ACUTE TOXICITY OF ENDOSULFAN TO ANABAS TESTUDINEUS

Vandana, Department of Zoology, L.S. College, Bihar University, Muzaffarpur -842001

Toxicity tests were carried out on Anabas testudineus with endosulfan (0.009-0.020 ppm) in 40 l. Fibreglass reinforced plastic tanks at 31 to 33.5 °C for a period of 96 h. At varying concentrations of endosulfan, A. testudineus showed distress with excessive mucus secretion within few hours of exposure. Death of A. testudineus started occurring after 3 or 4 h. Lethal concentration (LC 50) for A. testudineus was recorded to be 0.0137 ppm with 95% confidence limit (lower 0.0043 and upper 0.04365).

In paddy cum fish culture the high yielding varieties of paddy are susceptible to pests. Various pesticides are generally used to eradicate the pests from paddy fields. Biodegradable organochlorine pesticides are known to enter into aquatic ecosystems as run off from fields during monsoon. This sometimes creates pollutinal hazards. The most disastrous effect of pesticides is effect in mass fish kill in ponds receiving such waters and also in paddy cum fish culture systems in on record. Several workers have attempted to study the effect of endosulfan on fish (Dalela et al. 1978; Verma et al. 1978; Singh & Srivastava 1981; Ludemann & Neumann 1960; Schoettger; 1970 & Abdi, 1983) on Channa gachua, Saccobranthus sp.; Heteropneustes fossilis, cyprinus carpio, trout, white sucker and Catla catla etc. In the present communication attempts have been made to study the acute toxicity of endosulfan to Anabas testudineus.

A total of 350 Anabas testudineus (length 125.5 mm) were procured from the local fish ponds in Pri district (Orissa). Fish were treated with 250 ppm solution of KMnO4 for one minute before acclimation to the test conditions for 7 days at the ambient water temperature of 31-33.5 °C in 40 l. fiberglass reinforced plastic tanks. With a view to ascertain the lethal concentration, the fish were exposed to a wide range of concentrations (0.009 – 0.02 ppm) of endosulfan with control for 96 h in triplicate. Dead individuals were removed and examined everyday. Probit analysis of the data was done as per the method described by Finney (1977).

Table 1 Mortality of A. testudineus at different concentrations of Endosulfan with a period of 96 h at 31-33.5 °C

<table>
<thead>
<tr>
<th>Concentration (ppm)</th>
<th>24 h</th>
<th>48 h</th>
<th>72 h</th>
<th>96 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>0.020</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.019</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.018</td>
<td>62.5</td>
<td>79.1</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>0.017</td>
<td>45.8</td>
<td>58.33</td>
<td>79.1</td>
<td>79.1</td>
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<tr>
<td>0.016</td>
<td>33.3</td>
<td>45.8</td>
<td>54.1</td>
<td>62.5</td>
</tr>
<tr>
<td>0.015</td>
<td>25.0</td>
<td>33.3</td>
<td>45.8</td>
<td>50.0</td>
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<tr>
<td>0.014</td>
<td>29.1</td>
<td>37.5</td>
<td>45.8</td>
<td>45.8</td>
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<tr>
<td>0.013</td>
<td>20.8</td>
<td>29.1</td>
<td>41.6</td>
<td>45.8</td>
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<td>0.012</td>
<td>25.0</td>
<td>29.1</td>
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<td>16.6</td>
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<tr>
<td>0.009</td>
<td>16.6</td>
<td>20.8</td>
<td>20.8</td>
<td>20.8</td>
</tr>
</tbody>
</table>

A. testudineus exposed to endosulfan have shown increased respiratory activity, jerky upward movement, increase in opercular movements.
within an hour after exposure. After 3-4 h, fish died and settled at the bottom and later, floated on the surface with excess amount of mucus. The colour of the gill lamellae changed from reddish to light brown with excessive amount of mucus. At 0.19 and 0.020 ppm 100% fishes died within 24 h while at 0.018 ppm 100% mortality was observed in 72 h (Table 1). At 0.016 and 0.017 Ppm 62.5% and 79.1% mortality occurred in 96h respectively. Again at 0.13-0.15 ppm endosulfan concentration fish mortality ranged from 45-50% in 96 h. At 0.009-0.012 ppm only 20.8-29.1% mortality was recorded. Maximum number of fish died within 24 h of exposure. No mortality was observed in control except one fish jumped out and lost which is not taken into account. 96 hours LC 50 value for A. testudineus was calculated to be 0.0137 ppm (95% confidence limit was : Lower 0.0043 and Upper 0.04375 ) as described by Finney (1977) which is very much closer to the findings of Dalela et al (1978a), Verma et al (1979) and Sinha & Srivastava (1981) in respect of air breathing fishes.

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