A STUDY ON SEASONAL VARIATION OF PROXIMATE COMPOSITION OF TRIPLE TAIL, *LOBOTES SURINAMENSIS* (Bloch, 1790) FROM VISAKHAPATNAM FISHING HARBOR, EAST COAST OF INDIA.

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Abstract

Evaluating the proximate composition of food fish is the most important aspect in fish nutrition. The present study was carried out to determine the flesh quality of *Lobotes surinamensis* which correspond to different grade of inclination of the Visakhapatnam consumers. Major nutrient compositions of raw muscle like protein, lipid, moisture and ash were estimated. Major nutrient compositions like moisture, protein fat and ash were estimated in three different seasons, pre-monsoons, monsoon and post-monsoon respectively. The results of this study is revealed that the mean percentages of moisture, protein, fat and ash content of *Lobotes surinamensis* ranged between 78.21±0.17, 17.24±0.56, 1.95±0.18 and 2.53±0.48 %. The protein, lipid and ash content were found relatively high in amount from the samples collected in monsoon season. In the study, inverse relationship was found in between moisture and protein and moisture and lipid. The current study can be used as a baseline data for comparing the various nutritional profiles of *Lobotes surinamensis* in future.

Keywords: Proximate composition; *Lobotes surinamensis*, moisture, protein, fat,ash.

Introduction

Marine fishery resources are living natural resources which are self renewable with dynamic habitat. Fisheries emerging as the largest single industry and employing about 14 million people and generating economy and foreign exchange to the nation from 3,651 fishing villages along the coastline of India (Anon, 2008). *Lobotes surinamensis* is a sluggish offshore species that often floats on its side near the surface in the company of floating objects and occasionally drifts over reefs. Adults inhabit bays, muddy estuaries and lower reaches of large rivers. Juveniles may occur in floating Sargassum and mimic a floating leaf. It feeds on benthic crustaceans and small fish. The maximum length is 110 cm (Robins and Ray, 1986), but is common to about 80 cm (Bouhlel, 1988).

Seafood is always in news as it is proclaimed to be most nutritious and healthy food as well as being linked to increasing number of food borne outbreaks across the globe (Rushinadha *et al*., 2016). As the demand for fish is continuously increasing, making the required protein available to the existing population is a challenge (Ramesh *et al*., 2016). Fishes are widely consumed in many parts of the world by humans due to high protein content, low saturated fat and sufficient omega fatty acids known to support good health (Geetha *et al*., 2016). Body composition is a good indicator of the physiological condition of a fish but it is relatively time consuming to measure. Proximate body composition includes the analysis of water, fat, protein and ash contents of fish (Rani *et al*., 2016).

Fish meal is the main dietary protein source in aquaculture feeds (Hardy and Masumoto, 1990). Several studies deal with the proximate composition of biochemical components of many commercially important fishes (Ashwinikumar *et al.,* 2014; Palanikumar *et al*., 2014). Variation of biochemical composition of fish flesh may also occur within same species depending upon the fishing ground, fishing season, age and sex of the individual and reproductive status. The spawning cycle and food supply are the main factors responsible for this variation (Love, 1980).

Biochemical composition of flesh is a good indicator for the fish quality (Hernandez *et al*., 2001), physiological condition of fish and habitat of fish (Ravichandran *et al*., 2011). With an increasing population, the fishing pressure is also increasing in the capture sector (Rao *et al*., 2016). The water quality associated with aquaculture developments is an important concern globally, as a variety of negative environmental impacts on the receiving environment have been documented (rao *et al*., 2015). The modern day human is interested in taking seafood more in view of its nutritional superiority than all other sources of food accessible (Rushinadha and Sreedhar, 2017). Due to the tremendous change in the climate condition, season and industrial growth, there could be wide differences in the biochemical constituents of the fishes. Hence it becomes essential to document the proximate composition of the fishes periodically in a region. This study was therefore undertaken to create a base line data on the proximate composition of the *Lobotes surinamensis*, Visakhapatnam coast, east coast of India.

Material and methods

All samples were purchased from the fishing harbor at Visakhapatnam, east coast of India. The fish species collected were immediately dipped in ice, kept and transported in sterile polystyrene boxes to sustain freshness. Then, samples transferred to the laboratory for further analysis.

Moisture content was determined by the standard AOAC method (AOAC, 2000) for which a known weight (10 ± 0.5 g) of sample was placed individually in a moisture dish and dried in a hot air oven set at 105˚C until constant weights were obtained. The protein content of the fish was determined by micro Kjeldahl method (AOAC, 2000). It involves the conversion of organic nitrogen to ammonium sulphate by digestion of flesh with concentrated sulphuric acid in a micro kjeldahl flask. The digest was diluted, made alkaline with sodium hydroxide and distilled. The liberated ammonia was collected in a boric acid solution and total nitrogen was determined titrimetrically. The percentage of protein in the sample was calculated. For the estimation of fat content, the dried samples left after moisture determinations were finely grinded and the fat was extracted with chloroform and methanol mixture (AOAC, 2000). After extraction, the solvent was evaporated and the extracted materials were weighed. The percentage of the fat content was calculated. The ash content of a sample is residue left after ashing in a muffle furnace at about 550-600°C till the residue become white. The percentage of ash was calculated by subtracting the ash weight from initial weight.

Results

Proximate analysis is usually the first step in the chemical evaluation of a muscle ingredient, where the material is subjected to a series of relatively simple chemical tests so as to determine the moisture, protein, fat and ash percentage. The monthly variations of proximate composition of fish muscle *Lobotes surinamensis* were represented in Table 1 respectively.

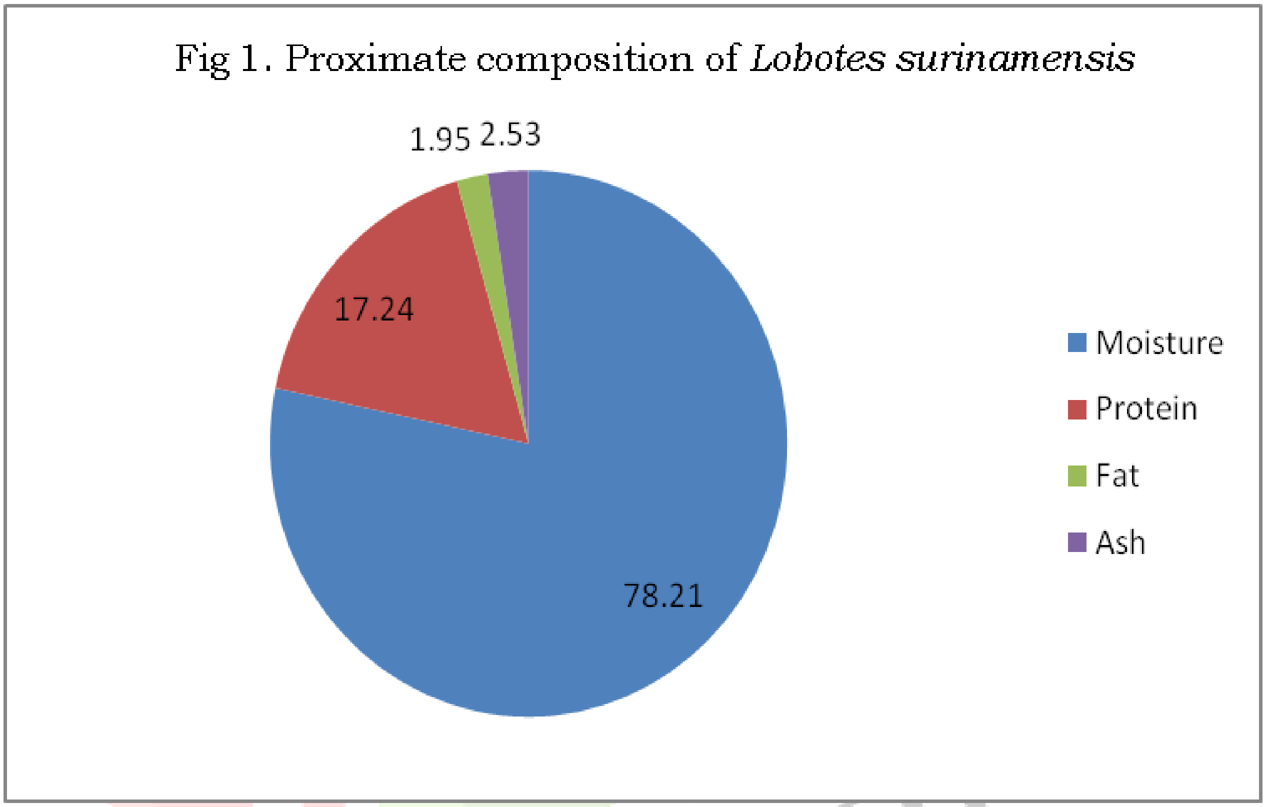
Moisture percentage of *Lobotes surinamensis* were observed in the range of 75.34±0.56 in the month of March and 80.15±0.19 in the month of November. In month wise observation, the abundant content of moisture was observed in the month of November (80.15±0.19) followed by December (79.65±0.08) and June (79.56±0.24) which has shown in table 1. The total mean values of moisture percentage were observed is 78.21±0.36 (Figure 1). Whereas in seasonal wise observation, more amount of moisture content was observed in pre-monsoon (78.76±0.67) followed by post-monsoon (78.40±0.17) and monsoon (77.46±0.25) season. The total mean value of protein content of *Lobotes surinamensis* was 17.24±0.56. In monthly wise observation, more amount of protein content was found in the month of March (18.76±0.16) followed by July (18.51±1.06) and February (17.92±0.28) (Table 1), whereas in seasonal wise observation, the abundant value of protein percentage was observed in monsoon (17.34±0.49) season followed by post-monsoon (17.25±0.56) season and pre-monsoon (17.12±0.26) season respectively.

Table 1: Monthly variation Proximate composition of *Lobotes surinamensis*

	Months & Year	**Moisture**	**Protein**	**Fat**	**Ash**
Pre-monsoon	**MARCH**	75.34±0.56	18.76±0.16	2.75±0.14	2.82±0.06
	APRIL	76.81±0.05	17.73±0.05	2.15±0.11	3.21±0.14
	MAY	78.12±0.16	16.71±0.46	1.85±0.21	2.78±0.39
	JUNE	79.56±0.24	16.14±1.29	2.17±0.42	2.33±0.22
Monsoon	**JULY**	77.46±0.16	18.51±1.06	1.68±0.16	2.74±0.54
	AUGUST	78.05±0.19	17.34±0.37	1.82±0.06	2.71±0.71
	SEPTEMBER	78.72±0.20	16.92±0.26	1.80±0.15	2.36±0.43
	OCTOBER	79.36±0.13	16.24±0.53	1.45±0.35	2.63±0.24
Post-monsoon	**NOVEMBER**	80.15±0.19	16.23±0.24	1.22±0.51	2.56±0.18
	DECEMBER	79.65±0.08	17.64±0.16	1.76±0.08	1.55±0.03
	JANUARY	78.71±1.25	16.70±0.34	2.36±0.08	1.77±0.16
	FEBRUARY	76.54±1.14	17.92±0.28	2.41±0.06	2.92±0.24

Fat accumulated more in the month of March (2.75±0.14) followed by February (2.41±0.06) and January (2.36±0.08) which has shown in table 1. The total mean values of fat percentage accumulated in the entire year were 1.95±0.18 (Figure 1). In seasonal wise variation, more content of fat accumulation was takes place in the season of monsoon (2.23±0.22) followed by pre-monsoon (1.94±0.18) season and post-monsoon (1.69±0.18) season respectively. Ash was found more percentage in the month of April (3.21±0.14) followed by February (2.92±0.24) and March (2.82±0.06) shown in Table 1. In seasonal wise observation, abundance of ash percentage was observed in monsoon (2.79±0.20) season followed by post-monsoon (2.61±0.48) season and pre-monsoon (2.20±0.15) season, whereas the total mean value of ash accumulation was found as 2.53±0.48 respectively.

Figure 1. Total mean value of proximate composition of *Lobotes surinamensis*



Discussion

The proximate composition generally means the percentage composition of four basic constituents such as moisture, protein, lipid and ash. The energy yielding nutrients like protein and lipid are considered as macronutrients which were present in high levels.

Several studies have been done to establish the proximate body composition in fish (Craig, 1977; Ali *et al* 2005; Aberoumad and Pourshafi, 2010; Naeem 2011), and results from some of these have been used to establish the nutritional requirements in fish (Tidwell *et al*., 2010; Okumu and Mazlum, 2002). The fish species examined belonged to high protein, low oil category, because the protein contents were between 15 to 20% and fat 0.20 to 2.00% (Stansby, 1982). While compare with previous studies, the present study of proximate composition values was within the range recorded for *Lobotes surinamensis* (Abbas *et al*., 2015; Abbas & Siddiqui, 2009). According to Love, (1970), principal composition of fish is 16-21 protein, 0.2-5 lipid, 0-0.5 carbohydrate and 66-81% water. The present study values of protein percentage showed the comparable values with the studies like Shaji and Kannan (2013) reported the protein content was 23.63% and Nisa and Asadullah (2011) reported crude protein varied from 16.65% to 20.09%. Ravichandran *et al.* (2011), also reported that protein content ranged between 17.04 - 28.01% %. Ravichandran *et al.* (2011).

Fats are the primary energy storage material in fish (Love, 1970; Adams, 1999; Tocher , 2003). Lipid content is a good index of future survival in some species (Simpkins *et al*., 2003) and a strong indicator of reproductive potential in some fish stocks (Marshall *et al*., 1999). In this study, the fat content was relatively lower in *Lobotes surinamensis* (1.95 ± 0.19) of Peng *et al* (2013) study. Ash is a measure of the mineral content of any food including fish (Omotosho *et al.*, 2011). The ash content changes with the time of storage due to absorbance of moisture and loss of protein (Hassan *et al*., 2013). In the present study, ash percentage was accumulated more in monsoon season followed by post-monsoon season and pre-monsoon season in *Lobotes surinamensis*. Overall, the mean concentration of ash percentage was 2.53±0.48 which was not much different from Matsumoto *et a.l* (1984).

Conclusion

The present study is revealed that the marine fish *Lobotes surinamensis* have very good nutritional value. Higher amount of protein and fat content of fish make it highly nutritious. The results explore that in seasonal wise, the protein and lipid content is comparatively lower with increasing of moisture content. This study can be used as baseline data for comparisons in future, with regard to fish nutritional quality.

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