Fact Sheet Date: March 12, 1998

NEW YORK STATE
- HUMAN HEALTH FACT SHEET -

Ambient Water Quality Value for Protection of Sources of Potable Water

SUBSTANCE: 2-Chlorotoluene **CAS REGISTRY NUMBER:** 95-49-8

AMBIENT WATER QUALITY VALUE: 5 ug/L

BASIS: Surface Water: Principal Organic Contaminant Classes

Groundwater: Former Reference to 10 NYCRR Subpart 5-1 Principal Organic Contaminant (POC) General Maximum Contaminant Level (MCL)

SUMMARY OF INFORMATION

Introduction

A search of relevant sources (see Scope of Review, below) found some information on 2-chlorotoluene (o-chlorotoluene).

2-Chlorotoluene does not have a Specific MCL as defined in 6 NYCRR 700.1, but is in principal organic contaminant class iii as defined in 700.1.

Pharmacokinetics

Detailed pharmacokinetic information is provided by U.S. EPA (1989). Studies indicate over 90% absorption from the gastrointestinal tract (Wold and Emmerson, 1974; Quistad et al., 1983). Wold (1974) stated that 2-chlorotoluene is rapidly and extensively metabolized and excreted following oral administration to the rat.

Oncogenic Effects

U.S. EPA (1989) describes the carcinogenic classification for this substance as "Group D: not classified," a category used to signify that adequate data to evaluate its potential are not available. No information on its carcinogenicity is listed on IRIS.

Non-oncogenic Effects

The non-oncogenic effects of 2-chlorotoluene have been assessed by several studies. Gibson et al. (1974a) administered 0, 20, 80 or 320 mg/kg/day 2-chlorotoluene to rats by gavage for 103 to 104 days. Effects at the middle dose included increased blood urea nitrogen, and in males, increased adrenal weight and decreased mean body weight gain. A no-observed-adverse-effect level (NOAEL) of 20 mg/kg was identified.

U.S. EPA (1989) also reported a NOAEL of 80 mg/kg from the work of Gibson et al. (1974b), the highest of three doses tested in a 97-day oral dog study.

From a developmental study on rabbits via inhalation (Huntingdon Research Center, 1983b), U.S. EPA (1989) reported maternal and fetal NOAELs of 1500 and 10,000 mg/m^3 respectively. Exposures were 6 hours/day to 0, 1,500, 4,000 or 10,000 mg/m^3 of 2-chlorotoluene vapors over gestation days 6 through 28.

In another inhalation study, Huntingdon Research Center (1983a) exposed pregnant rats to 2-chlorotoluene vapors, 6 hours/day, at 0, 1,000, 3,000 or 9,000 mg/m^3 over gestation days 6 through 19. No effects in the parent animals were reported at the low dose but several effects of unstated significance were noted at the mid and high doses. At 9,000 mg/m^3 there was an increased incidence of malformed fetuses and a significant reduction in litter and mean fetal weight. One fetus at 1,000 mg/m^3 was also malformed.

In a 90-day study performed by Industrial Bio-test Laboratories, and submitted to U.S. EPA by Occidental Chemical (1987), a mixture of 51% 2-chlorotoluene and 48% 4-chlorotoluene was given orally by capsule to beagle dogs at 0, 30, 100 or 300 mg/kg/day. Effects reported at the high dose include a "slightly lower" (than control males) group mean overall body weight gain in males and "slightly lower...than control males" erythrocyte counts, hemoglobin concentrations and hematocrit values.

Occidental Chemical (1983) summarized a 90-day gavage study on monochloro-toluene (51% 2-chlorotoluene and 48% 4-chlorotoluene) in which rats were dosed at 0, 100, 300 or 1,000 mg/kg/day. Several effects were noted at the high dose, with slightly reduced body weights in females at the mid dose.

The abstract of a Russian study reported the maximum no effect dose of 2-chlorotoluene to be 0.01 mg/kg, and that this isomer had similar toxic manifestations as 4-chlorotoluene (Tolstopyatova and Zholdakova, 1980). According to U.S. EPA (1985) the abstract contained no further details.

OTHER VALUES

U.S. EPA's IRIS (1994) lists an oral reference dose (RfD) of 0.02 mg/kg/day based on a NOAEL of 20 mg/kg/day in rats, from the same Gibson et al. (1974a) study as described above.

2-Chlorotoluene has no federal drinking water maximum contaminant level (MCL) or MCL goal (MCLG).

U.S. EPA (1989) has a Lifetime Health Advisory (HA) for 2-chlorotoluene of 100 ug/L, based on a NOAEL of 20 mg/kg/day from the study by Gibson et al. (1974a), a total uncertainty factor of 1000 and assuming a 20% relative source contribution from drinking water, as shown below.

$$\text{Lifetime HA} = \frac{20\ \text{mg/kg/day}}{1000} \times \frac{70\ \text{kg}}{2\ \text{L/day}} \times 0.2 = 0.14\ \text{mg/L (rounded to 100 ug/L)}$$

Under the State Sanitary Code (10 NYCRR Part 5, Public Water Supplies), the New York State Department of Health has established a maximum contaminant level of 5 ug/L for "Principal Organic Contaminants" such as 2-chlorotoluene in drinking water.

DERIVATION OF VALUE

None of the studies described above yield a value more stringent than the principal organic contaminant value of 5 ug/L. The above information on Tolstopyatova and Zholdakova (1980) was insufficient to derive a value. Specific derivations for surface water and groundwater are described separately because of an historical difference between them in State water quality regulations.

Surface Water

Regulations [6 NYCRR 702.2(b)] require that the value be the most stringent of the values derived using the procedures found in sections 702.3 through 702.7. The principal organic contaminant class value of 5 ug/L (702.3(b)) represents the most stringent value that can be derived for 2-chlorotoluene. Therefore, the ambient surface water quality value for 2-chlorotoluene is 5 ug/L.

Groundwater

The principal organic contaminant (POC) groundwater standard of 5 ug/L (6 NYCRR 703.5) applies to 2-chlorotoluene. This standard became effective on January 9, 1989 by inclusion by reference to 10 NYCRR Subpart 5-1 standards. The basis and derivation of the POC standard are described in a separate fact sheet.

REFERENCES

Gibson, W.R., F.O. Gossett, G.R. Koenig and F. Marroquin. 1974a. The toxicity of daily oral doses of o-chlorotoluene in the rat. Prepared by Toxicology Division, Lilly Research Laboratories. Submitted to Test Rules Development Branch, Office of Toxic Substances, USEPA, Washington, D.C. (As cited by U.S. EPA, 1989.)

Gibson, W.R., F.O. Gossett, G.R. Koenig and F. Marroquin. 1974b. The toxicity of daily oral doses of o-chlorotoluene in the dog. Prepared by Toxicology Division, Lilly Research Laboratories. Submitted to Test Rules Development Branch, Office of Toxic Substances, U.S. EPA, Washington, D.C. (As cited by U.S. EPA, 1989.)

Huntingdon Research Center. 1983a. Effect of 2-chlorotoluene vapors on pregnancy of the rat. Submitted to Test Rules Development Branch, Office of Toxic Substances. Washington, D.C.: U.S. Environmental Protection Agency. (As cited by U.S. EPA, 1989).

Huntingdon Research Center. 1983b. Effect of 2-chlorotoluene vapors on pregnancy of the New Zealand White rabbit. Submitted to Test Rules Development Branch, Office of Toxic Substances, U.S. EPA, Washington, D.C. (As cited by U.S. EPA, 1989.)

6 NYCRR (New York State Codes, Rules and Regulations). Water Quality Regulations, Surface Water and Groundwater Classifications and Standards: Title 6 NYCRR, Chapter X, Parts 700-705. Albany, NY: New York State Department of Environmental Conservation.

10 NYCRR (New York State Codes, Rules and Regulations). Public Water Systems: Title 10 NYCRR, Chapter 1, State Sanitary Code, Subpart 5-1. Albany, NY: New York State Department of Health, Bureau of Water Supply Protection.

Occidental Chemical. 1983. Evaluation of subchronic toxicity data for monochlorotoluene. Submitted to U.S. EPA with letter of 5/18/83. NTIS/OTS #507456.

Occidental Chemical. 1987. 90-Day subacute oral toxicity study with monochloro-toluene isomers (lot no. S-75-1300) in beagle dogs with cover letter dated 062587. TSCA 8(d) submission to U.S. EPA Office of Toxic Substances. NTIS/OTS #0513167.

Quistad, G.B., K.M. Mulholland and G.C. Jamieson. 1983. 2-Chlorotoluene metabolism by rats. J. Agric. Food Chem. 31(6):1158-1162. (As cited by U.S. EPA, 1989.)

Tolstopyatova, G.V. and Z.I. Zholdakova. 1980. Comparative hygienic characteristics of chloro derivatives of toluene as possible water pollutants. Gig. Sanit. (12):64-66. (Rus) [CA 94(17)133360e]. (As cited by U.S. EPA, 1985.)

U.S. EPA (Environmental Protection Agency). 1985. Health and Environmental Effects Profile for Chlorotoluenes. Cincinnati, OH: Environmental Criteria and Assessment Office. EPA/600/X-85/045. PB88-176052.

U.S. EPA (Environmental Protection Agency). 1989. Health Advisory for o-Chloro-toluene. Washington, D.C.: Office of Science and Technology, Office of Water.

U.S. EPA (Environmental Protection Agency). 1994. 2-Chlorotoluene. On-line. Integrated Risk Information System (IRIS). Cincinnati, OH: Office of Research and Development, Environmental Criteria and Assessment Office.

Wold, J.S. 1974. The metabolism of o-chlorotoluene - ^{14}C in the rat. Toxicology Division, Lilly Research Laboratories. June, 1974.

Wold, J.S. and J.L. Emmerson. 1974. The metabolism of ^{14}C-o-chlorotoluene in the rat. Pharmacologist. 16(2):196. Abstract. (As cited by U.S. EPA, 1989.)

SCOPE OF REVIEW

Several of the widely-recognized sources listed below can provide a comprehensive review and often a quantitative assessment of the toxicity of a substance. These sources were searched for information on 2-chlorotoluene; where none was found it is so noted.

- IRIS (U.S. EPA's Integrated Risk Information System). On-line database.
- RTECS (Registry of Toxic Effects of Chemical Substances). On-line database.
- CCRIS (Chemical Carcinogenesis Research Information System). On-line database (substance not on CCRIS).
- ATSDR (Agency for Toxic Substances and Disease Registry) toxicological profile (document not found).
- U.S. EPA ambient water quality criteria document (document not found).
- U.S. EPA health advisory.
- U.S. EPA drinking water criteria document (document not found).
- IARC (International Agency for Research on Cancer) Monographs Supplement 7 (substance not listed)

The sources above are deemed adequate to assess the literature through 1983. Coverage of recent literature (through 1993) was provided by a New York State Library on-line search of the databases listed below.

- NTIS (National Technical Information Service)
- TOXLINE
- BIOSIS

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