Endosulfan Fact Sheet

Endosulfan is an organochlorine insecticide that was first marketed in the 1950s. Like DDT and other organochlorines, endosulfan bioaccumulates in food chains; contaminates air, food, and drinking water; and poisons children, farmworkers, and wildlife. Exposure to endosulfan is associated with illnesses ranging from developmental and reproductive impairment to neurological damage and autism. Endosulfan is so dangerous that it has been banned or severely restricted in the European Union and over 20 other nations, but it continues to be widely used in the United States to control agricultural pests on a variety of fruit, vegetable, and field crops.

Risks to children

Infants and children are especially vulnerable to endosulfan poisoning:

- Endosulfan has been detected in the air in schools at levels exceeding levels-of-concern for young children derived from EPA data.[1]
- New research suggests that mothers who lived near applications of endosulfan during the first trimester of their pregnancy are more likely to have children who develop autism.[2]
- The pesticide is a suspected "endocrine disruptor," and is associated with reproductive and developmental effects such as miscarriages, reduced sperm quality and count, impairment of sexual organs, and delayed sexual maturity.[3]
- Endosulfan's endocrine disrupting properties also increase the risk of breast cancer in humans.[4]
- Studies suggest that young animals are more sensitive to the effects of endosulfan than mature animals.[5]
- Other effects of endosulfan exposure include tremors, convulsions, nausea, diarrhea, unconsciousness, permanent brain damage, coma, and death.
- Endosulfan is also found in food supplies,[6] drinking water,[7] and in the tissues and breast milk of pregnant mothers.[8]
- In 2007, EPA re-assessed endosulfan and determined that the risks to humans are even higher than it had previously estimated.[9] EPA has taken no regulatory action in response to these new findings.

Risks to wildlife

Endosulfan poses severe risks to threatened and endangered species and other wildlife:

- According to the National Oceanic and Atmospheric Agency, endosulfan was responsible for more fish kills in U.S. waters than all other pesticides between 1980 and 1989.[10]
- Endosulfan is implicated in the worldwide decline of amphibians.[11]
- Endosulfan has been detected in the tissues of numerous species including polar bears,[12] minke whales,[13] and northern fulmars (an Arctic bird species).[14]
- In 1989, the U.S. Fish and Wildlife Service determined that that a total 130 threatened and endangered species were potentially affected by the use of endosulfan and 43 species were jeopardized by endosulfan uses.[15]

- In 2002, EPA confirmed that registered uses of endosulfan pose risks of concern to all types of endangered species.[16]

Endosulfan contamination

Once endosulfan is released into the environment, it is highly persistent and mobile:

- Endosulfan is transported long distances in the atmosphere and has been detected in areas far from use sites, including national parks and the Arctic.[17]
- The half-life of combined residues of endosulfan varies from 9 months to 6 years.[18]
- The main degradation product, endosulfan sulphate, is equally toxic to the parent compound and perhaps even more persistent.[19]

Effective alternatives

Effective and proven alternatives to endosulfan are readily available to growers. Data on endosulfan alternatives are available at http://www.panna.org/files/field_guide_without_endosulfan.pdf

Regulatory status

EPA continues to allow endosulfan to be used in the United States:

- Endosulfan is currently registered for use a wide variety of crops including cotton, apples, pears, melons, cucumbers, squash, lettuce, celery, apricots, peaches, nectarines, plums, cherries, non-bearing citrus, tomatoes, sweet corn, sweet potatoes, potatoes, broccoli, cauliflower, cabbage, Brussels sprouts, blueberries, strawberries, alfalfa, almonds, walnuts, filbert nuts, macadamia nuts, peppers, eggplant, carrots, tobacco, and pineapples.[20]
- Approximately 1.38 million pounds of endosulfan are used annually in the United States.[21]

Use of endosulfan has been severely curtailed in other parts of the world:

- Nations that have completely banned or severely restricted use of endosulfan include Bahrain, Belize, Cambodia, Columbia, Cote d'Ivoire, the European Union, Jordan, Kuwait, Malaysia, Norway, Oman, Pakistan, the Philippines, Qatar, Saudi Arabia, Singapore, St Lucia, Sri Lanka, Syria, Tonga, and the United Arab Emirates.
- In February 2008, the West African nation of Benin announced that endosulfan would be banned once existing stocks are used. Nine West African countries have recently banned the use of endosulfan on cotton—Senegal, Mauritania, Mali, Guinea Bissau, Burkina Faso, Tchad, Cap-Vert, Gambia, and Niger. Endosulfan is also banned in the state of Kerala, India, as a result of severe adverse effects arising from aerial spraying of endosulfan on cashew plantations.
- The United Nations Environment Programme is currently considering a proposal to include endosulfan on the Stockholm Convention's list of persistent organic pollutants,

which would result in a near-global ban.[22] The United States has not ratified the Stockholm Convention.

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[3] Wilson et al., *Endosulfan elevates testosterone biotransformation and clearance in CD-1 mice*, Toxicol. Appl. Pharmacol. 148:158-168 (1998); Singh et al., *Effect of sub-chronic endosulfan exposures on plasma gonadotrophins, testosterone, testicular testosterone and enzymes of androgen biosynthesis in rat*, Indian J. Exp. Biol. (10):953-6 (1990); Singh et al., *Gonadal toxicity of short term chronic endosulfan exposure to male rats*, Indian J. Exp. Biol. (4):341-6 (1989).
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[8] Damgaard et al., *Persistent Pesticides in Human Breast Milk and Cryptorchidism*, Environ. Health Perspect. 114(7) 1133-1138 (2007).
[9] U.S. Environmental Protection Agency, *Endosulfan. Acute and Chronic (Food and Drinking Water) Dietary Exposure Assessment to update the 2002 Reregistration Eligibility Decision* (March 14, 2007).
[10] U.S. Environmental Protection Agency, Office of Pesticide Programs, *Endosulfan Environmental Fate and Ecological Risk Assessment* (2002).
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