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Nutritional Quality Evaluation of Indian Fish-*Trichiurus Lepturus*

Shameem K[*], Byju K[†], Anuradha V[‡], Vasundhara G[§], S M Nair[**] and N C Kumar[††] .

Abstract

Trichiurus Lepturus constitute one of the most important commercial fishes of India. Nowadays the major health problem arises due to malnutrition and lack of excellent sources for the nutrient food supply. Fisheries are one of the most promising healthy food sources that humans and other animals depend. Hence nutrient profiling is important to know the calorific value of food for the edible purpose. This study was aimed to find the nutritional quality evaluation of the fish *Trichiurus lepturus* collected from Cochin, Kerala and to suggest the calorific value of fish *Trichiurus lepturus*. It was found that the fish *Trichiurus lepturus* is a chief source of fats and proteins. The high concentration of fat may be an indication of high calorific value than compared to other fishes since the portion of calorific value lead by fat more.

Keywords: *Trichiurus lepturus,* protein, lipid, Nutritional quality, Fish.

[*] Inter University Centre for Development of Marine Biotechnology Cochin University of Science and Technology(IUCDMB-CUST), Cochin-16;
[†] (IUCDMB-CUST), Cochin-16;
[‡] (IUCDMB-CUST), Cochin-16;
[§] (IUCDMB-CUST), Cochin-16;
[**] (IUCDMB-CUST), Cochin-16;
[††] (IUCDMB-CUST), Cochin-16;

Introduction

Ribbon fish constitute an important commercial fishery at several places along the Indian coast. They are mainly consumed in fresh and salted conditions by the poor and middle class people. It is also a form of an important group of food fishes in India [1]. The monitoring and nutritional evaluation of fish as an indispensable part of our daily diet is important in the present scenario. The present study aims to understand the nutritional quality and its importance to be included as a dietary source.

Materials and Method

Collection of fish *Trichiurus lepturus* and identification.

Trichiurus lepturus belongs to Species: *lepturus,* Genus: *Trichiurus,* Family: Trichiuridae, Order: Perciformes, Class: Actinopterygii, Subphylum: Vertebrata, Phylum: Chordata, Kingdom: Animalia. (Fig. No 1). It was collected by National Institute of Fisheries Post Harvest Technology and Training (NIPHAT) Cochin. The Fish Sample was kept under 4˚C in an ice box and bought to laboratory. The samples were identified from Central Marine Fisheries Research Institute (CMFRI) Cochin.

Fig No.1. The fish sample *Trichiurus lepturus*

Trichiurus lepturus sample preparation

Trichiurus lepturus were washed with distilled water to free from all impurities and small microorganisms that adhere to the outer part. The skeleton was removed and the flesh was taken, freeze dried, powdered, kept in deep freezer till the analysis was carried out.

Total Carbohydrates

Total carbohydrate content in the dried fish sample *Trichiurus lepturus* was determined colorimetrically by phenol-sulfuric acid method [2]. 0.58mg of crude dried fish sample is dissolved in 1 ml of distilled water and centrifuged at 6000rpm and the filtrate was collected. To 0.1 ml of the filtrate in a test tube, 1mL of 5% Phenol reagent followed by rapid addition of 96% sulphuric acid. After 10 minutes, the contents in the tube were shaken and kept in water bath at 25-30˚C for 30 minutes. After cooling to room temperature absorbance was measured at 490 nm against a reagent blank in Analytikjena Specord 200 UV-Visible spectrophotometer. Glucose was used as standard and the results were expressed as percentage of dry weight of the sample.

$$Conc = \frac{\mathrm{X} * \mathrm{V}}{1000} * \frac{1}{\mathrm{W(mg)}} * 1000 \text{ mg/g}$$

- Conc – Concentration
- X - Spectrophotometric reading
- V – Volume of the solvent
- W – Weight of the sample

Total Protein

Total protein content of crude dried fish sample *Trichiurus lepturus* is determined colorimetrically by the method [3]. From the dried fish sample 0.5mg of the sample was dissolved in 1ml of NaOH. To 0.1 ml of the sample, 5 ml of freshly prepared alkaline copper tartrate reagent was added followed by 0.5ml of 1:1 of Folin-Ciocalteu phenol reagent. The contents were mixed thoroughly and allowed to stand for 20 minute for colour development. The absorbance was then read at 660 nm against a reagent blank using

Analytikjene Specord 200 UV-Visible spectrophotometer. Bovine serum albumin was used as standard and the results are expressed as percentage of dry weight of the sample.

$$Conc = \frac{X * V}{1000} * \frac{1}{W(mg)} * 1000 \text{ mg/g}$$

- Conc – Concentration
- X - Spectrophotometric reading
- V – Volume of the solvent
- W – Weight of the sample

Total phenol content

The total phenolic content (TPC) of the dried fish sample *Trichiurus lepturus* was determined with the Folin-Ciocalteau assay [4]. An aliquot (1 ml) of methanol water (1:1) extract or a standard solution of gallic acid (20, 40, 60, 80 and 100mg/l) was added to a 25 ml volumetric flask, containing 9 ml of distilled water. A reagent blank was also prepared using distilled water. 1ml of the 1:1 Folin Ciocalteu phenol reagent was added to the mixture and shaken. After 5 min, 10 ml of 7% Na_2CO_3 mixture. The solution was diluted to 25 ml with distilled water and mixed well. After incubation for 30 min at room temperature, the absorbance against the prepared reagent blank was determined at 750 nm with an UV-VIS double beam Spectrophotometer, Anelytikajena. The data for the total phenolic contents of dried fish *Trichiurus lepturus* were expressed as milligrams of gallic acid equivalents (GAE) per gram dry mass (mg GAE/g dw). All samples were analysed in duplicates.

$$Conc = \frac{X * V}{1000} * \frac{1}{W(mg)} * 1000 \text{ mg/g}$$

Lipids

Lipids from the fish sample were analysed using Bligh and Dyer (1959) method [5]. The powdered fish sample was extracted with (2:1) chloroform and methanol mixture art 60˚C for 30 minutes and allowed to cool. To 0.5 ml of the sample add 1 ml of concentrated H_2SO_4 and heated for 10 minutes at 100˚C. Allow to cool and add

5ml phoaphovaniline reagent the readings were taken after developing colour at 510 nm. The blank also taken for reference sample and the concentration were calculated using the equation given below.

$$Conc = \frac{X * V}{1000} * \frac{1}{W(mg)} * 1000 \text{ mg/g}$$

Results

From the nutritional quality analysis of *Trichiurus lepturus* fish collected from cochin, it was found that the lipid content was high followed by protein and carbohydrates

Table 1. Result of the nutritional parameters studied from *Trichiurus lepturus*

Sl.No	Parameter	Result mg/g	Calorific value Calories/gm
1	Carbohydrates	0.6383±2	0.0056
2	Proteins	5.228±3	0.0209
3	Lipids	16.88±3	0.1519
4	Phenolics	0.014±4	0.000056

Calorific value of *Trichiurus lepturus* fish

The calorific value of the fish *Trichiurus lepturus* was determined using the method Allan Robinson 2013[6] and the results obtained as shown in table No 1. Fat content from the fish contributed majority of the calorific value, followed by protein and carbohydrates. According to Tocher 2003 most fishes, consists primarily of proteins, lipids and carbohydrates. Along with proteins, lipids and fatty acids are the major constituent of fish and is important metabolic energy for growth [7].

Discussion

Nutritional profiling of the fish sample *Trichiurus lepturus* was conducted and it was found to be nutritionally significant as it is enriched with proteins, lipids and carbohydrates. It could be considered a good nutritional source as well as of some therapeutic value as shown by the presence of phenolics, which are considered as antioxidants and exhibit a wide range of biological effects

including antibacterial, anti-inflammatory, antiallergic, hepatoprotective, antithrombotic, antiviral, anticarcinogenic and vasodilatory actions [8].

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