

Fact Sheet Date: June 1998

**NEW YORK STATE
- AQUATIC FACT SHEET -**

**Ambient Water Quality Value
For Protection of Aquatic Life**

SUBSTANCE: Benz(a)anthracene

CAS REGISTRY NUMBER: 56-55-3

| TYPE: | BASIS: | Freshwater Ambient Water Quality Value, ug/L: |
|--------------|---------------|--|
| Chronic | Propagation | 0.03 |
| Acute | Survival | 0.23 |

INTRODUCTION

These values apply to the water column and are derived to protect aquatic life from the effects of waterborne contaminants. Values for the protection of propagation of aquatic life are referred to as Aquatic (Chronic) or A(C) values. Values for the protection of survival of aquatic life are referred to as Aquatic (Acute) or A(A) values.

SUMMARY OF INFORMATION

The U.S. EPA AQUIRE (AQUatic toxicity Information Retrieval System)(U.S. EPA, 1993) was searched for toxicity data on benz(a)anthracene with EC₅₀ or LC₅₀ toxicity endpoints. The initial search identified one toxicity test record. From that original group, only data with a documentation code of C (Complete methods and results documentation), and 96 hour LC₅₀ or 48 hour EC₅₀ endpoints were selected. If both flow-through and static test toxicity data were available for the same species, only flow-through data was used. Static toxicity test data was used only if flow-through data was not available. This second screening resulted in a final acute toxicity database for benz(a)anthracene of one study with one freshwater species. No acceptable studies for marine species were found. Species Mean Acute Values (SMAVs) were determined from the acceptable benz(a)anthracene toxicity studies obtained from the AQUIRE database. Ambient water quality guidance values were then calculated in accordance with 6NYCRR Part 706.1

DERIVATION OF ACUTE VALUES

As shown in Table 1, data are available for one of the eight families necessary to derive a Tier 1 freshwater value. Consequently, the data from the four families are used to derive a Tier 2 freshwater value. No suitable marine data was found, so saltwater values for benz(a)anthracene could not be determined.

Table 1. Freshwater toxicity data used to derive the benz(a)anthracene acute value. When only an SMAV is listed, the SMAV was the LC₅₀ of the test species indicated. NDA means no data was available.

| Data Requirement | Species | SMAV, ug/L | References |
|---|----------------------|------------|------------|
| Family Salmonidae | NDA | | |
| A second Family in the Class Osteichthyes | NDA | | |
| A third family from the phylum Chordata | NDA | | |
| A planktonic crustacean | <u>Daphnia magna</u> | 10 | 15337 |
| A benthic crustacean | NDA | | |
| An insect | NDA | | |
| A family in a phylum other than Arthropoda or Chordata | NDA | | |
| A family in any order of insect or any other phylum not already represented | NDA | | |

The lowest SMAV was divided by the SAF to determine the secondary acute value (SAV). Because one data requirement was met, a secondary acute factor (SAF) of 21.9 was selected. The Tier II guidance value was determined by dividing the SAV by two and rounding to two significant digits.

$$\text{SAV} = 10 / 21.9 = 0.4566 \text{ ug/L}$$

$$\text{Freshwater Tier II A(A) value} = 0.4566 \text{ ug/L} / 2 = 0.2283 \text{ ug/L} \approx 0.23 \text{ ug/L}$$

DERIVATION OF CHRONIC VALUES

The secondary chronic value (SCV) is determined by dividing the SAV by the secondary acute to chronic ratio (SACR). The Tier II A(C) value is equal to the SCV. A species acute to chronic ratio (ACR) is an acute LC_{50} divided by a chronic value for the same species. The chronic value is the geometric mean of the NOEC (No Observed Effects Concentration) and LOEC (Lowest Observed Effects Concentration) values. A minimum of three species ACRs are required to derive a SACR. If three species ACRs are not available, 6NYCRR Part 706.1 requires that a species ACR value of 18 should be substituted for each missing species ACR. The SACR is equal to the cube root of the product of the three species ACRs. Both saltwater and freshwater species data are used to derive a common SACR. No studies could be found in the AQUIRE database that provided adequate acute and chronic data to determine an acute to chronic ratio as required by 6NYCRR Part 706.1 so the SCV was determined by dividing the SAV by a SACR of 18.

The freshwater SCV = $0.4566 \text{ ug/L} / 18 = 0.0254 \text{ ug/L}$
Freshwater Tier II A(C) value = $0.0254 \text{ ug/L} \approx 0.03 \text{ ug/L}$

REFERENCES

U.S. EPA 1993. AQUIRE, AQUatic toxicity Information Retrieval Database, Technical Support Document. U.S. EPA Environmental Research Laboratory, Office of Research and Development, Duluth, Minnesota, September, 1993.

AQUIRE DATA CITATIONS

REFERENCE NUMBER: 15337

Trucco, R.G., F.R. Engelhardt, and B. Stacey, 1983. Toxicity, Accumulation and Clearance of Aromatic Hydrocarbons in *Daphnia pulex*. Environ. Pollut. Ser. A Ecol. Biol. 31(3):191-202

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