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Environment and Bioprocess Technology Centre

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RESULTS SUMMARY

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Your Ref No.	
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Request : Fish Acute Toxicity Test on LICIN LICIN - Floor Cleaner.

SAMPLE DESCRIPTION

One sample coded as LICIN LICIN – Floor Cleaner was received on 4 August 2004.

TEST METHOD

*Acute fish toxicity test according to OECD Guideline Test Method 203.

Note: *Non-accredited method.

RESULT: (refer to Appendix A for detailed test report)

Sample Code	Appearance	LC50 (96 hour)
LICIN LICIN – Floor Cleaner	Whitish pink	0.11 % (1100 mg/l)

INFERENCE

Refer to page 2.

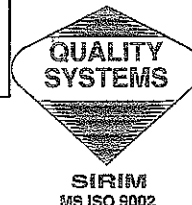
(The inferences expressed herein are outside the scope of accreditation).

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SIRIM Environment and Bioprocess Technology Centre

Test Report on
96-hour Tilapia (*Tilapia nilotica*), Fish Acute Toxicity Test
of LICIN LICIN - Floor Cleaner (Radixchem Industry Sdn. Bhd.)
 (ETC 237/16/435, J174/04, R205/04)

Summary of Results

The 96-hour static acute toxicity test was conducted on LICIN LICIN – Floor Cleaner using tilapia (*Tilapia nilotica*). The original sample was used directly. The final results were obtained from a definitive test of 0.50 %, 0.23 %, 0.10 %, 0.05 %, 0.02 %, 0.01 % series of sample concentrations. The LC₅₀ value at 96-hour exposure of tilapia are summarised as follows:

Sample Code	Original Appearance	LC ₅₀ (96 hour)
LICIN LICIN – Floor Cleaner	Whitish pink	0.11 %

1. Purpose of Test

To determine the acute toxic effect of LICIN LICIN – Floor Cleaner on tilapia. The test would be used to obtain the 96-hr lethal concentration in which 50 per cent of the fish would be killed (96-hr LC₅₀).

2. Test Period

20 – 24 August 2004.

3. Outline of Method

The test was conducted according to OECD Guidelines for Testing of Chemicals, 203 “Fish, Acute Toxicity Test” with some modification.

The test fish were exposed to six different concentrations of sample for a period of 96 hours. Mortality and toxicity responses were recorded at 24, 48, 72 and 96 hours. The percentage response at the end of the test duration was determined against that of the control.

4. Materials and Method

- i) Test substance: LICIN LICIN – Floor Cleaner
- ii) Test organism:
 - a) Common name (scientific name): Tilapia (*Tilapia nilotica*)
 - b) Source: supplier bred tilapia
 - c) Number of organism: 10 per exposure level
 - d) Weight/Length: ~ 0.44 g; 2.42 cm
 - e) Acclimatisation: Test fish were held in the laboratory at a controlled environment condition for at least 7 days prior to test. The survival rate was > 95% during the acclimatisation period.

- iii) Condition of exposure:
- Type of test: Static system
 - Exposure duration: 96 hours
 - Test concentrations: 0.01 %, 0.02 %, 0.05 %, 0.10 %, 0.23 %, 0.50 % and control.
 - Dilution water: Dechlorinated water
 - Aeration: All test concentrations were aerated as to maintain dissolved oxygen >60% of air saturation value.
- iv) Condition of test environment:
- Test vessel: Glass container of 7 L volume
 - Volume of test solution: 5 L
 - Temperature: 25 ± 2 °C
 - Light: 14 hours photo period daily
 - Renewal of test solution: Not applicable
- v) Observation and measurement:
- Mortality and visible abnormal response (test fish was considered dead if no reaction observed when touching its caudal penducle)
 - pH of test solution
 - Statistical evaluation of LC_{50} using EFFLUENT- LC_{50} vers1.2 SPEARMEN/STEPHEN software (binomial method).

5. Results

i) 96-hr LC_{50} (tilapia):

Sample Code	Description	LC_{50} (96 hour)
LICIN LICIN – Floor Cleaner	Whitish pink.	0.11 %

ii) Mortality:

Table 1: LICIN LICIN – Floor Cleaner, Cumulative mortality and pH of test solution

Test concentration	Cumulative mortality (%)					pH		DO
	2 hr	24 hr	48 hr	72 hr	96 hr	Initial	Final	
0.50 %	100	100	100	100	100	7.31	7.29	7.8
0.23 %	0	100	100	100	100	7.21	7.28	7.8
0.10 %	0	0	10	20	40	7.22	7.50	7.7
0.05 %	0	0	0	10	10	7.32	7.90	7.3
0.02 %	0	0	0	10	10	7.23	7.92	7.2
0.01 %	0	0	0	0	20	7.01	7.80	7.8
Control	0	0	0	0	0	7.00	7.32	7.7

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Environment & Bioprocess Technology Centre

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INFERENCE

The classification system for substances hazardous to the aquatic environment according to The Globally Harmonised System (GHS) for Hazard Classification and Communication (2001) is shown below.

Toxicity Category (Acute toxicity for 96hr LC ₅₀ for fish)	Classification Limit
Acute I	≤ 1.0 mg/l
Acute II	> 1.0 ≤ 10 mg/l
Acute III	> 10 ≤ 100 mg/l

Based on the GHS, the LICIN LICIN – Floor Cleaner is not classified as “hazardous to the aquatic environment” as its LC₅₀ (96 hr) value is 0.11 % or 1100 mg/l.

Precaution should be taken to ensure instream waste concentration (IWC) from discharge to water bodies of the ‘used’ product should not exceed 11 mg/l. The recommended value is calculated by dividing the LC₅₀ value with an application factor of 100 to estimate the No-Effect Concentration (NEC).

The USEPA has provided some guidelines to estimate the instream (receiving water) concentration that will not cause acute toxicity on the aquatic organisms (EPA/600/4-85/013). In absence of data on waste flow and receiving water flow, the following formula is adopted:

$$\text{IWC acute toxicity} \leq \text{LC}_{50} / 3$$

$$\text{IWC chronic toxicity} \leq \text{LC}_{50} / 20 \text{ (assuming product is degradable)}$$

$$\text{IWC chronic toxicity} \leq \text{LC}_{50} / 100 \text{ (assuming product is not degradable)}$$

Precaution should be taken to ensure instream (receiving water) concentration (IWC) from discharge to water bodies of the “used” product:

- (i) Should not exceed 367 mg/l to prevent acute toxicity.
- (ii) Should not exceed 55 mg/l (if product is easily degradable).
- (iii) Should not exceed 11 mg/l (if product is not degradable) to prevent long term or chronic toxicity.

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