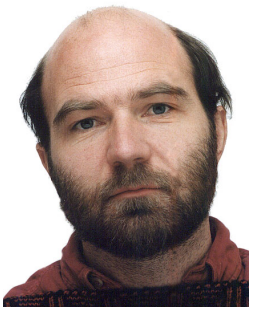
ETHICOD – ethical quality of farmed cod in a full value chain approach

Presenting author: Børge Damsgård, co-author: Hilde Toften, Øyvind Aas-Hansen, Kjell Midling
Nofima Marine, Norway



The main objective of the project ETHIQUAL is to examine how husbandry practices, aquaculture systems and pre-slaughter conditions contribute to the flesh quality and ethical quality of finfish seafood.

This objective in ETHIQUAL has been met with a range of studies, including different farm species and scientific question. In addition, the ETHICOD approach aimed to integrate many of these issues into a full value chain approach in one fish species. The approach covered the biological mechanisms (RTD pillar 5), the fish quality aspects (RTD pillar 4) and the consumer perspective (RTD pillar 2). This full scale value chain experiment tracked individual tagged Atlantic cod (*Gadus morhua*) from juveniles to slaughter, and to the consumer.

In general, the relationships between 'ethical' husbandry and muscle quality are complex, and the consumer perception may be affected of both flesh quality and perceived quality traits, based upon the product information. A combined study of biological mechanisms and public perception may thus contribute to understand the relative importance of ethical traits in farmed fish.

In the biological part of ETHICOD, the first part focuses on water quality and fish density in juvenile cod production. The study revealed a poorer welfare in intensive reared groups with high densities which were not compensated with higher water flow. The reduction in welfare status led to nephrocalcinosis and 20-30% growth reduction.

The second part during the on-grow period in sea cages terminated after 1.5 years at an average fish size of 1.5 kg. The sub-optimal rearing in juveniles was not compensated and the optimal reared juveniles were 10% larger at slaughter than the more intensive groups, revealing long term effects of poor welfare status in juvenile fish.

A standard pre-slaughter protocol were compared with a more 'ethical' protocol. Compared to e.g. salmonids, the Atlantic cod were less affected by pre-slaughter treatment, and changes in e.g. plasma cortisol and lactate indicated that welfare was little affected. After slaughter, the fish was processed in a fish industrial plant, and the filets were distributed to a flesh quality study, a sensory study in a trained panel, and to an in-home consumer survey.