

**STUDIES ON BIOCHEMICAL COMPOSITION OF THE CHANNA ORIENTALIS****M.T. Nikam**Shri Shivaji Science & Arts College Chikhli Dist. Buldana (MS), India  
meenamikam66@gmail.com**ABSTRACT**

The present investigation was aimed to study the chloride content and phosphate content in both sexes of *Channa orientalis*. Seasonal variations in chloride content were studied by some workers. In the present investigation chloride content slightly declined with large weight groups in all the tissues. But no significant difference in the content of tissues with different weight groups was observed in both the sexes. The phosphate content changed in relation to body weight in different tissues of the sexes. Though the anionic contents were observed apparently different in both sexes. But little significant difference was found between anionic content of both the sexes. An anionic content was different in different tissues, this is might be due to different physiological activities in different tissues

**Keywords:** Anions, phosphate, Chloride, tissues, *Channa orientalis*.

**Introduction**

Air breathing fishes have a unique position in fishing industry due to their hardy nature and easy maintenance. In addition to the aquatic oxygen they are privilege to respire atmospheric oxygen as a result of which they can be easily handled and kept in living condition for longer duration without much precaution. The fish species selected for present study is of economic value and readily available throughout the year & it stands captivity well. The fish is most sensitive. It represents the natural population in the river & water bodies of Amravati. It is resistant to handling & transportation. Phosphate is an important chemical constituents of fishes play important role in the development of fish and also responsible for various aspects of metabolism. It is used for energy rich compound of the cell. The chloride is an important ionic content of the fish body. It plays important role in acid base regulation in aquatic animals and in regulating cell volume and osmotic pressure in vertebrates.

**Review of Literature**

Very much information is not available on the inorganic contents of fishes. Saha and Guha (1939 and 1940) have estimated the calcium and phosphorus contents in the muscles of some freshwater fishes from Bengal. Similar observations were made by Airan (1950) in some freshwater fishes from Kolhapur. Vasavan et al. (1961) have verified the correlation existing between the inorganic

contents in some marine fishes of Russia. Seasonal variations in the inorganic phosphate and alkaline phosphatase of *Ophicephalus punctatus* (Bloch) have been worked out by Siddiqui and Siddiqui (1965) Tundisi and Krishnaswamy (1969) showed phosphorus content in *Neomysis integer*. Piatek (1970) noticed changes in chemical composition in relation to weight in Eel. Seasonal variations in the serum calcium were observed by Raizada and Singh (1985) in the freshwater fish *Cirrhinus mrigala* (Ham). Inorganic phosphorus in *Clarius batrachus* was also recorded by Jane et al. (1985). Belamy & Jones (1961) and Robertson (1966) studied chloride and phosphate content in plasm of *Myxine*. Sinha and Munsu (1979) observed the chloride content in muscle of ageing fish. Lockwood (1968) believed that different tissues might possibly have different ionic compositions. It is known that intrinsic factors like sex and size greatly influence various, physiological process in a variety of animals (Prosser, 1973) Small variations might be in all possibility, due to difference in the biochemical construction of the tissues in respect to size and sex. But few attempts have been made to study the chloride content and phosphate content in relation to sex and weight. Hence present work had been undertaken.

**Material and Methods**

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 weight with length group of 10 mm range were selected. These fishes were washed with dilute solution of potassium permanganate ( $\text{KMnO}_4$  1.0 mg/l) to remove dermal infection if any. Then the fishes were pithed. 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.

### Observation & Result

The anionic content showed following relationship with different body weight in the male *Channa orientalis*. An increase in phosphate content was observed with body weight in muscle, gill, liver and kidney. The phosphate content in the different tissues was noted as 46.02 to 55.54, 40.22 to 48.75 45.48 to 53.87 and 38.21 to 46.24 mM/kg in the muscle, gill, liver and kidney of the fish respectively (fig 1). The phosphate content was higher in the muscle, less in liver, lesser in gill and least in the kidney. The difference in the content was slightly more in smaller weight groups and less in larger weight groups of fishes.

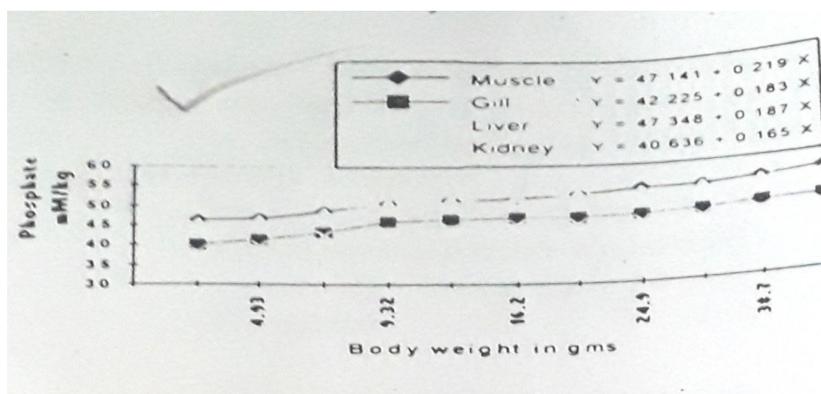


Fig 1

The chloride content slightly decreased with body weight groups in the muscle, gill, liver and kidney. The chloride content was found to be 958 to 1100, 843 to 982, 805 to 911 and 796 to 908 mm/kg in muscle, gill, liver and kidney respectively (fig 2). The chloride content was observed higher in the muscle, less in gill, lesser in liver and least in the kidney. No significant difference in the content of tissues in the different weight groups was observed.

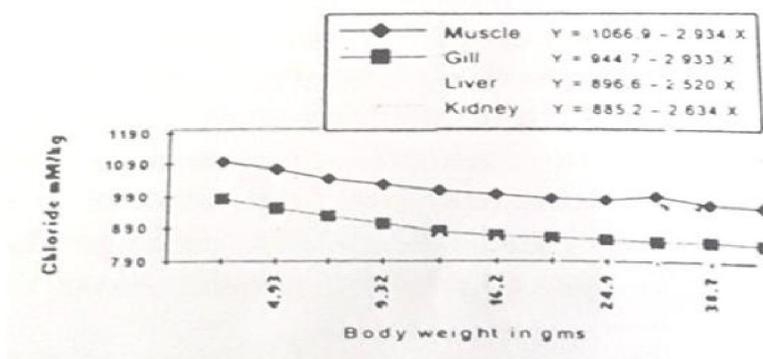


Fig 2

An anionic content in the female exhibited following relationship in muscle, gill, liver and kidney with different body weights. The phosphate content increased in all the tissues. The phosphate content was determined as 46.71 to 55.78, 43.95 to 53.87, 45.11 to 53.45 and 39.06 to 47.14 mM/kg in muscle, gill, liver

and kidney respectively (fig 3). The phosphate content was high in the muscle, less in liver, lesser in gill and least in kidney. The difference in the phosphate content in all the tissues was more in smaller animals and slightly decreased in larger animals.

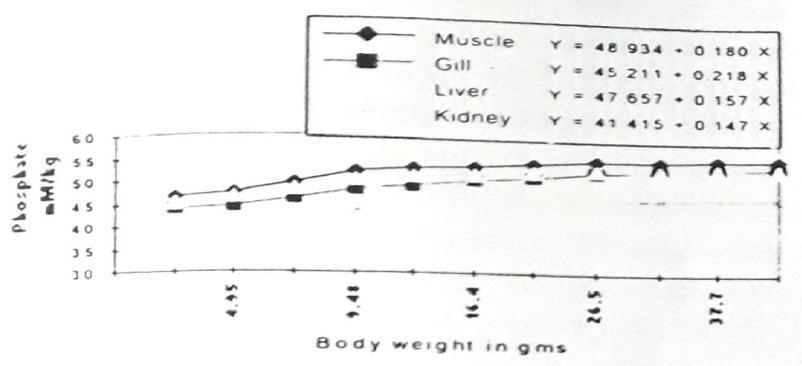


Fig 3

The chloride content was found to be slightly declined with body weight groups in all the tissues. The chloride content was observed 858

to 1020, 815 to 946, 758 to 910 and 508 to 615 mM/kg in muscle, gill, liver and kidney respectively fig 4.

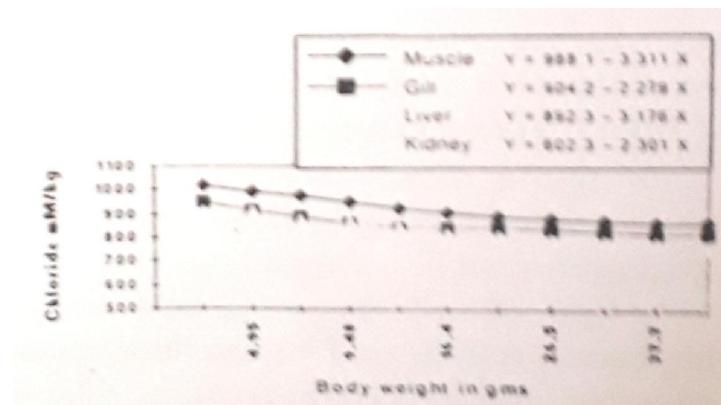


Fig. 4

The chloride content was higher in muscle, less in gill, lesser in liver and least in the kidney. No significant difference was observed in the content.

### Discussion

Phosphate is absorbed in the form of inorganic ions. Then it is utilized for the synthesis of energy rich compound of the cell. Siddiqui and Siddiqui (1965) observed a fall in serum

phosphate level during the winter season in *Ophicephalus punctatus*. Decline in serum phosphate level of brown trout during winter season was also reported by McCartney (1967). Raizda and Singh (1985) pointed out that inorganic phosphorus showed highest and lowest value during winter and summer respectively in *Cirrhinus mrigala*. They also reported that when the fishes are fully ripe the phosphorus level decreases. Female showed

higher values than males. Similar condition was observed in the present investigation. Effect of body weight on phosphorus content was observed by Tundisi and Krishnaswamy (1969). They reported that total phosphorus content was decreased with body weight in *Neomysis integer*. The phosphate content was appeared slightly higher in female than male. This differences in the relative abilities of the two sexes to absorb and store ions. The phosphate content was increased with body weight in all the tissues in both the sexes of *Channa orientalis*. But the content is different in different tissues. This is might be due to difference in the physiological activities of the tissues. Chloride is the most important anion in regulating cellular volume and intracellular osmotic pressure in vertebrates. Bellamy and Jones (1961) and Robertson (1966) in their studies reported that the muscle and liver showed lower concentration of chloride but higher values of phosphate than in plasma of myxine. An increase in the chloride content in *Lampetra fluviatilis* at sexual maturity was investigated by Bentley and Follett (1963). Sinha and Munshi (1979) observed that chloride content in the muscle of aging fishes was higher as compared to the adult *Channa punctatus*. In large adults during October to March (Post spawning period) chloride ions decreased sharply and remained identical in both sexes. Decline in chloride content in muscle is a result of decline in chloride content of both extra and intra cellular compartments during stress or ageing state of gonadal maturation (Sinha and Munshi, 1979). Seasonal variations in chloride content were studied by

some workers. But few attempts have been made to study the chloride content in relation to sex and weight. In the present investigation chloride content slightly declined with large weight groups in all the tissues. But no significant difference in the content of tissues with different weight groups was observed in both the sexes. From the above study it is clear that the phosphate content changed in relation to body weight in different tissues of the sexes. Though the anionic contents were observed apparently different in both sexes. But little significant difference was found between anionic content of both the sexes. An anionic content was different in different tissues, this is might be due to different physiological activities in different tissues.

### Conclusion

In *Channa orientalis* the phosphate content was increased with body weight in all the tissues of both the sexes. The chloride content was found to be 958 to 1100, 843 to 982, 805 to 911 and 796 to 908 mM/kg in the male and that of female 858 to 1020, 815 to 946, 758 to 910 and 508 to 615 mM/kg in muscle, gill, liver and kidney respectively. The content was higher in the muscle, less in gill, lesser in liver and least in the kidney of male and female. The chloride content appeared to be decreased with body weight. The present investigation reveal that the phosphate content was increased in body weight all the tissues of both the sexes. However, no significant effect of body weight was observed on the chloride content and little significant difference was noted in an anionic content of both the sexes.

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