

## Results from project 20918

"Heading of cod – effects on water content and microbiology when stored in ice slurry"

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## Materials

Cod caught by longline were split into two groups. One group was headed (Group A) and the other was kept with head on (Group B). The fish were put in slurry with seawater (250 l) and ice (100 l).

After 24, 48, 72 and 96 hours 10 fish from each group were transferred into ice boxes and kept on ice until total storage time of 7 or 12 days. The fish kept with head on in slurry was headed before being put into ice boxes, as commonly carried out in the industry.

Storage regime for the fish kept for seven days prior to measurements was as follows:

- 0 hours in ice/water + 7 days in ice;
- 24 hours in ice/water + 6 days in ice;
- 48 hours in ice/water + 5 days in ice;
- 72 hours in ice/water + 4 days in ice;
- 96 hours in ice/water + 3 days in ice.

A corresponding design was followed for the fish stored for 12 days before analyses. The total experimental design is shown in the Figure below.

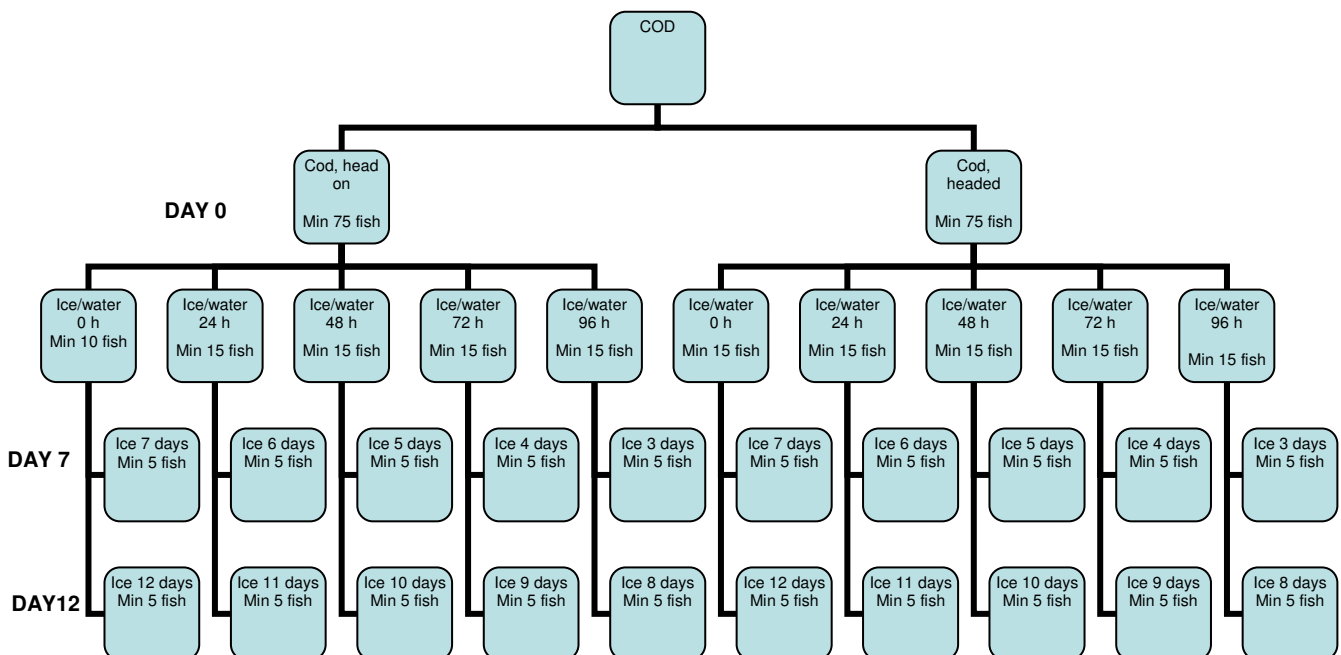
## Methods

Analyses at day 0:

Water content, Total volatile bases (TVB-N), Trimethylamine/trimethylamine oxide (TMA/TMAO), Total viable count, sulphide producing bacteria on 7 fish.

Analyses at day 7 and 12:

Water content, TVB-N, TMA/TMAO, Total viable count and sulphide producing bacteria on 5 fish from each group (0 groups). Pictures were taken from the neck of the fish.



## Water content

Water content was determined after heating the samples for 18 hours at 105 °C.

## Total volatile bases (TVB-N)

TVB-N was determined by using Tecator Kjeltac Auto Sampler System 1035 Analyzer (FOSS A/S, Hillerød, Danmark) as described by Tecator (1992).

## Trimethylamine og trimethylamine oxide

TMA-N og TMAO-N were determined in 6% trichloro acetic acid extract by microdiffusion and titration (Conway and Byrne, 1933)

## Microbiological methods

Samples of approximately 30 gram were taken from the back about 3 cm behind the neck with the use of sterile technique. The samples were diluted 1:10 in stomacher-bags with physiological saltwater, and homogenized in 2 minutes. Two collateral samples from each dilution were plated on Iron Agar plates with cysteine, and the plates were incubated at 12°C for 5 days.

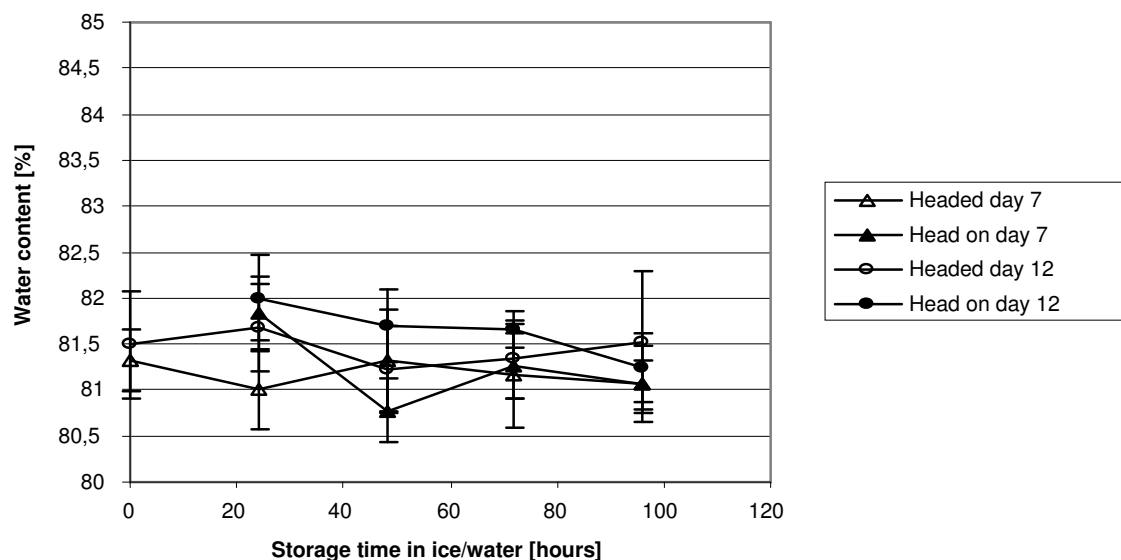
## Statistical analyses

Student T-test (Excel) and Martens Uncertainty test (Unscrambler, CAMO Process AS) were carried out in order to reveal if there were any differences between fish stored with head “on” or head “off” in slurry.

## Results

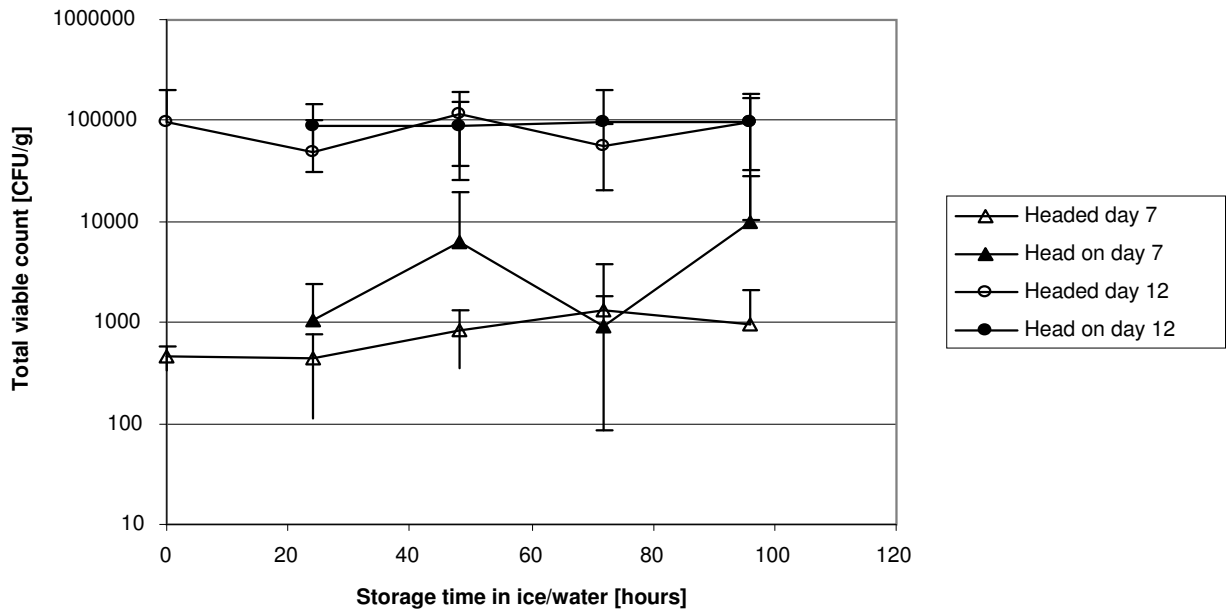
### Water content

There is no significant differences between cod stored head-off or head-on after storage for 0-96 hours in ice/water.

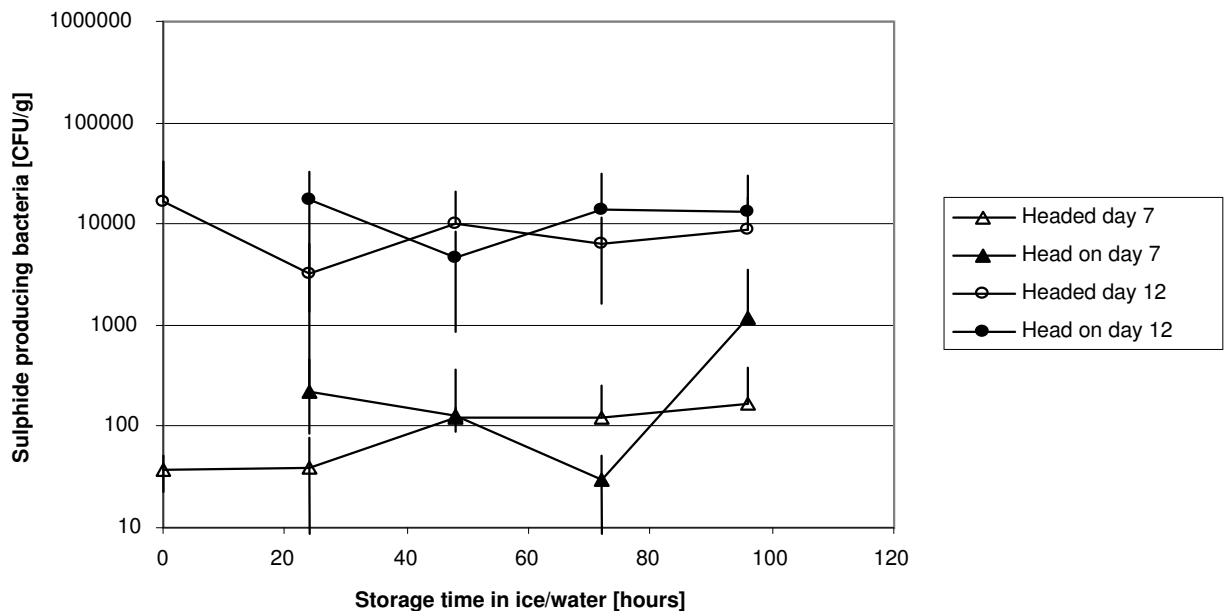


## Microbiology

There is no significant differences in total viable count between cod stored headed or head-on after storage for 0-96 hours in ice/water.

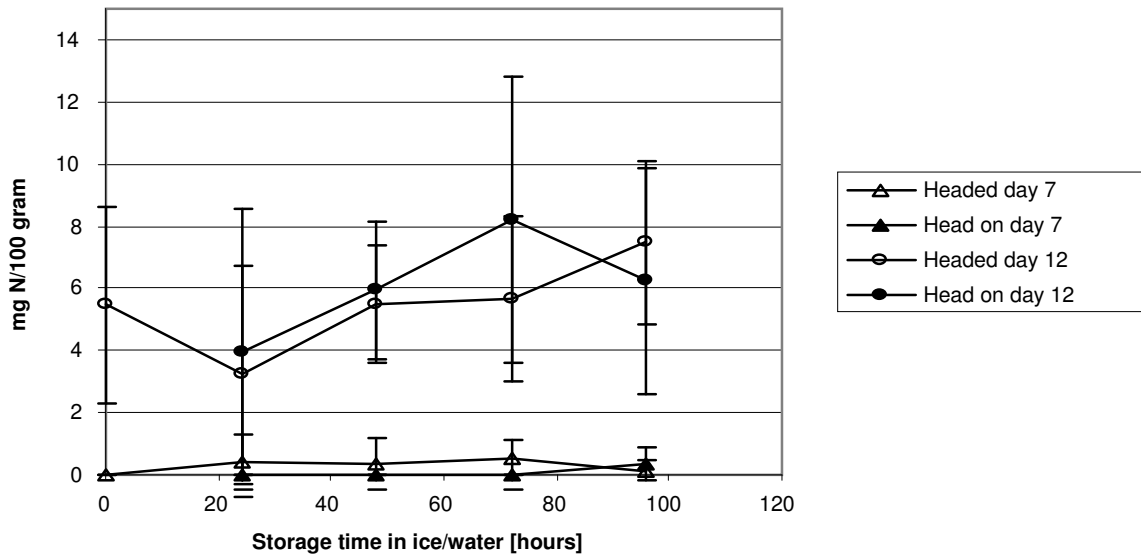


There is no significant differences in sulphide producing bacteria between cod stored headed or head-on after storage for 0-96 hours in ice/water.



### Trimethyl amine (TMA)

There is no significant differences in trimethyl amine content between cod stored headed or head-on after storage for 0-96 hours in ice/water.



### Total volatile bases (TVB-N)

There is no significant differences in TVB-N between cod stored headed or head-on after storage for 0-96 hours in ice/water when measured 7 days after catch.

There is a small, but significantly higher TVB-N-content in fish stored headed in ice/water for 96 hour compared to fish stored with head on when measured after 12 days.

