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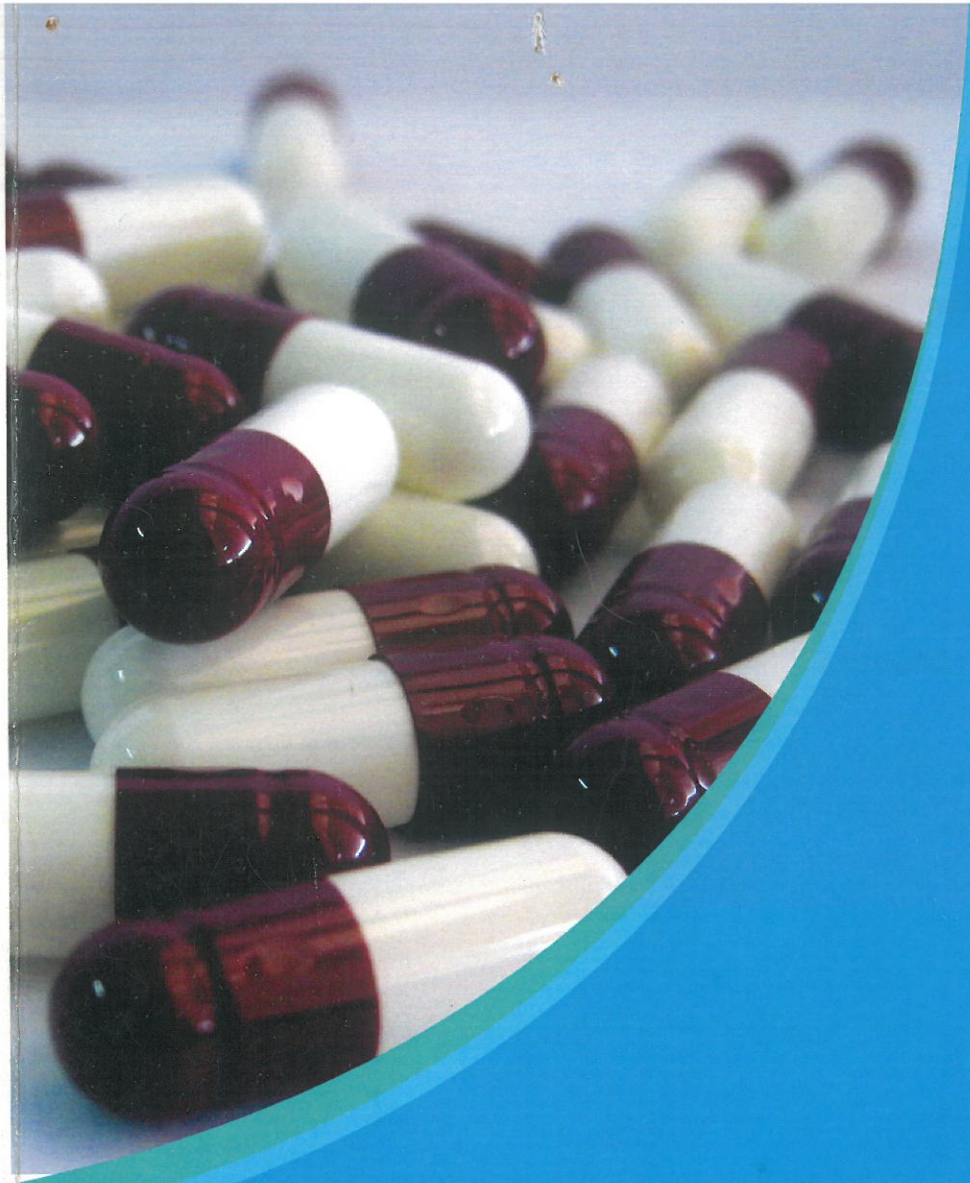


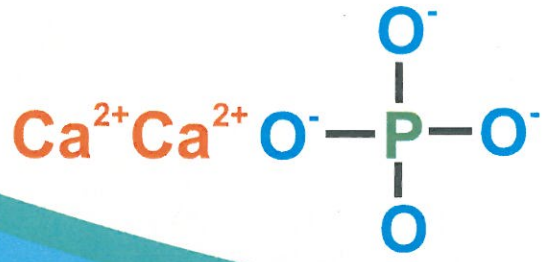
FISH CALCIUM

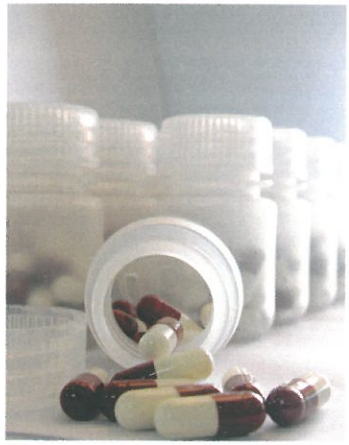
CAPSULES

Industrial processing of fish and shell fish results in the accumulation of skin, scales, viscera, bone and bone frames (in case of surimi production). The fish processing by-products and waste are found to be rich in proteins, lipids, chitin, collagen, minerals, and vitamins. Fish waste is potential raw material for high-value products having industrial and pharmaceutical applications.

Calcium, the most abundant mineral in the human body, has several important functions. More than 99% of total body calcium is stored in the bones and teeth where it functions to support their structure. The remaining 1% is found throughout the body in blood, muscle, and the fluid between cells. Calcium is directly involved in the development and maintenance of the skeletal system and participates in several physiological processes. In addition to its structural functions, calcium plays an important role in muscle contraction, blood clot formation, nerve impulse transmission, the maintenance of cell integrity and acid-base equilibrium, and activation of several important enzymes. Although most people are aware that calcium is an important element in their bodies, calcium is severely deficient in most diets. When calcium intake is low or calcium is poorly absorbed, bone breakdown occurs because the body must use the calcium stored in bones to maintain normal biological functions such as nerve and muscle function. In general, the basic source of calcium is the diet.

Calcium levels are tightly controlled by a complex interaction of hormones and vitamins. Dietary requirements vary throughout life and are greatest during periods of growth and pregnancy. Generally, calcium is obtained from the diet and it is severely deficient in most of regular diets. Therefore, to improve calcium intake, several calcium-fortified products are in the market and demand for these products is growing continuously.





The major source of calcium is the diet, and the most common and trusted source of calcium is milk or other dairy products. Wheat and maize are very poor sources of calcium. Most of the calcium provided by cereal foods comes from the calcium containing ingredients that are added to bread and biscuits as functional ingredients, such as calcium propionate and calcium phosphates.

It is well documented that consumption of small fish is nutritionally beneficial providing with a rich source of calcium. Calcium in fish could be absorbed to the body as tested in vivo. Fish bone, which was separated after removal of muscle from the frame, is a valuable source of calcium as "Dicalcium phosphate," which has the ideal calcium phosphorus ratio 2:1. The organic component of fish bone, which accounts for 30% of the material, is mainly collagen.

Recommended Calcium Intake for Different Age Groups

0-6 months	200 mg/day
7-12 months	260 mg/day
1-3 years	700 mg/day
4-8 years	1000 mg/day
9-18 years	1300 mg/day
19-50 years (female)	1000 mg/day
19-70 years (male)	1000 mg/day
Over 50 years (female)	1200 mg/day
Over 70 years (male)	1200 mg/day

Central Institute of Fisheries Technology, Cochin has optimized the process to extract calcium from bone which is mainly treated as processing discard during filleting operation of large fishes viz., tuna, carps etc. Before packing the material was powdered and supplemented with vitamin D for enhancing the absorption and bioavailability. In vivo studies conducted at CIFT in albino rats have shown that fish calcium powder supplemented with vitamin D has improved the absorption and bioavailability. Since calcium supplementation in diet is having high significance especially for women and aged, this product from fish bone is a viable and affordable option for dietary calcium supplementation. The product is packed in 400mg capsules containing 200mg calcium per capsule.