

Acute Toxicity of Sodium Monofluoroacetate to the Striped Skunk

Warren G. Eastland¹ and Samuel L. Beasom²

¹Department of Fisheries and Wildlife Sciences, Texas A & M University, College Station, Texas 77843 and ²Caesar Kleberg Wildlife Research Institute, Texas A & I University, Kingsville, Texas 78363

Attempts to alleviate depredations on agriculture and livestock have resulted in a battery of control methods for various pest species. Sodium monofluoroacetate (Compound 1080) is 1 of many toxicants historically used for coyote (Canis latrans) control, although recent use has been limited primarily to experimental programs involving single-lethal-dose (SLD) baits and the toxic collar (Connolly 1980). It is also used in both urban and rural rodent control programs. Sodium monofluoroacetate appears to be toxic to all terrestrial wildlife at some dose level (Atzert 1971, Rammell and Fleming 1978).

Median lethal doses (MLD) are commonly used to compare the relative susceptibility of various species to toxicants and thus gauge their relative degree of hazard. MLD levels for sodium monofluoroacetate toxicity were reviewed for several species of wild and domestic animals in the United States (Atzert 1971), but data were not available for many common species. Among the species for which data were lacking was the ubiquitous striped skunk (Mephitis mephitis). This paper provides basic MLD data for that animal.

MATERIALS AND METHODS

Striped skunks were live trapped and caught while spotlighting (Adams et al. 1964) in east-central Texas; kept outdoors in roofed individual 0.6 x 0.9 x 1.2 m cages on remote Texas A&M University property; provided with a maintenance diet of 0.5 kg commercial dry dogfood and bone meal once a day and a continuous water supply. Skunks were kept for at least 10 days prior to dosing to homogenize their nutritional levels.

Compound 1080 was premixed at the rate of 1.1 mg of 90%

Send reprint requests to WG Eastland at Idaho Dept. of Fish & Game, 109 W. 44th St., Boise, ID 83714.

technical grade sodium monofluoroacetate (Tull Chemical Co., Oxford, AL) per ml water to provide 1 mg 100% 1080/ml water. Striped skunks were secured in wire handling cones, weighed, and orally gavaged with the desired dose (per unit weight) of Compound 1080 after being fasted for 24 h. Four dosage levels were used ranging from 0.125 mg/kg to 0.75 mg/kg (Table 1). Tapwater was added to each dose as needed so each skunk received a volume of 5 ml. Once dosed, the animals were monitored continuously for the first 12 h post-dosing, every 2 h for the next 12h, and every 6 h thereon until recovery or death. Animals were returned to their standard maintenance diet 8 to 12 h post-dosing. Recovery was considered complete if an animal resumed normal feeding and watering habits for 7 days with no sign of Compound 1080 intoxication. MLDs were calculated by probit analysis (Helwig and Council 1979). Daily temperatures on the day of dosing and for several days thereafter had a morning low of 2 C and an afternoon high of 19 C as recorded at Easterwood Airport, approximately 1 km from the study site.

RESULTS AND DISCUSSION

Of the 14 skunks which reacted to the toxicant (Table 1), all displayed a latent period (\bar{x} = 1.48 h, range: 0.62-2.22 h) between dosing and the onset of sodium monofluoroacetate intoxication. Symptoms included loss of voluntary muscle control, vocalizations, and convulsions. All had either died or displayed no further 1080-intoxication symptoms after 12 h.

Probit analysis (Helwig and Council 1979) of dosing results (Table 1) yielded an MLD of 0.347 mg/kg with a 95% confidence interval of 0.212 to 0.541 mg/kg. This may be the highest MLD level for striped skunks, considering their general physiology.

Sodium monofluoroacetate is metabolized into fluorocitrate (Peters 1952), which inhibits the citric

Table 1. Dosage levels of sodium monofluoroacetate and striped skunk reactions when the daily temperature ranged from 2-19 C.

Dosage level (mg/kg)	Number dosed	Number reacting	Number of deaths
0.125	6	0	0
0.250	5	4	2
0.500	5	5	4
0.750	5	5	5

acid (Krebs) cycle, thus blocking the production of energy by the organism. Any environmental condition that changes an animal's energy demand is thus likely to affect the animal's susceptibility to a toxicant with an action similar to that of Compound 1080. The optimum temperature for skunks probably occurs in the 2-19 C range, and it is reasonable to expect skunks to become more susceptible to Compound 1080 intoxication as ambient temperature departs from optimum (McIlroy 1981, Oliver and King 1983, Eastland and Beasom 1986).

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