

Abstracts of Papers for the Fifteenth Annual Meeting of the
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3. *Fate of [¹⁴C]Vinyl Chloride Following Inhalation Exposure in Rats.* P. G. WATANABE, G. R. MCGOWAN, E. G. MADRID and P. J. GEHRING, Toxicology Research Laboratory, The Dow Chemical Company, Midland, Michigan.

The objective of the present study was to determine the rate of inhaled [¹⁴C]vinyl chloride (¹⁴C-VC) at different exposure concentrations in rats. Male rats were exposed to 10 or 1000 ppm [¹⁴C]VC for 6 hr and the routes and rates of elimination of ¹⁴C activity were followed for 72 hr after termination of exposure. Following exposure to 10 ppm VC, urinary ¹⁴C activity and expired VC comprised 68 and 2%, respectively, of the recovered radioactivity. After exposure to 1000 ppm VC, the proportion of the radioactivity in the urine decreased while that expired as VC increased, representing 56 and 12%, respectively. The pattern of pulmonary elimination of VC per se was described by similar monoexponential processes following 10 or 1000 ppm with respective half-lives of 20.4 and 22.4 min. The elimination of ¹⁴C in the urine was described by a biexponential process; the half-lives for the initial phase of excretion were 4.6 and 4.1 hr following 10 and 1000 ppm, respectively. The percentage of the recovered ¹⁴C remaining in the carcass after 72 hr was 14 and 15%, at the respective low and high exposure levels. The ¹⁴C remaining in the tissues was comprised primarily of nonvolatile metabolites of VC rather than VC per se. The urinary ¹⁴C was separated by high-pressure liquid chromatography into three major metabolites corresponding to N-acetyl-S-(2-hydroxyethyl) cysteine, thiodiglycolic acid, and a third unidentified metabolite. The proportions of the urinary metabolites were not markedly influenced by the exposure magnitude. The fate of inhaled [¹⁴C]VC was shown to be dose-dependent and this is consistent with previous studies on the fate of VC following ingestion.

144. *Sensory Irritation Caused by the Decomposition Products of Polyvinyl Chloride.* CRAIG S. BARROW, YVES ALARI and MARYANNE F. STOCK, Department of Occupational Health, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, Pennsylvania.

The evaluation of potentially toxic gases has come to be recognized as one of the salient features of fire toxicity. This study was undertaken to quantitate the degree of sensory irritation to the upper respiratory tract of mice to the decomposition products of three different formulations (A, B, and C) of polyvinyl chloride (PVC). Polymer A contained a plasticizer, polymer B contained a plasticizer and fire retardant, and polymer C contained neither plasticizer nor fire retardant. Groups of three to four male Swiss-Webster mice were exposed to the decomposition products of approximately 50-60 mg of each polymer. The thermogravimetric analysis of each polymer demonstrated that two distinct weight loss fractions occurred during the decomposition process. By varying the dilution air through the exposure chamber a range of exposure concentrations was obtained for each weight loss fraction. Dose-response curves were plotted by utilizing the percentage decrease in respiratory rate during each exposure as the response parameter. The results showed that in terms of sensory irritation PVC-A > PVC-B > PVC-C for the first weight loss fraction. Similar comparisons were made for the second weight loss fractions. Based on this work and previous studies of sensory irritation to other airborne chemicals, predictions of qualitative and quantitative human responses to sensory irritants such as the decomposition products of PVC are possible. (Supported under Research Grant No. 5-9005 from the National Bureau of Standards.)

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