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TOXICOLOGICAL REVIEW

OF

1,3-DICHLOROPROPENE

(CAS No. 542-75-6)

**In Support of Summary Information on the
Integrated Risk Information System (IRIS)**

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contain confounding chemicals as well, as it is unstable when exposed to heat and oxygen or heat and light (Watson et al., 1987). Degradation products will also form at room temperature if dichloropropene is stored for several weeks in the presence of oxygen (Watson et al., 1987).

3. TOXICOKINETICS RELEVANT TO ASSESSMENTS

1,3-Dichloropropene toxicokinetics in humans appear to be similar to those observed in rodents. Inhalation studies with both humans and animals have shown that 1,3-dichloropropene vapors are readily absorbed, conjugated with glutathione (GSH) via glutathione S-transferase (GST), and rapidly excreted in the urine as N-acetyl-(S-3-chloroprop-2-enyl)cysteine (3CNAC), a mercapturic acid metabolite (see Figure 1). Thus, the major metabolic pathway for 1,3-dichloropropene leads to its detoxification and excretion. Ingestion studies in animals have demonstrated that the toxicokinetics of oral exposures are similar to those of inhalation exposures. 1,3-Dichloropropene is unlikely to accumulate in the body.

3.1. ABSORPTION

Stott and Kastl (1986) studied the inhalation pharmacokinetics of technical-grade 1,3-dichloropropene by exposing male Fischer 344 (F344) rats to mean vapor concentrations of 30, 90, 300, and 900 ppm (136, 409, 1,363, and 4,086 mg/m³, respectively) for 3 hours. These air concentrations produced vapor uptakes of 147, 307, 880, and 1,810 nanomoles per minute, and corresponding absorption fractions of 82%, 65%, 66%, and 62%, respectively. Based upon the uptake of dichloropropene vapors, average amounts of dichloropropene absorbed by rats over the 3-hour exposure period were approximately 14, 29, 85, and 171 mg/kg in the 136, 409, 1,363, and 4,086 mg/m³ exposure groups, respectively. Even though the rate of uptake increased with increasing exposure, the increase was not linear at higher concentrations. The decrease in vapor uptake at higher concentrations was associated with an exposure-related depression in ventilatory frequency, which was statistically significant at 409 mg/m³ and higher. Stott and Kastl (1986) indicate that Alarie (1973) observed exposure-related depression in ventilatory frequency with numerous respiratory irritants; they suggest that 1,3-dichloropropene is a respiratory irritant.

The major site of absorption of inhaled 1,3-dichloropropene in the rat is the lung rather than the nasal mucosa (Stott and Kastl, 1986). The localized uptake of vapors in rats exposed to 90 or 150 ppm (409 or 682 mg/m³, respectively) was examined by surgically isolating the upper and lower respiratory tract. The lower respiratory tract absorbed approximately 50% of inhaled dichloropropene vapors whereas the upper respiratory tract absorbed only 11%–16% of vapors. Total absorption rates were approximately 73% and 79% at 409 and 682 mg/m³, respectively.

In 1992, Waechter et al. showed that absorption of 1,3-dichloropropene from inhalation exposure in humans was similar to absorption in rats (Stott and Kastl, 1986). Six male volunteers were exposed to 1 ppm (4.54 mg/m³)¹ commercial Telone II® (50.6% cis isomer,

¹Calculated using conversion of 1 ppm = 4.54 mg/m³ at 25° C.

