

**Short Communication****Proximate analysis and nutrient content estimation of marine fish species of saint martin's island in Bangladesh**

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ABSTRACT

Saint Martin's Island is a unique coral island in Bangladesh. Locally available fish species (both fresh and dry fish) were collected from the island to study moisture, ash, fat, protein content, fatty acid compositions and heavy metals. Fish oil was extracted from samples by solid phase dispersion method and fatty acid compositions were analyzed by GC-FID. Protein content in fresh fish samples was determined by the micro-Kjeldahl method. Homogenized samples were digested, filtered and analyzed by AAS for determining toxic heavy metals in the fish samples. The fresh fishes appear to be a good source of dietary protein.

Introduction

Bangladesh is rich in fresh and marine water resources and significant aquatic diversity (Hussain, 2010). Fish production has been playing a vital role in the national GDP. Bangladesh exported approximately 69000 MT fish and related products and earned BDT 43099.4 million in foreign currencies during 2017-18 (DoF, 2018). Four hundred forty-two fish species have been reported in the marine water of Saint Martin's Island, Bangladesh (Quader, 2010). Marine fish samples of different species (13 fresh and 13 corresponding dry fishes) were collected from Saint Martin's island in 2018 to make a proximate analysis of the nutrient contents.

Moisture and ash content were determined according to the standard AOAC 2000 (The

Association of Official Analytical Chemists) method (Tasnim et al., 2020). Moisture content ranged from 76% (Common pony fish) to 88% (Barramundi) in fresh fish, whereas in dry fishes, it was from 31% (Chinese silver pomfret) to 38% (Coral) and ash content in dry fishes ranged from 17% to 26%, while in fresh fishes it ranged from only 0.3% to 2.9% (Table 1).

Samples were homogenized by blending and silica sand and anhydrous sodium sulfate were then added. The samples were then extracted with ethyl acetate, then evaporated and reconstituted into n-hexane for the determination of total fat content. The highest amount of fat content was present in Chinese silver pomfret (*Pampus chinensis*) (Table 1)

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Fatty acids were converted into their methyl esters and were finally analyzed by GC-FID. Fresh fish samples were analyzed by the micro-Kjeldahl method and the percentage of protein among all the samples was found in the range of 41% to 76% (Table 1). The percentage of

lauric, myristic, palmitic, stearic, oleic and palmitoleic acid in different fresh and dry samples ranged from 1.8 to 11 & 3.4 to 13, 4.1 to 15 & 5.5 to 20, 31 to 61 & 41 to 63, 2.9 to 10 & 3.6 to 17, 0 to 24 & 0 to 22, 11 to 26 & 0 -19), respectively (Fig. 1-2).

Table 1. Moisture, ash and fat content (%) of fresh and dry fish and portein content (%) of fresh fish samples

Common/ English Name	Scientific Name	Local Name	Moisture Content (%)		Ash Content (%)		Fat Content (%)		Protein content (%)
			Fresh	Dry	Fresh	Dry	Fresh	Dry	Fresh
Scribbled Gobi	<i>Awaous guamensis</i>	Baila	81	37	0.98	21	1.3	1.7	70
Tuna	<i>Tunnus albacores</i>	Tuna	80	37	2.0	22	1.4	1.5	68
Coral	<i>Lates calcarifer</i>	Bol Koral	83	38	2.0	25	0.43	0.86	73
Pama Croaker	<i>Otolithoides pama</i>	Koladia	77	33	2.0	20	0.33	0.93	61
Tropical two- wing Flying fish	<i>Exocoetus sp</i>	Flying fish	77	36	0.90	19	0.98	1.1	76
Common pony fish	<i>Leioganath us eguilus</i>	Tak Chanda	76	36	2.9	18	1.6	2.7	68
Chinese silver pomfret	<i>Pampus chinensis</i>	Rup Chanda	77	37	2.9	26	1.9	3.2	67
Tripletail	<i>Lobotes surinamensis</i>	Choi	79	37	2.0	17	1.4	1.9	71
Snapper	<i>Lutjanus indicus</i>	Rangachoi	80	31	0.97	18	0.25	0.63	76
Broad- mouthed mullet	<i>Paramugil paramatus</i>	Baspata	81	35	0.93	19	0.70	1.3	70
Giant grouper	<i>Promicrops laceolatus</i>	Bol fish	79	35	2.7	22	1.3	1.4	69
Bay of Bengal hog fish	<i>Bodianus neilli</i>	Sundori	79	34	0.93	17	1.2	1.3	73
Barramundi	<i>Lates calcarifer</i>	Datina koral	88	35	0.3	19	0.30	0.47	41

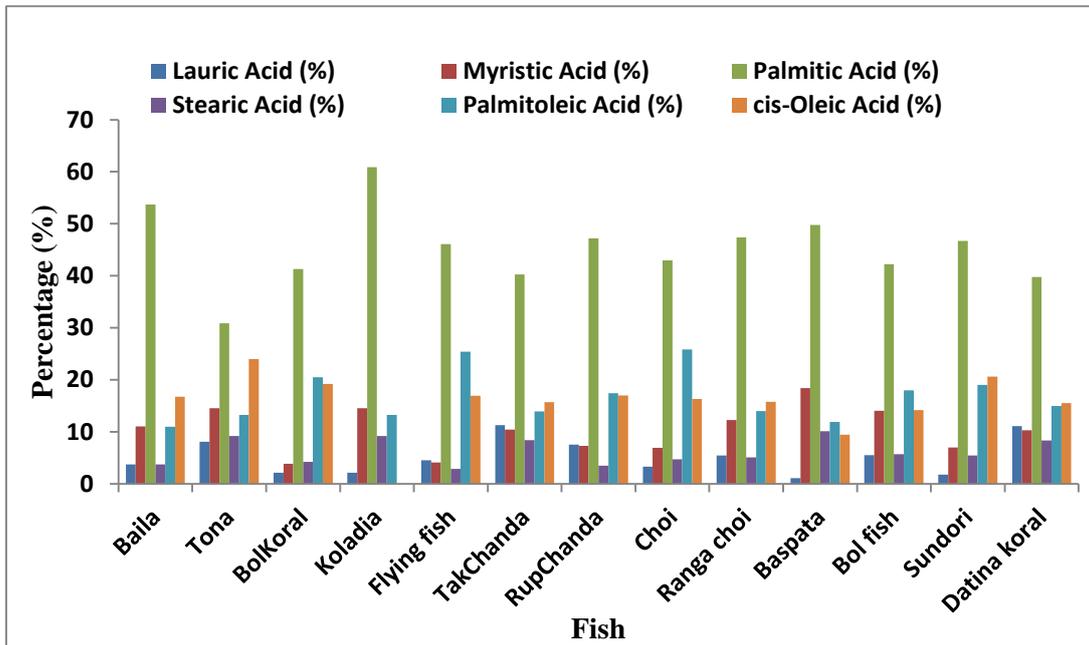


Fig. 1. Fatty acid composition (%) in fresh fish.

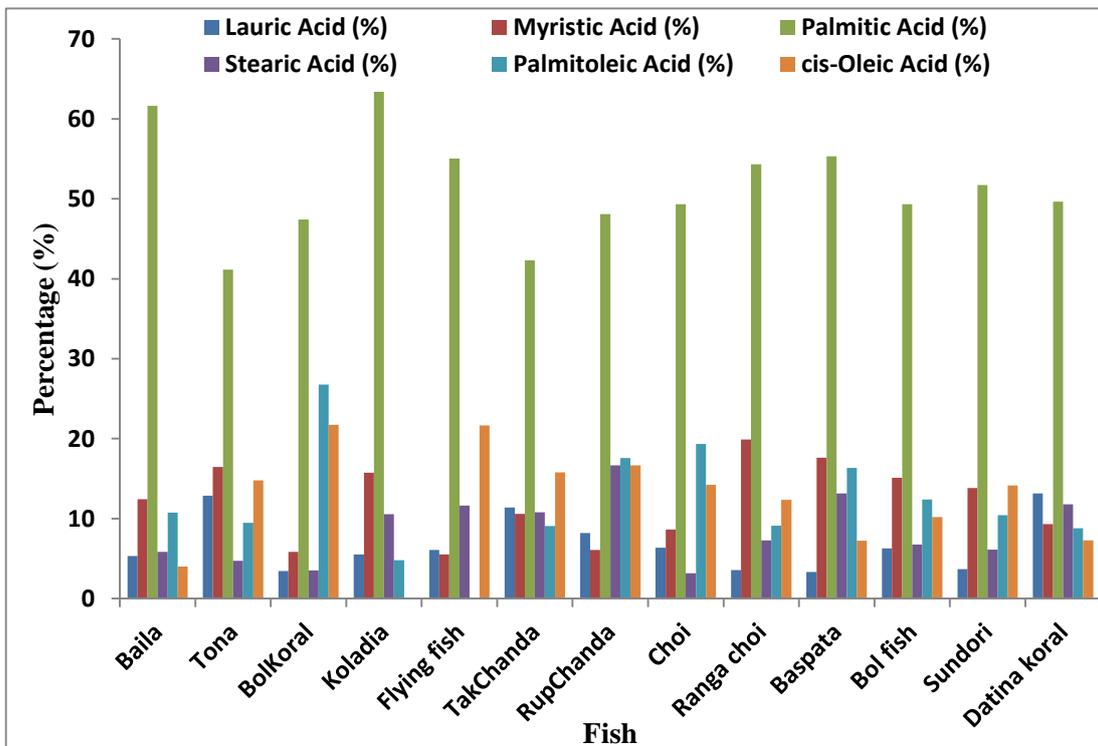


Fig. 2. Fatty acid compositions (%) in dry fish

Fatty acid compositions in fish differ depending on their living in the aquatic environment, *i.e.*, biological, physical, and chemical properties of marine water, fresh water, cold or warm water (Aggelousis et al., 1991). Fish obtains fatty acids from food as they consume marine and freshwater algae and planktons. The abundance of saturated palmitic acid in analyzed fish species might be due to the collection from the sea shore and not from the deep sea and fatty acid compositions in all marine water fishes are superior to freshwater fishes because of their primary food sources (Aziz et al., 2013).

Homogenized sample (10 g) was digested, filtered and analyzed by AAS for determining heavy metals (Cr, Cd, Pb, As, Zn, Cu, and Fe). The amount of Cr, Cd, and As in marine fishes was <0.02 mg/kg for both fresh and dry fish samples and that of Pb in fresh fish was <0.02 mg/kg and in dry fish was <0.18 mg/kg. Moreover, the amounts of Fe, Zn and Cu in various fish samples were 0.25-6.5, 1.2-2.4 and 0.43-8.4 mg/kg for fresh fish samples and 0.64-10.8, 1.7-2.4 and 0.11-2.9 mg/kg for dry fish samples, respectively (Table 2). These amounts were found to be below the maximum permitted limits (Tasnim et al., 2020).

A higher amount of moisture was present in fresh fishes than dry fishes. It implies that fresh fishes are expectedly more perishable than the dry ones.

Summing up, it was found that fishes contained a rich amount of different saturated and unsaturated fatty acids. The concentration of heavy metals was found to be below the permissible limit imposed by WHO. All fish

samples contain an adequate amount of protein, which implies that fresh fishes from Saint Martin's island are a good source of dietary protein.

Table 2. Heavy metals in fresh and dry fish.

Heavy Metal (mg/kg)	Fresh fish	Dry fish
Cr	<0.02	<0.02
Cd	<0.02	<0.02
As	<0.02	<0.02
Pb	<0.02	0.001-0.18
Fe	0.25-6.5	0.64-10.8
Zn	1.20-2.4	1.70-2.4
Cu	0.43-8.4	0.11-2.9

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