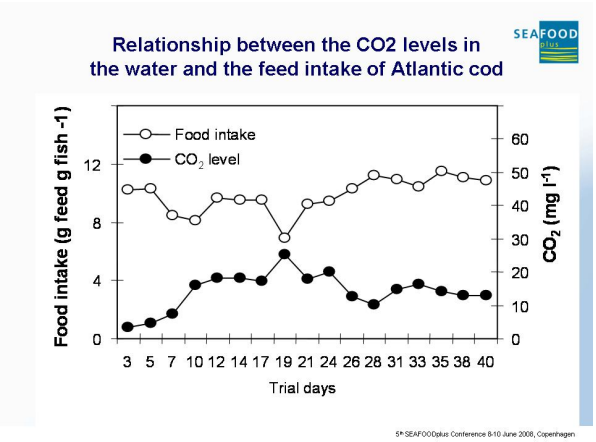
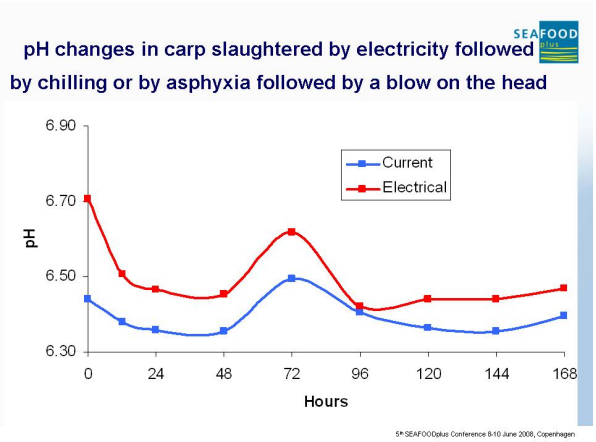
Improving the ethical quality traits of farmed fish - identifying optimal husbandry and pre-slaughter conditions

Presenting author: Hilde Toften [1]; Co-author's: Børge Damsgård [1], Øyvind Aas-Hansen[1], Linda Hansen[1], Hans van de Vis[2], Maciej Pilarczyk[3], Bert Lambooij[4]
[1] *Nofima, Norway*
[2] *IMARES, The Netherlands*
[3] *Institute of Ichthyobiology and Aquaculture, Polish Academy of Sciences*
[4] *Animal Sciences Group, Wageningen University and Research Centre, The Netherlands*





Fish welfare and ethical questions about husbandry and pre-slaughter practices have been increasingly important as a quality trait of farmed fish. However, the relationships between these practices and the quality traits are poorly understood. One of the main objectives in the project ETHIQUAL in SEAFOODplus has been to examine how husbandry practices and pre-slaughter conditions contribute to the flesh quality and ethical quality of finfish seafood. The goal has been to find a good balance between the current trend towards intensive rearing and the increasing consumer demand for healthy, high quality seafood, produced in an ethical sustainable way.

In this presentation, we are going to show some examples of husbandry practices that potentially can compromise the welfare and influence the flesh and ethical quality of farmed fish by using data collected under the SEAFOODplus programme. We will focus on intensive rearing conditions and poor water quality in production of Atlantic cod (Gadus mohua) and pre-slaughtering conditions and slaughter methods for turbot (Psetta maxima) and carp (Cyprinus carpio).

The cod studies revealed a poorer welfare in groups kept in water qualities associated with intensive rearing conditions such as sub-optimal carbon dioxide and oxygen levels. Indications of reduced welfare status were for example higher mortalities, impaired feed intake and growth, and higher incidences of nephrocalcinosis, haemorrhages, gas bubbles and fin damages.

The slaughtering studies with turbot showed that the current industrial method (transport followed by live chilling) does not affect the freshness of the product, compared to an experimental method (instantaneous electrical stunning applied directly to turbot in a holding tank followed by chilling). Visual inspection also revealed no product differences between the two methods. Electrical stunning did not result in carcass downgrading, and this implies that electrical stunning is an applicable method for farmed turbot.

In the carp study, the industrial method (asphyxia followed by a manually applied blow to the head) was compared with electrical stunning and chilling. Based on analysis of EEGs, behavioural observations, and colour and pH of fillets, electrical stunning and chilling was evaluated to be the most "humane" slaughter method of the two. Analysis of product quality parameters revealed that the flesh of carps killed by the experimental method had significantly higher pH values during the entire storage period, compared to the batch slaughtered by the industrial method. Contrary to our expectations, the experimental slaughter method did not result in a persistently lower lightness and increased redness of the fillets.