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A STUDY ON BIOCHEMICAL CHANGES IN FRESHWATER AIR-BREATHING FISH, ANABAS TESTUDINEUS (BLOCH) WITH ROGOR

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ABSTRACT

This paper has evaluate the Rogor insecticide LC50 values and relative comportemental changes in fresh-water fish Anabas testudineus (Bloch) exposed for 24 , 48, 72 and 96 hours. Anabas testudineus (Bloch) Anabas testudineus LC50 values were recorded at 9 ppm, 8.31 ppm, 7.8 ppm and 7.1 ppm. Fish have been observed with increasing opercular momentum, loss of balance, increased surface activity, mucous secretion, irregular activity of the swimming, rapid movement and aggression.

KEY WORDS : *Freshwater Air, Bloch, Anabas testudineus, Biochemical changes, Breathing Fish, Fish.*

INTRODUCTION:

Increased pesticide use causes a major decline in the quality of water (Bhalchandra et al., 2001)[1], which may result in the death of aquatic species, including fish (Kumarguru, 1995)[2]. There is an obvious indication of crude water contamination, but there is rising evidence that even low pesticide contamination can reduce fish population fecundity, contributing to long-term declining and eventual extinction of significant fish. Gross water pollution

Resources (Kime 1995)[3]. Ressource. Pesticides accumulate in various fish tissues due to their non-degradable nature and induce survival and development (Kaur and Toor, 1977)[4]. These pesticides represent a permanent danger to fish by altering behavioural habits (Ramneshwar and Rao 2002)[5], cellular morphology (Roy Talukdar et al 1985),[6] histo-pathology and physiology[6]. These pesticides pose a persistent threat to fish (Pandey et al. 2000). These interventions were suggested for the assessment of pesticide influence in aquatic environments and also for the prevention of its deleterious effects as biological indicators. (Petrocelli and Rand, 1985)[8].

The main biochemical machinery of fish is highly toxic to these pesticides (Rawat et al., 2002; Prasad and Kumar, 2013). Since we have little knowledge of the impact of pesticides on biochemical changes and of energy levels in various tissues of peach (Prasad and Kumar, 2013)[9], current activities have been taken into consideration.

In the laboratory, the research fish are purchased and acclimated. As standard methods defined in a monograph, water quality parameters are evaluated as the APHA (2012) methods and lethal toxicity for various times.

Biochemical parameters such as blood glucose, protein plasma, serum cholestral, transaminase Glutamate Pyruvate and transaminase Glutamate are to be tested in test kits supplied with Gorakhpur. Histo-pathological tests are carried out in liver , kidney, testing and ovary for the measurement of glycogen, proteins , lipids and cholesterols (Pearse, 1995; Bancroft et al., 1994). The calculation will also be carried out of Phosphatase Alkaline and Acid, Pyruvic acid and lactic acid (Bancroft et al., 1994).

In order to test the sense of variation between control and experimental values, the one-way variance analysis was applied (ANOVA). Statistically important were the P values below 0.5.

The application of pesticide products has contributed significantly to meet the rising demand for food by increasing farm yields. The overuse of broad-spectrum or non-selective pesticides harms, in some cases irreversibly, the ecosystem, soil and groundwater as well as fodder chains and, thus, jeopardises water and terrestrial environment welfare and health (Bhat et al, 2012; Rita et al . , 2006; Veeraiah, 2012) [2, 12, 15]. Toxic discharges from industry , mining, and farming and processing are entered and can have adverse effects on the people and the aquatic environment (Hamilton and Mehrle, 1986). Pesticides are one of the harmful contaminants that affect species, including the fish, in the aquatic environment.

The commercial toxicity of a pesticide is impaired, and the sensitivity of fish is most often affected by environmental factors. It's easy to secure your release beyond the cap by understanding the lethal concentration of a pesticide. Pesticide toxicity can also be categorised as chemical substances that are extreme, large, moderate, small and relatively inoffensive.The insecticides currently used for agricultural and domestic uses worldwide include organophosphate compounds. In the central and peripheral nervous system these insecticides induce toxicity by inhibiting the accumulated encyme acetyl cholinesterase, leading to overactivation of cholinergetic receptors after synoptic use and to neurotoxicity (Barat and Bahadur, 2014; Muthukumarawel et al . , 2013; Pandey et al., 2014)[3, 10]. Because of its high insecticide properties , low mammalian toxicity, low persistence and weak biodegradation of the ecosystem, organophosphates are more commonly used. Dimethoate is a touch or systemic circulation organophosphate with influence. Fish are a bioindicator because they are sensitive to changes in the aquatic environment and thus also play a critical role in water pollution monitoring (Ahmad, 2012; Binukumari and Basanthi, 2013)[1, 4]. Recient and noteworthy works have been published in Das and Mukherjee (2003) [5], Shrutis and Tantarpale, Tripathi and Rajesh (2015[14], Rajani and Revathy (2015) [11], on the impact of organophosphate on different aspects of the fish.

This research will determine the toxicity of carp, *Anabas testudineus* to an organophosphate pesticide-dimethoate for their easy access to and sustained survival in local watersheds. This is a common food fish with a range of reservoirs. This fish is common. Based on their broader use in crop fields, Dimethoate insecticide is chosen for research. Also highly soluble in water, this pesticide can leach in nearby bodies of water to harm aquatic species. This pesticide is a low persistence pesticide, but still stable with medium conditions and has a half life of 4-16 days.

METHODOLOGY

Live *Anabas testudineus* (Bloch) specimens were obtained through local Gaya fish traders. The fish were brought in the plastic bucket to the laboratory and held for about a week for correct acclimatisation. The unhealthy / infected / diseased fish were removed and all the other fish washed for about 30 minutes with 0.5% KMNO4 solution to clear ectoparasites. The fish were fed with bits of goat liver every day in the laboratory.

The LC50 values of all three pesticides groups namely Kelthane E.C before beginning any experiment. The method defined in APHA et al . (2012) was determined by (an organochlorine), dithane M-45 (carbamate) and metacid-50 (an organophosphate). The animals were then split into four categories: A (control), B (treated Kelthane), C (treated Dithane) and D (treated Metacid).sublethal concentrations of pesticides (as mentioned in Table 1) were exposed to fish. The fish were killed and dissected after 96 hours of exposure in order to extract muscle, ovary, kidney and liver. Weighed up and processed for the evaluation of their water, protein and lipid content and calorific value, the methods applied in Prasad & Kumar (2013), Alok & Mistry (2013), Kumari [11], and Yasmin(2016) and Bharati and Fatah (2016) [12] have been.

Table 1: Effect of pollutant exposure in certain tissues in *Anabas testudineus* (Bloch) at 30.0±1.00C and energy content in biochemical substances and in N = 6

S.No.	Conditoin	Dose mg/l	Tissues	water (g) %	Protein % (g)	Lipid (g) %	Calorificvalues (K.cal/g)
1	Control	-	Muscle	68.35±0.41	19.32±0.25	3.24±0.08	4.00±0.11
2	do	-	Ovary	68.78±0.38	17.46±0.19	3.64±0.09	3.50±0.14
3	do	-	Kidney	72.79±0.48	16.02±0.32	3.19±0.11	2.03±0.12
4	do	-	Liver	69.40±0.51	19.09±0.18	5.44±0.13	3.99±0.26
5	Kelthane	8.8	Muscle	71.45±0.25	16.12±0.54	2.17±0.06	2.12±0.18
6	do		Ovary	72.02±0.45	14.28±0.42	2.58±0.08	2.01±0.22
7	do		Kidney	75.18±0.21	13.10±.34	2.38±0.12	2.00±0.24
8	do		Liver	72.51±0.38	14.15±0.21	1.96±0.22	2.13±0.28
9	Metacid	8.2	Muscle	72.78±0.41	16.25±0.18	2.38±0.23	2.21±0.32
10	do		Ovary	73.18±0.18	14.35±0.38	2.70±0.21	2.18±0.36
11	do		Kidney	76.95±0.35	13.38±0.43	2.51±0.08	2.25±0.38
12	do		Liver	73.65±0.84	14.42±0.51	2.18±0.09	2.34±0.34
13	Dithane	20.5	Muscle	77.89±0.65	15.85±0.42	2.01±0.08	1.98±0.30
14	do		Ovary	73.65±0.51	13.98±0.38	2.03±0.12	1.86±0.26
15	do		Kidney	77.35±0.23	13.88±0.81	1.70±0.14	1.95±0.19
16	do		Liver	77.28±0.33	12.86±0.24	1.96±0.11	1.78±0.20

Anabas testudineus live freshwater fish have been gathered from the river, 35 km from siwan. India and the laboratory carried it. The fish have been fed live Earthworm pieces every alternate day and allow for 15 days before the experiment to acclimatise in laboratory conditions in large waterworms. Fresh water rich in oxygen has been renewed every day.

The fish were selected for LC50 identification (average weight: 10 gm and length: 9.5 cm). Preliminary experiments were performed in different Rogor concentrations to find concentration (ppm) that in a given period resulted in 50 percent mortality. During the experimentation, the LC50 values were determined based on the physical and chemical properties of the test water.

Table 2: LC50 freshwater testudineus Anabas stigma for a duration of 24 , 48, 72 and 96 hours after exposure to Rogor insecticide

Exposure Period in hrs.	Regression equation	LC_{50} values in % concentrations	Calculated LC 50 values in % concentrations	Variance	Chi-square X'	Fiducial limit up to 95 % confidence Ml M2
24hrs	Y=11.2266373 X - 5.00094227	9	9	0.00026081	0.00572734	0.92232061 0.98562741
48hrs	Y=7.95149167 X - 5.00225297	8.31	8.3	0.00025651	0.14220305	0.87497733 0.96492473
72hrs	Y=9.24280544 X - 5.00811372	7.8	7.9	0.000433447	0.03248002	0.85734784 0.93896244
96hrs	Y=12.0156952 X - 5.01063729	7.1	7.2	0.00023104	0.11853853	0.82769215 0.88727624

RESULTS

Table 1 offers details about the water, protein, lipid content and calorific values in various tissues- including the muscle, ovary, kidney , and liver control and experimental classes, which have been exposed

for 96 hours to various pesticide concentrations (i.e. Kelthane, dithane and metabacide) in the components of *Anabas testudineus* (Bloch). The spectrum of biochemical composants listed above was:- water 68.35±0.41 - 72.79±0.48%; protein 17.46±0.19-19.0±0.18%; lipid 3.19±0.11-5.44±0.13% and calorific values 2.03±0.12-4.00±0.11 K.cal/g. Treatment for 96 hours of all three of the above pesticides (at sublethal concentrations, as shown in Table 1) resulted in an increase in water content but, on the other hand, significantly decreased protein %, lipid %and calorific value (K.cal / g) (*Anabas testudineus* Bloch).

It was found that there was no harmful agent in the water used for the experiment. In the control group, no deaths were initially found. The behaviour, survival rate and mortality have been examined in fish exposed to deadly Rogor concentrations at short-term exposure.

LC50 values were recorded at 24 , 48, 72 and 96 hrs at 9 ppm, 8.31 ppm, 7.8 ppm and 7.1 ppm for freshwater fish, and Rogor-exposed *Anabas testudineus* LC50 values and regression results were calculated in order to assist present observation in Table 1. LC50 values have declined at 96 hours in the present study and increased over the 24 hours of exposure. Thus, the highest at 24 hours and the lowest at 96 hours of exposure were found [15].

DISCUSSION

We have very little knowledge of the impact of pesticides on biochemistry changes and energy content in various fish tissues (Pandey et al. 2003; Prasad and Kumar, 2013)[7,10]. In the current work, the water content in the above four tissues of the *Anabas testudineus* exposed to kelthane, dithane and metacid was increased. It has been found. After care, which could be defined as an enhanced metabolic activity of the pesticide exposure, muscles, ovaries, kidney , and liver were hydrated, which was consistent in the findings in *Clarias batrachus*, *Heteropneustes fossilis* (1981) and Prasad (1987).

Protein plays an incredibly important role in the biological system and is a crucial component in the design and activity of living materials. In the present study, when pesticides were applied to these tissues, a reduction in the percentage of protein in all four tissues, apparently due to stress and disrupted metabolic activity, was observed. The protein may have been depleted in order to combat pollutant stress. Kabeer et al. 1978[13] and Dehaidrai and Mukhopadhyay (1980) also shared their opinion.

Diminution of lipid content in all four tissues of *Anabas testudineus* was found in this study for 96 hours when exposed to various pesticides. The decreased lipid content, which is in line with current evidence, also was observed for Chaudhary (1981), *Heteropneustes fossilis* (after Malathion exposure), Palanichamy et al. (1986b)[14] in Carpio Cyprus (after Decision-Coroban exposure) and Palanichamy et al. (1986a) in Orecochromes mossambicus (after DAP exposure, Urea, Potash and Ammonium Cryoride fertilisers).

The current *Anabas testudineus* research shows a substantial reduction in the levels of energy in tissues compared with the monitoring of sublethal exposure of pesticides, consistent with the results of Yasmin (1989) in Clarias batrachus and Heteropneustes fossilis and Prasad and Kumar (2013)[10] in *Clarias batrachus* (Linn.)Energy depletion per unit weight of matter of organisms is considered to represent the use of high lipid energy for metabolism and under the pesticide stress reserve and protein is likely to mobilise *Anabas testudineus* (in this study) to meet high metabolic demand in pesticide resistance. Since the calorific content of the whole of the fish body in water is significantly reduced by pesticides, periodic energy contents testing in fish body, in particular in months, can be used as a bio-indicator for the evaluation of the pollution load, and measures can be taken to mitigate the pollution in the body to enhance its efficiency.

CONCLUSION:

This study showed an improvement in opercular movement of fish at 9 ppm, exposed to the lethal concentration of Rogor for 24 hours, at first fish. The accumulated mucus debris should be removed to breathe properly in the gill area. At the start, the fish suffocated and used to scatter air on the surface. The changes in this study demonstrate the motivational state of biochemistry, physiology and climate of fish.

Erratic swimming of the fish handled demonstrated a lack of coordination. The field in the brain linked to the preservation of equilibrium has been demonstrated. Erratic swimming, quick jerky movement and convulsions became apparent before death and asphyxiation was shown to be wasting. This has been found to be very susceptible to Rogor insecticide from the present report.

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