Chemical Composition of Some Food Fishes

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Chemical composition of caranx *(Caranx leptolepis)* threadfin bream *(Nemipterus japonicus)* whiting *(Sillago sinhane)* murrel *(Ophio cephalus)* carp *(Barbus sarana)* and wallagu *(Wallagu attu)* were determined and their calorific values were computed. They were well balanced in composition with respect to all the essential amino acids, and rich in potassium, calcium and sodium.

Herzberg & Pasteur (1969) has rightly observed that investigations aimed at collecting vital basic data on the proximate composition of food fishes have not received due attention from fishery technologists, who have relegated it as routine analysis of secondary importance. A clear idea about the proximate composition of common food fishes is essential not only for standardisation of proper processing methods, but also for removing unjustified prejudices from the minds of common consumers. But surprisingly this is one area, which has been by and large neglected. This is all the more evident in the case of Indian fishes. Kutty Ayyappan *et al.* (1976) and Gopalan *et al.* (1980) have publshied some basic data in this field. Mukundan & James (1977) and Mukundan *et al.* (1979, 1981) have also reported the nutrient contents of some tropical fishes. Earlier data published by Nair & Bose (1965), James (1969), Rangaswami *et al.* (1970) and Gourie *et al.* (1972) on the amino acids of fish muscle also deserve special mention in this context. However, still much remains to be done in this field. The present paper is an attempt to fill up this major gap in our information on the biochemical composition of our food fishes. Data on the proximate composition, mineral contents and amino acid composition of the muscle of three species of marine and three species of fresh water fishes are presented.

Materials and Methods

Fresh, adult fishes were used for the study. They were washed in cold water and gutted immediately on arrival at the laboratory. Only the edible portion of the fish was used for all the analysis.

Moisture, ash and fat were determined according to AOAC (1970). Protein was estimated as per Microkjeldahl's method (Hawk, 1954). Sodium and potassium were determined by emission spectrometry in a varian Techtron Atomic Absorption Spectrophoto meter. Iron was also estimated in the same instrument using atomic absorption spectrometry. Calcium was estimated by titration with EDTA (APHA, 1976). Amino acid composition was determined by standard microbiological assay (Kavanagh, 1963).

Results and Discussion

The chemical composition of the fishes studied are presented in Table 1 along with the computed calorific value. All the fishes studied have a protein content ranging from 18.4 (threadfin bream) to 22.2% (wallagu). The higher calorific value obtained for the carps and threadfin bream is due to the comparatively higher fat content in these fishes. However, fat is a highly variable factor owing to its seasonal variation (Gopakumar, 1973). In this context it may be said that calorific value will be more constant and dependable if the contribution by fat is excluded, in which case wallagu is the best fish as far as calorific value is concerned. The moisture content in all the fishes studied varied from 74.8% for carp to 77.5% for murrel. The ash content variation was from 1.15% for wallagu to 1.56% for caranx.

Table 1. *Chemical composition and calorific value of fishes*

Name of fish	Moisture %	Protein %	Fat %	Ash %	Calorific value k cal/100 g
Wallagu attu	75.74	22.18	0.93	1.15	97.03
Carp	74.84	20.84	3.15	1.17	111.70
Murrel	77.50	20.47	0.58	1.45	87.10
Threadfin bream	77.34	18.42	2.86	1.38	99.42
Whiting	76.32	21.90	0.25	1.53	89.85
Caranx	77.09	20.97	0.38	1.56	87.30

Table 2. *Mineral composition of fishes*

Name of fish	Sodium mg/100 g	Potassium mg/100g	Calcium mg/100g	Iron mg/100g	Calcium/Iron
Wallagu attu	57.72	90.18	45.09	3.97	11.36
Carp	34.36	121.28	30.32	2.55	11.98
Murrel	44.84	153.80	82.20	1.88	43.72
Threadfin bream	62.46	143.12	52.18	3.38	15.44
Whiting	50.42	174.92	44.43	2.26	19.66
Caranx	112.00	180.60	35.03	6.60	5.31

Table 3. *Essential amino acid composition of fishes (g/100g protein)*

Amino acids	Wallagu attu	Carp	Murrel	Threadfin bream	Whiting	Caranx
Lysine	5.92	7.11	6.79	5.62	6.14	7.86
Leucine	4.98	6.84	7.33	6.91	6.33	4.79
Isoleucine	5.33	3.96	4.76	5.22	5.52	4.14
Methionine	4.16	3.94	3.94	3.14	3.76	4.86
Threonine	6.13	5.82	5.75	5.42	5.16	6.43
Valine	4.86	6.11	6.73	5.93	5.97	5.48
Phenyl alanine	4.25	4.31	4.53	4.64	4.36	4.52
Tyrosine	4.53	3.62	4.28	3.76	3.48	3.52

Table 2 lists the mineral composition. A close look at the Table reveals that both sodium and potassium content are more in the marine fishes than in the fresh water fishes studied. The content of calcium varied from 30mg to 82mg per 100g while the variation in iron was from 1.9 mg to 6.6 mg per 100 g. However, there is an important difference in the ratio of calcium to iron among the fishes studied. Calcium and iron being indices of muscular activity (Smellie, 1974) and oxygen reception (White *et al.*, 1973) respectively, their ratio can be considered as muscular activity per unit of oxygen consumed otherwise termed as the 'muscle index', which is maximum for murrel followed by whiting and thread fin bream.

Table 3 shows the amino acid composition of the fishes studied. From this data no significant difference in the essential amino acid pattern of marine and fresh water fishes are indicated. However the data clearly reveals that all the fishes studied are well balanced with respect to all the essential amino acids.

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