

# FISH: A NUTRITIOUS FOOD

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Fish is a highly nutritious food containing many essential nutrients with high bioavailability. Known as “rich food for poor people,” it provides high quality proteins, fats, minerals, and vitamins. It provides source of income to millions of people along with much required nutrients. According to Food and Agriculture Organization of the United Nations, almost 100 crore people are not having access to enough nutritious food and are malnourished particularly with micro-nutrients like iron, zinc and vitamin A and nutritional security is yet to be achieved. As a result, stunted growth, poor learning abilities, nutritional blindness, and increased morbidity and mortality rates are common in these malnourished people. With its quality nutrients, fish occupies a significant place in non-vegetarian diet particularly in rice-based diets of India. More than 320 crore people get one fifth of their per capita intake of animal protein from fish. Globally, fish production was 184.6 million tonnes in 2022 and per capita fish consumption is 20.9 kg in the 2019. As per the American Heart Association, fish should be eaten at least twice a week.



## NUTRIENT COMPOSITION & HEALTH EFFECTS

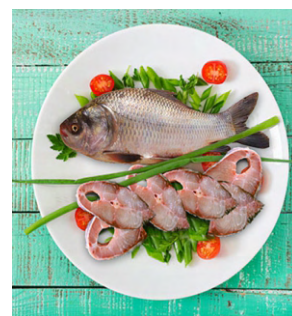
Nutritional composition of fish is influenced by variety, species, and physiological state of fish, e.g., size, age, sexual maturity, along with various genetic, nutritional and environmental factors like oxygen concentration, photoperiod, temperature, or pH. The nutrient composition of fish is mentioned in Table 1 as such basis. Fish usually contains 65-80% moisture, 15-20% protein, 5-20% fat, 0.5-2% ash and a very little amount of carbohydrates on live weight basis.

	Energy (Kcal)	Protein (g)	Fat (g)	Carbohydrate (mg)	Ca (mg)	P (mg)	Iron	Nacin (mg)
Rohu	97	16.6	1.4	4.4	650	175	1.0	0.7
Catla	111	19.5	2.4	2.9	530	235	0.9	0.8
Mrigal	93	18.9	1.7	0.5	429	305	4.5	
Prawn	89	19.1	1.0	0.8	323	278	5.3	4.8
Cat fish	86	21.4	-	-	10	230	-	2.5
Pomfret	87	17.0	1.3	-	200	290	0.9	2.6
Tilapia	96	20.08	1.7	-	10	170	0.56	3.9

## PROTEIN

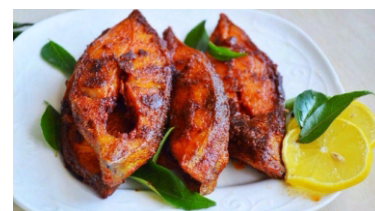
Fish is having high-quality protein (85-95% digestibility) which are more easily available than other proteins due to the presence of lower level of connective tissue. They contain all the eight essential amino acids including sulphur-containing amino acids (lysine, cysteine, and methionine) that improve the nutritional quality of any diet. An adult human being can get its daily protein requirement from about 250 g of fish. Production cost of fish and net carbon emissions is less than other dietary protein sources. Fish provides a greater satiety effect than others. In addition to building and repairing of tissues (growth, development & maintenance), producing enzymes and hormones it is required for many body processes, improving immunity and balancing body regulatory factors.

Immunoglobins act as a means of defence against many bacterial and viral infections. Proteins help to prevent protein calorie malnutrition. Amino acid taurine is responsible for reduction of cardiovascular risks in human being.



## FATS

Fat is the most variable nutrient in fish (0.2-25%). Polyunsaturated fatty acids (PUFAs) like docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) (omega 3 fatty acids) are components of fish fats. These are essential for proper growth, optimal brain, eyes, and neuro-development of children, and keep heart and brain healthy. In pregnant women, they help in proper brain development among unborn babies, and proper delivery. They decrease platelet aggregation, reduce the risk of myocardial infarction and coronary heart disease. The fat also contributes to energy supplies and assists in the proper absorption of fat-soluble vitamins namely A, D, E, and K. PUFAs help to maintain a healthy heart by lowering blood pressure and plasma triacylglycerol levels along with reduction of the risk of strokes, abnormal heart



rhythms, sudden death, and heart attack. They also help in reducing the risk of Alzheimer's disease, diabetes, depression, cancer, and dementia. They have anti-inflammatory effects and reduce the risk of arthritis. They are essential parts in the brain, nervous tissue, cardiovascular system, and cell membranes. They play a vital role in membrane mediated process such as osmoregulation, nutrient assimilation and transport.

## VITAMINS

Fish is rich in vitamins such as vitamin A, D, thiamin, riboflavin and niacin. Certain fish species, particularly those consumed whole with the head and viscera are known to be rich in vitamin A. Vitamin A and D in fish help in normal vision, building of cells, normal growth, immune function, formation of bones and teeth. Calcium and vitamin D are naturally present in fish which prevent rickets, low bone-mineral density, osteoporosis and osteomalacia. Vitamin D present in fish liver and oils is crucial for bone growth since it is essential for the absorption and metabolism of calcium. Thiamin, niacin, and riboflavin are important for energy metabolism.



## MINERALS

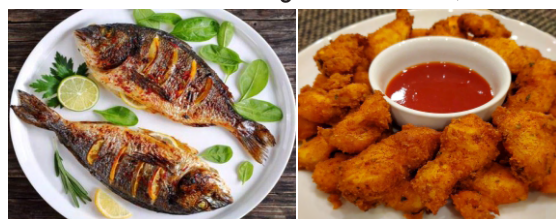
Fish is an excellent or good source of minerals such as calcium, phosphorus, iron, zinc, iodine, magnesium, selenium, and potassium. These are easily absorbed by the body. Fish and fish bones are a good source of Ca and the calcium absorption from fish is comparable to that of skimmed milk. Calcium is required for strong bones and for the normal functioning of muscles and the nervous system. It is also important in the blood clotting. Calcium ions play role in most of the metabolic process. Iron is present in high amount in gills, liver, kidneys, and spleen. Iron is important in the synthesis of hemoglobin in red blood cells which transports oxygen to all parts of the body. Deficiency of iron causes anemia, impaired brain function and loss of productivity in adults. In pregnant women, iron deficiency may increase the risk of maternal death and during young childhood it affects the brain development and learning ability.



Phosphorus as a part of adenosine tri-phosphate and zinc as a co-factor of enzymes are essential for nearly all the metabolic processes in our body. Zinc plays a significant role in the proper functioning of the immune system and for a healthy skin besides our growth and development. Selenium acts as an antioxidant along with vitamin E, which are required for thyroid hormone secretion and stimulates functioning of the immune system.

## NUTRITIOUS FOOD

Usually, fish based culinary items are easy to cook and a large variety of items can be prepared. The cooked products are very soft and easily digested than other animal products. It can also be used in fresh, dried or powder form. However, whole fish consumption is more beneficial than only the fish meat as the combination of all the nutrients exert the health beneficial effects. In this regard, small fish are better suited as they are often consumed as whole. Small fish are rich in micro-nutrients like iodine, selenium, zinc, iron, calcium, phosphorus, and potassium, but as they are concentrated in the heads, gut, and bones, they must be eaten whole to get the full nutritional benefit.



## CONCLUSION

Fish is one of the cheapest, low-fat, and highly bioavailable protein sources for all strata of people. The omega-3 fatty acids, selenium, calcium, iron, zinc, vitamin A, vitamin D and B complex vitamins have health-promoting effects. Consumption of whole fish should be encouraged to ensure nutritional security mostly among the women, elderly people, and children.

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