

Chemical Control/New Products

AVAUNT (INDOXACARB): A NEW MODE OF ACTION INSECTICIDE FOR CONTROL OF SEVERAL KEY ORCHARD PESTS

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*Abstract:* Indoxacarb is an insecticide in a new class of chemistry with a new mode of action now registered for use on apples and pears. Indoxacarb is in the oxadiazine class of chemistry and it works as a sodium channel blocker. Indoxacarb was registered in the U.S. for use on apples, pears, and many other crops in May of 2001. It is a reduced risk pesticide with very low mammalian toxicity and a benign profile for avian and aquatic toxicity. Indoxacarb is a broadspectrum insecticide with activity on codling moth, white apple leafhopper, pandemis leafroller, and lacanobia fruitworm.

**Product Attributes.** Avaunt (indoxacarb) insecticide is formulated as a 30% active water dispersible granule. Current use rates in pome fruit are 5.0 to 6.0 ounces of product per acre. The acute oral LD<sub>50</sub> is 1800 mg/kg and the acute dermal LD<sub>50</sub> is >5000 mg/kg. Indoxacarb is not systemic but does have translaminar movement into the mesophyll. While water solubility is very low, it is very lipophilic which facilitates transport into the waxy leaf surface where it is protected from weathering. Indoxacarb has good photostability and rainfastness.

**Biological Activity.** Indoxacarb affects insects from direct exposure to spray droplets and through ingestion of treated foliage/fruit. Once absorbed, it kills by binding to a site on the sodium channel and blocking the flow of sodium ions. The result is impaired nerve function, feeding cessation, paralysis, and death. Once indoxacarb is absorbed or ingested, feeding cessation occurs almost immediately even though it may take several days for insects to die.

**Spectrum of Insect Control.** Avaunt is labeled for control or suppression of the following insects on pome fruit: oriental fruit moth, codling moth, lesser appleworm, pandemis leafroller, redbanded leafroller, tufted apple bud moth, white apple leafhopper, potato leafhopper, plum curculio, tarnished plant bug, apple maggot, lacanobia fruitworm, European apple sawfly. For codling moth, Avaunt use should be limited to low pressure orchards and orchards that are using effective mating disruption programs. Avaunt does not provide adequate control of high populations of codling moth.

**Impact on Non-Target Organisms.** Avaunt has minimal impact on birds, earthworms, and aquatic organisms. Beneficial insects such as assassin bug, bigeyed bug, minute pirate bug, Damsel bug, lacewing larvae, spiders, predaceous mites and parasitic wasps are not significantly affected by dried residues of indoxacarb. This is primarily because of very limited ingestion due to the feeding habits of these insects and lack of uptake via tarsal exposure.

**Resistance Management.** Indoxacarb can play a useful role in resistance management programs because it has a mode of action not shared by other insecticides. Research done to date indicates no cross-resistance with current products including pyrethroids, organophosphates, and carbamates.