

Impact of Toxic Sediment on Growth of *Tilapia Mossambica* and *Channa Punctatus*

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Abstract:- In this study we procured toxic sediment from Amlakhadi water channel in Bhuj where paper, dye and textile industries were dumping their toxic wastes. We took *Tilapia mossambica* and *Channa punctatus* to test the toxicity of the sediment in the lab to find the NOEC for their growth.

I. AIM OF EXPERIMENT

The aim of experiment was to determine the impact of toxic waste on the growth of fish for species of fish i.e. *Tilapia mossambica* and *Channa punctatus*.

A. Feeding

Diet, based on the fish protein requirement, was prepared. The fish were fed @ 5-10% of body weight once a day, in the morning. The feeding rate was adjusted as per requirement.

B. Sediment

Organic contents in terms of organic carbons and organic matter, as well as nutrient load in terms of nitrogen and phosphates and heavy metals of the composite sediment, are presented in Table 1.

C. Survival of test organisms at toxic sediment

➤ Acute toxicity

The value of LC50 of sediment to *Tilapia mossambica* was 12.5 gm/l, while the values of LC0 & LC100 were 6.5 & 25.0 gm/l respectively. Similarly LC50 value of *Channa punctatus* was 25.5 gm/l, while values of LC0 & LC100 were 50.0 & 12 gm/l respectively.

➤ Selection of Sub Lethal Doses

The three sub lethal doses for both the fishes i.e. *Tilapia mossambica* & *Channa punctatus* were taken as different fractions of their LC₅₀ test values i.e. 12.5 & 25.5 gm/l respectively.

The three sub lethal doses selected for *Tilapia mossambica* were 0.8, 0.5 & 0.3 gm/l and the three sub lethal doses taken for *Channa punctatus* were 1.2, 0.8 & 0.5 gm/l.

Nutrient & Organic Load	
Organic carbon (%)	2.72
Organic matter (%)	4.7
Total Nitrogen (mg/100 gm)	245
Total Phosphorus (mg/100 gm)	49.5
Heavy Metal Concentration (in mg / 100 gm)	
Cadmium	6.0
Chromium	7.18
Copper	58.27
Lead	6.19
Iron	2763.5
Manganese	47.4
Zinc	109.75

Table 1:- Nutrient, Organic Load and Heavy Metal Concentrations in Composite Sediments from Amlakhadi Channel

B. Growth

To determine the sublethal effects of pollutant by means of growth, 30- days studies were carried out with reference to toxic sediment for both the fishes. The growths were recorded for three concentrations for *Tilapia mossambica* and *Channa punctatus* in triplicates. The control fishes were reared in fresh water (effluent-free water). The fishes were weighed at 0, 5th, 10th, 20th and 30th day.

II. RESULTS

The initial weight of *Tilapia mossambica* at 0 day was 20.05 gm while that of *Channa punctatus* was 27.65 gm. The weight was recorded at the end of the 30 day experiment of all the three concentrations i.e. 0.3 gm/l, 0.5 gm/l & 0.8 gm/l for *Tilapia mossambica* and 0.5 gm/l, 0.8 gm/l & 1.2 gm/l for *Channa punctatus* (Table 2).

As Table 2 shows that the average weight of *Tilapia mossambica* in control was 21.05 gm, which shows 5.2% more over initial weight. The weight of *Tilapia mossambica* in 0.3 gm/l was recorded as 21.02 gm, which was above 5.08% of initial weight. There was 0.14% decrease in weight in 0.5 gm/l at the end of 30-day experiment. At 0.8 mg/l sediment *Tilapia mossambica* showed 4.08% decrease in weight on 30th day.

As Table 2 shows the average weight of control *Channa punctatus* at the end of 30 day gained 2.96% increase over initial weight. The weight of *Channa punctatus* at the end of 0.5 gm/l was recorded 28.47 gm, which showed 0.542%

increase on initial weight. There was 2.35% decrease in weight in 0.8 gm/l at the end of 30-day experiment. The fish

exhibited 5.96% decrease in weight on 30th day at 1.2 gm/l sediment.

<i>Tilapia Mossambica</i>				<i>Channa Punctatus</i>			
Conc.	Initial weight (in grams) of fish on 0 day of experiment.	Final weight (in grams) of fish on completion of 30 days of experiment.	Percent increase (+) / decrease (-) over Initial Wt.	Conc.	Initial weight (in grams) of fish on 0 day of experiment.	Final weight (in grams) of fish on completion of 30 days of experiment.	Percent increase (+) / decrease (-) over Initial Wt.
Control	20.05	21.05	(+) 5.2	Control	27.65	28.47	(+) 2.96
0.3 gm/l	20.05	21.02	(+) 5.08	0.5 gm/l	27.65	27.80	(+) 0.54
0.5 gm/l	20.05	20.20	(-) 0.14	0.8 gm/l	27.65	27.00	(-) 2.35
0.8 gm/l	20.05	19.23	(-) 4.08	1.2 gm/l	27.65	26.00	(-) 5.96

Table 2:- Growth of Fishes during Long-Term Exposure

III. DISCUSSION & CONCLUSION

Growth trend at the end of the experiment for both the fishes *Tilapia mossambica* and *Channa punctatus* showed reduction in weight in highest concentration, while slight reduction in weight in medium concentration. Growth was not much affected in the lowest concentrations, as compare to control at the end of the experiment in case of *Tilapia* but in case of *Channa* is not as good as in control but on positive side.

Fishes are highly sensitive to toxicity in aquatic environment. By this study we found the NOEC level of toxic sediment obtained from *Amlakhadi* water channel.

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