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IMPACT OF SPINETORAM ON NUTRITIONAL VALUE OF FRESH WATER FISH *LABEO CALBASU (BLACK ROHU)*

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ABSTRACT

The motive of the investigation was to assess the effect on nutritional value of Labeo rohita fish after 96 hours exposure to acute concentrations of spinetoram insecticide, i.e., 2 ml and 4.5 ml. The nutritional parameters study showed moisture, carbohydrate, energy, crude protein, crude fibre, crude fat and total minerals levels declined significantly from day 1 to day 4. This research shows a major depletion in the nutritional value of fish, which combined with the fact that fishes are exposed to spinetoram under natural conditions.



KEYWORDS : *Spinetoram Insecticide, Fish Labeo Calbasu, Nutritional value.*

INTRODUCTION:-

Fish is widely consumed food across the globe. It is source of protein and an important nutrient to huge populations. Fish is source of essential macronutrients such as proteins and healthy fats which includes long chain omega 3 fatty acids, docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA) and a-linolenic acid. Consumption of fish and seafood is associated with positive health effects and more importantly decreased risk of cardiovascular and coronary heart diseases is observed (Bucher *et al.,* 2002) [51]. *Labeo Calbasu* aka Black Rohu in Indian subcontinent is an important freshwater carp from both the aquaculture and human consumption perspective.

Nutrients are important for body nourishment, repairing body parts, and promoting growth. Fishes are rich source of these essential nutrients in healthy diet. However, fishes and many aquatic species are endangered by pollutants in aquatic environment and the effect is transferred down the food chain. (Agrawal and Srivastava, 2003; Gupta and Srivastava, 2006; Jat and Kothari, 2006; Ayas *et al.,* 2007) [1, 6' 7' 3]. Spinetoram is an insecticide commonly used in agriculture these days. Insecticides and pesticides like spinetoram are often flown down to the nearby aquatic reservoirs.

The nutritional quality of fish is illustrated by proximate composition (Azam *et at,* 2004) [41. Key nutrients in fish are protein and fat, and their percentages indicates the nutritional status of fish. Important aspect in the proximate study of fish is the proximate composition differs from one organism to another depending on species, sex, age, season, food availability and other environmental parameters (Oduor Odote & Kazungu, 2008) [91.

MATERIAL METHOD:-

Live specimens of *Labeo calbasu,* i.e., Black rohu fish were procured from nearby freshwater reservoir. Fish were of length measuring between 16 to 19 cm and the weights were between 90 to 100 grams. Fish were randomly grouped in 3 groups of control group, LC0 and LC50, and 10 batches of each group were formed for the experiment. The control group fish were kept in normal water, LC0 group was exposed to LC0 concentration of

spinetoram and LC50 group was exposed to LC50 concentration of spinetoram. After 96 hours of exposure, fish survived from each were autopsied. Small pieces of fish were then allowed to dry in sun for a week and then fine powder samples were made from these in respective groups. The proximate analysis test of nutritional values was conducted on these fine powder samples.

RESULT:-

Acute toxicity of spinetoram for *Labeo rohita* was determined by experimenting with different concentrations. The LC0 was observed at 2.5 ml spinetoram in 100 Litres of water, where there were no mortality and abnormal behaviour and LC_{50} was observed at 4.0 ml spinetoram in 100 Litres of water, where there were 50% mortality after 96 hours of exposure.

Fish is rich in nutritional value as food. In control group, the nutritional values observed were moisture [07.50%], total mineral [20.10%], crude protein [66.95%], crude fat [05.75%], crude fibre [01.0%], carbohydrate [0.90%] and the energy [3.30 Kcal/g].

In LC0 group, the nutritional values observed were moisture [07.15%], total mineral [19.70%], crude protein [66.00%], crude fat [05.10%], crude fibre [00.20%], carbohydrate [0.87%] and the energy [3.18 Kcal/g]. The values are lower than the values of control group.

In LC50 group, the nutritional values observed were moisture [06.50%], total mineral [19.40%], crude protein [65.60%], crude fat [05.00%], crude fibre [00.01%], carbohydrate [0.06%] and the energy [3.05 Kcal/g]. The values are lower than the values of both control and LC0 group.

The values of all nutritional parameters declined from Control to LC0 to LCso groups during acute toxicity study which can be seen in the table below.

Table 1: Values of nutritional parameters of *Labeo calbasu* for different groups

Sr.	Parameter	Unit	Control	LCo	LC_{50}
I.	Moisture	%	07.50	07.15	06.50
2.	Total Minerals (Ash)	%	20.10	19.70	19.40
3.	Crude Protein	%	66.95	66.00	65.60
4.	Crude Fat	%	05.75	05.10	05.00
5.	Crude Fiber	%	01.00	00.20	00.01
6.	Carbohydrate	%	00.90	00.87	00.06
	Energy	Kcal/g	3.30	3.18	3.05

DISCUSSION:-

The value of moisture, total mineral and crude protein shows declines in groups exposed when compared to control group and further decreases with the increase in concentration from LC0 to LC50. Jha (1991) [8] also observed the protein in tissues declined after Channa punctatus fish was exposed to lead nitrate for period of 30 days. Saradhamani & Jesi Selvarani (2009) [10] and Shanthi *et al.* (2009) E[n] have reported protein in liver declined after exposure to heavy metal led to increased utilization to counter the toxicity stress. Somaiah *et at,* (2014) [DI studied the toxic effect of Phenthoate organophosphate insecticide on levels of protein in tissues of *Labeo rohita* and found that the protein levels decreased in all tissues when fish was exposed to insecticides for 1, 4 and 8 days with concentration 1/10th of 96 hours LC50.

The value of crude fat and fibre shows declines in group exposed when compared to control group. Shukla *et al.,* (2002) [12] reported the caloric value of lipids is approximately twice of weight of proteins and carbohydrates, the mobilization of these lipid reserves highlights the burden of high energy demands.

The value of carbohydrate and energy shows declines in groups exposed when compared to control group and further decreases with the increase in concentration from LC_0 to LC_{50} too. Impaired carbohydrate metabolism caused by toxic exposure may cause suppression of glycogen (Saradhamani and Jesi Selvarani, 2009). Carbohydrates are immediate and first line of energy source that is utilized to when energy is required and hence

the carbohydrate reserves in all tissues is depleted when the fish are exposed to toxicants (Tasneem *et at,* 2020) [M]. Decrease in carbohydrate content is caused by the energy demand from all tissues in toxicity stress condition (Arasta *et* at, 1996) [23].

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