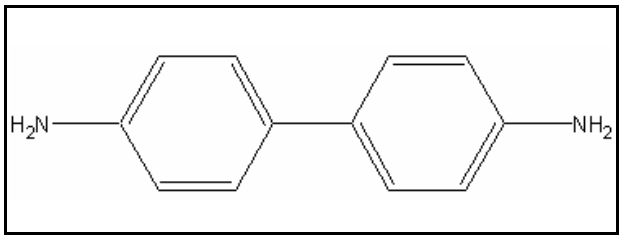
TIER I HUMAN HEALTH NONCANCER CRITERIA

BENZIDINE

CAS RN:	92-87-5
Water Solubility:	
Log K_{ow}:	1.576 [P]
Reference Dose:	4.348 x 10^{-8} mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class C; Possible human Carcinogen



Standard

The human health noncancer criterion for benzidine in drinking water sources is 74 µg/L. The human health noncancer criterion for nondrinking water sources is 3,700 µg/L.

Calculations

Bioaccumulation Factor

BAF predicted based on Log K_{ow} (from Stephan 1993)
Log K_{ow} = 1.576 (CLOGP program), K_{ow} = 37.6703
Trophic level trophic level 3 FCM = 1.0; 4 FCM = 1.0

$f_{fd} = 1/(1+(0.00000024\ kg/L)(K_{ow})) = 1.0$

Baseline $BAF_{T3} = (FCM)(K_{ow}) = (1.0)(37.6703) = 37.6703$

Baseline $BAF_{T4} = (1.0)(37.6703) = 37.6703$

Human health BAF_{T3} = [(37.6703)(0.0182)+1](1.0) = 1.686

Human health BAF_{T4} = [(37.6703)(0.0310)+1](1.0) = 2.168

Risk Associated Dose:

From the IRIS database:

Critical Effect: Liver and kidney pathology

$$ADE = \frac{NOAEL}{UF} = \frac{2.7 \text{ mg/kg-day}}{1000} = 0.0027 \text{ mg/kg/d}$$

Calculation of Criteria:

Non Drinking Water HNC = [(0.0027)(70)(0.8)]/0.01+[(0.0036)(1.686)+(0.0114)(2.168)]

= **3,700 μg/L**

Drinking Water HNC = [(0.0027)(70)(0.8)]/2+[(0.0036)(1.686)+(0.0114)(2.168)]

= **74 μg/L**

References

1. Stephen, C.E. 1993. Derviation of Proposed Human Health and Wildlife Bioaccumulation Factors for the Great Lakes Initiative. Environmental Research Laboratory, Office of Research and Development, U.S. EPA, Duluth, MN.

2. USEPA 1993. Integrated Risk Information System (IRIS database) chemical file for benzidine (CAS# 92-87-5).

3. Leo,A. and D.Weininger 1997. Daylight Software CLogP Version 3.15+ for Unix Pomona Medical Chemistry Project, Pomona College, Claremont, CA. Distributed by Daylight Chemical Information Systems, Inc., 3952 Claremont St., Irving, CA 92714 (Reference for the Log K_{ow})

Acronyms

ADE	Acceptable Daily Exposure
BAF	Bioaccumulation Factor
CAS RN	Chemical Abstract Service Registry Number
FCM	Food Chain Multiplier
IRIS	Integrated Risk Information System
K_{ow}	Octanol-Water Partition Coefficient
LOAEL	Lowest observed adverse effect level
NOAEL	No observed adverse effect level
P (superscript)	Predicted value
UF	Uncertainty factor

Revision History

April 4, 2000 - Criteria first developed

Contact Information

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