TEMPERATURE INDUCED CHANGES IN CHOLESTEROL CONTENT FROM DIFFERENT BODY PARTS OF FRESH WATER BIVALVE, *INDONAIA CAERULEUS* (PRASHAD, 1918) DURING WINTER SEASON.

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ABSTRACT

Considering the metabolic shifts in bivalve molluscs, increase in temperature of water (Which is important environmental stress factor), we report here the effect of rise in temperature on the cholesterol content from different body parts of fresh water bivalve, *Indonaia caeruleus* like mantle, hepatopancreas, gonad and foot of adult fresh water bivalve, *Indonaia caeruleus* (from Godavari river at Paithan during (December-January) during winter season. In the present study on Indonaia caeruleus due to effect of increase in temperature of water, the cholesterol content showed significant increase from mantle on 2nd and from gonad on 2nd and 8th day. The cholesterol content significantly decreased from mantle, on 16th day from hepatopancreas on 8th day and from foot on 8th & 16th day. Bivalves of approximately equal size are exposed to increase in temperature 30°C during winter for 16 days. Due to rise in temperature the cholesterol content showed more decrease from mantle on 16th day. The results of the experiments are discussed in light of physiological mechanisms involved in the fresh water bivalve mollusks.

KEYWORDS: Freshwater bivalve, temperature, cholesterol.

INTRODUCTION

Several reports have shown that cholesterol is about 1/3 of the total steroids existing in many species of lamellibranch mollusks (Idler and Wisemen, 1971; John and Kim, 1976). The
cholesterol has been shown to synthesized in *Crassostrea virginica* from acetate (Teshima and Patterson, 1981). Several reports have shown that Eulamellibranchia can synthesize sterols (Voogt, 1975; Teshima and Kanazawa, 1974). Many commercially important bivalve molluscs occurring in fresh water and marine environment have to face periodic fluctuations in the environmental factors which makes specific demands on the animal present in it. Perusal of literature shows that the effect of rise in temperature has been received little attention. It has been observed that, several bivalves get exposed to atmospheric air. Therefore considering these views the present study on fresh water bivalve *Indonaia caeruleus* was planned.

**MATERIALS AND METHODS**

The adult fresh water bivalve, *Indonaia caeruleus* (46 - 49 mm in shell length) were collected from banks of Godavari river at Paithan on December-January during winter season soon after bringing them to the laboratory, their shells were brushed and washed with tap water so as to remove the fouling algal and fungal biomass and mud. After 24h acclimatization in the laboratory conditions, they were grouped into 10(ten) and each group was kept separately in two aquaria each containing 5 Liter aerated reservoir water. The first group served as control with water of normal temperature (21.5°C-23.0°C) and second as experimental with increase in temperature (30°C) during winter. The temperature of the water in experimental group was adjusted by keeping thermostat (AUTOMATIC, RENA) France. (In experimental aquarium care was taken that, the animals were kept away from thermostat) and experiment was run for 16 days. The water of the control and experimental aquaria were renewed on every day at approximate interval of 12 to 13h throughout experimental period. During experimental period no food given to the animals. Physico-chemical parameters of water also determined. Similarly animals from every group were dissected and removed the separate body parts (mantle, hepatopancreas, gonad and foot) the cholesterol from each tissue was estimated (Kilmer, 1951) on 2nd, 8th and 16th day, in terms of mg cholesterol /100 mg tissue. All the values were subjected to student ‘t’test for statistical confirmation (Dowdswell, 1957). The physico-chemical characteristics of water used during experimentation were also determined (APHA et.al.1985).
RESULTS

Fig. 1: Effect of increase in temperature on the cholesterol content from different tissues of *Indonaia caeruleus* during winter season.

The physico-chemical parameters’ of water used in experiment on January-December during winter season were-Temperature of water (21.5°C-23.0°C), PH (7.73-7.76); hardness of water (97-103ppm) and dissolved oxygen content (6.334-6.741mg/lit.) The results of the present study were shown in Fig.1. Due to increase in the temperature upon 30°C, during winter, the cholesterol content showed significant increase from mantle (0.1048 ± 0.0144, p<0.05, 31.32%) on 8th from gonad (0.2298 ± 0.01543 p<0.01, 48.84%), on 2nd and (0.1148 ± 0.02443 p<0.05, 31.28%) 0n 8th day, compared to respective controls. While cholesterol content was significantly decreased from mantle (0.432 ± 0.0144, p<0.001, 64.17%) on 16th day compared to control. Similarly due to rise in temperature, the cholesterol showed significant decrease from hepatopancreas (0.07983 ± 0.02443, p<0.01, 45.57%) 0n 8th day and from foot (0.0738 ± 0.02343, p<0.001) on 8th day and on 16th day.

DISCUSSION

It is evident that ecological factor substantially influences that the cholesterol level from different body parts of fresh water mussel, *Indonaia caeruleus* (Rao et.al., 1987). Among the different tissue of bivalves, hepatopancreas and gonad are found to be the sites of majority of cholesterol. Synthesis, (Vedpathak et.al. 2007). Mantle and foot stored equal amount of content. Yasuda, (1971) stated that higher concentration of sterols in fresh water mussels.

In the present study on *Indonaia caeruleus* during winter season, due to rise in temperature, it was observed that, the cholesterol content significantly increased from mantal on 8th day and from gonad 2nd and 8th day while it significantly decreased from hepatopancreas and foot on
8\textsuperscript{th} and 16\textsuperscript{th} day. K.B. Ningule et.al. (2015) showed that due to effect of increase in temperature of water, the cholesterol content showed significant increase from gonad and decreased from foot.

The present study revealed that, due to increase in the temperature of water, experimental group perhaps activates steroidogenesis in hepatopancreas, gonad and foot.

Similar results were also reported by Rao et.al. (1987), Vedpathak, (1990) while studying effect of some ecological factor on fresh water bivalves. Such steroidogenesis in these tissues of fresh water bivalves due to pesticides toxicity stress has been reported in \textit{Lamellidens marginalis} (Swami et.al., 1983).

Tissue steroidogenesis in \textit{Indonaia caeruleus} was probably oriented towards the formation of corticosteroids since stress conditions elevate corticosteroids in the blood of animals. The possibility of the tissue metabolism in synthesizing, anti-inflammatory and anti-allergic cortisone derivatives from the cholesterol and precursors need further elucidation.

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REFERENCES


