

Embryotoxicity and Fetotoxicity of Inhaled or Ingested Vinylidene Chloride in Rats and Rabbits^{1,2}

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Embryotoxicity and Fetotoxicity of Inhaled or Ingested Vinylidene Chloride in Rats and Rabbits. MURRAY, F. J., NITSCHKE, K. D., RAMPY, L. W., AND SCHWETZ, B. A. (1979). *Toxicol. Appl. Pharmacol.* 49, 189-202. The teratogenic potential of inhaled or ingested vinylidene chloride was evaluated in Sprague-Dawley rats and New Zealand white rabbits. Both species were exposed to the test material by inhalation for 7 hr/day at concentrations of 20 (rats only), 80, or 160 ppm. For the ingestion study, rats were given drinking water containing 200 ppm vinylidene chloride. Rats were given vinylidene chloride from the 6th to the 15th days of gestation and rabbits on the 6th to the 18th days. A teratogenic effect was not seen in rats or rabbits inhaling concentrations of up to 160 ppm vinylidene chloride for 7 hr/day or in rats given drinking water containing 200 ppm vinylidene chloride. Toxicity to both the dams and their developing embryos was observed among the rats inhaling 80 or 160 ppm and among the rabbits inhaling 160 ppm. At exposure levels which caused little or no maternal toxicity (20 ppm in rats and 80 ppm in rabbits), there was no effect on embryonal or fetal development. Among the rats given drinking water containing 200 ppm VDC, there was no evidence of toxicity to the dams or their offspring.

Vinylidene chloride (1,1-dichloroethylene, VDC, $\text{CH}_2=\text{CCl}_2$) is used in the manufacture of various plastics, including films and coatings for food packaging. Reports on the acute toxicity of vinylidene chloride in laboratory animals have indicated moderate toxicity when given by inhalation or by gavage (Carpenter *et al.*, 1949; Rylova, 1953; Siegel *et al.*, 1971; Jenkins *et al.*, 1972; Jaeger *et al.*, 1973). Exposure by inhalation to 100 ppm vinylidene chloride for 6 weeks

resulted in some weight loss in rabbits and monkeys, but not in rats, guinea pigs, or dogs (Prendergast, 1967). Rats exposed for up to 4 weeks to 500 ppm vinylidene chloride exhibited nasal irritation, decreased weight gain, and liver cell degeneration; at 200 ppm, the only sign of toxicity was slight nasal irritation (Gage, 1970).

Vinylidene chloride has been shown to be a weak mutagen in certain strains of bacteria (McCann *et al.*, 1975; Greim *et al.*, 1975; Bartsch *et al.*, 1975). This effect was seen in bacterial systems only under conditions of activation with microsomal enzymes, implicating a metabolite of vinylidene chloride rather than vinylidene chloride itself as the causative agent.

No information regarding the teratogenic potential of vinylidene chloride was found in

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