

B13-1.0 2,3,6-TRICHLOROBENZOIC ACID**B13-1.1 Background Information****IUPAC:** 2,3,6-Trichlorobenzoic Acid**CAS:** 2,3,6-Trichlorobenzoic Acid**CASRN:** 50-31-7**2,3,6-TRICHLOROBENZOIC ACID USAGE:**

2,3,6-Trichlorobenzoic acid (2,3,6-TBA) was an post-emergence herbicide used in conjunction with other growth regulator herbicides in cereal, and grass seed crops to control broad leaved annual and perennial weeds (Tomlin, 1994).

2,3,6-TBA was used in combination with 2,4-D and/or 2,4,5-T. It was applied during the 1967 U.S. trials and the 1967 CFS trials (Demaree *et al.*, 1968; Boynton, 1969).

Table B13-1 2,3,6-TBA Acid Usage at CFB Gagetown^a

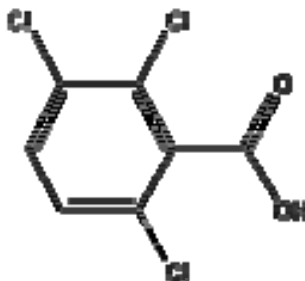
Year	Amount of 2,3,6-TBA Applied (kg)	Total Area Treated (ha)
1967	23	3.1
Total	2.3E+01	3.1E+00

^a Adapted from Demaree *et al.*, 1968 and Boynton, 1969.

B13-2.0 CHEMICAL AND PHYSICAL PROPERTIES**Formula:** C₇H₃Cl₃O₂

Activity: 2,3,6-TBA is a systemic growth-regulator herbicide with auxin like action, absorbed by the leaves and roots. 2,3,6-TBA inhibits oxidative phosphorylation. 2,3,6-TBA was shown to produce significant developmental effects, similar to but not identical with those produced by 2,4-D.

Notes: 2,3,6-TBA is not registered for use as an herbicide in Canada or the United States (PAN, 2006). Limited information exists regarding the toxicology of 2,3,6-TBA as an herbicide. All information that had been found was presented below. Databases searched include: U.S. EPA, IRIS database, RED database, IPCS INCHEM database, ATSDR CDC database, WHO, UNEP, PUBMED, EMBASE, NTP, Google keyword search, and PAN pesticide databases.

Structure:**Figure B13-1 2,3,6-TBA CASRN: 50-31-7 Structure****Table B13-2 Chemical and Physical Properties of 2,3,6-TBA**

Chemical/Physical Property	Result	Reference
Colour/Form	Colourless crystals	Tomlin, 1994
Dissociation Constant (pKa)	1.5	JW, 2006
Henry's Law constant	2.12×10^{-08} atm-m ³ /mole at 25°C	JW, 2006
Log K _{ow}	-2.37	JW, 2006
Melting Point	125-126°C	Tomlin, 1994
Molecular Weight	225.46	JW, 2006
Vapour Pressure	5.5×10^{-04} mm HG at 25°C	JW, 2006
Water Solubility	7,700 mg/L	JW, 2006

B13-3.0 PMRA EVALUATION

No information found.

B13-4.0 TOXICOLOGICAL SUMMARY**B13-4.1 Human Health Effects**

No data found.

B13-4.2 Health Effects by Route of Exposure**B13-4.2.1 Oral Exposure****Table B13-3 Mammalian LD₅₀ Values Resulting from Oral Exposure to 2,3,6-TBA**

Test Organism (Species/Sex)	LD ₅₀ (mg/kg)	Reference
Acute		
Rats	1,500	Fisons Limited, 1977
Mice	1,000	Fisons Limited, 1977
Guinea pig	1,500	Fisons Limited, 1977
Rabbit	600	Fisons Limited, 1977
Hen	1,500	Fisons Limited, 1977
Pheasant	1,000	Fisons Limited, 1977

Table B13-4 Mammalian Systemic Effects Resulting from Oral Exposure to 2,3,6-TBA

Test Organism (Species)	Exposure	Dose (Duration)	Response	Reference
Sub-chronic				
Sprague-Dawley albino rats	Diet	0, 10, 30, 100 ppm for 90 days	No treatment related effects on survival, growth, food consumption, or behavior. No significant differences were noted in blood or urine parameters in these animals, and no histologic changes were seen.	Johannsen <i>et al.</i> , 1987
Beagle dogs	Diet	0, 10, 30, 100 ppm for 90 days	No treatment related effects on survival, growth, food consumption, or behavior. No significant differences were noted in blood or urine parameters in these animals, and no histologic changes were seen.	Johannsen <i>et al.</i> , 1987

Table B13-5 Mammalian NOAELs and LOAELs for Oral Exposure to 2,3,6-TBA

Test Organism (Species)	Effect	Value	Endpoint	Reference
Sub-chronic				
Rats	NOAEL	1,000 mg/kg of diet	Minor disturbance of water metabolism.	Tomlin, 1994

B13-4.2.2 Dermal Exposure

No data found.

B13-4.2.3 Inhalation Exposure

No data found.

B13-4.3 Carcinogenicity

No data found.

B13-4.4 Populations at Special Risk

No information found.

B13-4.5 Toxicokinetics

No information found.

B13-4.6 Exposure Limits

Reference Dose (mg/kg/day)	Reference	Endpoint	Study	Reference	NOEL (mg/kg/day)	Uncertainty Factor
Acute/Short-term						
No information found	--	--	--	--	--	--
Intermediate-term						
No information found	--	--	--	--	--	--
Long-term						
0.0015 ^a	Health Canada, 2004	--	--	--	--	--
0.01 ^b	U.S. EPA, 1992	Increased adrenal weights; vacuolization of zona fasciculata in the cortex	Rat Reproductive Study	Robinson <i>et al.</i> , 1981	14.8	1,000

^a Based on exposure limits for 1,2,3- Trichlorobenzene.

^b Based on exposure limits for 1,2,4- Trichlorobenzene.

For the risk assessment purposes a long-term exposure limit of 0.0015mg/kg bw/day was selected for use.

B13-5.0 ENVIRONMENTAL FATE AND EXPOSURE

Air

Once 2,3,6-TBA is released to the atmospheric environment, its vapour pressure of 5.5×10^{-4} mm HG at 25°C (JW, 2006) will predict that it will mainly exist in the vapour phase (HSCB, 2002). It can be broken down photochemically by hydroxyl radicals in the atmosphere with a half-life roughly of 112 days (HSDB, 2002).

Water

Once 2,3,6-TBA is released in water, it was observed from laboratory and field studies that 2,3,6-TBA will not adsorb to sediment or suspended particulate matter. In fact, 2,3,6-TBA will readily leach through soil (HSDB, 2002). Once in solution with water, 2,3,6-TBA will not be subjected to volatilization from surface waters as predicted by its Henry's Law constant of 2.12×10^{-8} atm-m³/mole at 25°C. Furthermore, 2,3,6-TBA was predicted to degrade through photolysis (HSDB, 2002).

Soil

2,3,6-TBA is highly mobile in soil, and will readily leach into groundwater. 2,3,6-TBA was also found to be very persistent in natural soils. Reported persistence range from 5 months to 11 years, although most of the reported data ranged between 2 and 5 years (HSDB, 2002). No

concrete mechanism of breakdown in soil for 2,3,6-TBA was found, but one study indicated that 2,3,6-TBA may breakdown through cometabolism (Horvath, 1971).

B13-6.0 SUMMARY

2,3,6-TBA was used as a post-emergent herbicide, and is no longer registered for use in Canada and the United States. It was applied at CFB Gagetown in a mixture with 2,4-D during the 1967 U.S. trials and the 1967 CFS trials. Approximately, 23 kg of 2,3,6-TBA was applied over an area of 3.1 hectares (Demaree and Haws, 1968; Demaree and Creager, 1968; and, Demaree *et al.*, 1966).

2,3,6-TBA has low acute toxicity. Furthermore, no systemic effects were observed in a long term feeding study conducted by Johannsen *et al.*, (1987) using rats and dogs. No other information was found regarding the toxicity of 2,3,6-TBA.

B13-7.0 REFERENCES

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