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Provisional Peer Reviewed Toxicity Values for
2-Chloro-6-fluorophenol
(CASRN 2040-90-6)

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Acronyms and Abbreviations

| | |
|------------|--|
| bw | body weight |
| cc | cubic centimeters |
| CD | Caesarean Delivered |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act of 1980 |
| CNS | central nervous system |
| cu.m | cubic meter |
| DWEL | Drinking Water Equivalent Level |
| FEL | frank-effect level |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act |
| g | grams |
| GI | gastrointestinal |
| HEC | human equivalent concentration |
| Hgb | hemoglobin |
| i.m. | intramuscular |
| i.p. | intraperitoneal |
| IRIS | Integrated Risk Information System |
| IUR | inhalation unit risk |
| i.v. | intravenous |
| kg | kilogram |
| L | liter |
| LEL | lowest-effect level |
| LOAEL | lowest-observed-adverse-effect level |
| LOAEL(ADJ) | LOAEL adjusted to continuous exposure duration |
| LOAEL(HEC) | LOAEL adjusted for dosimetric differences across species to a human |
| m | meter |
| MCL | maximum contaminant level |
| MCLG | maximum contaminant level goal |
| MF | modifying factor |
| mg | milligram |
| mg/kg | milligrams per kilogram |
| mg/L | milligrams per liter |
| MRL | minimal risk level |
| MTD | maximum tolerated dose |
| MTL | median threshold limit |
| NAAQS | National Ambient Air Quality Standards |
| NOAEL | no-observed-adverse-effect level |
| NOAEL(ADJ) | NOAEL adjusted to continuous exposure duration |
| NOAEL(HEC) | NOAEL adjusted for dosimetric differences across species to a human |
| NOEL | no-observed-effect level |
| OSF | oral slope factor |
| p-IUR | provisional inhalation unit risk |
| p-OSF | provisional oral slope factor |
| p-RfC | provisional inhalation reference concentration |

| | |
|--------|---|
| p-RfD | provisional oral reference dose |
| PBPK | physiologically based pharmacokinetic |
| ppb | parts per billion |
| ppm | parts per million |
| PPRTV | Provisional Peer Reviewed Toxicity Value |
| RBC | red blood cell(s) |
| RCRA | Resource Conservation and Recovery Act |
| RDDR | Regional deposited dose ratio (for the indicated lung region) |
| REL | relative exposure level |
| RfC | inhalation reference concentration |
| RfD | oral reference dose |
| RGDR | Regional gas dose ratio (for the indicated lung region) |
| s.c. | subcutaneous |
| SCE | sister chromatid exchange |
| SDWA | Safe Drinking Water Act |
| sq.cm. | square centimeters |
| TSCA | Toxic Substances Control Act |
| UF | uncertainty factor |
| µg | microgram |
| µmol | micromoles |
| VOC | volatile organic compound |

PROVISIONAL PEER REVIEWED TOXICITY VALUES FOR 2-CHLORO-6-FLUOROPHENOL (CASRN 2040-90-6)

Background

On December 5, 2003, the U.S. Environmental Protection Agency's (EPA's) Office of Superfund Remediation and Technology Innovation (OSRTI) revised its hierarchy of human health toxicity values for Superfund risk assessments, establishing the following three tiers as the new hierarchy:

1. EPA's Integrated Risk Information System (IRIS).
2. Provisional Peer-Reviewed Toxicity Values (PPRTV) used in EPA's Superfund Program.
3. Other (peer-reviewed) toxicity values, including:
 - ▶ Minimal Risk Levels produced by the Agency for Toxic Substances and Disease Registry (ATSDR),
 - ▶ California Environmental Protection Agency (CalEPA) values, and
 - ▶ EPA Health Effects Assessment Summary Table (HEAST) values.

A PPRTV is defined as a toxicity value derived for use in the Superfund Program when such a value is not available in EPA's Integrated Risk Information System (IRIS). PPRTVs are developed according to a Standard Operating Procedure (SOP) and are derived after a review of the relevant scientific literature using the same methods, sources of data, and Agency guidance for value derivation generally used by the EPA IRIS Program. All provisional toxicity values receive internal review by two EPA scientists and external peer review by three independently selected scientific experts. PPRTVs differ from IRIS values in that PPRTVs do not receive the multi-program consensus review provided for IRIS values. This is because IRIS values are generally intended to be used in all EPA programs, while PPRTVs are developed specifically for the Superfund Program.

Because science and available information evolve, PPRTVs are initially derived with a three-year life-cycle. However, EPA Regions or the EPA Headquarters Superfund Program sometimes request that a frequently used PPRTV be reassessed. Once an IRIS value for a specific chemical becomes available for Agency review, the analogous PPRTV for that same chemical is retired. It should also be noted that some PPRTV manuscripts conclude that a PPRTV cannot be derived based on inadequate data.

Disclaimers

Users of this document should first check to see if any IRIS values exist for the chemical of concern before proceeding to use a PPRTV. If no IRIS value is available, staff in the regional Superfund and RCRA program offices are advised to carefully review the information provided in this document to ensure that the PPRTVs used are appropriate for the types of exposures and circumstances at the Superfund site or RCRA facility in question. PPRTVs are periodically updated; therefore, users should ensure that the values contained in the PPRTV are current at the time of use.

It is important to remember that a provisional value alone tells very little about the adverse effects of a chemical or the quality of evidence on which the value is based. Therefore, users are strongly encouraged to read the entire PPRTV manuscript and understand the strengths and limitations of the derived provisional values. PPRTVs are developed by the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center for OSRTI. Other EPA programs or external parties who may choose of their own initiative to use these PPRTVs are advised that Superfund resources will not generally be used to respond to challenges of PPRTVs used in a context outside of the Superfund Program.

Questions Regarding PPRTVs

Questions regarding the contents of the PPRTVs and their appropriate use (e.g., on chemicals not covered, or whether chemicals have pending IRIS toxicity values) may be directed to the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center (513-569-7300), or OSRTI.

INTRODUCTION

Verified toxicity values for 2-chloro-6-fluorophenol are unavailable on IRIS or HEAST (U.S. EPA, 2006, 1997). The chemical is not included in the Chemical Assessments and Related Activities (CARA) list (U.S. EPA, 1994, 1991). An ATSDR toxicological profile has not been produced for 2-chloro-6-fluorophenol (ATSDR, 2006a). Toxicity values for the chemical are not available from CalEPA (2006a, b). A health assessment for 2-chloro-6-fluorophenol is not available from the International Agency for Research on Cancer (IARC, 2006) or the World Health Organization (WHO, 2006). The chemical has not been assessed by the National Toxicology Program (NTP, 2006). Occupational guidelines and standards for 2-chloro-6-fluorophenol have not been established by the American Conference of Governmental Industrial Hygienists (ACGIH, 2005), the Occupational Safety and Health Administration (OSHA, 2006), or the National Institute for Occupational Safety and Health (NIOSH, 2006).

Research papers pertinent to the potential toxicological and carcinogenic effects of 2-chloro-6-fluorophenol were sought through computer searches of the CCRIS, GENETOX, HSDB, RTECS, and TSCATS databases (not date limited); DART/EPIC, MEDLINE,

TOXLINE, and TOXCENTER databases (1960's-May, 2006); and the Current Contents database (November, 2005-May, 2006).

REVIEW OF PERTINENT DATA

Human Studies

Available information regarding the toxicity of 2-chloro-6-fluorophenol in humans is limited to reports of sore throat, headache, eye irritation, nosebleeds, and skin rashes following exposure from an accidental atmospheric release of a mixture consisting mainly of 2-chloro-6-fluorophenol, toluene, and steam from a chemical facility near Holley, New York on January 5, 2002 (ATSDR, 2006b; NYSDOH, 2003; Juhl et al., 2003). The accident resulted in relocation of people from 15-20 homes in the area of greatest contamination. Follow-up consisted mainly of environmental and urine sampling. Environmental samplings were taken from air, soil, water, wipes from surfaces, vegetation, and miscellaneous household articles (ATSDR, 2006b; NYSDOH, 2003). Five rounds of urine sampling were performed, beginning on January 5, 2002 and ending in December, 2002 (ATSDR, 2006b). No reports of other human exposures to 2-chloro-6-fluorophenol were located. ATSDR (2006b) and NYSDOH (2003) noted the lack of information regarding the potential health effects of exposure to 2-chloro-6-fluorophenol and used available health effects data on chlorophenols to evaluate the potential health risks for exposure to 2-chloro-6-fluorophenol.

Animal Studies

No information was located regarding the health effects of exposure to 2-chloro-6-fluorophenol in animals.

FEASIBILITY OF DERIVING PROVISIONAL TOXICITY VALUES FOR 2-CHLORO-6-FLUOROPHENOL

Derivation of provisional toxicity values for 2-chloro-6-fluorophenol is precluded by the lack of quantitative human toxicity data, animal toxicity data, human or animal carcinogenicity data, and genotoxicity data for this chemical.

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