

Mineral Content of Some Marine Fishes

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Minerals and trace elements are the constituents of biological bodies or they interact with enzymes present in the body which govern the majority of chemical reactions involved in the building of life processes. The major role of zinc is enzymatic and over seventy metallo-enzymes that are known, require zinc for their functions⁽¹⁾. Besides growth retardation, the most prominent signs of zinc deficiency are loss of appetite, skin changes, impaired wound healing and taste acuity.⁽²⁾ Iron is the most vital component of haemoglobin. The important role of haemoglobin is to transport oxygen. Deficiency of iron leads to fatigue, weakness, lack of appetite and pallor.⁽³⁾ The body contains more calcium than any other mineral. The amount of calcium outside the skeletal tissue is very little, but it regulates heart beat, nerve transmission, muscle contraction and blood coagulation. Calcium helps in controlling blood acid-base balance, plays a role in cell division, muscle growth and iron utilization, activates certain enzymes and helps transport nutrients through cell membrane. Muscle spasm can be triggered by calcium deficiency⁽⁴⁾. Magnesium is closely related to calcium and phosphorus in body function. Next to potassium, magnesium is the predominant cation in cells. It activates certain enzymes specially those related to

carbohydrate metabolism. It maintains the electrical potential across nerve and muscle membrane. Magnesium is also involved in protein synthesis and DNA production, and function in the storage and release of energy in ATP. Deficiency symptoms may include loss of appetite, irritability, insomnia, cardiovascular changes etc⁽⁵⁾. Potassium is the principal cation of fluid inside the cell while sodium is the cation outside the cell. Excess sodium retention increases the fluid volume (edema) and low sodium leads to less fluid and dehydration⁽⁶⁾. In view of importance of the above mentioned minerals, it is necessary to know mineral values of different foodstuffs for dietary suggestion of the local population. Previously, we reported mineral content of locally available sweet-water fishes⁽⁷⁾. The present study was undertaken to know zinc, iron, calcium, magnesium, sodium and potassium content of some fishes of Bay of Bengal (marine fishes).

Fresh marine fishes were purchased from local market of Cox's Bazar and carried to the Institute of Nutrition and Food Science in a ice-box. Edible portions of each fish were mixed together and grinded in a hand grinder. Moisture was determined by drying about 5g sample in triplicate in an oven at 100-105° C. Duplicate 5g aliquots of samples were placed in Kjeldahl flask and

wet ashed according to the method of Davies and Hillary.⁽⁸⁾ Zinc, iron, calcium, magnesium, sodium and potassium were determined by atomic absorption spectrophotometer (Pye Unicam fitted with a single element hollow cathod lamp, a three slit lumen head and air acetylene flame system). After proper dilution with demineralized water, the sample was directly aspirated into the flame⁽⁹⁾. Standards obtained from Sigma Chemicals and were run simultaneously. The glass wares that used for analytical purpose were metal free.

Table 1 shows that moisture contained of the marine fishes varied from 76.2g in bata to 80.1g/100g edible portion (EP) in echuyri. The highest amount of iron was found in chingri (2.22 mg) and the lowest in echuyri (0.85mg). Chingri also contained highest amount of zinc (2.25mg). We previously found similar amount of iron in some sweet-water fishes like hilsa (2.24 mg), shole (2.0mg) and punti (1.98 mg). Punti also rich in zinc (2.48 mg)⁽⁷⁾. The amount of calcium was highest in olua

(376.5 mg) followed by chingri (357.2mg), chapila (304.1 mg). Echuyri has the lowest amount of calcium (89.0mg). Similar trend was also observed in case of magnesium and sodium contents of fishes studied previously. However, the amount of potassium was found highest in echuyri (260.6mg). Among the fishes studied, chapila contained lowest amount of potassium (180.0mg). Marine fishes seem to be rich in calcium. Previously, we found that calcium contents of most of the sweet-water fishes varied between 4.4mg (pangas) to 40.0mg/100g (tengra). Out of 19 different species, only koi contains 233 mg calcium / 100g. On average, the amount of magnesium found in different sweet-water fishes was 25mg/100g. The amount of sodium in marine fishes was 4 to 5 times higher than those observed in sweet-water fishes. On the other hand, on average marine fishes contained slightly lower amount of potassium as compared to the amount observed in sweet -water fishes⁽⁷⁾.

Table 1 : Moisture, Iron and Zinc Content of Some Marine Fishes

Name of Fishes		Moisture (g/100g) EP	Iron (mg/100g) EP	Zinc (mg/100g) EP
Common	Scientific			
Bata	<i>Cirrhina reha</i> (Hamilton)	76.2	1.31	0.94
Chingri	<i>Penacus indicus</i>	79.4	2.22	2.25
Chapila	<i>Gadusia chapra</i>	78.0	2.06	1.84
Echuyri	<i>Trichiurus haumela</i>	80.1	0.85	1.23
Poa	<i>Pama pama</i> (Hamilton Buchanan)	78.4	1.96	0.74
Olua	<i>Colla dussumieri</i>	79.2	2.00	1.25

* EP = Edible portion

Table 2 : Calcium, Magnesium, Sodium and Potassium Content of Some Marine Fishes.

Name of Fishes		Calcium (mg/100g)	Magnesium (mg/100g)	Sodium (mg/100g)	Potassium (mg/100g)
Common	Scientific	EP	EP	EP	EP
Bata	<i>Cirrhina reha</i> (Hamilton)	122.2	32.9	305.1	200.6
Chingri	<i>Penacus indicus</i>	357.2	40.7	340.2	240.0
Chapila	<i>Gadusia chapra</i>	304.1	36.9	265.1	180.0
Echuyri	<i>Trichiurus haumela</i>	89.0	31.2	155.7	260.6
Poa	<i>Pama pama</i> (Hamilton Buchanan)	290.0	35.7	232.2	235.4
Olua	<i>Colla dussumieri</i>	376.5	38.1	346.4	195.8

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