United States Environmental Protection Agency

Name of Chemical: Clothianidin
Reason for Issuance: Conditional Registration
Date Issued: May 30, 2003

Environmental Characteristics

STUDY TYPE	HALF LIFE/OTHER
Hydrolysis	Stable
Photolysis in Water	Less than 1 day
Photolysis on Soil	34 days
Aerobic Soil Metabolism	148-1,155 days
Anaerobic Aquatic Metabolism	27 days
Mobility-Leaching	Mobile to highly mobile
Terrestrial Field Dissipation	277 days to 1,386 days in the 0-15 cm soil depth; Generally not detected below the 45 cm soil depth

Potential to Contaminate Groundwater

Based on laboratory and field studies, the available data on clothianidin show that the compound is persistent and mobile, stable to hydrolysis, and has potential to leach to ground water and be transported via runoff to surface water bodies.

Ecological Characteristics

Terrestrial

Clothianidin is practically non-toxic to the bobwhite quail on an acute basis (LD50 > 2000 mg/kg) and practically non-toxic to the mallard duck and the bobwhite quail on a sub-acute basis (5-day LC50 > 5040 ppm and 5230 ppm, respectively). However, exposure to treated seeds through ingestion may result in chronic toxic risk to birds (exposure of 525 ppm adversely affected eggshell thickness for Bobwhite quail).

Clothianidin is moderately toxic to small mammals on an acute oral basis (LD50 > 389 mg/kg). Chronic exposure to treated seeds through ingestion may result in reproductive and/or developmental effects.

Clothianidin is highly toxic to honey bees on an acute contact basis (LD50 > 0.0439 µg/bee). It has the potential for toxic chronic exposure to honey bees, as well as other nontarget pollinators, through the translocation of clothianidin residues in nectar and pollen. In honey bees, the effects of this toxic chronic exposure may include lethal and/or sub-lethal effects in the larvae and reproductive effects in the queen.

However, due to evidence of effects on the rat immune system and that juvenile rats appear to be more susceptible to these effects, and due to the lack of a developmental immunotoxicity study, a 10X database uncertainty factor is applied to all dietary exposure endpoints.

SUMMARY OF DATA GAPS

Toxicology:

- Developmental immunotoxicity study
- Additional analysis of test materials used in mutagenicity studies Residue Chemistry:
- Rotational crop residue field trials with mature soybeans Environmental Fate Data:
- Aerobic aquatic metabolism
- Seed leaching study Ecological Effects Data:
- Whole sediment acute toxicity to freshwater invertebrates
- Field test for pollinators