

FISH IN NUTRITION AND ECONOMY

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INTRODUCTION

All life on earth is nourished by the basic products of interaction between solar radiation, carbondioxide, chlorophyll, trace elements and water. This transmutation produces carbohydrates, proteins, vitamins, oils and other things composing living matter. Only plants contain chlorophyll in sufficient quantity through which solar energy can be bound with chemicals to create living matter. The great range of animal life including our own depends on these plants.

Our food must contain carbohydrates, fats, proteins, vitamins and minerals in required quantities for balanced growth. Of these, proteins form the basis of life i.e. they are essentially required for growth and maintenance of health.

Population and Protein Demand

The present world population is about 4 billions. Taking the individual protein requirement per day as 70 gm the total

population requires about 102 million tonnes of protein annually. The present protein production is far less than what is required. There is acute shortage of food in the world as a whole leading to large nutritional inadequacies. In the less developed areas of Asia and Africa widespread malnutrition is very common. In many of these areas the level of animal protein intake is only 1/5th of that in the more developed areas. It is reported that in India about 79% of the population is suffering from malnutrition and protein deficiency. India ranks second in the world in population, but 7th in respect of land area. With 2.4% of the total land area of the world our country has to feed 15% of the world's population. Every year about 21 million babies are born and the net annual addition to the existing population is about 13 million.

Protein malnutrition is an important cause of infant and child mortality, stunted physical growth, low work output, premature ageing and reduced life span in the

developing countries. A close relationship between malnutrition and mental retardation has been reported.

To solve the problem of protein deficiency all the available food sources should be explored, exploited and distributed in a proper way. Fish is one of such important food sources. As fish contains proteins of superior nutritional properties it is placed in the important category of foods. Moreover fish is a comparatively cheaper protein food which common man can afford.

Distribution of protein

The protein composition is about 67% of plant origin, 24% of meat and milk origin, 4% of poultry and egg origin and 5% of fish origin.

Nutritional aspects of fish

Protein is constituted by several amino-acids. The primary function of dietary protein is to provide amino acids for the synthesis of tissue proteins during growth, for the maintenance of cellular nitrogenous constituents and for other metabolic needs. So the nutritive value of fish depends on the amino acid make-up of the protein present in the fish. Out of 19 amino acids commonly occurring in food proteins, ten are supposed to be essential amino acids. They are isoleucine, leucine, lysine, methionine, cystine, phenyl alanine, tyrosine, threonine, valine and tryptophane. These

amino acids should be provided by the dietary proteins. The remaining amino acids can be synthesised in the body.

Theoretically man can survive healthily on plant proteins alone, since plants contain all the essential amino acids. Practically this is not the case. Cereal grains and other seeds are the main source of man's food energy. These are short of lysine and the sulphur containing amino acids that man needs in his diet for energetic health. The essential amino acids are in right proportion in foods of animal origin viz., meat, milk and fish. Among these the protein content is maximum in fish which contains 30-90% of dry solids (with an average 60%) as against 35% in milk and 50% in eggs. Apart from its high protein content the fish is also rich in vitamins and minerals. The much needed vitamins A and D and vitamin B complex are found in fishes in appreciable amounts. Fish oils are the richest known source of vitamin A and D. Fish forms one of the best sources of minerals such as calcium, phosphorous, iron, sodium and iodine. Fish is also a good source of trace elements which are essential for normal tissue metabolism and for maintenance of health. Carbohydrate is practically nil in fish. Fish fat is rich in poly-unsaturated fatty acids which help in keeping down the cholesterol level in blood. It is reported that consumption of 100 gm. of fish per day would meet about 25% of our requirement of protein,

10% of fats, half of vitamins and most of the minerals. The high degree of digestibility is a special advantage of fish. Thus fish is a potential agent for combating malnutrition.

Development of fisheries

Fishing is supposed to be the earliest form of hunting. It is the oldest industry but has been least popular till recently. Fish is the most underutilised conventional food source accounting for only 1 to 2% of the world's total food consumption. This limited use of fish has been due to the religious and social beliefs coupled with lack of knowledge and facilities for its proper exploitation and preservation. During the last two decades there was substantial improvement in fishing in almost all the fishing nations in the world leading to a total fish catch of 65.7 million tons in 1973. Japan, U. S. S. R., China, Norway, U. S. A., Peru and India are in the front line in the field of fish production. The contribution of leading countries to the total fish production is given in the following table :

Japan	:	10.70	million tons
U. S. S. R.	:	8.62	" "
China	:	7.87	" "
Norway	:	2.98	" "
U. S. A.	:	2.67	" "
Peru	:	2.30	" "
India	:	1.90	" "
Thailand	:	1.69	" "
Rep. of Korea	:	1.65	" "
Spain	:	1.57	" "
Denmark	:	1.47	" "
U. K.	:	1.44	" "

April, 1976

The effort in fishing should increase further because most of the ocean waters are still supposed to be underexploited. The present catch rates from Atlantic, Pacific and Indian Oceans are 0.17, 0.14 and 0.03 tons per sq. K.M. respectively. Expert opinion is that these figures can be raised considerably.

Fishery Development in India

India with a coast line of 5000 K.M. accounts for 40% of the total fish production from Indian Ocean bordered by 36 countries. The present total fish catch from Indian Ocean is only about 3 million tons even though the estimated annual output is about 14 million tons. About 1.9 million tons of fish (marine = 1.2 million tons, inland = 0.7 million tons) is landed annually in India. Compared to the potentialities of India the present catch is very low. Exploitation of off-shore and deep sea waters can add substantially to the existing fish catch. Fish farming is another important source of fish production. Even though about 9.02 million hectares of brackish water and 1.6 million hectares of fresh water areas are available in India only 0.6 million hectares are utilised for fish farming at present. Catch from this exploited area itself is low compared to the production per unit area in many other countries. Catch per unit area can be improved by adopting scientific method of fish culture.

About 66% of the marine catch of India is landed in the west coast and 34% in the east coast. The following table shows the marine fish production of India:

Marine Fish Production of India
(in tonnes)

State	Oil sardine	Maackerel	Prawns	Other varieties	Total
1. W. Bengal and Orissa	8	254	2933	21884	25079
2. Andhra	689	1676	8378	147012	157755
3. Tamil Nadu	—	3185	5436	153202	161823
4. Pondicherry	—	516	48	5408	5972
5. Kerala	104168	12118	63423	273368	453077
6. Karnataka	23727	10004	2960	22984	59675
7. Maharashtra	1068	2651	62501	121292	187512
8. Gujarat	—	—	2764	103027	105791
9. Other state	1395	489	971	4050	6905
Total :	131055	30893	149414	852227	1163589

The average growth of fish catch in our country is 4.6% while the world average is 6.5%. For a country like India with a large population and acute shortage of food and animal protein the marine catch should be increased considerably. This can be done by improving the technical efficiency of harvesting the known stocks, locating and defining new stock and developing new end-products from presently unutilised species and opening up new field of aqua-culture.

Disposition of catch

In India about 70% of the total fish catch is consumed fresh, 12% sundried, 9% salted, 5% frozen and canned and 4% converted into fish meal.

Export of marine products

In 1973, India exported about 49,000 tons of processed marine products valued at Rs. 80 crores. However the corresponding figures for 1974 were 47,000 tons and 77 crores. Except in 1974 the export growth was continuous. The annual growth rate in export from India is 15% while the world average is 8.2%. Marine products rank very high in the list of India's export earners.

Diversification of marine products

About 75% of the total quantity of marine products exported from India is constituted by prawns which in turn constitute only less than 9% of our marine catch. Production and marketing of

conventional and diversified products from other species of fish and shell fish such as sardine, mackerel, bombay duck, tuna, miscellaneous varieties of fish, crabs, clams, mussels, etc. is essential for the healthy growth of the fishing and fish processing industry in our country. New and improved processing methods have been developed at the Central Institute of Fisheries Technology, Cochin for the production of various items mentioned above. Many of these products are likely to have demand in international markets also.

Socio-economic status of fishermen

It is reported that about 70% of the present marine catch is brought to shore in about one ~~million~~^{lakh} non-mechanised indigenous fishing vessels operated by poor fishermen. The fishermen population is scattered in ^{about} 18,000 fishing villages. Eventhough the contribution of this community to the gross income of the nation is substantial their socio-economic condition is still poor and therefore has to be improved.

