Effect of Endosulfan on Protein Content of Freshwater Bivalve Corbicula Striatella

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Abstract
The protein content of freshwater bivalve, Corbicula striatella was studied after exposure to endosulfan. Overall depletion in proteins content in mantle, foot, gill, digestive gland and whole body was observed. The study was carried for median lethal (0.314) and sublethal (0.068).ISO 14001 standards of EMS.
Keywords: *Protein, Endosulfan, Corbicula striatella*

1. Introduction

Adequate information is available related to impact of environmental pollutants on aquatic animals. Use of pesticides becomes unavoidable part of farming. When these pesticides reach the water bodies, they are taken up by the aquatic biota. Aquatic biota like zooplankton, insects, worms, molluscs and fishes cannot escape from the pollutants in water, suffer from various ill effects, like mass, molarity , chronic changes in behaviour, low survival rates and morphological changes in different organ system.(1)The pesticide pollutants are known to alter the physiochemical properties of water.(2)These in turn interfere and interact with various physiological activities of organisms.(3)The higher concentrations of toxicants brings adverse effects on aquatic organisms at cellular and molecular level and ultimately it leads to alteration in the biochemical composition.

Organochloride pesticides which are widely used for pest control need to study so as to evaluate their impact on aquatic animals. Most of the information regarding the effect of these compounds has been obtained from mortality studies but little is known about their effects on physiological processes. Biochemical constituents like glycogen, protein and lipid are considered as sensitive indicators of stress as they act as key substrates for metabolism.(4)In the present investigation importance is being given for the study of protein content in different tissues of fresh water bivalve Corbicula striatella aftermedian lethal and sublethal exposure to endosulfan. The species put to study is protein rich and therefore has an important place in the aquatic food chain.

2. MATERIALS AND METHODS

The experimental animals, Corbicula striatella were collected from Girna dam near Chalisgaon, District Jalgaon, Maharashtra state. They were acclimatised to laboratory conditions for five days before they were subjected to experiment. Acclimatised healthy and adult bivalves were selected for experiment. The bivalves weredivided into three groups, A, B, and C. Group A was maintained without pollutant as control and remaining two groups exposed to Endosulfan median lethal (0.314ppm) and sublethal(0.068ppm) concentrations. Animals were taken out for analysis from Bgroup after 24,48,72 and 96 hours of exposure and from Cgroup after 7,14 and 21 days of exposure. Different tissues such as mantle,foot, gill, digestive gland and whole body were taken for experimental analysis. Same procedure was followed for control group.The tissue were dried at 70^0C in oven and carefully made into dry powder ,which was used for protein estimation .Total protein content was determined by Lowry's method(5).

3. RESULTS AND DISCUSSION

When exposed to median lethal and sub lethal concentrations of endosulfan,the total protein content in different tissues of test animal Corbiculastriatella was found to be decreased. From the table 1 and 2, it is clear that the depletion in total protein content was proportional to the exposure period.

Normally more energy is needed to mitigate any stress conditions. This energy may be obtained from carbohydrates, proteins, and lipids.[6] In the present study during toxic stress Corbicula striatella tried to detoxify the pesticides by spending more energy and thereby showed reduction in protein level in different tissues. A marked decline in protein content on increasing exposure period suggests an increased proteolysis and possible utilisation of the products of their degradation for metabolic purpose.

Table1: Effect ofendosulfan on protein content of Corbicula striatellaafter medianlethal exposure

Tissue	Exposure Period				
	Control	24hrs	48hrs	72 hrs	96hrs
Mantle	46.66 ±2.35	41.66** ±2.35 -10.71	38.83*** ±4.58 -16.78	33.33*** ±4.74 -28.56	30.00** ±4.08 -35.70
foot	83.33 ±2.35	76.66 NS ±2.35 -8.00	75.0 NS ±0.00 -9.99	71.5** ±2.35 -14.19	65.00** ±2.35 -21.99
Gill	71.66 ±2.35	53.33 NS ±2.35 -25.57	48.33* ±2.35 -32.55	46.46** ±2.35 -34.88	21.65*** ±4.08 -41.86
Digestive gland	51.66 ±1.17	46.66* ±2.35 -9.67	44.16*** ±1.17 -14.51	38.33*** ±2.35 -25.80	32.16*** ±2.35 -47.42
Whole Body	61.66 ±2.35	53.33 NS ±4.71 -13.50	50.00* ±0.00 -18.91	48.33* ±1.17 -21.61	47.00*** ±2.04 -31.07

1. Values expressed as mg/100mg dry wt. Of tissue
2. ± indicates SDof three observation
3. (+) or (-) indicate % change over control .Values are significant at * = P< 0.05 ; ** =P<0.01; *** = p<0.001

Similar finding were reported in Cyprinuscarpio[7] ,Indonaiacaeruleus[8] and Thiaralineata(9)
Depletion in total protein content in CorbiculaStriatella suggests that they may be channelized into TCA cycle through aminotransferase system to cope up with excess demand of energy during toxic stress .Similar results were reported in freshwater bivalve Lamiliidensmarginalis

Table.2 Effect of endosulfan on protein content of Corbicula striatella after sub lethal exposure

Tissue	period of exposure			period of exposure		
	control			Experimental		
	7 days	14 days	21days	7 days	14 days	21 days
Mantle	46.66 ±2.35	46.35 ± 0.00 -0.77	46.00 ±4.14 -1.41	30.00*** ±0.00 -35.70	25.17*** ±1.02 -46.06	24.17*** ±1.97 -48.20
Foot	83.33 ±2.35	83.00 ±0.00 -0.39	81.87 ±1.17 -2.59	58.33 NS ±2.35 -30.00	55.00*** ±4.08 -33.99	53.33*** ±4.71 -36.00
Gill	71.50 ±2.35	70.33 ±2.35 -1.63	70.00 ±0.00 -2.09	36.67*** ±4.04 -48.71	33.33*** ±0.00 -53.38	28.33*** ±2.35 -60.37
Digestive gland	61.66 ±2.35	51.33 ± 2.35	51.00 ±0.00	28.88*** ±1.88	26.25*** ±1.25	24.17*** ±1.17

		-22.67	-51.04	-36.71	-66.20	-66.20
Whole Body	61.66 ±2.35	61.33 ±1.88 -0.53	61.08 ±0.00 -0.94	41.33*** ±1.02 -32.97	35.83*** ±4.71 -47.89	32.5 NS ±0.00 -47.29

1. Values expressed as mg/100mg dry wt. Of tissue
2. ± indicates SD of three observation
3. (+) or (-) indicate % change over control .Values are significant at * = P< 0.05 ; ** = P<0.01; *** = p<0.001

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