

FISH IN HUMAN NUTRITION

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A healthy population is the greatest asset of a nation. People's health primarily depends upon the food available to them. Availability of good quality food to all in sufficient quantity has to be considered as an essential part of social justice. The quality of a food does not depend on its taste, colour or external appearance alone. It should also contain carbohydrates, proteins, fats, minerals, vitamins, etc. in the right proportion. These nutrients are essential for physical and mental development. Diet of our people is often not balanced. Protein deficiency is a main drawback in the diet of majority of our people. It is in this context that we have to realise the importance of including enough fish in our diet. Proper utilization of our available fishery resources will certainly help to solve this problem to a considerable extent.

Fish is a nutritious food. It is easily digested and assimilated. The proximate composition of the edible part of fish, in general, can be stated as follows:

Moisture	:	67 - 90%
Protein	:	10 - 20%
Fat	:	0.4 - 20%
Minerals	:	0.5 - 2%

Protein

Proteins are the building units of cells. Deficiency of quality protein in the diet will adversely affect the growth and development. Proteins are made up of amino acids. Proteins containing all the essential amino acids in the required proportion have high nutritional value. Vegetable proteins in general are found to be inferior in quality compared to animal proteins. They are in general deficient in essential amino acids.

Fish proteins contain all the essential amino acids in the required proportion and for the same reasons, it has a

high nutritional value. It is easily digestible due to its peculiar structure. Since it is more easily digested than vegetable or other animal proteins, its nutritional availability is correspondingly higher. It is perhaps the cheapest source of quality protein and useful in reducing protein malnutrition which is prevalent especially among the weaker sections of the society.

Fats and Oils

Among nutrients, fish lipids, with their unique composition, merit special mention. Generally, fat content is low in fish. Whereas vegetable and other animal lipids are generally saturated in nature, fish oils are not so. Instead, they are rich in polyunsaturated fatty acids (PUFA) like EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid). Exhaustive studies have been made on the special properties of these PUFA. The ability of PUFA to lower the serum lipid and serum cholesterol levels and to increase the rate of blood circulation has been proved beyond doubt. PUFA concentrates, especially those containing high amounts of EPA and DHA, can be used as a medicine to control cardiac diseases. (eg. MaxEPA, EPA CAP). Incorporation of high amounts of fish in daily diet is found to decrease serum cholesterol level markedly. It is seen that EPA can control the aggregation of blood platelets to some extent. Thus, fish lipids control cardiac diseases caused by cholesterol deposition in arteries and thrombosis.

The studies conducted on Alaskan Eskimos have brought to light these peculiarities of fish oils. The survey conducted for a period of about 15 years on the life style of Greenland Eskimos revealed that there were only two or three deaths due to cardiac arrest during that period. Eskimos survive mostly on fish. It was seen that they had a long bleeding time of approximately 7 to 8 minutes. This bleeding time was found to be reduced to half when they were brought to Denmark and put on typical Danish diets. It was clear from this experiment that the Eskimos had been consuming some materials that help to prevent clotting of blood. Later studies showed that certain prostaglandins produced from the n-3 polyunsaturated fatty acids from fish oils were responsible for this beneficial effect. Since then, nutrition scientists have been suggesting fish oils as an effective remedy for cardiac diseases. Relatively lower incidence of cardiological problems among our coastal population eating fish can also be attributed to these properties of

fish lipids. However more research work is necessary on this topic to know more about this.

Minerals

Fish is a food rich in minerals. It contains good amounts of calcium, phosphorus, copper and iron. Some fish contain 12 mg/100 g of iron. As is well known, iron is an integral part of blood. The red meat of tuna is rich in iron. The studies conducted by CIFT recently revealed that the incorporation of fish in diet can control anaemia occurring among pregnant women and children. Iodine and fluorine in fish prevent goitre and dental deterioration respectively. Due to the availability of iodine from fish, goitre, common in hilly regions, is absent among coastal populations eating fish.

Vitamins

Vitamins are essential for body functions. Fat soluble vitamins A, D and E are abundant in fish oils. Shark liver oil contains 50000-100000 IU vitamin A. Water soluble vitamins of B complex are also found in fish. Tuna contains large quantity of vitamin B and sardine contains large quantity of vitamin B12. Fish is thus good for the prevention of most of the diseases caused by vitamin deficiency.

Fish contains only small amounts of carbohydrate. But this need not be considered as a defect as carbohydrate can be obtained from cereals and tubers which are taken along with fish.

It has been suggested that the very low incidence of cancer among Eskimos can also be attributed to their consumption of large quantities of fish in their diet.

Studies have been conducted at CIFT on the nutritive value of fish proteins and lipids. These studies revealed that all the fish available along our coast are highly nutritious. In this context we have to remember that the nutritional value of a fish does not depend upon its appearance or taste. Low value fish are in no way inferior to quality table fish in nutrient value. CIFT has prepared a database containing details about the nutritional value of almost all fish available along our coast. This will help in formulating special diets.