Birth Defect Research for Children,inc.
Fact Sheets

Dursban and Birth Defects

What is it? Dursban is a trade name for chlorpyrifos, a broad-spectrum insecticide used to kill a wide variety of insects. Classified as an organophosphate, chlorpyrifos is a contact poison that interferes with an enzyme essential for the proper working of the nervous system in humans and insects. Chlorpyrifos is relatively insoluble in water, binds strongly to soil particles, and is persistent in the environment. It is absorbed in human and animal body fat up to 40 days after a single exposure. Chlorpyrifos is available in emulsifiable concentrate, dust, pellet, spray, granules, and wettable powder. It was registered for direct use on certain animals, farms and farm buildings, schools, nurseries, hospitals, restaurants, commercial buildings, and domestic buildings. However, it was withdrawn by the manufacturer for indoor applications and from the direct application pet care product market. Chlorpyrifos is routinely used by homeowners and pest control companies for outdoor insect treatments and yard turf grass applications, and is used to saturate the soil as a termite preventative just prior to pouring the concrete foundation. The EPA requires a 24-hour reentry interval before entering crop areas treated with emulsifiable and wettable formulations of chlorpyrifos, unless protective clothing is worn. Indoor air guidelines for chlorpyrifos have been exceeded during indoor flea applications and reached borderline evacuation levels in many homes which have been treated for termites.

Acute Effects: Chlorpyrifos is toxic to humans and affects the central nervous system, the cardiovascular system and the respiratory system. Human exposure is from inhalation, contact with the skin, and less frequently by ingestion. When chlorpyrifos is inhaled, the first symptoms may include runny nose, coughing, chest discomfort, difficult or short breath, and wheezing due to constricted breathing passages. Skin contact may cause sweating and muscle contractions. After exposure by

any route, other symptoms may occur after a few minutes to 12 hours. Those symptoms may include pallor, nausea, vomiting, diarrhea, abdominal cramps, headache, dizziness, eye pain, blurred vision, constriction and dilation of eye pupils, tears, salivation, and confusion. Severe poisoning will affect the central nervous system, producing lack of coordination, slurred speech, loss of reflexes, weakness, fatigue, muscle contractions, twitching, tremors of the tongue or eyelids, and eventually paralysis of the body extremities and respiratory muscles. Death may be caused by respiratory failure or cardiac arrest.

Chronic Effects: Repeated or prolonged exposure to chlorpyrifos may result in the same effects as acute exposure including the delayed symptoms. Other effects from exposure include impaired memory and concentration, disorientation, severe depression, irritability, confusion, headache, speech difficulties, delayed reaction times, nightmares, sleepwalking, drowsiness or insomnia and many flu-like conditions. In *Chemical Exposure and Disease* (Princeton Scientific Publishing Co., Inc., 1994), Dr. Janette Sherman examined the use of organophosphates and chlorpyrifos in home and occupational settings. In addition to Dursban's toxicity and persistence, she points out that since chlorpyrifos is "not readily water soluable," a solvent must be used to dissolve it in the pesticide formulation. The solvent carries its own risks of toxicity. Dioxin may also be a contamination byproduct of the manufacturing process. These additional variables must be factored into evaluating the toxicity of chlorpyrifos. Newborns and young children are especially sensitive to organophosphates like Dursban because of rapidly growing cells and immature central nervous and immune systems.

Reproductive Effects

Animal Studies: Although the EPA has not determined that chlorpyrifos adversely affects reproduction, tests conducted by the manufacturer in pregnant mice resulted in small pups with an increased incidence of skeletal abnormalities at the highest doses and skull defects that allowed the brain to be exposed at lower doses. Other studies in rats found that low doses of chlorpryrifos resulted in increased fetal deaths with decreased body weight and neurotoxicity in the survivors. When Dursban was injected into male rats, semen-producing cells in the testes were destroyed. After Dursban 44 was applied to185 bulls at an artificial insemination facility, all became ill, 7

died, and the rest experienced a dose-related reduction in sperm production. In 1978, a monkey-rearing facility was treated with chlorpyrifos. Of 98 monkeys in the facility, 19 died and many became ill. Two of the sick monkeys aborted pregnancies and two became infertile. In addition, two retarded offspring were born.

Human Studies: A German study in humans found chlorpyrifos in cervical mucus, sperm fluid, and breast milk. In the October/November 1997 edition of Archives of Environmental Health, Dr. Sherman reviewed a study of "adverse reproductive outcomes associated with Dursban exposure during pregnancy" based on data submitted to the EPA by the manufacturer. (Dursban Revisited: Birth Defects, US EPA and the Center for Disease Control; 52(5); 332-333, 1997). The birth defects reported included brain and central nervous system, eye, cardiac, ear, palate, limb, genitourinary, muscle tone anomalies, and mental retardation. In 1993, a popular magazine reported that two successive children born to a family that regularly treated their house with Dursban had birth defects. Both children were born with cerebral palsy and cataracts, and suffered from seizures.

Resources

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