

## Taurine: Amino Acid in Seafood Contributing To Reduced Cardiovascular Risk

### Edel O. Elvevoll, Ph.D.

Professor of Food Science  
Norwegian College of Fishery Science  
Institute of Marine Biotechnology  
University of Tromsø  
Breivika, N-9037 Tromsø, Norway

#### Summary:

Study results have indicated reduced cardiovascular risk through consumption of taurine in the diet. Taurine can protect against oxidative stress, neurodegenerative diseases and atherosclerosis; lower blood pressure; reduce blood cholesterol values and improve cardiac performance. Taurine levels in the flesh of many farmed fish can be controlled through feed supplements, with beneficial effects reflected in the final product.

Scientific and technological developments in the field of food have led to a marked shift in how consumers deal with food and health. There is growing awareness among consumers that the dietary source and form of food can affect their overall health. In this context, the many positive nutritional aspects of seafood make it unique.

These aspects include its low saturated fatty acid content, high n-3 fatty acid content, high-quality protein and balanced amino acid profile containing all the essential amino acids. Seafood also contains vitamins D, A and B<sub>12</sub>; the minerals iodine and selenium, and other bioactive substances; as well as peptides and amino acids.

One of the amino acids that possess effects beyond the provision of basic nutrients is taurine.

#### Beneficial Effects

The beneficial effects of dietary taurine have been observed in both animal and human, as evidenced in studies by the author and recently reported by Yukio Yamori and fellow researchers in *Advances in Experimental Medicine and Biology*.



Mollusks are especially high in taurine, an amino acid that can help improve cardiac performance and reduce blood cholesterol in humans.

Their data indicated reduced cardiovascular risk through taurine alone or in combination with n-3 polyunsaturated fatty acids.

Study results point to the use of taurine as a nutritional supplement to protect against oxidative stress, neurodegenerative diseases and atherosclerosis. Taurine is also regarded as essential for retinal development in children.

Taurine may reduce the production of proinflammatory products and has been shown to lower blood pressure in borderline hypertensive patients. It has also been reported that taurine can improve cardiac performance, reduce blood cholesterol values and suppress platelet aggregation.

#### Taurine in Seafood

According to a 2006 article by Thomas Bouckennooghe and coauthors in *Current Opinion in Clinical Nutrition and Metabolic Care*, the capacity for biosynthesis of taurine varies among species. Compared to test rats, for example, humans, primates, cats and even fish exhibit very little biosynthesis of taurine. As a result, dietary taurine accounts for the majority of the taurine supply.

Taurine is an end product of sulphur amino acid (SAA) metabolism. Animal protein is generally considered a better source of SAA than vegetable protein. Fish consumption reportedly raises concentrations of serum taurine higher than

beef and chicken muscle.

Seafoods, especially invertebrates such as mollusks and crustaceans, are high in taurine. Saithe, cod and salmon also provide excellent taurine concentrations. Variations in taurine concentration among species and between individuals of the same species may be due to seasonal changes in temperature, salinity and diet. Fresh products offer the highest levels of taurine, as levels of the amino acid decrease considerably in highly processed products.

#### Taurine Content In Farmed Fish

Dietary taurine requirements and the effects of taurine concentration in feeds on the final quality of farmed fish have been studied for several species. When synthetic taurine or organic material high in taurine was added to diets, taurine levels comparable to those present in the diets of wild fish were achieved in the fillets of the farmed fish.

In a current experiment with African catfish, the fish received fishmeal-based diets enriched with 1-18 mg synthetic taurine/g wet feed over six weeks. The taurine content in the edible part of the fish rose with increasing dietary taurine concentration and leveled off when the taurine inclusion exceeded 8 mg/g wet feed. A twofold increase of taurine in the muscle was achieved with the 18 mg/g feed diet.