

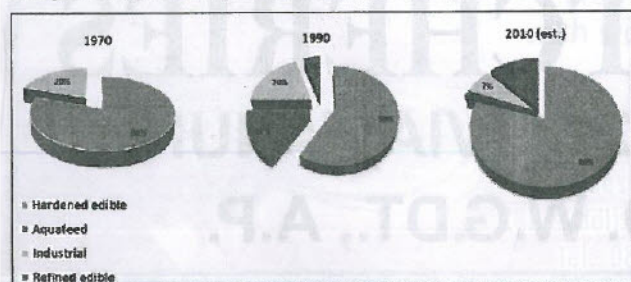
Wild to farm: A journey of fish oil to aquaculture

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The epidemiological studies among Eskimos in North West Greenland have shown that the incidence of heart related diseases is lower and is due to the higher intake of omega 3 fatty acid in their body. Following this several studies were conducted till date on the health benefits of fish oil which is a major source of omega 3 fatty acids, especially EPA and DHA. The proven fact was fish oil possess antithrombotic and anti-inflammatory properties and hence protective role against depression and cognitive decline, cardiovascular diseases, neurological disorders etc. (Nasopoulou & Zabetakis, 2012).

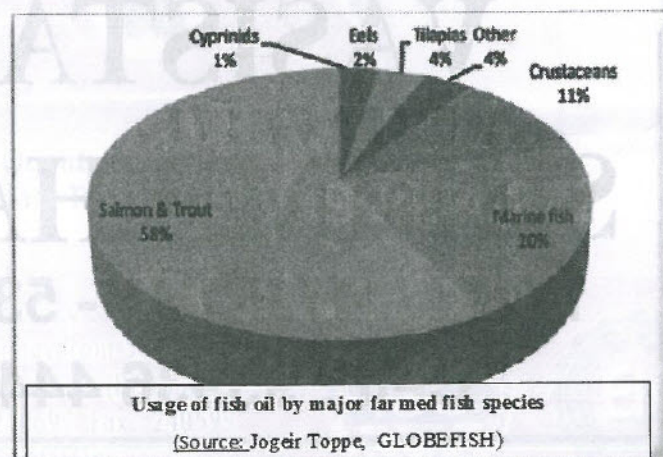
Fish cannot produce these omega 3 PUFA in their body but are acquired through the intake of marine organisms of lower trophic levels. Hence the intake of fish and fish oil is highly suggested for humans for the possible beneficial effects. The increasing demand of fish due to the increasing population growth and increased awareness on benefits of fish oil, the aquaculture needs to be highly promoted for meeting the demands. In 2016, the global fish production was about 171 million tonnes and 47 percent of the total is contributed by aquaculture. The fatty acid composition of feed will get completely reflected in the fatty acid profile of the fishes. So the cultured fishes are to be given omega 3 fatty acid enriched feeds to ensure the quality of the final product comparable to their wild counter parts particularly marine ones.

Changes in usage of Fish oil (Jonathan Shepherd, IFFO, 2011)



According to the Marine Ingredients Organisation (IFFO) approximately 75 percent of annual fish oil production is used for the preparation of aquaculture feeds (Auchterlonie, 2018). Aquaculture fishes get fish oil not only by the addition of fish oil to feed but also from the fish meal which are given as feed. Fish oil is produced from cooked fish by pressing followed by centrifugation and separation. Fish meal and fish oil can be produced not only from whole fish but also from fish trimmings or fish by-products. Many marine species are used for the extraction of fish oil mainly small pelagic fishes. Fish oil stands as the richest available source of long-chain omega 3 polyunsaturated fatty acids (PUFAs) which are important in human diets. In the coming years, fish oil production could not cover the necessary quantity needed for aquaculture (Tacon, 2005).

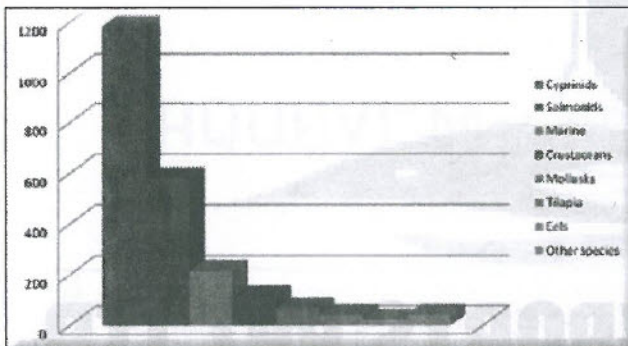
In order to reduce the cost of fish feeds, highly available vegetable oils like soybean, linseed, rapeseed, sunflower etc. were studied for partially replacing fish oil. But the problem exists in the poor omega 3 fatty acid composition of vegetable oils. For the replacement to be effective, the diet should have sufficient quantities of essential fatty acids. It was found that the minimum



requirements of gilthead bream (*Sparus aurata*) for eicosapentaenoic acid and docosahexaenoic acid are around 0.9% of the diet (Kalogeropoulos, et al. 1992). Some fishes can unsaturate and elongate the saturated fatty acids but in many cases the efficiency is lower.

The need of fish oil in aquaculture is thus essential and the increased use of few pelagic species for the reduction of fish to oil and meal raises a question to the sustainability of those species. Even though replacement of fish oil with other oils are studied, they are yet to get

evolved as a fully dependable technology. Further research in the field of aquaculture, genetics, utilisation of new and highly abundant sources for fish oil etc. are to be concentrated so as to ensure the quality of cultured fish that reaches our table.



Omega 3 fatty acid contribution by different fish species per million people (live weight equivalents)(Source: Joger Toppe, GLOBEFISH)

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