International Journal of Fisheries and Aquatic Research
ISSN: 2456-7248; Impact Factor: RJIF 5.44
Received: 19-07-2020; Accepted: 05-08-2020; Published: 19-08-2020
www.fishjournals.com
Volume 5; Issue 3; 2020; Page No. 47-49

Significance of fish nutrients for human health

Surya Prakash Mishra
Department of Zoology, Ganpat Sahai PG College, Sultanpur, Uttar Pradesh, India

Abstract
Fishes are good source of aquatic food. These are richboth in macro and micro nutrients, required for growth and better human health.Fish proteins haveimmunoglobulins that act as defense mechanism against viral and bacterial infections and prevent protein calorie malnutrition. The lipids of fishescontainLC n-3 PUFA like EPA and DHAthat not only maintains the blood pressure but also helpful in preventing the cardiovascular diseases. Iron helps in hemoglobin synthesis and prevents the occurrence of anemia. Selenium is important for the function of the thyroid gland.Calcium and vitamin D naturally present in fishes prevent the rickets, low bone-mineral density and osteomalacia to occur. Vitamin A helps to maintain the normal vision and normal immune system. In present review article, author tried to describe the importance ofnutrients present in fishes for human health in Indian prospective. Author also recommends for an awareness campaign about the health benefits of fish consumption.

Keywords: fish, human health, nutritional value

1. Introduction

Fishes are exclusively aquatic and cold blooded vertebrates with streamlined body and lateral line sense organs (Verma and Prakash, 2020) [14]. They occur both in marine and fresh water. Fishes are good sourcing of both macro (such as proteins, lipids, ash) andmicro nutrients (such as vitamins and minerals). The nutrients are essential for good health (Srivastava and Srivastava, 2008) [12]. and better life as they provide energy and involved in repair and regulation processes.

The moisture, protein, lipids, vitamins and minerals are important macro and micro nutrients that are responsible for implying nutritional value to the fish meat (Kumar *et al.*, 2020) [8]. Fish provides essential nutrients especially proteins of high biological values and fats, so it is often referred to as rich food for poor people (Sujatha *et al.*, 2013) [13]. Protein and fats are the major nutrients of fish which determine the nutritional value of fish. Fishes has excellent nutritive value, which provides high quality protein, fats, vitamins and minerals like magnesium and phosphorus (Ali *et al.*, 2020) [1]. Because of presence of both macro and micro nutrients in fish, it is better than other animal foods. Apart from being food source, fish also functions to prevent human being from variety of diseases in the world. The fish protein contains the essential amino acids which improve the overall nutritional quality of a mixed diet (Pawar and Sonawane, 2013) [11]. Only 140gm of fish can fulfill the 50-60% daily requirement of proteins in an adult human. Fishes are also rich in micronutrients which tend to be more easily available than those from plant food. In comparison to land living animals, fishes are rich sources of protein and have a high content of omega-3 long chain poly unsaturated fatty acids.

Early before the beginning of civilization, humans consumed fish in a variety of ways by making various dishes. Fish has better availability and affordability than other animal protein sources. Fishes are the cheapest source of animal protein. From health point of view, fish is useful for people as it provides proteins, fats, vitamins and minerals. From nutritional point of view the macro and micronutrients present in fish are acceptable for human consumption. Globally, the fish per capita consumption has increased from 14.4kg in the 1990s and has crossed 20.3kg in the 2016s. The annual per capita consumption of fish for the entire population is estimated at 5-6 kg whereas for the fish eating population, it is found to be 8-9 kg. This is not good about 50 percent of the global rates. However, the Indian Council of Medical Research recommends this is to be 12kg per annum. The aim of this study was to make aware the Indian population and provide information of nutrients present in fish and its benefits to human health. Different nutrients present in fishes have unique and very important function in the human health. It can also help people to understand the benefits of eating fish and also aware for importance of fish in preventing various diseases.

Biochemical composition of fish

Fish is known to have a lot of nutrients including macro and micro nutrients. The macronutrients are protein, lipid and a very little amount of carbohydrate. The micronutrients include vitamins and minerals which are important constituent as well. According to Balami *et al.* (2019) [2], various nutrients available in fish are as under:

Table 1

Moisture	65-80%
Protein	15-20%
Fat	5-20%
Ash	0.5-2%

1. Protein

About 60% of people from developing countries depend upon fish for over 30% of their animal protein supplies. The unit cost of production of fish as compared to other dietary protein source such as chicken, mutton, pork, beef, etc. is much cheaper. It is better than meat protein and although inferior to Milk and egg protein. The value of fish protein is very high

having a stable composition of essential amino acids, with slight deficiencies of methionine and threonine and an excess of lysine. The latter amino acid is lacking in cereals. Fish is low in calories as compared to other protein-rich foods such as meat poultry. As a low in calories and an amazing source of protein, fish helps to maintain a healthy weight (Pawar and Sonawane, 2013) [11]. The fish is a high quality source of protein as it contains almost all essential amino acids. Besides, the fish muscle is more digestible than other animal protein due to the presence of lower level connective tissue (Ventakaraman and Chezhian, 2015) [15].

2. Fats

Fats play an important role in hormone synthesis, circulation of vitamins and providing energy. The fats are rich in unsaturated fatty acids like MUFA (mono unsaturated fatty acid) and PUFA (poly unsaturated fatty acid) that provide essential fatty acids. Omega-3 fatty acids are found in foods such as fish and flaxseed and in dietary supplements, such as fish oil. The three main Omega-3 fatty acids are alpha-linotenic acid (ALA), eicosapentanoic acid (EPA) and docosahexaenoic acid (DHA). ALA is found mainly in plant oils such as flaxseed, soya bean and canola oils while DHA and EPA are found in fish and other seafood (Morales *et al*., 2015) [9].

ALA is an essential fatty acid, meaning that human body cannot synthesize it hence it is required to take with foods and beverages. The human body can convert some ALA into EPA and then to DHA, but only in very small amount. Therefore getting EPA and DHA from foods is the only practical way to increase levels of these Omega-3 fatty acids.

Omega-3s are important components of the membranes that surround each cell. DHA levels are especially high in retina (eye), brain and sperm cells. Omega-3s also provide calories and have many functions related with heart, blood vessels, lungs, immune system and endocrine organs.

3. Vitamins

The entire vitamins essential for human health is present in good amount in fish but amount may vary according to the fish species. Fish is a significant source of vitamin A and D and other vitamins of B-group. Many species of fishes store large amount of vitamin A and D in their liver. Vitamin A helps for normal growth, formation of bones and teeth, building of cells and it also prevent the problem of poor eyesight and helps in the treatment of many eye diseases (Pal *et al.*, 2018) [10]. In fishes, the vitamins are synthesized in the skin from 7-dehydrocholestrol when exposed to ultraviolet light. It has 3 times higher potential as compared to vitamin-D (ergocalciferol). Vitamin D deficiency leads to rickets, osteomalacia and a low bone mineral density (BMD) and increased cases of bone related disorder. It is also connected with diabetes (Holick, 2008a, 2008b) [5, 6]. Vitamin D deficiency causes osteopenia, osteoporosis and fractures in adults. Fish and fish oils contains vitamin D naturally (Holick and Chen, 2008) [7].

4. Minerals

Fish is an important source of minerals which are not widely available from other sources in the diets of poor people. In comparison to other minerals, Ca absorption is insufficient as only 25-30% of Ca is absorbed by human body. Besides, milk and milk products, fish and fish bones are good source of Ca. The Ca absorption from fish is comparable to that of skimmed milk. Ca is also important for bone density and plays a role in most of the metabolic processes. Fish is very rich in minerals such as iodine and selenium. The consumption of small indigenous species of fish as whole with heads and bones can be excellent source of many minerals such as iodine, selenium, zinc, iron, calcium, phosphorus and potassium. Selenium is toxic in large doses to humans but is important for humans which functions in the form of selenoproteins as a co-factor for reducing the antioxidant enzymes, such as glutathione peroxidase. This also helps for the proper functioning of thyroid gland. Low level of selenium can lead to myocardial infracts, increased risk of cancer and renal disease (Holben and Smith, 1999) [4]. Iron is an important component for synthesis of hemoglobin in R.B.Cs which helps to transport oxygen to all parts of the body. The deficiency of iron can cause anemia, impaired brain function and in infants it causes poor learning ability and improper behavior.

Conclusion

Nutrition is a fundamental pillar of human health. Fish is an important source of human nutrition. The nutrients vested in fishes play a vital role for better health of human beings and also prevent many diseases that are likely to occur. The nutrients like proteins, lipids, vitamins and minerals help in many ways to keep a human healthy. Dieticians recommended 30g fish or animal protein diet daily. The consumption of food fishes can help to reduce weight while retaining muscle mass and maintaining appetite also. Fish is also important for a healthy heart and promotes the development of brain and eyes. While considering fish as a food rich in nutrients, n-3 PUFA is a major constituted such as EPA and DHA (Bucher *et al.*, 2002) [3]. This makes a person healthy and prevents a lot of diseases like cardiovascular diseases. Demand of fish and fish products are growing day by day due to the fact that it consists of plentiful of essential nutrients for the health of people.

This, it can be concluded that fish is an important source of nutrients as it provides a good balance of proteins, lipids, vitamins and minerals with a very low calorific content. The nutritional value and health benefits of the fishes are unrecognized and undervalued. Author recommends launching a broad level awareness campaign to disseminate the people about the benefits of fishes.

References

1. Ali SSR, Abdhakir ES, Muthukkaruppan R, Sheriff MA, Ambasankar K. Nutrient Composition of Some Marine Edible Fish Species from Kasimedu Fish Landing Centre, Chennai (TN), India. International Journal of Biological Innovations. 2020; 2(2):165-173. https://doi.org/10.46505/IJBI.2020.2213
2. Balami S, Sharma A, Karn R. Significance of Nutritional value of fish for human health. Malaysian Journal of Halal Research. 2019; 2(2):32-34. DOI: 10.2478/mjhr-2019-0012
3. Bucher HC, Hengstler PSC, Meier G. Polyunsaturated fatty acids in coronary heart disease a meta-analysis of randomized controlled trials. American Journal of Medicine. 2002; 112:298-304.
4. Holben DH, Smith AM. The diverse role of selenium within seloproteins: A review. Journal of the American Dietetic Association. 1999; 99:836-843.
5. Holick MF. The vitamin D deficiency pandemic and consequence for nonskeletal health: Mechanisms of action. Molecular Aspects of Medicine. 2008; 29:361-368.

6. Holick MF. "Diabetes and the Vitamin D connection". Current Diabetes Reports. 2008; 8:393-398.
7. Holick MF, Chen TC. Vitamin D deficiency; a worldwide problem with health consequences. The American Journal of Clinical Nutritions. 2008; 871:1080-1086.
8. Kumar A, Bajpeyee AK, Yadav CB. Effects of Dietary vitamin-C on Biochemical and Morphometric parameters of Labeo rohita. International Journal of Biological Innovations. 2020; 2(2):174-177. https://doi.org/10.46505/IJBI.2020.2214
9. Morales M, Hogaldo F, Sevenich R. Fatty acids profile in canned tuna and sardine after retrosterilization and high-pressure thermal sterilization treatment. Journal of food and Nutrition Research. 2015; 54(2):171-178.
10. Pal J, Shukla BN, Maurya AK, Verma HO. A review on role of fish in human nutrition with special emphasis fatty acid. International Journal of Fisheries and Aquatic Studies. 2018; 6(2):427-430.
11. Pawar SM, Sonawane SR. Fish muscle protein highest source of energy. International Journal of Biodiversity and Conservation. 2013; 5(7):433-435. https://doi.org/ 10.5897/IJBC12.043.
12. Srivastava R, Srivastava N. Changes in nutritional value of fish Channa punctatusafter chronic exposure to zinc. J. Environ. Biol. 2008; 29(3):299-302.
13. Sujatha K, Joice AA, Senthilkumaar P. Total protein and lipid content in edible tissues of fishes from Kasimodu fish landing centre, Chennai, Tamil Nadu. European Journal of Experimental Biology. 2013; 3(5):252-257.
14. Verma AK, Prakash S. Status of Animal Phyla in different Kingdom Systems of Biological Classification. International Journal of Biological Innovations. 2020; 2(2):149-154. https://doi.org/10. 46505/IJBI.2020.2211
15. Venkatraman S Chezhian. Proximate composition of different fish species collected from Muthupet mangroves. International Journal of Fisheries and Aquatic Studies. 2015; 2(6):420-423.