Health Based Guidance for Water
Health Risk Assessment Unit, Environmental Health Division
651-201-4899

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Toxicological Summary for: Sulfentrazone

CAS: **122836-35-5**

Synonyms: FP-846; N-(2,4-dichloro-5-(4-(difluoromethyl)-4,5-dihydro-3-methyl-5-oxo-1H-1,2,4-triazol-1-yl)phenyl)methanesulfonamide

Acute Non-Cancer Health-Based Value ($nHBV_{Acute}$) = 3000 µg/L

$$\frac{\text{(Reference Dose, mg/kg-d) x (Relative Source Contribution) x (Conversion Factor)}}{\text{(Acute Intake Rate, L/kg-d)}}$$

$$= \frac{\text{(1.9 mg/kg-d) x (0.5)}^{*} \text{ x (1000 µg/mg)}}{\text{(0.290 L/kg-d)}^{**}}$$

= 3276 rounded to **3000 µg/L**

*Relative Source Contribution: MDH 2008, Section IV.E.1.
**Intake Rate: MDH 2008, Section IV.E.1 and US EPA 2019, Exposure Factors Handbook, Tables 3-1, 3-3 and 3-5.

Reference Dose/Concentration:	HED/Total UF = 57.5/30 = 1.9 mg/kg-d (CD-1 mouse)
Source of toxicity value:	Determined by MDH in 2025
Point of Departure (POD):	250 mg/kg-d (NOAEL, Unnamed 1994 aci EPA 2003)
Dose Adjustment Factor (DAF):	0.23, Body weight scaling, default (MDH 2017 and US EPA 2011)
Human Equivalent Dose (HED):	POD x DAF = 250 mg/kg-d x 0.23 = 57.5 mg/kg-d
Total uncertainty factor (UF):	30
Uncertainty factor allocation:	3 for interspecies differences (for toxicodynamics), 10 for intraspecies variability
Critical effect(s):	Increased clinical signs of toxicity, decreased motor activity, and changes in functional observational battery parameters
Co-critical effect(s):	None
Additivity endpoint(s):	Nervous system

Short-term Non-Cancer Health-Based Value (nHBV) = 60 µg/L

$$\frac{\text{(Reference Dose, mg/kg-d) x (Relative Source Contribution) x (Conversion Factor)}}{\text{(Short-term Intake Rate, L/kg-d)}}$$

$$= \frac{\text{(0.032 mg/kg-d) x (0.5)}^{*} \text{ x (1000 µg/mg)}}{\text{(0.290 L/kg-d)}^{**}}$$

= 55 rounded to **60 µg/L**

*Relative Source Contribution: MDH 2008, Section IV.E.1.
**Intake Rate: MDH 2008, Section IV.E.1. and US EPA 2019, Exposure Factors Handbook, Tables 3-1, 3-3 and 3-5.

Reference Dose/Concentration:	HED/Total UF = 0.950/30 = 0.032 mg/kg-d (Sprague Dawley rats)
Source of toxicity value:	Determined by MDH in 2025
Point of Departure (POD):	4.13 mg/kg-d ($BMDL_{0.5SD}$, Freeman 1992 aci EPA 1994)
Dose Adjustment Factor (DAF):	Body weight scaling, default (US EPA 2011 and MDH 2017)
Human Equivalent Dose (HED):	POD x DAF = 4.13 mg/kg-d x 0.23 = 0.95 mg/kg-d
Total uncertainty factor (UF):	30
Uncertainty factor allocation:	3 for interspecies differences (for toxicodynamics) and 10 for intraspecies variability
Critical effect(s):	decreased mean number of fetal forepaw metacarpal ossification sites per litter
Co-critical effect(s):	None
Additivity endpoint(s):	Developmental

Subchronic Non-Cancer Health-Based Value ($nHBV_{Subchronic}$) = 60 µg/L

$$\frac{\text{(Reference Dose, mg/kg-d) x (Relative Source Contribution) x (Conversion Factor)}}{\text{(Subchronic Intake Rate, L/kg-d)}}$$

$$= \frac{\text{(0.032 mg/kg-d)}^{\#} \text{ x (0.2)}^{*} \text{ x (1000 µg/mg)}}{\text{(0.074 L/kg-d)}^{**}}$$

= 86 rounded to 90 µg/L

#The calculated subchronic RfD (0.15 mg/kg/day) is higher than the short-term RfD (0.032 mg/kg-d), which is based on developmental effects. The subchronic RfD must be protective of all types of adverse effects that could occur as a result of subchronic exposure, including short-term effects (MDH 2008, page 34). Therefore, the short-term RfD is used in place of the calculated subchronic RfD when deriving subchronic water guidance.
*Relative Source Contribution: MDH 2008, Section IV.E.1.
**Intake Rate: MDH 2008, Section IV.E.1. and US EPA 2019, Exposure Factors Handbook, Tables 3-1, 3-3 and 3-5.

The Subchronic nHBV must be protective of shorter duration exposures that occur within the subchronic period and therefore, the Subchronic nHBV is set equal to the Short-term nHBV of 60 µg/L. Additivity endpoints: Developmental.

Chronic Non-Cancer Health-Based Value ($nHBV_{Chronic}$) = 60 µg/L

$$\frac{\text{(Reference Dose, mg/kg-d) x (Relative Source Contribution) x (Conversion Factor)}}{\text{(Chronic Intake Rate, L/kg-d)}}$$

$$= \frac{\text{(0.032 mg/kg-d)}^{\#} \text{ x (0.2)}^{*} \text{ x (1000 µg/mg)}}{\text{(0.045 L/kg-d)}^{**}}$$

= 142 rounded to 100 µg/L

#The calculated chronic RfD (0.47 mg/kg/day) is higher than the short-term RfD (0.032 mg/kg-d), which is based on developmental effects. The chronic RfD must be protective of all types of adverse effects that could occur as a result of chronic exposure, including short-term effects (MDH 2008, page 34). Therefore, the short-term RfD is used in place of the calculated chronic RfD when deriving chronic water guidance.
*Relative Source Contribution: MDH 2008, Section IV.E.1.
**Intake Rate: MDH 2008, Section IV.E.1. and US EPA 2019, Exposure Factors Handbook, Tables 3-1, 3-3 and 3-5.

The Chronic nHBV must be protective of shorter duration exposures that occur within the chronic period and therefore, the Chronic nHBV is set equal to the Short-term nHBV of 60 µg/L. Additivity endpoints: Developmental

Cancer Health-Based Value/Risk Assessment Advice (cHBV) = Not Applicable

Cancer classification:	Not likely to be carcinogenic to humans (EPA, 2018)
Slope factor (SF):	Not Applicable
Source of cancer slope factor (SF):	Not Applicable
Tumor site(s):	Not Applicable

Volatile: No

Summary of Guidance Value History:

In 2018, MDH developed a noncancer pesticide rapid assessment of 200 µg/L. In 2025 MDH derived Acute, Short-term, Subchronic, and Chronic Noncancer Health-Based Values (nHBVs) of 3000, 60, 60, and 60 µg/L, respectively. The Acute, Short-term, Subchronic, and Chronic nHBVs have changed from the 2021 noncancer pesticide rapid assessment value as a result of: 1) using MDH's most recent risk assessment methodology; and 2) incorporation of more toxicological information.

Summary of toxicity testing for health effects identified in the Health Standards Statute (144.0751):

Even if testing for a specific health effect was not conducted for this chemical, information about that effect might be available from studies conducted for other purposes. MDH has considered the following information in developing health protective guidance.

	Endocrine	Immunotoxicity	Development	Reproductive	Neurotoxicity
Tested for specific effect?	No	Yes	Yes	Yes	Yes
Effects observed?	-	No	Yes[1]	Yes[2]	Yes[3]

Comments on extent of testing or effects:

[1] The short-term, subchronic and chronic RfDs are based on a developmental effect, namely decreased number of fetal forepaw metacarpal ossification sites per litter in rats. Decreased pup body weight, postnatal survival, litter sizes, and increased absorptions and resorptions in rats were reported at doses ranging from 250-350 times higher than the short-term RfD. Increased skeletal variations and malformations including decreased number of ossification sites in other bones were reported at doses more than 1400 times higher than the short-term RfD. Similarly, in rabbits, decreased live fetuses, litter sizes, fetal body weights, and increased abortions were reported at doses ranging from more than 350 – 7000 times higher than the short-term RfD.

[2] Changes in the time needed to reach reproductive maturity milestones were reported, including an increase in average time to vaginal opening in female rats after exposure to more than 300 times the short-term RfD and a decrease in average time to testes descent in male rats after exposure to more than 70 times the short-term RfD. Decreased fertility, low sperm count, intratubular degeneration of seminal product in the epididymis, and decreased weights of the testes, prostate, and epididymides were reported in male rats exposed to more than 250-350 times the short-term RfD. Similarly, decreased testes and epididymides weights were decreased in male dogs following subchronic exposure to more than 1100 times the short-term RfD.

[3] The acute RfD is based on neurotoxic effects, specifically staggered gait, splayed hindlimbs, decreased motor activity, and other changes in the functional observation battery reported in the acute rat neurotoxicity study. Additionally, female rats exposed subchronically to sulfentrazone in a neurotoxicity study had increased locomotion, no auditory response, uncoordinated gait and landing during reflex testing at doses greater than 20 times the acute RfD. At doses more than 30 times the acute RfD, hindlimb grip strength and tail flick latency was increased in male rats.

Tremors and convulsions were reported in other general systemic animal toxicity studies as well. In a 90-day mouse study, tremors were reported at doses more than 40 times the acute RfD. Rabbit developmental studies reported tremors or convulsions starting at doses more than 60-300 times the acute RfD.

Resources Consulted During Review:

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