

# Relationship between Water, Lipid and Protein in the Muscle, Liver and Gonad in a Freshwater Fish, *Notopterus notopterus*(Pallas)

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**Abstract:** Variation in water, lipid, protein in Muscle, Liver, Testis, Ovary of Fresh water fish *Notopterus notopterus* from Godavari River at Nanded Region Maharashtra State. Were observed from January 2017 to December 2017. 100 fishes with in 60 male and 40 female. It is observed that *Notopterus notopterus* contains 21% protein which is high compared to hen's egg.

**Keywords:** Water, lipid Protein in muscle Liver, and Gonad, *Notopterus notopterus*.

## 1. INTRODUCTION

Love (1970) stated that an increase in the proportion of either water, lipid or protein leads to the decrease of the other, so that the sum remains approximately constant. Rao (1967) and Jafri & Khawaja (1968) have shown an inverse relationship between water and fat in freshwater fishes. The fluctuation in the major biochemical constituents are influenced by breeding and feeding cycles (Lovern & Wood, 1938; Rao 1967). Relationship of water lipid and protein in *Notopterus notopterus* is reported in this communication.

## 2. MATERIAL AND METHOD

*Notopterus notopterus* were collected from the Vellayani Lake, Trivandrum. The specimens were sexed and grouped into classes based on the stages of maturity. From each specimen the muscle, liver and gonad were dissected out and dried in an oven at 105°C. The difference in weight between wet and dehydrated tissue gave the water content. The lipids were extracted by adding ethanol ether mixture (3:1 v/v) two times and heated to 60°C. The supernatant removed by centrifugation. The above process was repeated with another solvent mixture of methanol and chloroform (1:1 v/v) for the same sample. The lipids were recovered from solvents by distillation (Gradwohl, 1963). Microkjeldahl method (Wong, 1923) as modified by Alexander (1956) was used for determining the nitrogen content.

In the muscle, liver (female) and gonad of *Notopterus notopterus* the variation of lipid and protein showed an inverse relationship with the variation in water content. But the water content of the liver of male *Notopterus notopterus* showed a direct relationship with lipid and protein content (Table 1).

**Table 1: Percentage Composition of Water, Lipid, and Protein in the Muscle, Liver and Gonad of male and female *Notopterus notopterus***

Sex	Tissue	Constituent	Immature	Maturing	Ripening	Ripe	Spent
			(Percentage by wet weight)				
Male	Muscle	Water	80.00	77.00	76.00	82.10	82.0
"	"	Lipid	2.6	3.16	3.42	2.60	2.50
"	"	Protein	12.10	14.2	15.18	10.50	9.10
Female	"	Water	82.20	80.4	78.20	81.0	81.0
"	"	Lipid	2.5	3.36	3.50	2.84	1.2

”	”	Protein	10.9	11.2	13.80	11.0	10.0
Male	Liver	Water	76.20	78.08	78.80	77.0	75.0
”	”	Lipid	7.60	7.9	7.90	7.2	6.0
”	”	Protein	8.00	8.2	8.50	8.20	8.16
Female	”	Water	77.0	75.68	72.40	76.0	76.20
”	”	Lipid	7.0	8.0	9.0	8.10	7.0
”	”	Protein	9.0	10.0	11.00	9.10	9.0
Male	Testis	Water	76.0	76.0	75.0	72.00	76.50
”	”	Lipid	5.50	5.88	6.00	6.00	3.90
”	”	Protein	10.0	9.82	12.00	13.00	12.0
Female	Ovary	Water	75.0	74.0	65.00	64.20	68.00
”	”	Lipid	5.80	5.98	6.00	6.60	6.0
”	”	Protein	14.0	15.62	21.00	21.0	17.50

### 3. RESULT & DISCUSSION

Milory (1908) observed a rapid rise in the percentage of fat in the muscle of herring prior to the rapid growth of ovary and testis and a further decline in fat content at spawning with a simultaneous increase in water content. It was found that as the lipid and protein content gradually rose with the advancement of maturity a corresponding decrease in water content was noticed in muscle, liver (female) and gonad of *Notopterus notopterus*

Depending on the lipid and protein content *Notopterus notopterus* can be included under category A (Stanby & Olcott, 1963). The low fat content and high protein content make it a food fish, its muscle protein showing the highest value on ripening (15.18%). Proteins and lipids are higher in the ripe ovaries compared to liver, testis and muscle. Such higher values are expected as the yolk is a reserve of lipoproteins and fats to be utilised in the development of the embryo. *Notopterus notopterus* also contains 21% of proteins in the ripe ovaries which provides evidence to the higher protein content of the fish eggs as compared to the hen's egg which has 12% protein as cited by Hasan & Jafri (1964).

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