

ACUTE TOXICITY OF ENDOSULFAN TO ANABAS TESTUDINEUS

Vandana , Department al 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 in mass fish kill in ponds receiving such waters and also in paddy cum fish culture systems is 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*, *Saccobranchus* 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. fibreglass 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 I Mortality of *A. testudineus* at different concentrations of Endosulfan with a period of 96 h at 31-33.5 °C

Concentration (ppm)	Mortality (%)			
	24 h	48 h	72 h	96 h
Control	Nil	Nil	Nil	Nil
0.020	100	-	-	-
0.019	100	-	-	-
0.018	62.5	79.1	100	-
0.017	45.8	58.33	79.1	79.1
0.016	33.3	45.8	54.1	62.5
0.015	25.0	33.3	45.8	50.0
0.014	29.1	37.5	45.8	45.8
0.013	20.8	29.1	41.6	45.8
0.012	25.0	29.1	37.5	29.1
0.011	16.6	20.8	25.0	25.0
0.010	20.8	25.0	25.0	25.0
0.009	16.6	16.6	20.8	20.8

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.

The authors are grateful to Dr. S. D. Tripathi, Director, Central Institute of Freshwater Aquaculture (ICAR), Kausalyaganga, Bhubaneswar - 751002 and the Head of Post-graduate Department of Zoology, University of Bihar, Muzaffarpur - 842001.

REFERENCES

- Abidi Rehena 1983** Toxicity of certain pesticides to fishes. *Proc. Nat. Acad. Sci. India* 53 (B); 156-163
- Dalela R C, Verma SR and Bhatnagar MC 1978a** Histochemical studies on the effect of Roger and Thiodon on the activity of acrophosphatase in liver, muscles and kidney of *Channa gachua* *Ind J. Exp. Biol.* 16: 1079-1102
- Finney D J 1971** Probit analyses, Cambridge University London, 333 p
- Ludemann VD and Neumann H 1960** Versuche über die akute toxische Wirkung neuzeitlicher Kontaktinsektizide auf einsohmmerige Karfen (*Cyprinus carpio* L.) *Zeitschr. angew. Zool.* 47: 11-13
- Schoettger RA 1970** Toxicology of Thiodon in several fish and aquatic invertebrates, U S Dept. of Interior. *Fish Wild Life Ser. Rep.* 35:31
- Singh NN, Bansal S K, Gupta A K 1981** Effects of endosulfan on fish carbohydrate metabolism, *Ecotoxicol., Environ. Safety.* 6 pp
- Verma S R, Bansal S K, Gupta A K, Pal N, Tyagi A K, Bhatnagar MC, Kumar K and Dalela RC 1979** Acute toxicity of twenty three pesticides to a freshwater teleost *Saccobranchus fossilis*, *Proc. Symp. Environ Biol.* 481-49.