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CENTER FOR LAKE SUPERIOR ENVIRONMENTAL STUDIES

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Applied Research

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FSIT

Call D. J. (Ank)
1987

July 6, 1987

Memorandum
Center for Lake Superior Environmental Studies, University of Wisconsin
Superior, WI 54880 (Memo to L. Larson)
Loren Larson
Center for Lake Superior Environmental Studies
University of Wisconsin-Superior
Superior, WI 54880

Dear Loren,

We have completed fathead minnow early life-stage toxicity tests on the University campus with dinoseb and carbofuran. These were flow-through tests with measured concentrations of toxicants.

Dechlorinated water from the City of Superior was used as the diluent water. For the dinoseb test, the mean water temperature was $25.1 \pm 0.6^\circ\text{C}$. Dissolved oxygen was maintained at $83.5 \pm 6.8\%$ of saturation, with a range from 66.7 to 96.0%. The mean pH was 7.2 ± 0.1 . Hardness and alkalinity were 53.3 ± 1.4 and 44.5 ± 1.3 mg/L as CaCO_3 , respectively. For the carbofuran test, the mean water temperature was $24.5 \pm 0.7^\circ\text{C}$. Dissolved oxygen was maintained at $76.8 \pm 7.1\%$, with a range from 65.4 to 95.3%. The mean pH was 7.1. Hardness and alkalinity were 53.3 ± 1.6 and 43.9 ± 1.0 mg/L as CaCO_3 , respectively. Data were analyzed by one-way ANOVA and Dunnett's procedure. For weight and length parameters, individual fish were used as replicates if the variance was not significantly different between replicate treatments. If the variance differed, a mean weight or length was obtained for each chamber, and the chambers were used as replicates.

Tables summarizing the results are included. Chronic limits for dinoseb were 0.059 and 0.105 mg/L. Chronic limits for carbofuran were 0.142 and 0.237 mg/L based upon survival and growth. A statistically significant decrease in survival at 0.142 mg/L was not considered biologically significant.

Acute tests were also conducted with these chemicals in the same laboratory. They were flow-through tests with measured concentrations of toxicant. In the dinoseb acute test, the water temperature was $24.2 \pm 0.4^\circ\text{C}$ and the pH was 7.2 ± 0.03 . Dissolved oxygen was 7.6 mg/L, and hardness and alkalinity were 49.3 ± 0.54 mg/L and 42.9 ± 0.14 mg/L as CaCO_3 , respectively. In the carbofuran acute test, the water temperature was $25.4^\circ\text{C} \pm 0.7^\circ\text{C}$, and the pH was 7.4 ± 0.1 . The mean dissolved oxygen level was $87.4 \pm 7.6\%$ of saturation, and hardness and alkalinity were 53.8 ± 0.9 mg/L and 43.8 ± 0.4 mg/L as CaCO_3 , respectively.

The 96 hr LC50 for dinoseb was 0.41 mg/L. A confidence interval was not determined due to the nature of the dose-mortality relationship. The 96 h LC50 for carbofuran was 0.844 mg/L. Its 95% confidence interval was 0.758 to 0.939 mg/L.

CBF

R= ADAMS
OK

Water, AQUA
MOR, GRO, POP
Carbofuran '87 / Dinoseb '87

17: No Not Public...

X-OCT 23 1996

Please let me know if you need additional information.

Sincerely,



Dr. Daniel J. Call
Research Scientist

jb

Hatchability, Development, Survival and Growth of Fathead Minnows (*Pimephales promelas*) Exposed to Dinoseb (2-sec-butyl-4,6-dinitrophenol) for 32 Days Post-fertilization

Parameter	Mean Concentration ± s.d. (mg·L ⁻¹)				
	<0.007 (±0.000)	0.020 (±0.003)	0.036 (±0.005)	0.059 (±0.008)	0.105 (±0.018)
Mean percent hatch	54.1	56.2	59.4	53.4	51.3 ^a
Mean percent dead and abnormal fry at hatch	1.0	0.0	3.1	2.5	4.8
Mean percent survival at 28 days post-hatch	86.6	86.7	100.0	98.4	65.0
Mean wet weight at 28 days post-hatch (g)	0.140	0.146	0.130	0.124	0.112
Mean dry weight at 28 days post-hatch (g)	0.029	0.029	0.025	0.022	0.020
Mean standard length at 28 days post-hatch (mm)	20.2	19.8	19.4	18.6	17.7*
Mean total biomass per chamber at 28 days post-hatch (g dry wt)	0.754	0.759	0.746	0.652	0.368**

a/ Percent survival of 30 individuals.

b/ *, **: Significantly different from controls at 95 and 99 percent confidence levels, respectively.

MFC = 0.0001

Hatchability, Development, Survival and Growth of
Fathead Minnows (*Pimephales promelas*) Exposed to
Carbofuran for 35 Days Post-Fertilization

	Mean Concentration ± s.d. (mg.L ⁻¹)				
	79.5 (±0.000)	86.5 (±0.004)	86.5 (±0.009)	89.1* ^{b/} (±0.017)	85.0 (±0.020)
Mean percent hatch	100	100	100	93.4*	41.6** ^{b/}
Mean percent abnormal and dead at hatch	5.7	4.6	2.9	9.5	8.3
Mean percent survival at 29 days post-hatch	100	100	100	93.4*	41.6** ^{b/}
Mean wet weight (g) at 29 days post-hatch	0.125	0.133	0.129	0.125	0.092**
Mean dry weight (g) at 29 days post-hatch	0.025	0.025	0.024	0.022	0.016**
Mean standard length (mm) at 29 days post-hatch	19.3	19.9	19.4	18.4	15.6**
Mean total biomass/chamber at 29 days post-hatch (g dry wt)	0.749	0.754	0.725	0.642	0.321**

a/ Percent survival of 30 individuals transferred from egg cups to exposure chambers.

b/ *, **: Significantly different from controls at 95 and 99 percent confidence levels, respectively.

