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Global Aquaculture Advocate ™

Intelligence

Salmon + selenium = 1 healthy serving

Wednesday, 1 February 2006

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Selenium produces cytokines, which hep stimulate and guide immune responses

Regular consumption of selenium-rich salmon yields a host of health benefits. Photo courtesy of Red Lobster.

On the list of things considered good for us to eat, salmon ranks quite high. It is an excellent source of high-quality, low-fat protein, as well as various vitamins and minerals, including niacin and calcium. Most people know that salmon is an outstanding source of essential omega-3 fatty acids, a fact which has received a great deal of publicity and research in recent years.

While the importance of this attribute cannot be overstated, other nutrients in salmon are also worthy of notice and vital to human nutrition and health. One such nutrient is selenium.

Essential element

Selenium is a trace mineral element found in soil, water, and certain foods. It is an essential element in the nutrition of many animals, including humans, in whom it is required for the function of several vital enzymes known as selenoproteins.

In humans, selenoproteins are needed throughout life to ensure normal growth, development, and maintenance of overall function. Selenium and the enzymes into which it is incorporated are crucial in several key metabolic processes. They are also crucial in immune system function and antioxidant defense systems. As a consequence, selenium has wide-reaching effects on the human body.

Important selenium interactions

Most of the thyroid hormone released by the human thyroid gland circulates in the bloodstream in an inactive form. Selenoproteins are among the enzymes required for thyroid hormone activation. The activated hormone is critical in balancing overall metabolic rate and producing normal growth and development.

Selenium-dependent enzymes also interact with other antioxidant nutrients, such as vitamin C, vitamin E, and the omega-3 fatty acids EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) to enhance antioxidant activity in several metabolic pathways. Research is ongoing to determine the full effects of these interactions, but it is known that sufficient antioxidant levels are necessary to prevent the oxidative cellular damage that occurs naturally with aging and may be accelerated by such stressors as infection and inflammation.

Adequate antioxidant activity can help prevent hardening of the arteries and heart disease, and limit inflammatory conditions such as rheumatoid arthritis. Chronic and acute infections, cancers, and other conditions may also be improved by the action of selenium-dependent antioxidants.

The function of selenium in the immune system appears to relate to its role in the production of cell-signaling molecules called cytokines, which help stimulate and guide immune responses to infection and inflammation. Selenium-deficient individuals are more prone to infection, but dietary selenium supplementation enhances certain immunologic responses.

Therefore, adequate selenium intake is needed for normal human functioning. Isolated selenium deficiency is rare, occurring only in areas of the world such as northern China with both low soil selenium levels and limited seafood access. Individuals with intestinal absorption problems or who undergo long-term intravenous feedings can also experience selenium deficiency.

Dietary or supplemented selenium may have a role in preventing or treating many illnesses, and extensive research is currently under way along these lines. Potential areas of benefit include the prevention or treatment of cancers, heart and other cardiovascular diseases, human immunodeficiency virus and other infections, asthma, burns, cataracts, rheumatoid arthritis, osteoarthritis, and other conditions.

Selenium sources

Selenium can be found in many foods, but the richest sources are Brazil nuts grown in selenium-rich soils, organ meats, seafood, and muscle meats. The selenium content of plant foods is dependent on the concentration of selenium in the soils in which they are grown.

Seafoods with particularly high levels of selenium are salmon, halibut, crab, shrimp, red snapper, and swordfish. Levels vary somewhat in farm-raised salmon, depending on the selenium content of their feed and the water in which they are grown, but generally are remarkable. Ongoing research into supplementation with trace nutrients like selenium in fish feeds appears to show significant nutritional benefits to both the fish and their eventual consumers.

Salmon typically contain 25 to 50 micrograms (mcg) of selenium per 100-gram serving, averaging about 40 mcg per 85-gram (3-oz) portion. The current U.S. recommended dietary allowance for daily selenium intake is 55 mcg for adult women and 70 mcg for men. The average American diet contains around 100 mcg per day, depending upon the amount of seafood consumed and the selenium content of the soil in which plant foods were grown.

In other parts of the world, especially those with low-selenium soils, dietary selenium may not be so readily available. However, just a small amount of salmon readily provides the recommended amount of selenium.

Supplementation effects

Supplementation beyond the recommended allowances continues to be studied, and may have a role in disease prevention, especially for certain cancers, and heart and vascular problems. Preliminary studies in men have shown remarkable effects from selenium supplementation at 200 mcg per day in the prevention of prostate cancer.

As with many nutrients, more may be better, but only up to a point. Toxicity from excess selenium can occur. The recommended daily upper limit is 400 mcg, but studies have demonstrated that daily consumption of 200 mcg appears safe.

(Editor's Note: This article was originally published in the February 2006 print edition of the Global Aquaculture Advocate*.)*

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