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Fish commodity - Means for improved nutritional security

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Abstract

Fish is a good source of almost all nutrients except carbohydrate and vitamin C. It has a very important role in eradicating long term nutritional problems including anemia, stunting, low birth weight and many others. In the present scenario many people of our country, particularly rural, illiterate and backward populations are not much aware about the balanced diet due to which they are suffering from various nutritional problems (Deb and Haque, 2010). The majority of women and children are anemic and malnourished. When we think about balanced diet, fish along with cereals may become a good proportion to combat the nutritional problems.

Keywords: Nutrients, anemia, low birth weight and malnourished etc.

Introduction

Fish and other aquatic animals make an 'irreplaceable' contribution to food and nutrition security in many Asian and African countries where large numbers of people are poor and undernourished. Fish are a rich source of high quality protein, a range of micronutrients, and fatty acids essential for human brain and overall body development. Awareness regarding importance of diet in human health is increasing day by day. When we think about balanced diet, fish along with cereals may become a good proportion (Tulchinsky, 2010) [5]. Fish the collective term used for fresh and salt- water fin fish, shell fish, including prawns, crabs, lobsters, clams mussels and other aquatic animal life, is a highly nutritious food rich in vitamins, minerals, high quality protein and low in saturated fat. The advantage of fishes from nutritional point of view is also increased due to its quality taste and at the same time it's easily digestibility (Bark, 2016) [6]. Majority of women and children in India are anaemic and malnourished. The children are at higher risk for malnutrition and less likely to attend the school themselves. Women in these conditions have little power to combat food and nutritional security. In rural areas the problem of nutritional security is more severe as there is acute shortage of quality food materials. The remainder of the paper addresses ways in which the fish commodity helps and contributes to combat the malnutrition and improves the nutritional security. The implications for food and nutrition security at a range of scales are then explored in detail, with significance, nutritional quality, of aquaculture products.

Food Security

It is defined by FAO as "A situation in which all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preference for an active and healthy life."

Nutritional Security

The concept of food security cannot be made holistic without nutritional security. Indians diet is qualitatively and quantitatively deficient in micronutrients due to inadequate availability of vegetables, fruits, pulses and millets at affordable price which leads to nutrition related problem. In this context dietary diversification by introducing fish commodity is the most appropriate and sustainable option ensuring adequate intake of about all micronutrients with quality protein and other available macronutrients.

Nutritional Elements of Fish

Fish contains water, proteins, and other nitrogenous compounds, lipids, minerals and vitamins. Chemical composition of fish exhibits strong intra-species and inter-species variation depending on age, sex, environment and season.

Protein

The protein fraction is, in general constant in most species, occasional change have been observed. In general protein content of fish varies from 15-20% of wet body weight. The advantage of fish protein is that they contain all essential amino acids in required proportion similar to milk, egg and mammalian meat protein. In addition amino acid composition of fish protein is such that it can provide all amino acids for synthesis of all proteins required for human system. Fish protein thus improves the overall nutritional quality of a mixed diet, especially of a vegetarian diet.

Table 1: Essential amino acids (%) of the total amino acids in various proteins

Amino acids	Fish	Milk	Beef	Egg
Lysine	8.8	8.1	9.3	6.8
Tryptophan	1.0	1.6	1.1	1.9
Histidine	2.0	2.6	3.8	2.2
Phenylalanine	3.9	5.3	4.5	5.4
Leucine	8.4	10.2	8.2	8.4
Isoleucine	6.0	7.2	5.2	7.1
Threonine	4.6	4.4	4.2	5.5
Methionine-Cystine	4.0	4.3	2.9	3.3
Valine	6.0	7.6	5.0	8.1

(FAO 2016b, Food Security and nutrition for all)

LIPID

The lipid fraction of fish is the component that shows greatest variation. Fish lipid differs greatly from mammalian lipid in that they include up to 40% of long chain fatty acid (14-22 carbon atoms) that are highly unsaturated and contains 5-6 double bonds. On the other hand mammalian fat generally contains not more than two double bonds per fatty acids molecule.

The fat in fish is unsaturated and contains plenty of essential fatty acids and fat soluble vitamins, both of these are important nutrients that are needed to remain healthy. The Omega-3 fatty acids and vitamin D that we get from fish are

very important because they are very few in other source of these nutrients. Liver oil from certain species of Sharks is a natural source of "squalene" a terpenoid hydrocarbon with medicinal properties. It acts as chemo-preventive agents against lung metastasis. It protects human skin from lipid peroxydation due to exposure to ultra-violet rays and other sources of oxidative damage. It also revitalized weekend body cells and helps to revive cell regeneration and hence is used in health foods.

In human nutrition, fatty acids such as linoleic and linolenic acids are important and considered essentially as they cannot be synthesized by the body. However fish oils contain PUFA, DHA and EPA which are essential polyunsaturated fatty acids and have a great importance for healthy human life.

Nitrogen Containing Fractions

Among various various nitrogen containing fractions, fishes have very important amino acid called as "Taurine" which may be helpful for people with arteriosclerosis, edema, heart disease, hypertension and hypoglycemia. It is vital for proper utilization of Sodium, Potassium, Calcium and Magnesium, and it has a particular role in sparing Potassium loss from heart muscles. It helps to prevent from dangerous cardiac arrhythmias. It is also needed for digestion of fats, absorption of fat soluble vitamins and control of serum cholesterol level. Taurine has a protective effect on brain when the brain is dehydrated. It is also used to treat the anxiety, epilepsy and poor brain function and associated with Zinc for maintaining eye function. Beside these functions this is also helpful in treatment of breast cancer. Studies also showed that vitamin C and Taurine can reverse abnormal blood vessels response associated with cigarette smoking.

Vitamins and Minerals

The fish contains various amounts of vitamins and minerals. In general the fish is good source of vitamin B, A and D. The hepatic reserve of vitamin - A in aquatic animals are much greater compared to mammals and birds. Fish liver, eggs, milt and skin are good source of Vitamin-B1, riboflavin, pyridoxine, folic acid biotin and Vitamin B12.

Fishes are also good source of almost all minerals present in sea water. Fish meat is regarded as valuable source of calcium and phosphorus in particular but also of iron, copper and selenium. The total content of mineral in raw fish flesh and aquatic invertebrate is 0.6 to 1.5% of their wet weight.

Table 2: Mineral content of few common fishes (in mg %)

Si. No.	Common Name	Na	K	Ca	Fe	P
1	Catla	58.00	161.70	459.20	1.00	245.00
2	Rohu	56.32	216.26	87.30	2.38	100.60
3	Mrigal	69.50	170.50	352.10	1.10	283.20
4	Cat fish	86.48	136.42	64.30	1.42	156.30
5	Murrel	44.86	153.80	82.20	1.88	198.30
6	Pearl spot	126.90	296.70	315.30	1.80	251.00
7	Grey mullet	136.40	252.80	136.90	4.40	175.00
8	Anchovy	170.12	243.00	48.00	0.86	165.10
9	Mackerel	100.16	424.50	42.90	4.60	308.00
10	Ribbon fish	-	-	214.70	1.39	225.10
11	Oil sardine	88.12	196.22	68.30	1.24	118.10
12	Crab	186.80	378.80	68.00	10.20	150.00
13	Shrimp	209.00	382.00	32.30	5.30	268.00
14	Prawn	182.20	298.60	74.00	1.24	179.90

(FAO 2016b, Food Security and nutrition for all)

Carbohydrate

The carbohydrate content of finfish is insignificant, but certain shellfishes store some of their energy reserve as a glycogen, which contributes to characteristic sweet taste. Dietary supplementation of marine polysaccharides, chitin and chitosan derived from shellfish has been found to effective in treatment of atherosclerosis, epilepsy and ulcer. The mucopolysaccharides and chondroitin sulphates derived from shark are also useful in treatment of rheumatoid arthritis.

Conclusion

The above facts indicate that fish is a good source of almost all nutrients except carbohydrate and vitamin C. More over besides combating protein calorie malnutrition, supplementing diets with fish, have a very important role in eradicating long term nutritional problems including anemia, stunting, low birth weight and many others. In the present scenario many people of our country, particularly rurals, illiterate and backward populations are not much aware about the health benefits of eating fish. Therefore a mission mode approach is required involving the nutritionists and medical professionals, social welfare departments and NGOs to make these people aware about the contribution of fish in balancing the nutrients in their daily diets.

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