

2-12-85

DATA EVALUATION RECORD

PAGE 1 OF

CASE: GS0103

PICLORAM FRSTR

CONT-CAT: 01 GUIDELINES: 72-1 72-4

MRID: 00151784

Mayes, M.; Dill, D.; Hopkins, D. (1984) The Toxicity of Technical Picloram to the Embryo, Larval, and Juvenile Stages of the Rainbow Trout (*Salmo gairdneri* Richardson): ES-703. Unpublished study prepared by Dow Chemical USA. 17 p.

REVIEW RESULTS:

VALID X INVALID _____ INCOMPLETE _____

GUIDELINE:

SATISFIED X PARTIALLY SATISFIED _____ NOT SATISFIED _____

DIRECT RVW TIME =

START DATE:

END DATE:

REVIEWED BY: *Michael Rexrode*

TITLE: *Interim Biology*

ORG: *EEB/HED*

LOC/TEL: *557-0578*

SIGNATURE:

DATE:

APPROVED BY: *Don Liban*

TITLE: *Section Head*

ORG: *EEB/HED*

LOC/TEL:

SIGNATURE:

DATE:

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APPROVED BY:

TITLE:

ORG:

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DATE:

1. Chemical: Tordon K Salt Liquor
2. Test Material: 93.8% ai Picloram
3. Study/Action Type: Rainbow trout acute and chronic toxicity testing
4. Study Identification: Mayes, M.A.; Dill, D.C.; Hopkins, D.L. 1984. The Toxicity of Technical Picloram to the Embryo, Larval, and Juvenile Stages of Rainbow Trout." Prepared by DOW Chemical U.S.A., Midland Mich.

5. Reviewed by: Miachel Rexrode
Fishery Biologist
EER/HED

Signature: *Michael Rexrode*
Date: *2/12/85*

6. Approved by: *Doug Urban*
~~Norm Cook~~
Section Head
EER/HED

Signature: *Douglas Urban, Retiring*
Date: *2/11/85*

7. Conclusions: This study appears to be scientifically sound but ~~cannot~~ ^{and will} support Registration at this time. ~~EER cannot evaluate these studies completely without the raw data.~~
An MATC between 0.55 mg/l and 0.88 mg/l was confirmed suggesting very high toxicity to trout larvae.

Materials/Methods

Water used in the acute and chronic testing was from the upper Saginaw Bay of Lake Huron off Whitestone Point. Before this water was used in the laboratory it was carbon filtered, U.V. irradiated and pH adjusted with CO₂ to about pH 8.2. During testing, pH ranged from 7.8 - 8.5; the hardness and alkalinity ranged from 73-83 mg/l (as CaCO₃) and 47 to 53 mg/l (as CaCO₃) respectively; and the conductivity ranged from 129-159 ~~micro~~ ^{micro}amps/cm. Rainbow trout were received as eyed eggs from Mt. Lassen Trout Farms, Red Bluff, California. After hatching, fish were kept until 90 days before acute testing began. Embryos used in the embryo-larval test were obtained from the same source about 3 months later, and were 10 days pre-hatch. Upon receipt, the embryos were dispensed into a trout hatches with a water temperature of 12°C and held at least one hour prior to the selection of embryos used to set the test.

A modified Mount-Brungs proportional diluter system was used for both the acute and embryo-larval exposure. Test vessels were double strength glass glued with silicone adhesive, and measured 30.5 x 15.2 cm. Each was provided with a nitrex nylon screen-covered drain which maintained a water volume of 3.7 liters. Embryos were incubated in circular (124 mm in diameter by 51 mm high) cups with 360 um nylon screen bottoms. The flow of water was directed into the incubation cup to produce a flow of water around the embryos during the incubation period. During the embryo exposure phase the embryos were shielded from direct light by a black polyethylene curtain. At completion of hatch the larvae were provided with a 16 h light/8 hr dark light cycle (500 lux).

The diluter was set to deliver 6 nominal test concentrations (2.0 - 0.23 mg/l) and a water control. There were four replicate aquaria per concentration with 30 embryos per replicate. Embryos were placed in the incubation cups and then placed in the test aquaria. Observations were taken daily; dead embryos or larvae were counted and removed.

Swim-up alevins were fed a starter grade commercial diet (Silver Cup Fish Feed) 3 times daily.

Results

There was no control mortality during the test. However, sublethal effects (surface breathing and loss of equilibrium) was observed at 10.9 mg/l and higher. The average weight of fish at the end of the study was 0.7 g. The day-to-hatch mean was day 10 for all concentrations and controls. There was no significant ($\alpha = 0.05$) concentration related effects in the percent hatch, terata, and time to swim-up (16 days post-day-to-hatch). Larval survival was significantly reduced at 2.02 mg/l. There was a well defined concentration - response in growth with both length and weight significantly reduced at 0.88 mg/l and higher. The MATC lies between 0.55 mg/l and 0.88 mg/l.

Reviewer's Conclusion

This study appears scientifically sound but can not support Registration at this time. The results from acute and chronic studies ^{must} be confirmed by reviewing the "raw" data. The registrant should submit all replicate data for EEB's analysis.

Category: Supplemental

This study appears to be scientifically sound and will support registration. A well defined concentration response was noted at 0.85 mg/l. An MATE between 0.85 mg/l and 0.1 mg/l was confirmed, suggesting that picloram can be very highly toxic to trout larvae.

Category: Core

TABLE 1. Hatchability of Embryos, Normal Larvae at Hatch, Survival, and Growth Measurements for Rainbow Trout Embryos and Larvae Exposed to Technical Picloram, Means and Standard Deviation

Average Measured Concentration mg/l	Embryos ^a Hatched(%)	Normal Larvae ^b at Hatch (%)	Larval ^b Survival	Mean Weight ^c (mg)	Mean Length (mm)
ND ^d	100	95.8 ± 3.2	89.2 ± 8.8	1052.8 ± 64.7	40.9 ± 0.7
0.23 ± 0.01	99.2 ± 1.7	96.6 ± 2.8	97.4 ± 3.3	1040 ± 39.6	40.9 ± 0.3
0.38 ± 0.02	99.2 ± 1.7	97.5 ± 1.7	95.0 ± 4.3	1036.5 ± 58.9	40.8 ± 0.5
0.55 ± 0.02	100	96.7 ± 3.9	92.5 ± 8.3	1048.5 ± 48.6	41.1 ± 0.3
0.88 ± 0.02	100	95.8 ± 3.2	95 ± 1.9	774.3 ± 58.7*	37.7 ± 1.1
1.34 ± 0.04	100	97.5 ± 3.2	92.5 ± 5.7	604 ± 41.2*	35.2 ± 0.5
2.02 ± 0.05	100	95.8 ± 5.0	72.5 ± 9.6*	284.3 ± 6.4*	27.9 ± 0.4

^aBased on 30 embryos/replicate; 4 replicates/concentration

^bBased on number hatched per replicate

^cUnweighted means and standard deviation of replicates, 4 replicates means

^dNot detected; detection limit 0.05 mg/L

*Significantly decreased from control at $\alpha = 0.05$, one-tailed Dunnett t-test.

Picloram Ecological Effects Branch Review

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Pages 7 through 9 are not included in this copy.

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