Carbofuran I.R.E.D. FACTS

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Pesticide Reregistration

All pesticides sold or distributed in the United States must be registered by EPA, based on scientific studies showing that they can be used without posing unreasonable risks to people or the environment. Because of advances in scientific knowledge, the law requires that pesticides first registered before November 1, 1984, be reregistered to ensure that they meet today's more stringent standards.

In evaluating pesticides for reregistration, EPA obtains and reviews a complete set of studies from pesticide producers that describe the human health and environmental effects of each pesticide. To implement provisions of the Food Quality Protection Act (FQPA) of 1996, EPA considers the special sensitivity of infants and children to pesticides, as well as aggregate exposure of the public to pesticide residues from all sources, and the cumulative effects of pesticides and other compounds with common mechanisms of toxicity. The Agency develops any mitigation measures or regulatory controls needed to effectively reduce each pesticide's risks. EPA then reregisters pesticides that meet current human health and safety standards and can be used without posing unreasonable risks to human health and the environment.

When a pesticide is eligible for reregistration, EPA explains the basis for its decision in an Interim Reregistration Eligibility Decision (IRED) document. This fact sheet summarizes the information in the IRED document for the N-methyl carbamate pesticide carbofuran, case number 0101

Regulatory History

Carbofuran was first registered in the United States in 1969 and is classified as a restricted use pesticide.

Through an agreement between EPA and the technical registrant in 1991, granular carbofuran has been limited to the sale of 2,500 lbs per year in the U.S. since 1994, and to use on spinach grown for seed, pine seedlings, cucurbits, and bananas only.

Additionally, in the late 1990s the technical registrant made a number of changes to labels for flowable carbofuran in order to reduce drinking water and ecological risks of concern. These included reducing application rates and numbers of applications for alfalfa, cotton, corn, potatoes, soybeans, sugarcane, and sunflowers.

Three human studies have been conducted for carbofuran – one oral and two dermal. These studies were reviewed by the Agency's Human Studies Review Board (HSRB) in May 2006. The HSRB concluded that, while informative, the studies are not appropriate for use by the Agency in either the individual carbofuran or N-methyl carbamate cumulative risk assessment. The Agency did not use any of the human studies in the risk assessment for carbofuran.

Uses

Carbofuran is a systemic, broad spectrum N-methyl carbamate insecticide and nematicide registered for control of soil and foliar pests on a variety of field, fruit, and vegetable crops. There are no residential uses.
Nearly 1 million pounds of carbofuran are applied annually.
Carbofuran is a restricted use pesticide.

Health Effects

As with other N-methyl carbamate pesticides, the critical effect of carbofuran for various exposure durations is cholinesterase inhibition; that is, it can overstimulate the nervous system causing nausea, dizziness, confusion, and at very high exposures (e.g. accidents or major spills), respiratory paralysis and death. Similar to other N-methyl carbamate pesticides, inhibition is followed by rapid recovery of cholinesterase.
Carbofuran is classified as "Not Likely" to be a human carcinogen.

Ecological Effects

Carbofuran is very highly toxic to birds on an acute basis, and highly toxic on a sub-acute basis. A chronic effect level could not be established due to the fact that all concentrations tested caused mortality in the test subjects.
Carbofuran is highly toxic to mammals on an acute basis. Chronic toxicity testing on laboratory rats showed reduced offspring survival and body weight reductions.
Carbofuran is very highly toxic to freshwater and estuarine/marine fish on an acute basis. The available chronic test showed larval survival as the most sensitive endpoint for freshwater fish and embryo hatching as the most sensitive endpoint for estuarine/marine fish.
Carbofuran is considered to be very highly toxic to freshwater and estuarine/marine invertebrates on an acute basis. Chronic tests showed reproductive effects.

Risks

Three lines of evidence were considered in assessing ecological risks from carbofuran: a screening level deterministic assessment, a refined probabilistic assessment, and an evaluation of available field data. All three lines of evidence support the same conclusion: ecological risks are of concern from all uses of flowable carbofuran. A screening level assessment for granular carbofuran also shows risks of concern from all uses of granular carbofuran.

Occupational risks are of concern from most mixer/loader/applicator scenarios, even when assessed with engineering controls (i.e. MOEs fail to reach 100). Additionally, post-application risk assessments indicate the need for restricted entry intervals (REIs) which are longer than REIs required by current labels.

Acute dietary risk from food alone is estimated at 260% of the aPAD and 490% of the aPAD for children 1-2 years old, the population subgroup with the highest estimated dietary exposure. Chronic dietary risks were not assessed because cholinesterase inhibition due to

carbofuran exposure reverses rapidly. EPA believes that the acute dietary assessment would be protective of any chronic exposures in the diet.

Since acute exposures exceed the aPAD for food alone, EPA is concerned about any additional exposure (to all subpopulations) through drinking.

Risk Mitigation

To address the assessed risks of concern, the following mitigation measures will be implemented:

Cancellation based on high ecological and worker risks and low economic benefits for growers

Sorghum	Alfalfa	Sweet corn
Cotton	Grapes	Field corn and popcorn
Wheat	Potatoes	Bananas/plantains
Cucurbits (flowable)	Oats	Soybeans
Barley	Tobacco	Fallow/idle land
Sugarcane	Ornamentals	Sugar beets
Peppers (except Chile)		

4-year Phase-out for the crops which have moderate benefits to growers.

Artichokes, Chile peppers in the Southwestern U.S., cucurbits (granular formulation only), sunflowers, spinach grown for seed, and pine seedlings in the Southeastern U.S.

Regulatory Conclusion

Based on the assessment of ecological and human health risks associated with carbofuran uses, the Agency has determined that all uses of carbofuran are ineligible for reregistration.

The Agency is proposing to retain tolerances for sugarcane, rice, bananas, and coffee for imported commodities. The dietary risk from these commodities (food alone) is 56% of the aPAD for children 1-2 years old, the population subgroup with the highest estimated dietary exposure.

For More Information

Electronic copies of the Carbofuran IRED and all supporting documents are available in the public docket EPA-HQ-OPP-2005-0162 located online in the Federal Docket Management System (FDMS) at http://www.regulations.gov.

For more information about EPA's pesticide reregistration program, the carbofuran IRED, or reregistration of individual products containing carbofuran, please contact the Special Review and Reregistration Division (7508P), Office of Pesticide Programs, US EPA, Washington, DC 20460, telephone 703-308-8000.

For information about the health effects of pesticides, or for assistance in recognizing and managing pesticide poisoning symptoms, please contact the National Pesticide Information Center (NPIC). Call toll-free 1-800-858-7378, from 6:30 am to 4:30 am Pacific Time, or 9:30 am to 7:30 pm Eastern Standard Time, seven days a week. The NPIC internet address is http://npic.orst.edu. EXIT Disclaimer