Hormones regulating growth and fattiness in salmon - research towards sustainable feeding in fish aquaculture

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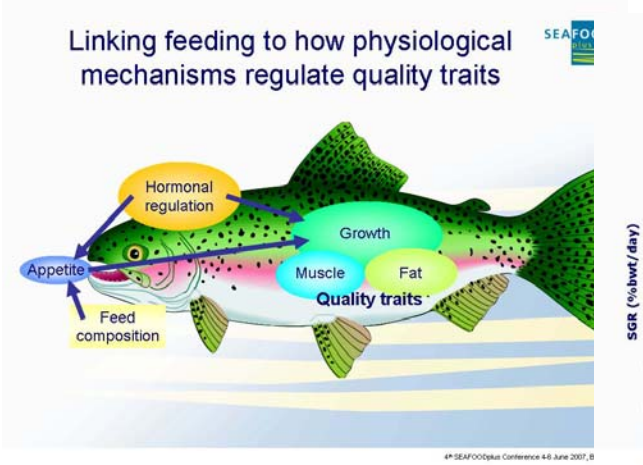

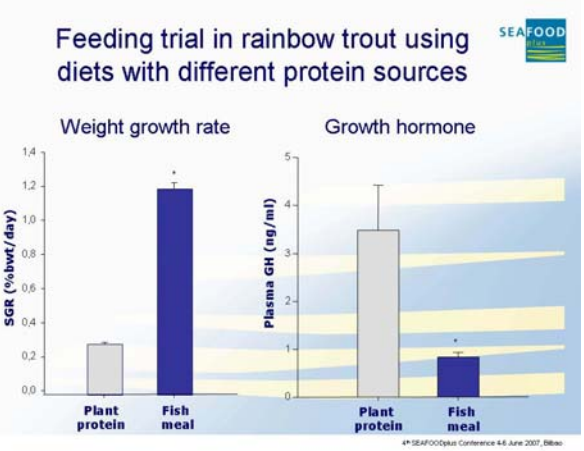

One aim of the BIOQUAL project is to understand how hormones relate to quality traits in finfish aquaculture and how this knowledge may be used for novel, more sustainable fish diets.

Fish aquaculture is among the fastest growing food production sectors in the world. This is due to a rising public demand for seafood products that exceeds sustainable wild supplies of fish. However, aquaculture, in common with other food production practices, is facing several challenges for a sustainable development. One such challenge is that by culturing carnivorous fish species, marine natural resources, so-called feed-fish species, have been heavily exploited as feed at the risk of collapsing marine ecosystems. Understanding the mechanisms of nutrition, feeding and energy balance is therefore of importance in developing sustainable fish aquaculture. Several approaches for more sustainable feeding strategies are envisaged by the fish aquaculture community. One option is to replace fish meal and fish oil with plant-based ingredients, another is to use feeding strategies that improve feed efficiency *e.g*. through better matching of diet composition and ration to growth performance. To successfully achieve this, without a negative impact on the physiology or quality of the fish, research is being carried out on the key mechanisms controlling growth performance and fat deposition in relation to dietary composition. Fat deposition in muscle is an important trait that can improve muscle quality, but fat deposition in the places such as the liver and body cavity, is a waste. Another important aspect is to understand the mechanistic basis for seasonal variability in growth and fat storage in temperate fish species.

Growth and adiposity are as quality traits the end results of several physiological processes, regulated by hormones and highly influenced by nutritional factors. Our research within the BIOQUAL project in SEAFOODplus focuses on understanding how ghrelin regulates appetite and adiposity in salmonids and how it interacts with the growth hormone – insulin-like growth factor I system and its regulation of growth and metabolism. Through the SEAFOODplus project, feeding studies have been carried out in collaboration with NIFA and BIOMAR, addressing questions concerning the effects of inclusion of vegetable components on growth and adiposity.

The research may contribute to the knowledge base used to develop future performance indicators on growth, energy status and metabolic patterns. This may in turn help to tailor the feed composition and feeding practices at specific life stages and/or seasons and realise the full growth potential of the fish, with a more efficient use of feed while maintaining or improving product quality.