



## **BIOCHEMICAL COMPOSITION OF FRESH AND MARINE WATER FISH VARIETIES**

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### Abstract

*The fresh fish varieties like tilapia, katla pink perch and silver belly were analysed for chemical constituents like moisture, fat, protein, calcium, phosphorus, iron, vitamin A and peroxide value. Marine fish were found to be rich sources of calcium, phosphorus iron and fat, whereas fresh water fish were rich in protein and vitamin A. Fat content was comparatively low. Yield of fish muscle was found to be high in fresh water species like katla (78 per cent) and tilapia (75.5 per cent). Higher peroxide value was observed in marine varieties.*

**Keywords-** *Tilapia, Katla Pink perch, Silver belly, Peroxide value*

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### **I. INTRODUCTION**

In the early 1970's fish was considered as a resource against hunger in the world. Presently, fish has gained importance as a health food, because several species have been identified as rich in easily digestible protein containing all the essential amino acids, therapeutically important polyunsaturated fatty acids, in addition to calcium, iodine, vitamins, and many other nutrients [1]. Fish is a natural renewable resource, not only in terms of bio diversity but a source of high quality animal protein food for the people [2] FAO estimates that global fish consumption will increase from 19 Kg to 21 Kg per capita by 2020 [3]. The four major constituents in the edible portion of fish are water, protein, lipid (fat or oil) and ash (minerals). Fish oil may protect the brain from cognitive problems associated with Alzheimer's disease, those with rheumatoid arthritis, psoriasis or other auto-immune disorders. Fish oil prevents age related blindness [4]. The analysis of these four basic constituents of fish muscle is often referred to as proximate analysis. India is presently the world's fourth highest fish producer and the second highest inland fish producer [5]. Kerala, the southwestern state of India is gifted with large number of backwaters, ponds, and streams. The total coastline of the state is 590 Kms. Fishing is a major occupation in the state.

### **II. MATERIALS AND METHODS**

Two marine and two fresh water fish varieties, which are popular and comparatively cheap, were selected for the study. They were pink perch (*Nemipterus raponicus*) and silver belly (*Gerres filamentoses*) belonging to marine species and tilapia (*Tilapia mossambica*) and katla (*Catla catla*) of fresh water species. All the selected varieties were bought from Thrissur local market. Whole fish (weighed quantity) was washed with water and drained well. The edible portion was separated from skin and bones with a sharp knife. The extracted fish muscle was washed in 1 per cent sodium chloride solution and drained.

### A. Chemical constituents of fresh fish muscle

Chemical constituents of fresh fish muscle was analysed using standard procedures as shown in the table.

**Table.1. Standard procedures to analyse fresh fish muscle**

Components	Reference methods
Moisture (percent)	AOAC (1980) [6]
Fat (g)	AOAC (1955) [7]
Protein(g)	AOAC (1980).[6]
Calcium (mg)	Page (1982).[8]
Phosphorus (mg)	Jackson (1973). [9]
Iron (mg)	(Raghuramulu <i>et al.</i> , 2003). [10]
Vitamin A (µg)	Srivastava and Kumar(2006). [11]
Peroxide value (meq)	Sadasivam and Manickam (1992). [12]

### III. RESULTS AND DISCUSSION

Among the four fish varieties maximum moisture content was observed in pink perch (81.39 g 100g<sup>-1</sup>) and minimum in silver belly (75.50 g 100g<sup>-1</sup>). A significant variation was observed in the moisture content of fish varieties. Fat content ranged from 1.78 to 3.74 g 100g<sup>-1</sup>, the maximum being for pink perch and the minimum for silver belly. There was significant variation in the fat content of the four fish varieties. Tilapia (20.75 g 100g<sup>-1</sup>) had the maximum protein content and it was minimum in pink perch (16.25 g 100g<sup>-1</sup>). Significant variation in the protein content of tilapia and katla and in pink perch and silver belly was observed. Variation between the fresh water and marine water fish species was also significant. Calcium content varied from 542.26 mg 100g<sup>-1</sup> in katla to 943.25 mg 100g<sup>-1</sup> in pink perch .Statistically, a significant variation was observed in the calcium content of fresh water and marine water species and also, between the selected four varieties. A significant variation was observed in the phosphorus content of fresh water and marine water fish varieties. Phosphorus content was highest in silver belly (674.81 mg 100g<sup>-1</sup>) and lowest in pink perch 248.89 mg 100g<sup>-1</sup>. Silver belly had the maximum iron content (2.30 mg 100g<sup>-1</sup>) and katla the minimum (1.27 mg 100g<sup>-1</sup>). Significant variation was observed in the iron content in all the fish varieties. The variation observed between fresh water and marine water fish varieties was also significant.

**Table.2. Chemical constituents of fresh fish muscle (per 100 g)**

Values having different super script differ significantly at 5% level

DMRT column wise comparison

<b>Fish varieties</b>	<b>Moisture (%)</b>	<b>Fat (g)</b>	<b>Protein (g)</b>	<b>Calcium (mg)</b>	<b>Phosphorus (mg)</b>	<b>Iron (mg)</b>	<b>Vitamin A (µg)</b>	<b>Peroxide value (meq)</b>
<b>Tilapia</b>	78.83 <sup>b</sup>	2.63 <sup>b</sup>	20.75 <sup>a</sup>	575.93 <sup>c</sup>	457.42 <sup>b</sup>	1.84 <sup>c</sup>	90.77 <sup>b</sup>	0.16 <sup>b</sup>
<b>Katla</b>	77.50 <sup>c</sup>	2.5 <sup>c</sup>	19.60 <sup>b</sup>	542.26 <sup>d</sup>	249.38 <sup>c</sup>	1.27 <sup>d</sup>	96.28 <sup>a</sup>	0.15 <sup>c</sup>
<b>Pink perch</b>	81.39 <sup>a</sup>	3.74 <sup>a</sup>	16.25 <sup>d</sup>	943.25 <sup>a</sup>	248.89 <sup>d</sup>	2.14 <sup>b</sup>	86.06 <sup>c</sup>	0.17 <sup>a</sup>
<b>Silver belly</b>	75.50 <sup>d</sup>	1.78 <sup>d</sup>	18.66 <sup>c</sup>	728.40 <sup>b</sup>	674.81 <sup>a</sup>	2.30 <sup>a</sup>	80.43 <sup>d</sup>	0.13 <sup>d</sup>

#### IV. SUMMARY AND CONCLUSION

The weight of fish muscle was found to be more in fresh water fish viz., katla (78 per cent) and tilapia (76 per cent). Moisture content of fish muscle varied from 75.50g100g<sup>-1</sup> (silver belly) to 81.39g100g<sup>-1</sup> (pink perch). Pink perch had the highest fat content of 3.74g100g<sup>-1</sup> followed by tilapia (2.63g100g<sup>-1</sup>) and katla (2.5g100g<sup>-1</sup>). Tilapia had the highest protein content (20.75g100g<sup>-1</sup>) and pink perch (16.25g100g<sup>-1</sup>) the lowest. Calcium content varied from 542.26mg100g<sup>-1</sup> in katla to 943.25mg100g<sup>-1</sup> in pink perch. The highest iron content was in silver belly (2.30mg100g<sup>-1</sup>) and lowest in katla (1.27mg100g<sup>-1</sup>). Phosphorus content was also highest in silver belly (674.81mg100g<sup>-1</sup>) whereas the lowest value was observed in pink perch (248.89mg100g<sup>-1</sup>). The vitamin A content in fish varied from 80.43µg 100g<sup>-1</sup> (silver belly) to 96.28µg 100g<sup>-1</sup> (katla). In the case of peroxide value, pink perch (0.17meq100g<sup>-1</sup>) recorded the maximum followed by tilapia and katla where the peroxide values were 0.16meq100g<sup>-1</sup> and 0.15meq 100g<sup>-1</sup> respectively. Peroxide value was minimum in silver belly (0.13meq100g<sup>-1</sup>). Peroxide value was significantly high in pink perch which also had the highest fat content.

It can be concluded that, the fresh fish varieties were analysed for chemical constituents like moisture, fat, protein, calcium, phosphorus, iron, vitamin A and peroxide value. Marine fish were found to be rich sources of calcium, phosphorus iron and fat, whereas fresh water fish were rich in protein and vitamin A. Fat content was comparatively low. Yield of fish muscle was found to be high in fresh water species like katla (78 per cent) and tilapia (75.5 per cent). Higher peroxide value was observed in marine varieties.

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