United States Environmental Protection Agency | Office of Prevention, Pesticides And Toxic Substances (H-7508W) | EPA-738-F-94-014 September 1994

R.E.D. FACTS

Difenzoquat

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 which were first registered years ago 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, describing the human health and environmental effects of each pesticide. The Agency imposes any regulatory controls that are needed to effectively manage each pesticide's risks. EPA then reregisters pesticides that can be used without posing unreasonable risks to human health or the environment.

When a pesticide is eligible for reregistration, EPA announces this and explains why in a Reregistration Eligibility Decision (RED) document. This fact sheet summarizes the information in the RED for reregistration Case 0223, difenzoquat.

Use Profile

Difenzoquat is a selective, post-emergent herbicide used to control wild oats in barley and wheat. Wild oats is an annual grassy weed that out-competes barley and wheat, causing serious yield losses. Marketed under the trade name Avenge, difenzoquat is a soluble concentrate/liquid applied once per growing season as a ground or aerial broadcast treatment. Most of the product used in the U.S. is applied to wheat crops (64-77%).

Regulatory History

Difenzoquat was first registered as a pesticide in the U.S. in July 1975, for its current uses. EPA issued a Registration Standard for difenzoquat in December 1988 (NTIS #PB89-162127). Currently, two difenzoquat pesticide products are registered. One is a technical grade, manufacturing use product containing 96% of the active ingredient; the other is the end-use product Avenge, a soluble concentrate containing 31.2% active ingredient.

Human Health Assessment

Toxicity

In acute toxicity studies, difenzoquat has caused severe irritation to the eyes of rabbits. It has been placed in Toxicity Category I, indicating the greatest degree of acute toxicity, for eye irritation effects. Difenzoquat

causes a moderate degree of acute toxicity administered orally, to the skin and by inhalation, and has been placed in Toxicity Categories II and III for these effects.

In a subchronic feeding study using beagle dogs, difenzoquat caused no treatment-related effects. However, treatment-related skin reactions and effects were noted in a dermal toxicity study using rabbits.

A chronic toxicity study using rats resulted only in decreased body weight gains. A study using beagle dogs resulted in numerous toxic signs including high mortality, decreased food consumption, weight loss, tremors, lethargy and irregular gait. Difenzoquat is not carcinogenic in studies using rats and mice, and has been classified as a Group E carcinogen (a compound showing evidence of non-carcinogenicity for humans).

Developmental toxicity studies using rats and rabbits resulted in maternal toxicity in the higher dose groups, a decrease in fetal weights in rats, and vertebrae abnormalities in rabbit offspring. In a reproductive toxicity study using rats, difenzoquat caused maternal decreased body weight gain and weight decreases in pups at birth and weaning. Difenzoquat is not mutagenic. Neurotoxicity studies still are required.

Dietary Exposure

People may be exposed to low level residues of difenzoquat in the diet when consuming wheat, barley or the meat of poultry, cattle, hogs and sheep. Tolerances or maximum residue limits are established, and have been reassessed, for residues of difenzoquat in barley and wheat grain and straw, in the meat, fat and byproducts of cattle, goats, hogs, horses and sheep, and in poultry meat and meat byproducts (please see 40 CFR 180.369). Tolerances are not established or needed for milk or eggs, but food and feed additive tolerances must be established for wheat bran and shorts, and barley bran and hulls.

EPA estimates that the overall U.S. population is exposed to about 0.1% of the difenzoquat Reference Dose (RfD), or amount believed not to cause adverse effects if consumed daily over a 70-year lifetime. Children aged one through six, the most highly exposed population subgroup, are exposed to about 0.2% of the RfD. The new food additive tolerance for wheat bran will not cause a measurable increase in these extremely low exposure levels.

Occupational and Residential Exposure

Pesticide handlers (mixers, loaders and applicators) may be exposed to difenzoquat during application. However, difenzoquat generally is of low acute toxicity and causes no toxicity concerns for workers, with the exception of primary eye irritation. Since difenzoquat is extremely acutely toxic to the eyes and is placed in Toxicity Category I for eye irritation, a 48 hour restricted entry interval (REI) imposed by the Worker Protection Standard (WPS) will be maintained. During this time period, workers who must enter treated areas will be required to wear personal protective

equipment (PPE) including coveralls, chemical-resistant gloves, shoes plus socks, and protective eyewear.

Human Risk Assessment

Although difenzoquat is used on barley and wheat crops, consumers are exposed to extremely low level residues in their diets posing no known risks. Difenzoquat generally is of low acute toxicity but poses a risk of acute eye irritation to workers. To mitigate this risk, a 48 hour restricted entry interval will be maintained. People who must enter treated areas during this time are required to wear designated protective clothing and equipment including protective eyewear.

Environmental Assessment

Environmental Fate

Difenzoquat is persistent and relatively immobile. However, the environmental fate assessment is not complete because the route of dissipation has not been established. Laboratory data indicate that difenzoquat binds with/is immobile in soil and has little potential for ground water contamination. However, field dissipation studies contrast sharply and indicate that residues decline with time. Additional, confirmatory data are required to compare the recovery methods used in laboratory and field studies.

Ecological Effects

Difenzoquat is slightly toxic to practically non-toxic to birds and freshwater fish, but is moderately toxic to freshwater invertebrates. It is non-toxic to honey bees.

Ecological Effects Risk Assessment

Current uses of difenzoquat do not pose any unreasonable threat to the environment. Difenzoquat is believed to present a slight to moderate potential for acute toxicity to wildlife and aquatic species. Actual acute risks, however, appear to be minimal. Chronic toxicity to wildlife appears to be slight, and chronic risk to fish is unlikely.

Since difenzoquat is a herbicide that is applied aerially, risk to non-target aquatic and terrestrial plants, including endangered plant species, is expected to be high. Additional, confirmatory data are required to assess these risks. In addition, EPA is exploring risk mitigation for all herbicides.

Additional Data Required

EPA is requiring the following generic data for difenzoquat to confirm its regulatory assessments and conclusions:

Acute and 90-Day Neurotoxicity Screening Studies;

Seed Germination/Seedling Emergence;

Vegetative Vigor;

Aquatic Plant Growth;

Confined Rotational Crop;

Droplet Size Spectrum;

Drift Field Evaluation;

Non-guideline laboratory study comparing recovery methods used in previous laboratory and field dissipation studies.

The Agency also is requiring product-specific data including product chemistry and acute toxicity studies, revised Confidential Statements of Formula (CSF) and revised labeling for reregistration.

Product Labeling Changes Required

The labels of all registered pesticide products containing difenzoquat must comply with EPA's current pesticide labeling requirements. No additional labeling requirements are required for the end-use product at this time. However:

- The Restricted Entry Interval (REI) established by the Worker Protection Standard must remain at 48 hours. This REI must be inserted into the standardized REI statement required by PR Notice 93-7.
- Personal protective equipment (PPE) for early entry includes coveralls, chemical resistant gloves, shoes plus socks, and protective eyewear. These items must be inserted into the early entry PPE statement required by PR Notice 93-7.

Regulatory Conclusion

The use of currently registered pesticide products containing difenzoquat in accordance with approved labeling will not pose unreasonable risks or adverse effects to humans or the environment. Therefore, all uses of these products are eligible for reregistration.

These difenzoquat products will be reregistered once the confirmatory generic data, product specific data, revised Confidential Statements of Formula and revised labeling are received and accepted by EPA.

For More Information

EPA is requesting public comments on the Reregistration Eligibility Decision (RED) document for difenzoquat during a 60-day time period, as announced in a Notice of Availability published in the Federal Register. To obtain a copy of the RED document or to submit written comments, please contact the Pesticide Docket, Public Response and Program Resources Branch, Field Operations Division (7506C), Office of Pesticide Programs (OPP), US EPA, Washington, DC 20460, telephone 703-305-5805.

Following the comment period, the difenzoquat RED document will be available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, telephone 703-487-4650.

For more information about EPA's pesticide reregistration program, the difenzoquat RED, or reregistration of individual products containing difenzoquat, please contact the Special Review and Reregistration Division (7508W), OPP, 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 Pesticides Telecommunications Network (NPTN). Call toll-free 1-800-858-7378, between 8:00 am and 6:00 pm Central Time, Monday - Friday.