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Acute toxicity in fresh water fish

Final Report

CSIR-INDIAN INSTITUTE OF TOXICOLOGY RESEARCH
(Formerly: Industrial Toxicology Research Centre)
MAHATMA GANDHI MARG, POST BOX NO. 80,
LUCKNOW-226001 U.P. (INDIA)

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Name and address of the client	**Mr. T. Sampath Kumar** **Proprietor** **Naulgi Nanobiotech** **651, 11th Main Road, 5th Block** **Jayanagar** **Bangalore-560041**
Reference number	**Work Order No. nil dated 8.2.2014**
Description and identification of the test sample	**Acute toxicity in fresh water fish test of product NUALGI (Green brown liquid)**
IITR code no. for the study	**SP-138**
Date of start of the study	**17.2.2014**

Signature
Head, Research, Planning &
Business Development
Date:
Seal:

(बी० डी० भट्टाचार्जी) / B. D. Bhattacharji
वरि० प्रधान वैज्ञानिक / Sr. Principal Scientist
अनुसंधान विकास एवं व्यापार परियोजना अनुभाग
Research Planning and Business Development Division
सी.एस.आई.आर.–भारतीय विषविज्ञान अनुसंधान संस्थान
CSIR-Indian Institute of Toxicology Research
पो० बा० नं० 80 / P.B. No. 80
महात्मा गांधी मार्ग / Mahatma Gandhi Marg
लखनऊ-226 001 / Lucknow-226 001

Principal Investigators

Ms. Preeti Chaturvedi

Dr. R.C.Murty

Other Participants

Mr. Sandeep Kumar

Test Facility

CSIR-Indian Institute of Toxicology Research
Lucknow 226001

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1. STUDY DETAILS

Study Title: Acute Toxicity in fresh water fish.

Study item: SP-138.

Study Number: SSP-269

Date of Experimentation:

Start - 28/02/14

Completion - 28/03/14

Test facility: Aquatic Toxicology Lab, Indian Institute of Toxicology Research, Lucknow.

2. SUMMARY

The test item SP -138 was tested for its Fish Toxicity potential on Guppy Fish (*Poecilia reticulata*) according to the OECD Guidelines (203) for Acute Fish Toxicity (1992).

Laboratory acclimatized Guppy Fish (*Poecilia reticulata*) were exposed to different concentrations of the test item for 96 hrs under static laboratory conditions as per OECD guidelines. Behavioral observations were made during the course of exposure and mortality data recorded.

Based on these results, the test item – SP-138 is classified as a non- toxic to fish at 96 hrs with LC_{50} of >100mg/L under the test conditions as described in the report.

Date: March 31, 2014

31/3/14

(Principal Investigator)

The objective of this Acute Fish Toxicity study was to assess the acute effect/potential of the SP-138 using Guppy Fish (*Poecilia reticulata*) under laboratory conditions. This study provides a rational basis for the toxicity potential of this test item to aquatic species like fish.

4. TEST GUIDELINES AND METHODOLOGY

The study was conducted according to the OECD Guidelines (203) for Acute Fish toxicity (1992) mutually agreed with the Sponsor.

5. PRINCIPLE OF THE TEST

The test item is mixed homogeneously in aquarium water at different concentrations and fish are exposed for different time durations. Controls are exposed in the similar manner to water without any addition of chemical. The fish are observed for any mortality or alteration in their behavior. Based on the mortality data at different concentrations, median lethal concentration of the test item was calculated using the method of Hamilton et al. (1977).

6. INITIAL CONSIDERATIONS

The test substance is a patented greenish-brownish suspension of nanoparticles, which is an aqueous solution of inorganic mineral nutrients in a form that is redispersible in water to form a nutrient for plant growth. Fishes and other aquatic organisms may be exposed directly or indirectly. Thus, the test item requires toxicity/safety studies before regulatory clearance for manufacture and marketing. The pH of the test item is 6.3, which was used after proper dilution for Acute Fish Toxicity tests.

7. MATERIALS AND METHODS

7.1 Test System

Animals: Guppy Fish (*Poecilia reticulata*) maintained under laboratory conditions

Source : Local Supplier

Source	:	Local Supplier
Justification of selection:		Guppy Fish is one of the recommended fish species for test studies as per OECD guidelines and regulatory acceptance.
No. of fish :		10 fishes per concentration
Body weight at treatment:		0.58 – 0.6 g
Identification:		Each treatment tank was identified by labels indicating the time, date and concentration of the test item.
Acclimatization:		7 days
Grouping:		The fishes were grouped into batches of 10 each, and exposed to different concentrations of the test item.

Concentration of SP-138 (mg/L) of water)	No. of fish/tank
Control	10
1	10
10	10
25	10
50	10
75	10
100	10

7.2 Environmental Conditions: The fishes were maintained in IITR tap water at temperature of 23 ± 2°C with light/dark cycle of 12 hr. Water parameters were analysed (APHA, 2012) and found to be- Dissolved Oxygen 7.0 mg/L, total hardness 180 ± 10 mg/L as CaCO3 and pH of 6.8.Fishes were fed on commercial fish-feed. Measurements like pH, dissolved oxygen and temperature were carried out daily.

7.3 Test item information

Code by test facility:	**SP-138**
Date of receipt:	17.02.2014

Physical appearance:	Greenish-Brown suspension of nanoparticles in water.
Storage conditions:	Cool place away from sunlight Ambient
pH of test item:	6.3

7.4 Preparation of dose

The test solution of the chosen concentrations are prepared by simple dilution of the stock solutions (concentration not exceeding 100mg/L). The resultant solution was used immediately for the test. The different concentrations of the test item were calculated on the basis of W/V.

7.5 Preparation of test species

The fish were acclimatized to laboratory conditions seven days before the start of the exposure.

7.7 Treatment of test species

Randomly selected batches of fish were exposed to different concentrations of the test item.

8. OBSERVATIONS

Fish were examined for apparent behavioral signs viz. loss of equilibrium, swimming behaviour, respiratory function, pigmentation, etc.) at 24, 48, 72 and 96 hours after the start of exposure. Fishes are considered dead if there is no visible movement (e.g. gill movements) and if touching of the caudal peduncle produces no reaction. Dead fishes were removed when observed and mortalities recorded.

9. RESULTS

Mortalities recorded:

Concentrations of SP-138 in water (mg/L)	No. of fish/ tank	Total number of mortalities at			
		24 hours	48 hours	72 hours	96 hours
Control	10	0	0	0	0
1	10	0	0	0	0
10	10	0	0	0	0
25	10	0	0	0	0
50	10	0	0	0	0
75	10	0	0	0	0
100	10	0	0	0	0

10. CONCLUSION

The test item SP-138 is classified as non- toxic to fish under the test conditions with LC_{50} of >100mg/L as described in the report.

11. REFERENCE

- APHA (2012). Standard methods for the Examination of Water and Waste Water 22nd Edition, Washington, DC.

- OECD (1992) Guidelines for testing of chemicals Fish acute toxicity Test No. 203.

- Hamilton M. A., Russo R, Thruston R. V (1977). Trimmed Spearman-Karber method for estimating median lethal concentration in toxicity bioassays, Environ. Sc. Technol. 11: 714-718.

12. REPORT DISTRIBUTION

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31/3/14

Signature with Date
(Principal Investigator)