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Nutritional Composition of Marine Water Fishes of Bangladesh: A Review

Md. Hafizur Rahman[1], Mst. Sharmin Sultana[2], Nasrat Jahan Shelly[1] and Md. Sajedur Rahman[1]

[1]Dept. of Biochemistry and Molecular Biology, [2]Dept. of Soil Science, Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka (12 07), Bangladesh

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Corresponding hafizur62@gmail.com

0000-0001-6036-7793

ABSTRACT

Marine fishes have been recognized for high quality protein and essential fatty acids which play a vital role in human being for nutrition and disease prevention. This review focuses on the nutrient composition of marine fishes in Bangladesh. Nutrient composition data was collected through literature searching in databases and source, including PubMed, Web of Science, Google Scholar, Science Direct, World Fish, and Bangladesh-based database Banglajol. Published articles contained proximate composition, vitamins, minerals and fatty acids profiles of marine fishes. The highest energy, protein, fat and ash content in 100 g edible raw marine fish was 926 kJ, 50 g, 24.2 g, and 8.4 g, respectively. The maximum amount of minerals such as 8.6 mg iron, 29.3 mg zinc, 1900 mg calcium, 160 µg iodine, 120 µg selenium, 1000 mg phosphorus, 187.98 mg magnesium, 497.4 mg sodium, 764 mg potassium, 1.1 mg manganese, 300 mg sulphur and 0.5 mg copper found in 100 gram edible raw marine fishes. The highest quantity of vitamins was 288.7 µg vitamin A, 0.9 mg vitamin B6, 15 µg vitamin B12, 13 µg vitamin D, 2.4 mg vitamin E, 17 µg folate, 0.2 mg thiamine, 0.2 mg riboflavin and 19.3 mg niacin in 100 gram edible raw marine fishes. According to available data, marine fish are good sources of protein, vitamins, zinc, calcium, phosphorus and fatty acids. This illustrates the diversity in nutrient content of fish species which should guide policy and programs to improve food and nutrition security in Bangladesh.

KEYWORDS: Fatty acids, marine fish, minerals, proximate composition, vitamins

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1. INTRODUCTION

Fish is an incomparable animal-source food in Bangladesh, both in terms of quantity and quality accounting for approximately 18.1 kg consumed per person per year and the frequency of consumption, far exceeding that of any other animal-source food (Belton et al., 2014). Coastal rivers and estuaries are among the world's most abundant aquatic resource environments (Roy et al., 2020). A wide range of fishes (around 511 marine species) including shrimp is found in Bangladeshi part of Bay of Bengal which account for the 16.28% of the national fish production (Jahan et al., 2014). Bangladesh is one of the leading fish producing countries in the world and fisheries sector receives a significant contribution from marine fishery, which covers an area of about 118,813 km^2 along with 200 nautical miles of the exclusive economic zone from the coastline of Bay of Bengal (Manik, 2022). In Bangladesh, 23.81% of the overall agricultural Gross Domestic Product (GDP) and the fisheries sector makes up 3.65% of the national GDP (Rahman et al., 2018). Approximately 270,000 fishing households in the coastal region make their living in some way from the marine fishery (Islam and Shamsuddoha, 2018). Fish makes up two thirds of the animal protein consumed in Bangladesh. When looking at daily consumption per person, fish (62.6 g) comes in third place, followed by carbohydrates (471.3 g) and vegetables (167.3 g), accounting for over 60% of the annual intake of animal protein (Waid et al., 2019), however, malnutrition in Bangladesh is still a serious public health concern. On the other hand, a growing trend of non-communicable diseases linked to obesity and overweight indicates the double burden of malnutrition in Bangladesh (Shafique et al., 2007; Hasan et al., 2017). To address the high rate of malnutrition, it is crucial to go from a high quantity to a high quality nutritional consumption. In that case, understanding the nutrient composition can be useful for the right food choice not only to improve diet quality but also to prevent nutrient-specific malnutrition. Fish is a substantial source of highly unsaturated fatty acids (HUFA) and polyunsaturated fatty acids (PUFA), particularly omega-3 fatty acids like eicosapentaenoic acid (EPA) and do-cosahexaenoic acid (DHA) (Erkan and Ozden, 2007; Huynh et al., 2007). Fish proteins have a high value since they include a large number of necessary amino acids (Shaji and Kannan, 2013; Toppe et al., 2007). On the other hand, several human illnesses, including cardiovascular disease, cancer, rheumatoid arthritis, and inflammation, have therapeutic and pre-ventative benefits from fishes (Raatz et al., 2013). Fish muscle and bones also contain essential minerals (Ersoy and Qzeren, 2009). Marine fish are abundant in vital macro and micronutrients that are highly accessible, readily absorbed by people of all ages, and helpful in enhancing human health (Larsen et al., 2011). Fish are also a significant source of vitamins and minerals, such as vitamin D, selenium, zinc, phosphorus, and calcium (Lund, 2013; Tilami and Sampels, 2017). Marine fish consumption has several advantages such as reducing the incidence of cardiovascular disorders in maturity, improving cognitive and visual development during infancy and childhood, and neurodevelopment during the embryonic stage (Cohen et al., 2005; Eilander et al., 2007; Carlson, 2009; Leiris et al., 2009; Marik and Varon, 2009). Data regarding the nutrient composition of fish is inadequate in Bangladesh. Only 15 out of 475 identified marine fish species have had their nutrient composition recorded in the country's Food Composition Table (Islam, 2003; Shaheen et al., 2022). This review examines the nutritional qualities of marine fish in the Bay of Bengal that are caught in Bangladesh marine territory. The findings could be useful in several ways. First, this review identifies marine fish that are rich in nutrients. Second, the findings may be helpful in encouraging nutrient-rich fish eating to improve the quality of diets. Third, the results will promote the eating of nutrient rich marine fish by people from all socioeconomic groups. This review could be helpful to realize nutritional value of marine fishes in Bangladesh required for dietary and livelihood associated planning, marine policy formulation, and trade related purposes both national and international settings.

2. PROXIMATE COMPOSITION

The energy, protein, fat, moisture and ash composition of marine species are shown in Table 1. The total protein content in fish species ranged from 7.4 to 25 g $100g^{-1}$ and can be assumed to be high dietary quality, being an animal-source protein. Tuna had the highest (25 g) amount of protein while loittya (*Harpadon nehereus*) had the lowest (7.4 g) (Table 1). Besides tuna fish several other fishes such as hilsa, parshe or bata (*Mugil cephalus*), chapila (*Sardinella fimbriata*) and kauwa (*Megalaspis cordyla*) all have a good amount of protein. The fat content was detected ranged from 0.2 to 24.2 g $100g^{-1}$. Hilsa (*Tenualosa ilisha*) had the highest fat level (24.2 g $100g^{-1}$), whereas Toungsole/Kukurjib/Pata (*Cynoglossus bengalensis*) had the lowest fat content (0.2 g 100 g^{-1}). Fat generally varies much more widely than other proximate components of fish, and usually reflects differences in the way fat is stored in particular species but may also be affected by seasonal/lifecycle variations and the diet/food availability of the species at the time of sampling (Emre et al., 2018; Ozogul et al., 2011). The moisture content of fish species ranged from 50 to 91.2 g 100 g^{-1}. Ash content ranged from 0.7 to 8.4 g 100 g^{-1}. Among the marine species, Folichanda (*Pampus argenteus*) had the lowest ash content (0.7 g 100 g^{-1}), while Gang tengra (*Arius caelatus*) had the highest value (8.4 g 100 g^{-1}). The total energy content varied

Table 1: Name of fish species with the highest and the lowest proximate composition content

Proximate composition (Unit)	Proximate composition per 100 g of edible raw marine fish		Local name (Scientific name) of fish species with the highest value	Local name (Scientific name) of fish species with the lowest value	Reference (highest value, lowest value)
	Highest value	Lowest value			
Protein (g)	25	7.4	Tuna/Maittya (*Euthynnus affinis*)	Loittya (*Harpadon nehereus*)	Shaheen et al., 2013; Rahman et al., 2018
Fat (g)	24.2	0.2	Hilsa (*Tenualosa ilisha*)	Toungsole/Kukurjib/Pata (*Cynoglossus bengalensis*)	Hossain et al., 2014; Uddin et al., 2001
Moisture (g)	91.2	50	Loittya (*Harpadon nehereus*)	Hilsa (*Tenualosa ilisha*)	Hossain et al., 2014; Nordhagen et al., 2020
Ash (g)	8.4	0.7	Gang tengra (*Arius caelatus*)	Folichanda (*Pampus argenteus*)	Bogard et al., 2015; Azam et al., 2004
Energy (kJ)	926	54.7	Hilsa (*Tenualosa ilisha*)	Loittya (*Harpadonn ehereus*)	Shaheen et al., 2013; Rahman et al., 2018

greatly with a range of 54.7–926 kJ 100 g^{-1} which is related to variation in fat content in the different species.

3. MINERAL COMPOSITION

The iron, zinc, calcium, iodine, selenium, phosphorus, magnesium, sodium, potassium, manganese, sulphur and copper composition for fish species are shown in Table 2. Iron content varied considerably with a range from 0.2 (Loittya) to 8.6 (Rupchanda) mg 100 g^{-1}. Overall, the data presented here indicate that several species may contribute significantly to dietary iron intakes which may have important policy implications given the public health significance of iron deficiency in Bangladesh. Iron and zinc are essential trace elements; they must be taken into the body sufficient quantities to maintain vital functions in the human body (Yin et al., 2017). Many essential trace elements play an important role in many functions such as hormonal functions and co-factors in the enzyme (Bakirdere et al., 2011), and these elements have different functions in the human body. Zinc concentration varied considerably from 0.1 to 29.3 mg 100 g^{-1}. Among the marine species, Poa (*Otolithoides pama*) had the highest zinc content (29.3 mg 100 g^{-1}), while Kauwa (*Megalaspis cordyla*) had the lowest value (0.1 mg 100 g^{-1}). Calcium content ranged considerably from 13 to 1900 mg 100 g^{-1}. Among the marine species, Rupchanda/Folichanda (*Pampus argenteus*) had the lowest calcium concentration (13 mg 100 g^{-1}), while Lal poa (*Johnius argentatus*) had the highest value (1900 mg 100 g^{-1}). In a study in two rural sub-districts of Bangladesh, it was estimated no women or young children had diets adequate in calcium, attributable to low food intake and low dietary diversity (Arsenault et al., 2013). In developed countries, dairy products tend to be the primary source of dietary calcium; however, this is not the case in Bangladesh where frequency of dairy consumption is very low (Belton et al., 2014). The iodine content of foods tends to be largely dependent on environmental conditions. Marine fish and seafood tend to be rich dietary sources. The iodine was detected in fish species with a range of only 6.9–160 µg 100g^{-1}. Unicorn cod (*Bregmaceros mcclellandi*) had the highest iodine level (160 µg 100g^{-1}), whereas Parse (*Liza parsia*) had the lowest iodine content (6.9 µg 100g^{-1}). Selenium content of foods varies significantly according to surrounding environmental conditions. The selenium content in marine species showed a wide range from 17 to 120 µg 100g^{-1}. The selenium concentration of the marine species varied, Loittya (*Harpadon nehereus*) having the lowest value (17 µg 100g^{-1}) and Puiya (*Benthosema fibulatum*) having the highest value (120 µg 100g^{-1}). Phosphorus content ranged from 110 to 1000 mg 100g^{-1}, Among the marine species, Folichanda (*Pampus argenteus*) had the lowest phosphorus concentration (110 mg 100g^{-1}), while Lal poa (*Pennahia argentata*) had the highest value (1000 mg 100g^{-1}).

The ranges of magnesium was 19 to 187.98 mg 100g^{-1}, and the marine species, Loittya (*Harpadon nehereus*) had the lowest magnesium concentration (19 mg 100g^{-1}), while Koral/Vetkee (*Lates calcarifer*) had the highest value (187.98 mg 100g^{-1}). The sodium content in fish species ranged from 40 to 497.4 mg 100g^{-1}. The highest sodium concentration, 497.4 mg 100g^{-1} was found in Loittya (*Harpadon nehereus*) and the lowest amount, 40 mg 100g^{-1} was observed in Fesha/Teli (*Setipinna taty*). Marine fish species varied in their potassium content levels from 50 to 764 mg 100 g^{-1}. Loittya (*Harpadon nehereus*) had the lowest potassium content 50 mg 100 g^{-1}, while Parshe (*Liza parsia*) had the greatest value, 764 mg 100 g^{-1}. Manganese content was found 0.01 to 1.1 mg 100 g^{-1}, whereas Tailla (*Eleutheronema tetradactylum*) had the lowest concentration of 0.01 mg 100 g^{-1} manganese, and Koral/Vetkee (*Lates calcarifer*) had the highest concentration of

Table 2: Name of fish species with the highest and the lowest mineral content

Mineral content (Unit)	Mineral content per 100 g of edible raw marine fish		Local name (Scientific name) of fish species with the highest value	Local name (Scientific name) of fish species with the lowest value	Reference (highest value, lowest value)
	Highest value	Lowest value			
Iron (mg)	8.6	0.2	Rupchanda (*Pampus chinensis*)	Loittya (*Harpadon nehereus*)	Nordhagen et al., 2020; Rahman et al., 2018
Zinc (mg)	29.3	0.1	Poa (*Otolithoides pama*)	Kauwa (*Megalaspis cordyla*)	Nordhagen et al., 2020; Zaman et al., 2014
Calcium (mg)	1900	13	Lal poa (*Johnius argentatus*)	Rupchanda/Folichanda (*Pampus argenteus*)	Shaheen et al., 2013; Bogard et al., 2015;
Iodine (µg)	160	6.9	Unicorn cod (*Bregmaceros mcclellandi*)	Parse (*Liza parsia*)	Bogard et al., 2015; Nordhagen et al., 2020
Selenium (µg)	120	17	Puiya (*Benthosema fibulatum*)	Loittya (*Harpadon nehereus*)	Nordhagen et al., 2020
Phosphorus (mg)	1000	110	Lal poa (*Pennahia argentata*)	Folichanda (*Pampus argenteus*)	Bogard et al., 2015;
Magnesium (mg)	187.98	19	Koral/Vetkee (*Lates calcarifer*)	Loittya (*Harpadon nehereus*)	Nordhagen et al., 2020; Zaman et al., 2014
Sodium (mg)	497.4	40	Loittya (*Harpadon nehereus*)	Fesha/Teli (*Setipinna taty*)	Shaheen et al., 2013; Zaman et al., 2014
Potassium (mg)	764	50	Parshe (*Liza parsia*)	Loittya (*Harpadon nehereus*)	Shaheen et al., 2013; Zaman et al., 2014
Manganese (mg)	1.1	0.01	Koral/Vetkee (*Lates calcarifer*)	Tailla (*Eleutheronema tetradactylum*)	Bogard et al., 2015; Zaman et al., 2014
Sulphur (mg)	300	190	Tailla (*E. tetradactylum*)	Folichanda (*Pampus argenteus*)	Bogard et al., 2015;
Copper (mg)	0.5	0.02	Churi (*Trichiurus haumela*)	Kalochanda (*Parastromateus niger*)	Bogard et al., 2015; Mansur et al., 2018

manganese, 1.1 mg 100 g^{-1}. Sulphur content were ranged from 190 to 300 mg 100 g^{-1}. Folichanda (*Pampus argenteus*) had the lowest level of sulphur, 190 mg 100 g^{-1}, whereas Tailla (*E. tetradactylum*) had the maximum concentration 300 mg 100 g^{-1}. The range of copper content was 0.02 to 0.5 mg 100 g^{-1}. Churi (*Trichiurus haumela*) had the highest content of copper at 0.5 mg 100 g^{-1}, while Kalochanda (*Parastromateus niger*) had the lowest concentration at 0.02 mg 100 g^{-1}.

4. VITAMIN COMPOSITION

The vitamin A, B6, B12, D, E and folate composition of fish species is shown in Table 3. Total vitamin A were detected by several researchers in marine fish species and ranged from 7.3 to 288.7 µg 100 g^{-1}. Among the species, Unicorn cod (*Bregmaceros mcclellandi*) had the highest vitamin A content (288.7 µg 100 g^{-1}), while Loittya (*Harpadon nehereus*) had the lowest vitamin A (7.3 µg 100 g^{-1}). The vitamin B6 was detected in fish species and ranged from 0.1 to 0.9 mg 100 g^{-1}. Koral/Vetkee (*Lates calcarifer*) had the lowest level of vitamin B6, 0.1 mg 100 g^{-1}, whereas Tuna/Maittya (*Euthynnus affinis*) had the maximum concentration 0.9 mg 100 g^{-1}. The vitamin B12 content in fish species ranged from 0.50 to 15 µg 100 g^{-1}. The highest vitamin B12 concentration, 15 µg 100 g^{-1} was found in Kauwa (*Megalaspis cordyla*) and the lowest amount, 0.5 µg 100 g^{-1} was observed in Murbaila (*Platycephalus indicus*). Very limited data on vitamin B12 in fish and seafood are available for comparison in the literature. The vitamin B12 has particular public health significance given the recent estimate of a national prevalence of vitamin B12 deficiency in 22% of adult women and the clear negative implications of deficiency on cognitive development and function (Benoist, 2008). As dietary sources of vitamin B12 are exclusively animal-source foods in Bangladesh, and fish is the most significant food, increased consumption of fish is

Table 3: Name of fish species with the highest and the lowest vitamin content

Vitamins (Unit)	Vitamin content 100 g^{-1} of edible raw marine fish		Local name (Scientific name) of fish species with the highest value	Local name (Scientific name) of fish species with the lowest value	Reference (highest value, lowest value)
	Highest value	Lowest value			
Vitamin A (µg)	288.7	7.3	Unicorn cod (*Bregmaceros mcclellandi*)	Loittya (*Harpadon nehereus*)	Nordhagen et al., 2020
Vitamin B6 (mg)	0.9	0.1	Tuna/Maittya (*Euthynnus affinis*)	Koral/Vetkee (*Lates calcarifer*)	Shaheen et al., 2013;
Vitamin B12 (µg)	15	0.5	Kauwa (*Megalaspis cordyla*)	Murbaila (*Platycephalus indicus*)	Bogard et al., 2015; Nordhagen et al., 2020
Vitamin D (µg)	13	0.1	Tailla (*Eleutheronema tetradactylum*)	Folichanda (*Pampus argenteus*)	Bogard et al., 2015
Vitamin E (mg)	2.4	0.1	Koral/Vetkee (*Lates calcarifer*)	Murbaila (*Platycephalus indicus*)	Shaheen et al., 2013; Bogard et al., 2015
Folate (µg)	17	2.2	Poa (*Protonibea diacanthus*)	Murbaila (*Platycephalus indicus*)	Shaheen et al., 2013; Bogard et al., 2015
Thiamine (mg)	0.2	0.01	Tuna/Maittya (*Euthynnus affinis*)	Rupchanda, sada (*Pampus argenteus*)	Shaheen et al., 2013
Riboflavin (mg)	0.2	0.1	Lakkha/Gada (*Leptomelanosoma indicum*)	Fesha/Faishya (*Setipinna phasa*)	Shaheen et al., 2013
Niacin (mg)	19.3	0.7	Tuna/Maittya (*Euthynnus affinis*)	Koral/Vetkee (*Lates calcarifer*)	Shaheen et al., 2013

likely to be an appropriate food-based strategy to prevent and fight vitamin B12 deficiency. Vitamin D was detected in fish species and ranged 0.1 to 13 µg 100 g^{-1}. Folichanda (*Pampus argenteus*) had the lowest vitamin D content, 0.1 µg 100 g^{-1}, while Tailla (*Eleutheronema tetradactylum*) had the greatest value, 15 µg 100 g^{-1}. Comparable data on vitamin D content in marine fishes are few in the literature. It is likely that several species could contribute significantly to dietary vitamin D intakes. Vitamin E was detected in fish species and ranged 0.1 to 2.4 mg 100 g^{-1}. Murbaila (*Platycephalus indicus*) had the lowest level of vitamin E, 0.1 mg 100 g^{-1}, whereas Koral/Vetkee (*Lates calcarifer*) had the maximum concentration at 2.4 mg 100 g^{-1}. There aren't many comparable data on vitamin E content in marine fishes in the literature. The data presented here indicate that some fish are a potentially important source of vitamin E. Folate content was found 2.2 to 17 µg 100 g^{-1}, whereas Murbaila (*Platycephalus indicus*) had the lowest concentration of 2.2 µg 100 g^{-1} folate, and Poa (*Protonibea diacanthus*) had the highest concentration of folate, 17 µg 100 g^{-1}. The results indicate that all species analyzed would generally be considered low dietary sources of folate, and therefore unlikely to contribute significantly to dietary folate intake in Bangladesh. Thiamine content in fish species ranged from 0.01 to 0.2 mg 100 g^{-1}. Among the species, Tuna/Maittya (*Euthynnus affinis*) had the highest thiamine content (0.2 mg 100g^{-1}), while Rupchanda, sada (*Pampus argenteus*) had the lowest value (0.01 mg 100 g^{-1}). Riboflavin content was found 0.1 to 0.2 mg 100 g^{-1}. Fesha/Faishya (*Setipinna phasa*) had the lowest concentration of riboflavin, 0.1 mg 100g^{-1}, while Lakkha/Gada (*Leptomelanosoma indicum*) had the greatest value, 0.2 mg 100g^{-1}. Niacin was detected in fish species and ranged 0.7 to 19.3 mg 100 g^{-1}. Koral/Vetkee (*Lates calcarifer*) had the lowest level of niacin, 0.7 mg 100 g^{-1}, whereas Tuna/Maittya (*Euthynnus affinis*) had the maximum concentration 19.3 mg 100 g^{-1}.

5. FATTY ACID COMPOSITION

Total monounsaturated fatty acid (MUFA) and saturated fatty acid (SFA) contents are shown in Table 4. Total saturated fatty acid (SFA) and monounsaturated fatty acid (MUFA) contents ranged from 0.1 to 12.6 g 100 g^{-1} and 0.1 to 7.7 g 100 g^{-1}, respectively. Hilsa was the highest source of SFA and MUFA, whereas Loittya (*Harpadon nehereus*) was the lowest source of MUFA. The total n-3 polyunsaturated fatty acid (PUFA) content ranged from 0.02 to 2.99 g 100 g^{-1}, with the highest sources being Hilsa (*Tenualosa ilisha*) and the lowest source was Fesha/Teli (*Setipinna taty*). Total n-6 PUFA content ranged from 0.02

Table 4: Name of fish species with the highest and the lowest fatty acid content

Fatty acids (Unit)	Fatty acids per 100 g of edible raw marine fish		Local name (Scientific name) of fish species with the highest value	Local name (Scientific name) of fish species with the lowest value	Reference (highest value, lowest value)
	Highest value	Lowest value			
Total SFA (g)	12.6	0.1	Hilsa (*Tenualosa ilisha*)	Hilsa muscle (*Tenualosa ilisha*)	Hossain et al., 2014
Total MUFA (g)	7.7	0.1	Hilsa (*Tenualosa ilisha*)	Loittya (*Harpadon nehereus*)	Hossain et al., 2014; Nordhagen et al., 2020
Total n-3 (g)	2.99	0.02	Hilsa (*Tenualosa ilisha*)	Fesha/Teli (*Setipinna taty*)	Bhuiyan et al., 2006; Hossain et al., 2014
Total n-6 (g)	0.7	0.02	Sting ray/ shaplapata (*Dasyatis uarnak*)	Rita (*Rita buchanani*)	Bhuiyan et al., 2006; Yusuf et al., 1993
EPA (mg)	1310	20	Hilsa muscle (*Tenualosa ilisha*)	Loittya (*Harpadon nehereus*)	Hossain et al., 2014; Nordhagen et al., 2020
DHA (mg)	1240	60	Hilsa (*Tenualosa ilisha*)	Loittya (*Harpadon nehereus*)	Hossain et al., 2014; Nordhagen et al., 2020

to 0.7 g 100 g^{-1}, with the highest sources being Sting ray/ Bagashaplapata (*Dasyatis uarnak*) and the lowest sources Rita (*Rita buchanani*). This may reflect differences in the diet or environmental conditions of farmed versus capture fish among other factors (Li et al., 2011). A balanced n-6:n-3 PUFA ratio is more desirable in prevention of cardiovascular and other chronic diseases (Simopoulos, 2008). The eicosapentaenoic acid (EPA) of fish was found 20 to 1310 mg 100g^{-1} with the highest sources being Hilsa muscle (*Tenualosa ilisha*) and the lowest source was Loittya (*Harpadon nehereus*). The docosahexaenoic acid (DHA) of fish was found 60 to 1240 mg 100 g^{-1} where Hilsa (*Tenualosa ilisha*) had the highest and Loittya (*Harpadon nehereus*) had the lowest quantity. This is of particular interest given for the role of fatty acids in growth and development during the first two years, and specifically, DHA is a structural constituent of membranes specifically in the central nervous system and its accumulation in the fetal brain takes place mainly during the last trimester of pregnancy and continues at very high rates up to the end of the second year of life (Lauritzen et al., 2016). The data presented here indicate that marine fish species in Bangladesh, are good dietary source of fatty acids and should be considered in food-based approaches to optimize growth and development during the first two years.

6. CONCLUSION

According to available data, several marine fish species such as Hilsa (*Tenualosa ilisha*), Unicorn cod (*Bregmaceros mcclellandi*), Tuna (*Euthynnus affinis*), Koral (*Lates calcarifer*), Parshe (*Liza parsia*), Rupchanda (*Pampus chinensis*), Poa (*Otolithoides pama*), Lal poa (*Johnius argentatus*) have been identified as nutritious and have potential to address malnutrition due to protein, iron, zinc, calcium, and DHA deficiencies. In Bangladesh, the information of this review paper may be useful for planning diets and livelihoods, developing marine policies, and pursuing trade-related purposes both domestically and internationally.

7. FURTHER RESEARCH

Variations in the content of nutrients were noted when several researchers studied and reported on a particular species; therefore, it is advised to do high-quality research with an emphasis on examining vitamins, minerals, and heavy metals.

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