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Chemical and Proximate Composition Properties of Different Fish Species Obtained from Iran

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Abstract: Body composition is a good indicator for the physiological condition of a fish, but it is relatively time consuming to measure. Proximate body composition is the analysis of water, fat, protein and ash contents of fish. Proximate analysis of three fishes species such as *Skip Jack Tuna, Yelowfin tuna* and *Longtail tuna* were carried out with standard methods. The lower the percentage of water, the greater the lipids and protein contents and higher the energy density of the fish, it is concluded that *Skip Jack Tuna* fish contains lowest water and highest protein (25.2%) and energy density (137.97 kcal). Therefore *Skip Jack Tuna* fish has best quality form point of view of high biological values of protein and fat and nutritional values and it is recommended for most consumption and provide people health.

Key words: Skip Jack Tuna · Yelowfin tuna · *Longtail tuna* · Proximate composition · Nutrients

INTRODUCTION

In recent years, fish has become favorite foodstuff for the majority of societies because of several health reasons. Fish is safer and healthier to be consumed compare with goat, mutton, buffalo meat and chicken meat. Fish are good sources of protein, fat, vitamin and mineral. Compared to other sources of protein, fish are well known to be excellent sources of protein which can be seen from amino acid composition and protein digestibility [1]. Fish is also one of the main sources of protein in the developing countries [2].

Body composition is a good indicator for the physiological condition of a fish, but it is relatively time consuming to measure. Proximate body composition is the analysis of water, fat, protein and ash contents of fish. Carbohydrates and non-protein compounds are present in negligible amount and are usually ignored for routine analysis [3]. The percentage of water is good indicator of its relative contents of energy, proteins and lipids. The lower the percentage of water, the greater the lipids and protein contents and higher the energy density of the fish [4]. However, these values vary considerably within and between species, size, sexual condition, feeding season and physical activity. Protein content, which is an important component, tends to vary little in healthy fish [5]. There is a wealth of literature available on body composition of various fish species [6-14].

Aim of this study is comparison of proximate composition of selected different fishes varieties.

MATERIALS AND METHODS

Sample Handling and Preparation For Nutritional (Proximate Value)

Analysis: *Skip Jack Tuna,Yelowfin tuna* and *Longtail tuna* were purchased fresh in March 2010 for Bander Abbas Seaside Fish Processing Factory in south Iran. They were kept in cold iced box and transported to the laboratory. On arrival at the laboratory, the fresh fish were washed immediately and the bone and skin were separated from the flesh. Fish flesh was then washed until it was free from blood and placed in plastic bag, sealed and kept in freezer at -20°C before they were analyzed. Prior to analysis the mince was thawed in a refrigerator overnight at 4°C.

Proximate Composition: Proximate composition of fishes was determined using AOAC methods [2]. Moisture content was measured by weighing differences before and after oven drying at 100-105°C for 16 h. Protein content (% N x 65) was determined by the Kjeldahl method. Ash content was determined using dry ashing procedures. Fat content was measured by drying

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Table 1: Proximate and Chemical Composition of Fishes Samples

Fishes Species	TVN (mg/100gr.)	Moisture (%)	Protein (%)	Fat (%)	Ash (%)
Skip Jack Tuna	69.85a	25.2b	3.85c	1.5e	18.2a
Yelowfin tuna	72.2 a	25.2b	4.8c	1.6e	17.5a
Longtail tuna	74.45a ± 0.14	23.11b ± 0.15	0.69 ± 0.16d	0.75f ± 0.06	16.8b

Value is the mean of 3 replicates Means within a column with different letters are significantly different (P<0.05).

Table 2: Detection of Microorganisms in Fishes Species

Fishes Species / Bacteria	*Vibrio parahaemolyticus,*	*Escherichia coli*	*Salmonella*	*Staphylococcus aureus*	*Total count*
Skip Jack Tuna	0	0	0	0	1.1×10^4
Yelowfin tuna	0	0	0	0	1.8×10^4
Longtail tuna	0	0	0	0	6.4×10^3

Value is the mean of 3 replicates.

the samples in 100°C oven and then extracting the crude fat with petroleum ether in a Soxhlet extractor for 4 hr. All samples were done in triplicates.

Statistical Analysis: All data were analyzed by one-way ANOVA analysis using SPSS 11.5 for windows, Duncan's multiple range tests was used to resolve differences among treatment means. A value of $P < 0.05$ was used to indicate significant difference.

RESULTS AND DISCUSSION

Mean percentage for moisture, protein, fat, ash and carbohydrate content of fishes are given in Table 1. Fishes had moisture content ranging from 68.6 to 77.1% (Table 1). Similar result reported by Hui [5].

The results of the fish body composition analysis revealed a strong similarity between the two fish species, other than the higher fat content of *Yelowfin tuna* (Table 1). The nutritional composition of the two species fell within reported values for fish [16,17] meaning that they can be utilized for production of other valued fish products. Protein and fat are the major nutrients in fish and their levels help define the nutritional status of the particular organism. The chemical composition of fish varies greatly from one individual to another depending on age, sex, environment and season with protein levels ranging from 16-21 %, lipids 0.1-25 %, ash 0.4-1.5 %, moisture 60-81 % with extremes of 96 % having been reported[15].

Recommended allowed level for total volatile nitrogen (TVN) in Iran Standard was 30mg/100gr and Table 1 shows that amounts of TVN in fishes species were very low in comparison with Iran standard.

Skip Jack Tuna fish has best quality from point of view of nutrients in comparison with other fishes.

Table 2 shows that there was no any pathogen microorganism such as *Vibrio parahaemolyticus, Escherichia coli, Salmonella, Staphylococcus aureus* in three fishes species and total counts in all fishes samples was very low in comparison with total counts of Iran Standards.

The percentage of water is good indicator of its relative contents of energy, proteins and lipids. The lower the percentage of water, greater the lipids and protein contents and higher the energy density of the fish [18].

It can be concluded that the nutritional body composition of the selected fishes, including nutrients, is within nutritional ranges required by humans. Fat composition exhibited seasonal variations in all species of fish. Biological values of protein in fishes is high and it contains all essential amino acids and fish fat also contains essential fatty acids and omega-3 fatty acids. Fish contains most minerals, therefore consumption fish is good for people health. The lower the percentage of water, greater the lipids and protein contents and higher the energy density of the fish, it is concluded that *Skip Jack Tuna* fish contains lowest water and highest protein and energy density.

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