RESEARCH ARTICLE

Studies on Glycogen content in different tissues of the *Channa Orientalis*

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ABSTRACT

The present study was conducted on Glycogen content in different tissues of the fish *Channa orientalis*. The organic constituents glycogen, analysed from the tissues muscle, gill, liver and kidney in relation to body weight and sex. The glycogen content was found to be 2.55 to 3.88, 2.08 to 3.21, 4.23 to 8.27 and 0.48 to 1.08 mg/g in male and that of female 2.10 to 3.50, 1.98 to 3.10, 3.55 to 7.88 and 0.38 to 1.06 mg/g in muscle, gill, liver and kidney respectively. The content was higher in liver, less in muscle, lesser in gill and least in kidney of both the sexes. The glycogen content was found to be declined with body weight in all the tissues of both male and female fish.

Keyword: Glycogen, different weight, content tissues, *Channa Orientalis*

INTRODUCTION

The fishes constitute one of the major sources of cheap nutrition for human beings. Air breathing fishes have a unique position in fishing industry due to their hardy nature and easy maintenance. It is commonly known as “Snake headed fish” It is locally known as ‘Dok’. It is supposed to be best food fish. Carbohydrate is one of the primary constitute of the food which furnish energy. Much of the energy expended by the fish in swimming comes from oxidation of lipid or from glucose. The glycogen content was estimated in different tissues of the fish *Channa orientalis*. The carbohydrate act as a important energy source. The nutritional value of different fishes depends on their biochemical composition. Such as protein, carbohydrates, lipids, vitamins and mineral content.

Carbohydrate is one of the primary constituent of the food which furnish energy. The glycogen content in different fishes was demonstrated by some workers. Liver and muscle glycogen was mentioned in river lamprey by Bently and Follett (1965). Vurghese (1976) observed glycogen in the liver, muscle and ovary of the Pampus argenteus and *Parasrometeus nigen* (bloch). Mansuri (1979) also stated seasonal variations in the glycogen content in some marine fishes. Chari (1981) studied glycogen in the liver and ovary of *Heteropneustes fossilis*. Dasgupta and Sirkar (1985) found glycogen content in the tissues of *Clarius batrachus*. Renukardhya and Vurghese (1986) reported glycogen in the muscle of *Catla catla*.

Studies on the glycogen content in relation to body weight and sex are few. Therefore, an attempt was made to estimate the glycogen content in the different tissues of the fish *Channa orientalis* in both the sexes.

MATERIAL AND METHODS

Collection and Maintenance of Fishes:

The fishes *Channa orientalis* were collected from Purna river of Amravati region. Then they were brought to the laboratory in a live condition. They were transferred to the glass aquarium and inspected for any possible injury or infection. Injured fishes were avoided. Only healthy fishes of different weights in gm and length range group of 10 mm were selected. These fishes were washed with dilute solution of potassium permanganate ($KMnO_4$ 1.0 mlg/1) to remove dermal infection if any. Then the fishes were pithed. The fishes were separated into different groups according to body weight. The fishes were cut open to ascertain the sex. The tissues like muscle, gill, liver and kidney were pooled up from the fishes. After noting down the sex and weight of the fishes, the tissues were quickly weighed and used for the analysis of organic constituents. The analyses of various tissues were carried out on the wet weight basis.

Estimation of carbohydrate:

For the estimation of glycogen the tissues muscle, gill, liver and kidney were weighed from male and female. The glycogen content was estimated by the method of Hassid and Abraham (1957) using anthrone reagent. The amount of glycogen was calculated by multiplying the glucose value by the factor 0.927. The glycogen content is expressed as mg of glycogen per gm wet weight of tissue.

RESULT AND DISCUSSION

The glycogen content constituents showed the following relation with body weight in the muscle, gill, liver and kidney. The glycogen content decreased gradually with body weight in all the tissues. The glycogen content exhibit as 2.55 to 3.88 2.08 to 3.21, 4.23 to 8.77 and 0.48 to 1.08 mg/g in muscle, gill, liver and kidney respectively. The content was higher in the liver, less in muscle, lesser in the gill and least in the kidney. The difference in the content was more in smaller groups and less in larger groups [Figure 1].

The decrease in the content with body weight was high in kidney, less in gill, lesser in the muscle and least in the liver. This difference might be due to different physiological activities of different tissues. The decline of glycogen with body weight indicated higher physiological demand of glycogen with increase in weight.

The glycogen constituents showed following relation with body weight and sex in the muscle, gill, liver and kidney. The glycogen content decreased with body weight in all the tissues. The content was observed as 2.10 to 3.50, 1.98 to 3.10, 3.55 to 7.88 and 0.38 to 1.06 mg/g in muscle, gill, liver and kidney respectively [Figure 2] The was higher in liver, less in muscle, lesser in gill and least in the kidney.

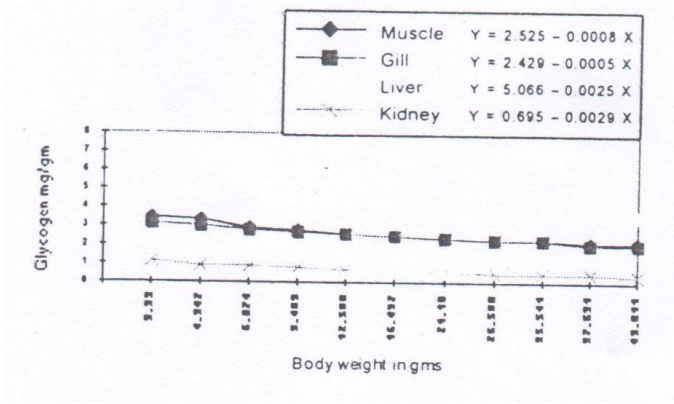

Figure 1: ???

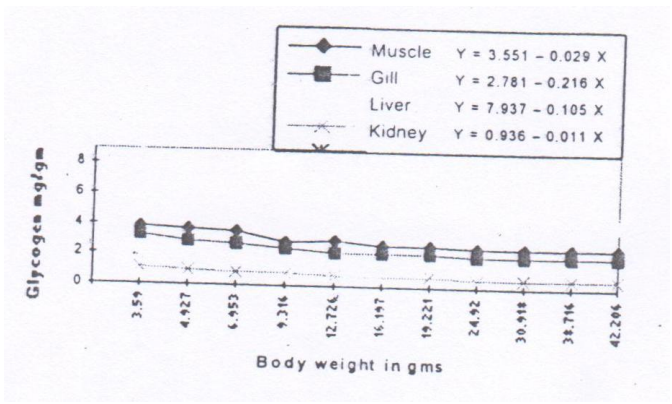

Figure 2: ???

The difference in the content more in smaller fishes and less in the larger fishes. The decrease in the content was high in the kidney, less in gill, lesser in the muscle and least in the liver. The depletion of glycogen with body weight showed that higher physiological demand of glycogen with increase in weight.

Discussion:

Glycogen is important organic constituent of the fishes. It vary in different fishes with size, maturity, sex, food and their locality. The present work had been carried out to show the effect of sex and weight on these organic constituents in the muscle, gill, liver and kidney. Some studies on the glycogen variation in the tissues of fishes are available. The diminution in the glycogen value during the maturation period was reported by Greene (1921) and Black et al. (1960). Depletion in liver and muscle glycogen during spawning migration in Lamprey was observed by Bently and Follett (1965). Vurghese (1976) reported that glycogen in the liver and muscle varies with the maturation cycle and spent stage of the fish. Chari (1981) studied decrease in glycogen content in the *Heteropneustes fossilis* during various stages of development. Dasgupta and Sirkar (1985) also found variation in glycogen level in relation to breeding cycle.

The literature showed that more studies on the glycogen content in relation to body weight are not available. While the present study correlated the glycogen content with body weight. The content decreased with body weight. The content was high in smaller weight groups due to high demand for glycogen. The glycogen content was different in all the tissues because of the difference in the physiological activities of the tissue. Little significant difference was noted in the glycogen content between the male and female *Channa orientalis*.

Conclusion:

The organic constituents glycogen, analysed from the tissues muscle, gill, liver and kidney in relation to body weight and sex. The glycogen content was found to be 2.55 to 3.88, 2.08 to 3.21, 4.23 to 8.27 and 0.48 to 1.08 mg/g in male and that of female 2.10 to 3.50, 1.98 to 3.10, 3.55 to 7.88 and 0.38 to 1.06 mg/g in muscle, gill, liver and kidney respectively. The content was higher in liver, less in muscle, lesser in gill and least in kidney of both the sexes. The glycogen content was found to be declined with body weight in all the tissues of both male and female fish.

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