

Nordic Centre of Excellence Network in Fishmeal and Fish oil

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Executive Summary

The main objective of this work was to summarise current knowledge on fishmeal and fish oil as well as identify the research needs and create a roadmap for future industry-driven research. The main conclusion was that the quality of raw material, fishmeal and - oil are not yet well defined. The real focus by the industry has mainly been limited to nutrients, such as proteins and fats and other components that make up fishmeal. There has been less focus on the health benefits of dietary contents of fishmeal and –oil, the relationship between processing methods and the nutritional and technical properties of fishmeal. In addition, to proactively strengthen the market position and competitiveness, it is crucial for the industry to achieve a common understanding of the needs of their customers in line with a clear profile of the benefits of their products. A communication strategy as well as a research strategy for the industry is needed.

Background

Fishmeal and fish oil production plays an important role in the Nordic countries. However, production has been static in the last decade, while the world’s protein and oil demand has increased, along with increasing public demand for improved sustainability. The inclusion of fishmeal and oil in fish feed has decreased dramatically in the last decade and is expected to continue to decrease with growing aquaculture production (Figure 1, Figure 2). However, the demand for protein and other nutrients will increase and the industry needs to keep up with the development in the feed industry.

Raw material & analytical methods

One of the conclusions of this work was that raw material, fishmeal and fish oil qualities need to be better defined as well as the relationship between them. Research is needed to further prove the relationships between TVN and e.g. fish oil qualities (lipid oxidation etc.), but other methods may be more effective of measuring freshness in general, e.g. the quality index method (QIM) or biogenic amines. Regarding fishmeal, the real focus by the industry has mainly been limited to nutrients, such as proteins and fats and other components that make up fishmeal. Further, there is a need for standardization of protein determination within the fishmeal industry as both the Dumas and the Kjeldahl methods do not always give the same results.

Production of fishmeal and oil & Preservation methods throughout the value chain

Production of fishmeal is a fairly standardized process which has not changed much the last decade. There is a need for a better understanding of how processes and the methods used affect the material and nutritional and technical properties at different stages during processing. It is essential to preserve the freshness of raw material with adequate cooling and make sure the cooling chain is maintained during landing. Moreover, it’s important to preserve both fishmeal and oil since they are very sensitive towards external condition during transport and storage.

Key properties of various final products

The relationship between the quality of the fishmeal and the technical properties must be established for fishmeal producers to further understand their own products, as these properties are important for feed producers, farmers and other customers. The industry should emphasize the amino acid composition of fishmeal and which amino acids are lacking in plant-based ingredients, e.g. methionine and lysine (Figure 3).

Production of fish protein concentrates (fish silage) or fish hydrolysates has shown to improve technical properties of feed mixtures during feed manufacturing. Fish solubles from high quality raw fish could also be used to make products for human consumption, or extracting other nutrients such as peptides, hormones, vitamins etc. The unique X-factor of fishmeal still remains to be defined as well as the influence on the immune defense, health and stress tolerance of the fish.

Results from the workshop in Fishmeal and Fish oil – 2018

Innovation has been lacking within the fishmeal industry and it has been described by many as a stagnant industry. To tackle the obstacles ahead a clear strategy for the industry is of crucial importance. A communication strategy as well as a research strategy is called upon. Cooperation with the next step in the value chain is important to increase the value of fishmeal and oil. There is a lack of communication along the value chain from the industry to the consumers. There is still a lack of understanding by the consumers of why fishmeal is produced, the reasons must be communicated in such a way that it reaches the average consumer. The identity of the industry needs to be clear and transparent to promote a story about the industry to provide a clear and positive image of the industry to be communicated to the society. The industry members are interested in moving forward to sustain the future growth of the industry. Fishmeal and fish oil production has been prosperous for a very long time, but to remain so, cooperation among all stakeholders is crucial for continued progress.

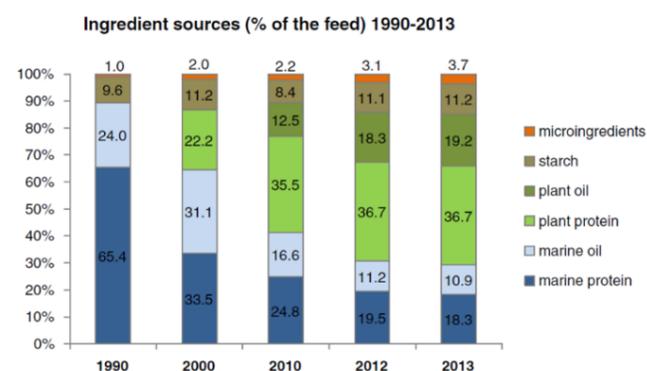


Figure 1 Nutrient sources in Norwegian salmon farming as percentage of total diet (Ytrestøl et al. 2015).

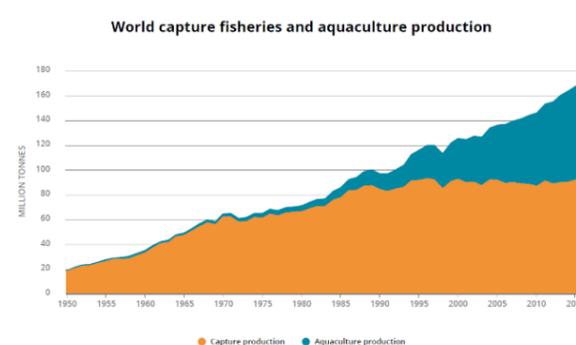


Figure 2 World wild catch fisheries and aquaculture production (FAO, 2018).

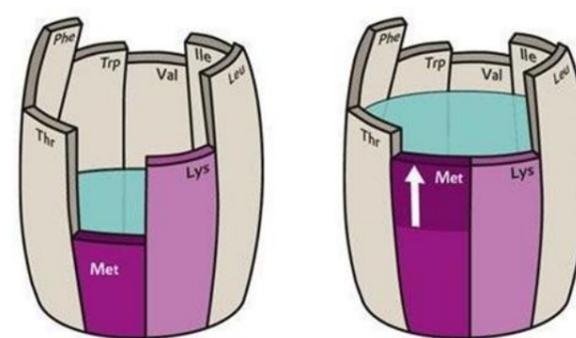


Figure 3 The “Liebig barrel” illustrates the limitation of protein synthesis due to the lack of an essential amino acid. The shortest stave of the barrel represents the first limiting amino acid (here Met)