

Type	Rodenticide
Controls	Rodents, although products may be animal specific (like for mole control).
Mode of Action	Single-dose poison that blocks nerve transmissions and causes respiratory arrest.

Thurston County Review Summary:

Pesticide products with bromethalin as an active ingredient fail Thurston County's review criteria for the following reasons;

1. Baits containing bromethalin are considered high in hazard for human toxicity.
2. The risk of toxicity to a child eating a bait product containing bromethalin is considered high in hazard.
3. Bromethalin is considered high in hazard for persistence and bioaccumulation.
4. Bromethalin lacks a long-term risk assessment which creates a significant data gap and makes the review incomplete without it.

MOBILITY

Property	Value	Reference	Rating
Solubility (mg/L)	<0.01	2	Low
Soil Sorption (Kd=mL/g)	1,300	5	Low
Organic Sorption (Koc=mL/g)	76,000,000,000	5	Low

Mobility Summary:

Bromethalin is not very soluble in water and binds strongly to all soil types. Bromethalin is rated low in hazard for the potential to move off the site of application (unless it is moved by an animal).

PERSISTENCE

Property	Value	Reference	Rating
Vapor Pressure (mm Hg)	0.0000017	4	Moderate
Biotic or Aerobic Half-life (days)	178	1	High
Abiotic Half-life (days)	Not found		
Terrestrial Field Test Half-life (days)	Not found		
Hydrolysis Half-life (days)	Stable	1	High
Anaerobic Half-life (days)	Not found		
Aquatic Field Test Half-life (days)	Not found		

Persistence Summary:

Bromethalin products are designed to withstand environmental conditions and are not expected to dissipate into the air or dissolve in water. Bromethalin can be slowly degraded by soil microbes, but the persistence hazard is considered high because it is likely to take over 100 days to degrade to half of the applied concentration.

BIOACCUMULATION

Property	Value	Reference	Rating
Bioaccumulation Factor	Not found		
Bioconcentration Factor	120,000	8	High
Octanol/Water Partition Coefficient	log Kow = 4.26	1	Moderate

Bioaccumulation Summary:

There is some differences in the data available for bromethalin and its potential to bioaccumulate. The chemical properties indicate that the chemical has a moderate affinity to bind with organic solvents, which indicates a moderate potential for accumulating in fish or animal tissue. A European data source has a calculated bioconcentration value that indicates that bromethalin has a very high potential to bioaccumulate. The hazard for bioaccumulation from bromethalin is rated as high.

ACUTE TOXICITY

Test Subject	Value	Reference	Rating
Mammalian (LD50)	9.1 mg/kg	6	High
Avian (LD50)	4.6 mg/kg	2	High
Honey bee or insect (LD50)	Not found		
Annelida -worms (LC50)	>100 ppm	2	Low
Fish (LC50)	0.04 ppm	2	High
Crustacean (LC50)	0.03 ppm	2	High
Mollusk (LC50)	Not found		
Amphibian (LD50 or LC50)	Not found		

Acute Toxicity Summary:

Bromethalin has a single-dose toxicity mammals that is considered too highly toxic by Thurston County's IPM policy (even though the goal of the chemical is to kill small animals). The lethal dose concentration (LD50) to rats was 9.1 mg/kg and Thurston County's policy fails any ingredient that has an LD50 less than 50 mg/kg. An LD50 value is the ingredient dose concentration that results in the death of half of the test animals, the smaller the lethal dose value is the higher the chemical's toxicity. Bromethalin is also considered very highly toxic to birds and aquatic organisms.

ACUTE TOXICITY - Risk Assessment

Subject and Scenario	Dose of Concern	Exposure	Margin of Safety	Route	Reference	Rating
Applcator / handler exposure was not evaluated						
Child eating 5 grams of bait product	0.025 mg/kg/day	0.025 mg/kg/day	None	Ingestion	1	High
Short-term contact exposures were not evaluated						
Combined exposures were not evaluated						

Acute Toxicity Risk Assessment Summary

In evaluating the risk of toxicity from short-term exposures, the scenario assumes a child eats the entire bait in a bait station (5 grams of product). This potential exposure has no safety factor at all - an adverse effect would be likely. Ideally, the exposure scenario would have a safety margin of 100 for EPA to say it passes their level of concern and Thurston County would like to have a safety factor greater than 1,000 for it to be perceived as "low in hazard".

Baits containing bromethalin fail the review for the risk of toxicity from a single exposure.

CHRONIC TOXICITY

Property	Value	Adverse Effect	Reference	Rating
Carcinogenicity	Not required	Not required	1	Low
Mutagenicity	No evidence	--	1	Low
Neurotoxicity - (NOAEL)	0.025 mg/kg/day	Spongy degeneration	1	Check risk
Endocrine Disruption	Not listed	--	9	Low
Developmental Toxicity (NOAEL)	0.5 mg/kg/day	None observed	1	Check risk
Reproductive Toxicity (NOAEL)	Data gap			
Chronic Toxicity (NOAEL)	0.025 mg/kg/day	Spongy degeneration	1	Check risk

Chronic Toxicity Summary:

The EPA has waived carcinogenicity testing due to the lack of a possibility for a long-term dietary exposure. A 90-day dietary toxicity study (intermediate-term toxicity testing) showed neurotoxicity in the form of spongy degeneration (leukoencephalomyelopathy) at 0.125 mg/kg/day. Developmental toxicity was not observed at any of the doses tested, although maternal toxicity was observed at lower doses. There was no information found for reproductive toxicity testing.

CHRONIC TOXICITY - Risk Assessment

Subject and Scenario	Dose of Concern	Exposure	Margin of Safety	Route	Reference	Rating
Long-term contact exposures were not evaluated						
Long-term dietary exposure were not evaluated						
Long-term exposure assessments were not evaluated						
Long-term combined exposures were not evaluated						

Chronic Toxicity Risk Assessment Summary:

Risk assessment data is lacking for any exposure other than that of a child eating 5 grams (single bite) of bait product. There were no long-term or intermediate-term risk assessments performed by the registrant, although, the EPA has identified chronic exposure scenarios that they perceive as potentially harmful (Reference 1). The lack of any intermediate or long-term exposure assessment is considered a significant data gap. This data gap is significant enough to cause the review to be incomplete without it (unless it fails for other reasons).

Degradation Products:

EPA reported degradation of bromethalin as; 43.8% degraded to desnitobromethalin, up to 15.4% non-extractable residues, 2.2% carbon dioxide, up to 2.9% unknown volatile organic carbons, and up to 3.6% of other unknown degradation products. Bromethalin has a metabolism half life of 5.6 days in rats (Reference 1).

Comments:

Formulated products can be mildly irritating to the eye but are not considered skin irritants. Bromethalin is not considered a skin sensitizer (Reference 1) however, one product stated that it was a mild sensitizer (Reference 3).

References

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