

The future supply of seafood

A consistently growing market...

It is finally evident that seafood consumption is on its way up in most countries. The reason for this development is believed to be due to the fact that we now know more about why seafood is healthy. The general saying has been that everybody should eat seafood because it is healthy, but little was known about why. Seafood has been known as a good source of certain vitamins, like vitamin A and D, and some minerals and trace elements, like iodine and selenium, but these elements can also be acquired from other dietary sources. So there must be other reasons.

The major research project SEAFOODplus, being the largest seafood research project ever supported by the EU, has given many clues to why seafood is healthy that reach far beyond the contents of vitamins and essential trace elements. The project is presently in its final stage, and many of the results can be viewed on the website (www.seafoodplus.org). The very important role of omega-3 fatty acids has been demonstrated, and not only their effect on prevention of cardiovascular diseases, but also much more far-reaching effects like reducing risk of inflammation and even cancer, reduction of post-partum depression, osteoporosis, and a range of other metabolic effects where evidence is only starting to gather for generating a real multifunctional picture of how omega-3 fatty acids work in the human body.

Interestingly, a hypocaloric diet containing seafood seems to alter the human basic metabolism in a way that lasts, leading to an effect that not only reduces weight in the short term, but leads to a lasting weight loss. This is very important to

a society where overweight and obesity is becoming a major problem.

Are future supplies of seafood sufficient?

There is, however, concern about the supply of seafood. For a long time, it was considered natural to obtain the seafood from traditional fisheries. But can this continue? According to FAO statistics, more than 70% of fish resources are fully exploited or over-exploited. The answer has to be found in fish farming. During the last 20 years, farming fish has been developed to a very advanced stage, and presently, about 50% of the world market of fresh seafood is delivered from fish from an aquaculture, and the potential seems to be huge. Adequate attention needs to be paid to the environment and all farming operations must be carried out sustainably in the local environment. Therefore, the current rapid growth observed may decline over the coming years, but then the need to consolidate production, strengthen research to optimise farming conditions and obtain products with a consistently high quality from aquaculture will greatly increase.

Aquaculture is still in its infancy. A lot of experience has been gained from salmon farming, particularly in northern Europe, and certain species suitable for farming in the Mediterranean areas, like sea bass, sea bream and turbot are showing growth on the market. However, new diseases may occur unexpectedly, for example, recent problems in the salmon industry in Chile have resulted in great economical losses. A



far better understanding of disease prevention through genetic studies and the impact of nutritional components in fish feed on the immunological defence mechanisms are needed.

Challenges in aquaculture

Farming many true marine species is far more difficult than farming salmonids, and very little is known about the nutritional requirements of the fish larvae and juveniles in order to obtain a successful survival rate. In some cases, fish will not acquire the correct skin pigmentation when fully grown if the feed composition at early life stages has not been correct. In other cases, there are special requirements to light conditions, pressure, salinity and other physical conditions in order for the fish to develop successfully. If these problems are to



be solved without wasting time and effort on trial and error investigations, which is also time-consuming for many species, well organised research is necessary for a deeper understanding of the mechanisms for growth. Further, growth may be optimised substantially in farming relative to the situation when the fish is free-living and has to search for suitable food sources.

One example of an obvious choice for a species to be farmed is the blue fin tuna. Fisheries on wild stocks are threatening sustainable populations in the oceans, and as the fish is steadily increasing in popularity at the marketplace, fish farming is the obvious answer. Research can't take place fast enough for the survival of the remaining wild fish stocks.

Tailor-made seafood

The greatest potential of aquaculture is the possibility to tailor-make the exact quality of fish as requested by the market, and with a consistent content

of all essential nutritional elements. Until now, fish production has mainly focused on economical optimisation through a faster growth rate and a high density of fish in farming facilities. Further, as fish meal and fish oil, essential for many fish species in aquaculture, is becoming a limiting factor in the feed, other raw materials from plants are sought. However, it is not easy for carnivorous fish species to live on a vegetable diet, and plant oils may lack the fatty acids essential for fish development. Finally, altered feed may result in a product with poor quality

characteristics and nutritional quality for the human diet may be reduced substantially.

Choosing fish species that naturally feed on a plant diet may solve some of the problems, but there is only a limited number of species and the taste may deviate from consumer preferences. More fish is being marketed in Europe based on fish raised in fresh or brackish waters in the Far East. This is partially satisfying market needs, but in the long term, with fish farming in Europe continuously growing, it should be able to deliver the fish species and qualities requested by the European market.

Still another benefit of fish farming should be mentioned. As fish feed can be accurately controlled, it is possible to optimise the nutritional condition of the fish being harvested. In the SEAFOODplus project, it has been demonstrated that selenium can be enriched in fish feed. Selenium is an element found naturally in fish, but the level can be

raised through controlling the content in the fish feed. Fish is thus being used as a carrier of a very valuable nutrient of the human diet. In most cultures, the supply of selenium is below recommended levels. If it is brought up, it is believed to reduce incidences of several diseases, among which is cancer. The concept of using fish as a carrier for essential elements for human nutrition should be developed further, and the key to its success is within aquaculture.

A new research platform

The market for seafood is on its way up; the consumers are discovering the health benefits and are asking for safe, nutritious seafood that also tastes nice. At a new research platform, launched January 2009, we will work towards increasing the research efforts to meet the future supply requirements for a consistently growing seafood market. The platform is built on a consortium of 68 partners that have collaborated for five years in the SEAFOODplus project. New stakeholders are invited to join the partnership, comprising the most central seafood research institutes and industries in Europe.



Dr Torger Børresen
Research Director

DTU Aqua, National Institute of
Aquatic Resources
Building 221
2800 Kgs. Lyngby
Denmark

Tel: +45 45252577
Fax: +45 45884774

tb@aqua.dtu.dk

Dr Joop Lutén
Nofima Marine, Norway
Joop.luten@nofima.no

Dr Mercedes Careche
CSIC, Instituto del Frío, Spain
mcareche@if.csic.es

www.seafoodplus.org