

Chemical Watch Factsheet

A Beyond Pesticides/ NCAMP Factsheet

p-DCB

para-dichlorobenzene

A common space deodorant and moth control agent, and found in solid cakes used to deodorize toilets and urinals, para-dichlorobenzene (p-DCB) is also a raw material in the manufacture of engineering thermoplastics (e.g. Phillips Petroleum's Ryton™, a polyphenylene sulfide resin). p-DCB is a chlorophenol compound, a class which includes the herbicides 2,4-D (Weedone™), 2,4,5T/Silvex (now banned), and the wood preservative pentachlorophenol (Penta™). Ninety percent of the production of the related, more toxic compound ortho-dichlorobenzene is used to manufacture the herbicide dichloropropionanilide (Propanil) for use on rice.

There are three major domestic suppliers of p-DCB: Monsanto, PPG Industries and Standard Chlorine. EPA estimated in 1984 that production was 73.5 million pounds. The Agency estimates that 77 million people are exposed to p-DCB used as a toilet deodorant alone.

The risks associated with exposure may be high. The National Toxicology Program (NTP) published findings in January, 1987, from rat and mouse carcinogenicity studies with p-DCB. The research-

ers found that p-DCB was specifically toxic to the mouse liver and the rat kidney. Male rats developed dose-responsive malignant kidney tumors; these males also suffered increased incidences of mononuclear cell leukemia. Female rats did not develop tumors.

the staggering risk of 6 cancers per 100 people exposed.

EPA currently classifies p-DCB as a Class C, or possible human, carcinogen. In October, 1987, EPA called in data from registrants, asking for information on product and residue chemistry, environmental

fate and CORT data (chronic effects, oncogenicity by the inhalation route, reproductive and teratogenic effects) by 1991.

p-DCB has often been described as a "safe" mothproofing chemical, simply because it is not as acutely toxic to humans (LD50=500 mg/kg) as naphthalene or cam-

phor. p-DCB is readily metabolized in the liver, where its presence triggers production of the liver enzymes needed to break it down. This property, the ability to "induce" liver cells to synthesize large amounts of new mixed function oxidases, is shared among many chlorinated hydrocarbons.

Nevertheless, reviewers have noted cases of chronic exposure manifesting in: 1) liver effects like jaundice and yellow atrophy (liver filled with fat); 2) kidney effects, seen in one case where a 69 year old man who had sat in a p-DCB-treated chair developed a kidney

chemicalWATCH Stats:

Chemical Class: Halogenated organic compound

Use: Insecticide, Insect Repellent, Rodenticide, Fungicide

Toxicity Rating: Slightly toxic

Signal Word: Warning

Long-term Health Effects: Possible Human Carcinogen (Group C).

Environmental Effects: Listed as a hazardous air pollutant by EPA. Moderately toxic to fish and slightly to moderately toxic to aquatic invertebrates.

In mice, malignant liver tumors developed in males and females at the highest dose tested. Male mice at the highest dose tested developed a very rare liver tumor, hepatoblastoma. In addition, there were increased incidences of adrenal and thyroid tumors in female mice.

In 1987, EPA's Office of Toxic Substances circulated draft cancer risk estimates. For exposure to toilet deodorants, they estimated risks as high as 5 extra cancer cases per 10,000 people, for exposure to space deodorants, as many as 1 cancer per 1,000 people, and for workers handling p-DCB, they calculated

inflammation (glomerulonephritis) and allergic purpura of the skin; 3) respiratory symptoms like labored breathing (dyspnea) and tumor-like nodules in the lungs (pulmonary granulomatosis); 4) eye effects, such as cataracts developing in young

women chronically exposed to p-DCB vapors; 5) neurological effects, including headache, agitation, and in overdose cases, seizures and hallucinations; and 6) blood effects such as small red blood cells lacking hemoglobin (hypochromic

microcytic anemia). In particular, a woman who handled both naphthalene and p-DCB flakes while mothproofing garment stock in a poorly-vented clothing resale shop developed aplastic anemia.

reprinted from *Pesticides and You*, Volume 8, Number 1. March 1988.

Update, November 2007:

In September 2007, the EPA signed the Reregistration Eligibility Decision (RED) for p-DCB. This document identified moth repellents as the primary use of, and exposure to, p-DCB. Since p-DCB is registered for indoor uses only and has no registered food uses, ecological risk assessments and dietary and drinking water exposures were not evaluated, even though the Agency for Toxic Substances and Disease Registry (ATSDR) has noted that low levels of p-DCB can occur in drinking water. On the EPA's National Priorities List, p-DCB has been identified on at least 244 out of more than 1600 waste sites.

The Department of Health and Human Services (DHHS) has determined that p-DCB may reasonably be anticipated to be a carcinogen, while the EPA has classified it as "Not Likely to be Carcinogenic to Humans" in 2007- a classification that was downgraded from its previous rating as a Group C- possible human carcinogen. The National Institute for Occupation Safety and Health (NIOSH) has also listed p-DCB as a potential occupational carcinogen. According to EPA's Air Toxic's program, the primary exposure pathway to p-DCB is from breathing contaminated indoor air.

The RED document indicated that among children under the age of six, there were 3,165 exposure cases to p-DCB while the entire population has 4,480; thus children represent the largest portion of the total exposed in the population (70.6%). The majority of these are a result of moth repellent exposures, especially via ingestion. The EPA acknowledges that there are uncertainties associated with both the toxicity data used for ingestion risk assessments and with the human incident report. As a result, the Agency recommends that that mothballs no longer be marketed in such a way that individual moth balls are applied to areas accessible to children, and to package the product in such a way as to discourage children from ingesting the product. Precautionary label language was also recommended to warn consumers about the risks to children.

p-DCB chemicalWATCH Factsheet Bibliography

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