 mg a.i./l (25 °C). In acetone, chloroform, dichloromethane, ethyl acetate, dimethylformamide >500, di-isopropyl ether 170, ethanol 40, hexane 10, *n*-octanol 10 (all in g a.i./l).
Stability: stable in acid but hydrolysis and epimerization more important at pH >7.
DT_{50}(half-life): >1 y (pH S. 50 °C); 30 d (pH 7. 30 °C); 15 d (pH 9, 20 °C), 1.6 d (pH 9. 37 °C). Stable for 7 d under 100 W light (tech.).
Specific rotation: [α]20/D +17.S°.

COMMERCIALIZATION
History: acaricide and insecticide reported by J. R. Tessier *et al.*, (*IUPAC Pestic. Chem.*, 5: 95, 1983). Introduced in France (1990) by Roussel Uclaf.
Patent: EP 46186; FR 2486073.
Manufacturer(s): Roussel Uclaf.

APPLICATIONS

Biochemistry: acts on the central nervous system.
Mode of action: contact and stomach action.
Uses: an ingested and contact acaricide effective against a wide range of phytophagous mites on citrus, cotton, fruit, hops ornamentals, soya beans, **TOBACCO**, vegetables and vines. It also shows insecticidal properties. In particular with high efficacy on *thrips species* on fruit trees, vines and vegetables.
Formulation types: EC; SC; WP; EW.
Mixtures: (*acrinathrin* +) propargite.
Compatibility: may not be compatible with alkaline products.
Selected tradenames: 'Rufast' (AgrEvo).

ANALYSIS

Product analysis: by hplc. Residues in plants, soil and water determined by glc with ECD.

TOXICITY

Oral (acute oral): LD_{50}: rat and mouse: >5000 mg/kg b.w. (for tech. in corn oil).
Percutaneous: LD_{50}: rat >2000 mg/kg b.w.
Skin and eyes: non-irritating to eyes and skin (rabbit). Not sensitizing to skin (guinea pigs).
Inhalation: LC_{50} (4 h): rat: 1.6 mg/l air.
Toxicity class : (WHO): III ("Slightly Hazardous"); (EPA): (Formulation) IV.

TOXICOLOGICAL EVALUATION (national)

NOELS: (90-day rat study): male: 2.4 mg/kg b.w., female: 3.1 mg/kg b.w.; (1-year dog study): 3 mg/kg b.w.
Non-mutagenic and non-teratogenic in rats (2 mg/kg b.w. daily) or rabbits (15 mg/kg b.w. daily). ADI: 0.02 mg/kg b.w.
Low solubility in water and high adsorption on soil mean that low LC_{50} or LD_{50} values under laboratory conditions do not present significant hazard under practical field conditions.

ECOTOXICOLOGY

Birds: acute oral LD_{50}: bobwhite quail: >2250; mallard ducks: >1000 mg/kg b.w.
LC_{50} (8 d):bobwhite quail: 3275; mallard ducks: 4175 mg/kg diet.
Fish: LC_{50}: rainbow trout: 5.66; mirror carp: 0.12 mg/l.
Bees: oral LC_{50} (48 h): 150-200 ng/bee; contact (48 h): 200-5OO ng/bee.
Worm: LD_{50} (14 d): >1000 mg/kg/earthworm. NOEC biomass: 1.6 mg/kg.
Daphnia: LD_{50} (48 h): 0.57 mg/l.
Algae: EC_{50} (96 h): >0.82 mg/l (green algae).

ENVIRONMENTAL FATE

Animals: no metabolites found representing >10% of parent compound. The main residue is the parent compound.
Plants: the main residue is the parent compound.
Soil/Environment: strongly adsorbed onto soil and immobile (irrespective of pH and o.m. content);
K_d: 2460-2780;
K_{oc}: 127500-319 610.
Soil column leaching: (1% of applied acrinathrin found in leachate): DT_{50} (half-life): 5-100 d (4 soil types); DT_{50} under aerobic conditions (pH 6.2, o.m. 3.1%): 52 d.

REVIEWS AND SOURCES

FAO/WHO/JMPR, Pesticide Residues in Food: none.
WHO/IPCS, Environmental Health Criteria: none.
WHO/IPCS, Concise International Chemical Assessment Documents: none.
WHO Health and Safety Guides: none.
WHO Data Sheets on Pesticides: none.
WHO Chemical Safety Cards: none.
WHO Classification of Pesticide by Hazard: (1992-1993).
WHO Guidelines for Drinking Water Quality: none.
IARC Monographs: none.
ITIC International Safety Reviews: none.
The Pesticide Manual (11th Ed.), (A World Compendium) BCPC, 1997.
Codex Alimentarius Recommended Evaluation's Date for acrinathrin: not yet assigned.