Quality optimisation of frozen Atlantic mackerel (*Scomber scombrus*) products

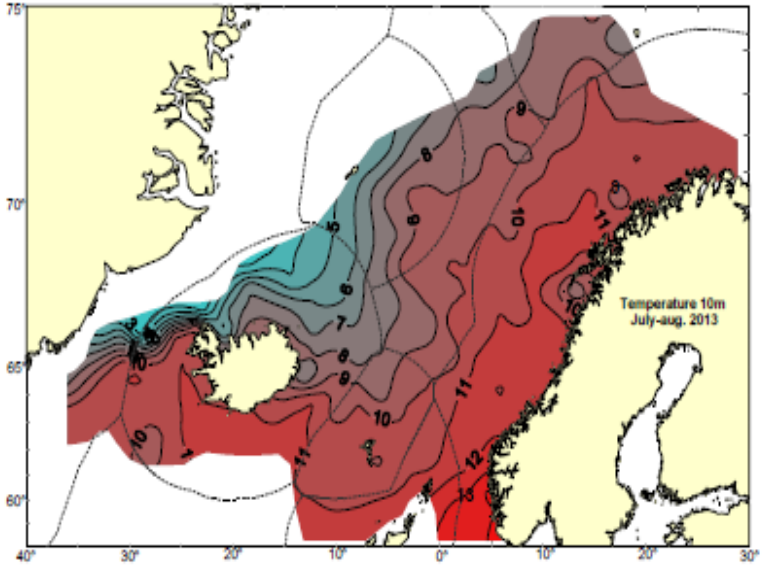
Paulina E. Wąsik, PhD

UNIVERSITY OF ICELAND
FACULTY OF FOOD SCIENCE AND NUTRITION

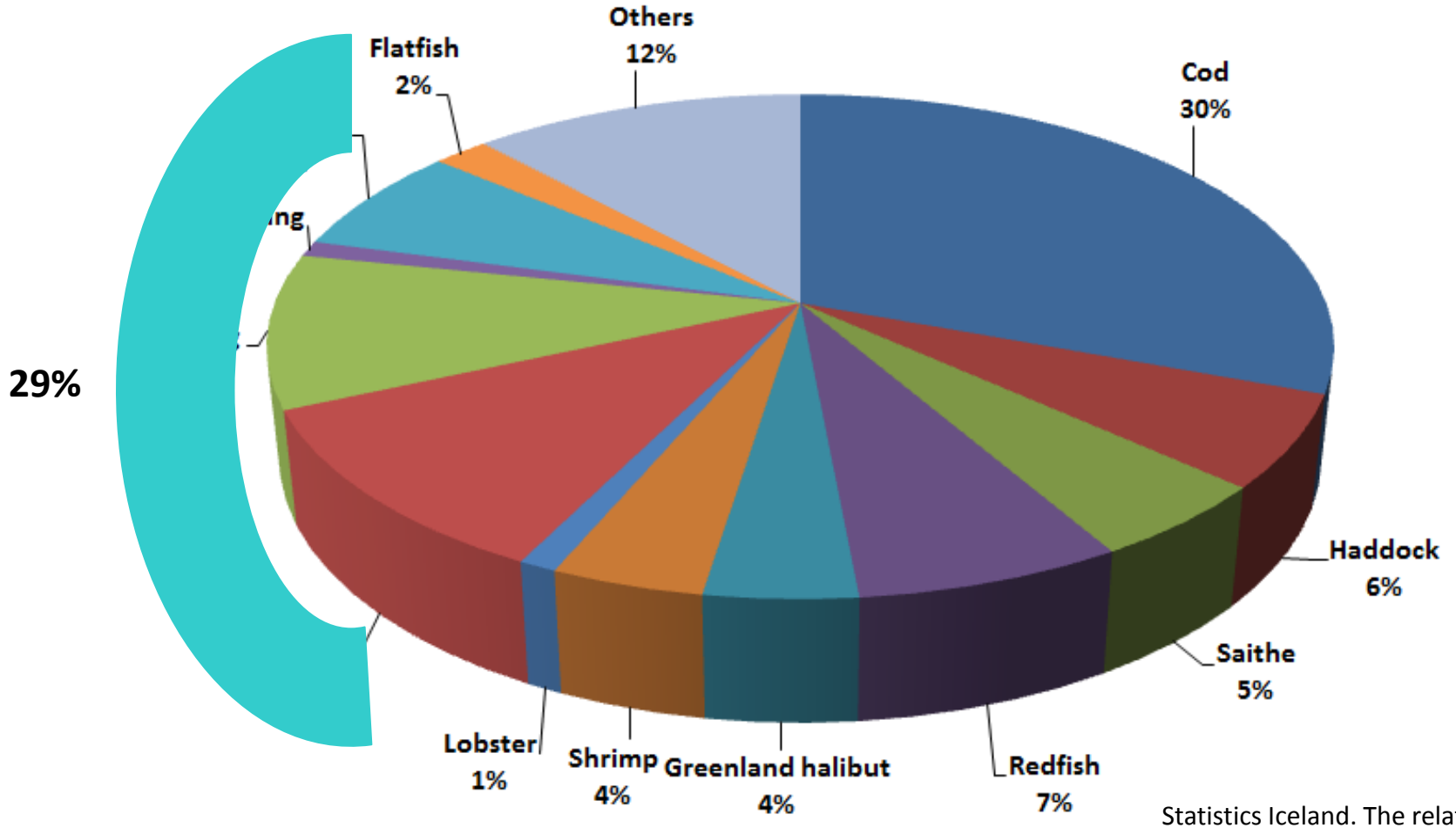
Introduction

- Atlantic mackerel *(Scomber scombrus)* is known from widespread relocations and has been discovered in Icelandic waters since 2007 and gained great economical importance

- The mackerel migrates into Icelandic waters during the summer period (June–September), in order to find larger and richer feeding areas after spawning and travelling

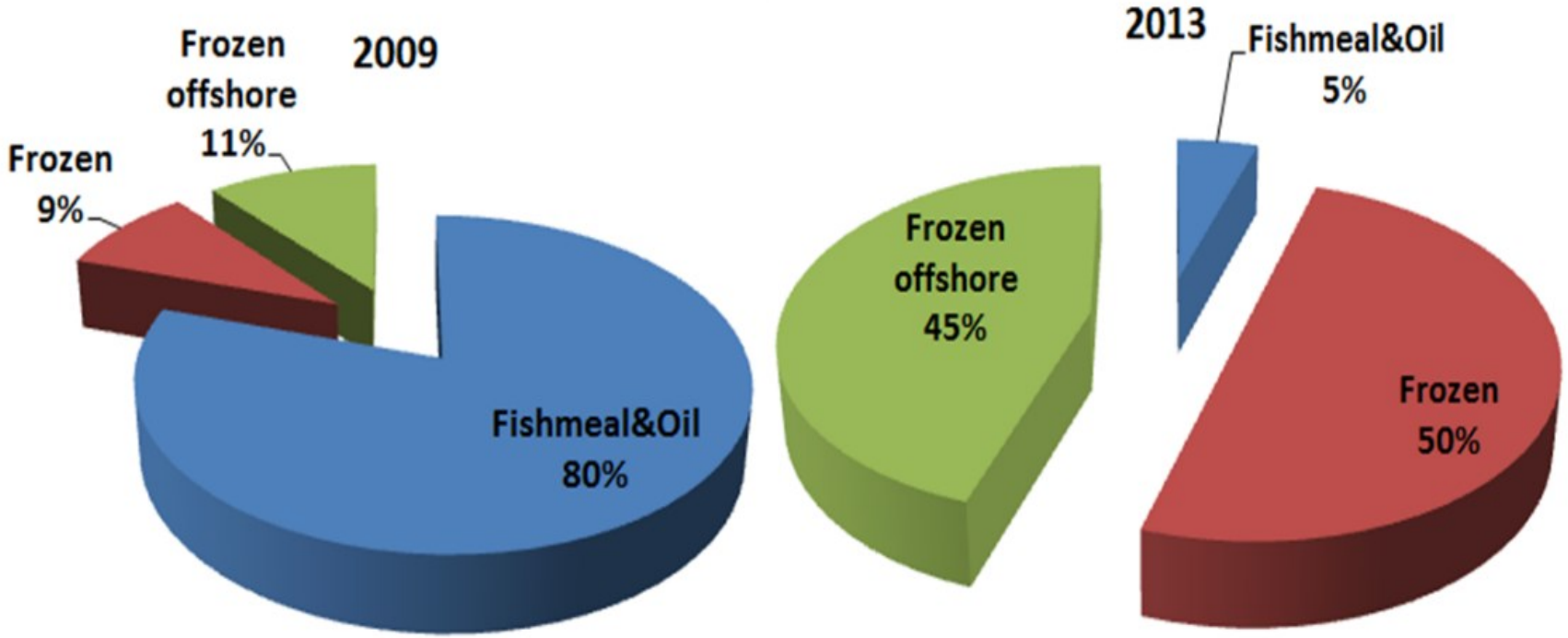


Economic importance of Atlantic mackerel

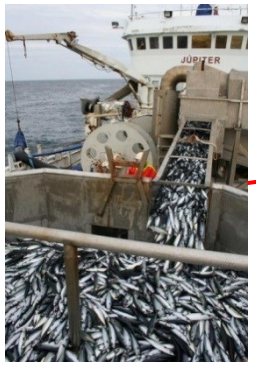


Statistics Iceland. The relative value of seafood exports in 2012

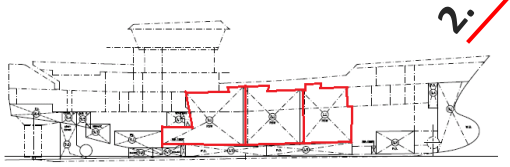
Product evolution



Temperature profiles from catching to the consumer



1. Catching

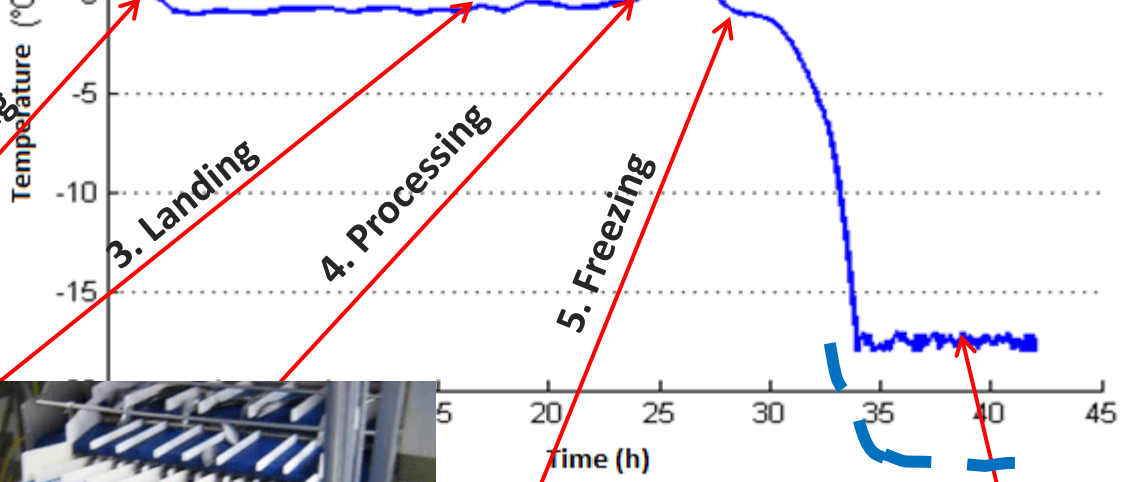


2. Chilling

3. Landing

4. Processing

5. Freezing

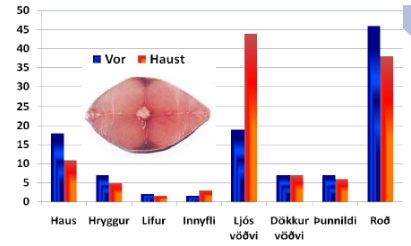


6. Transportation / Storage

Factors affecting quality of frozen mackerel products

Catching time variation

Paper I - IV



Frozen storage conditions

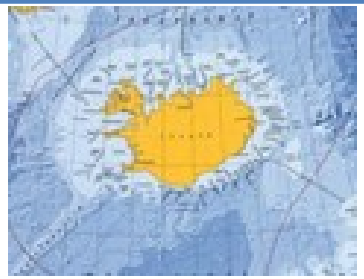
Paper II - V

Processing technologies

Paper IV

Geographical variation

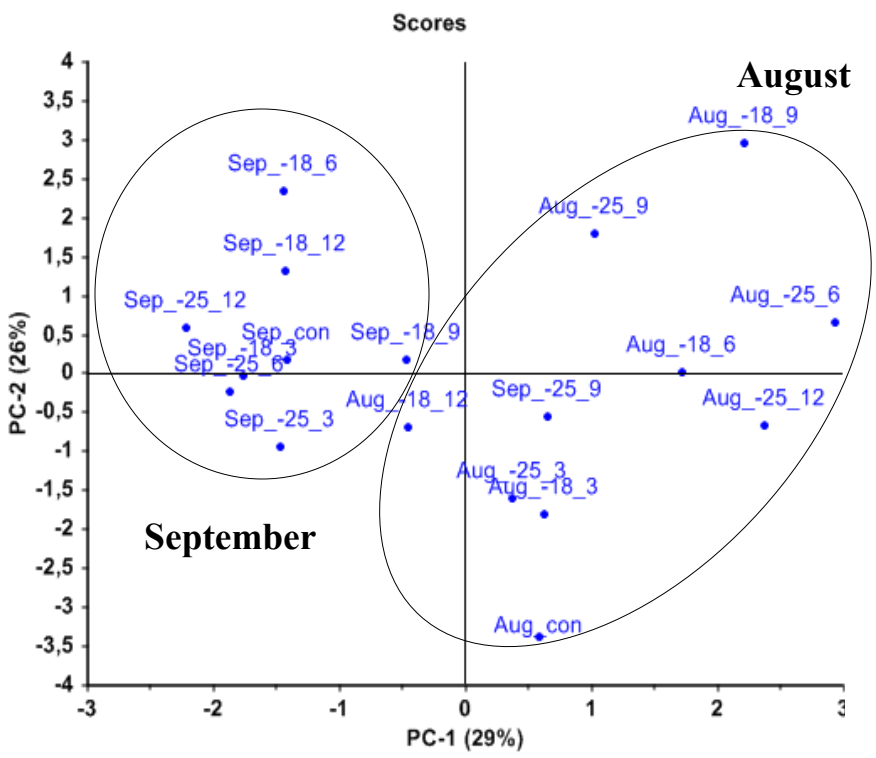
Paper I

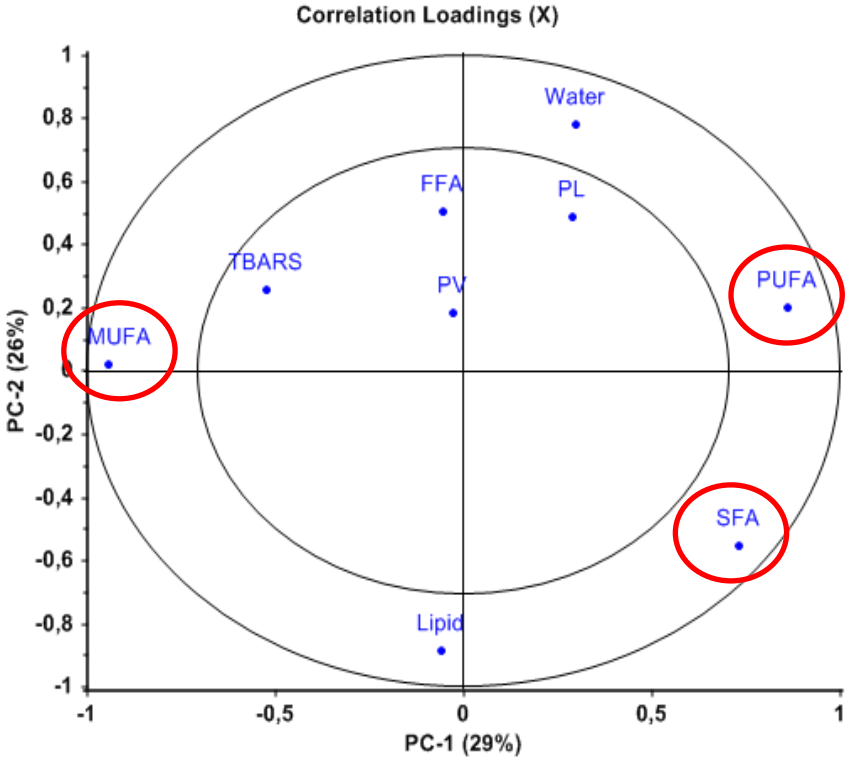


Heat treatment

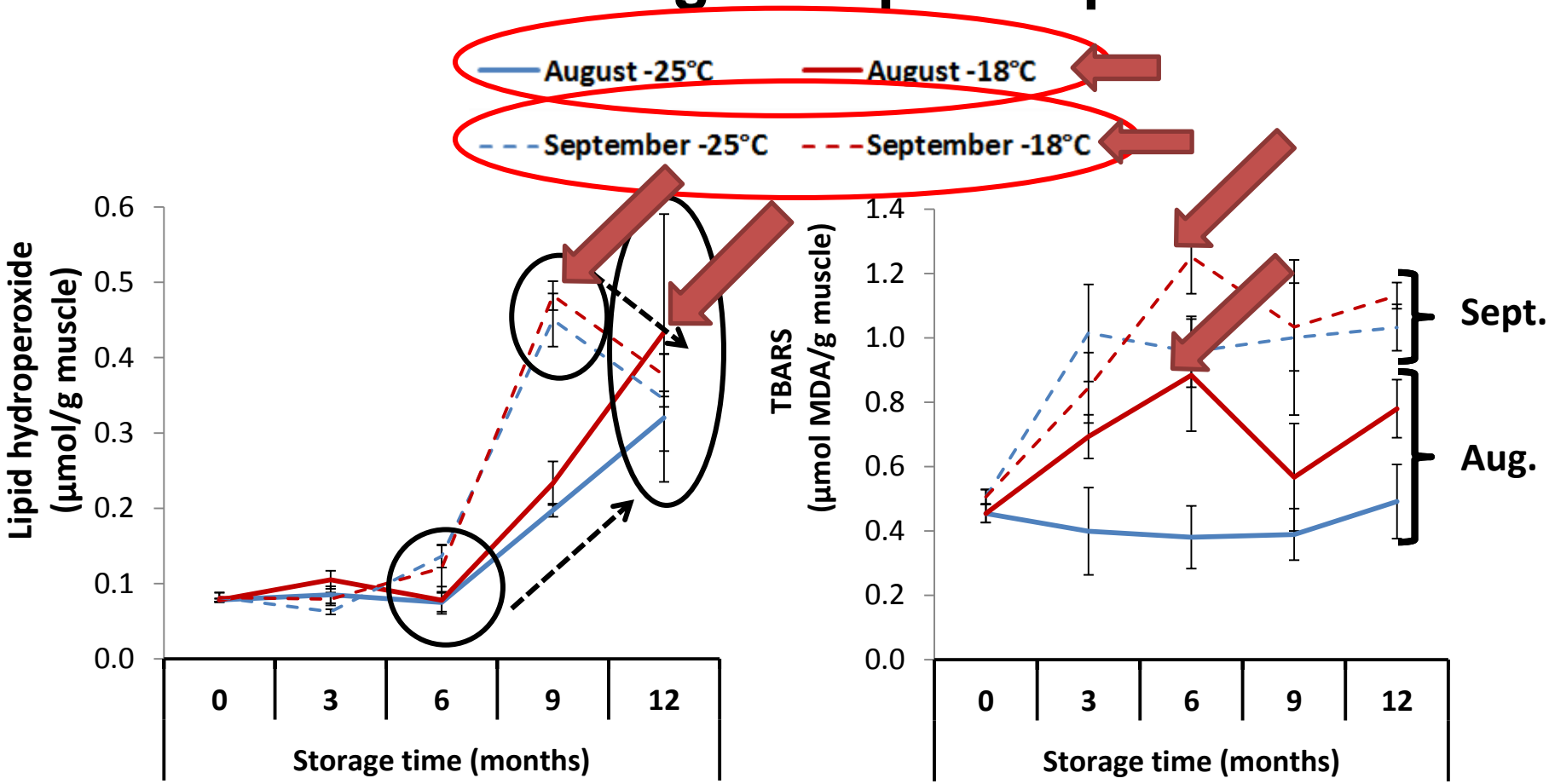
Paper V

Effect of seasonal variation on lipid composition



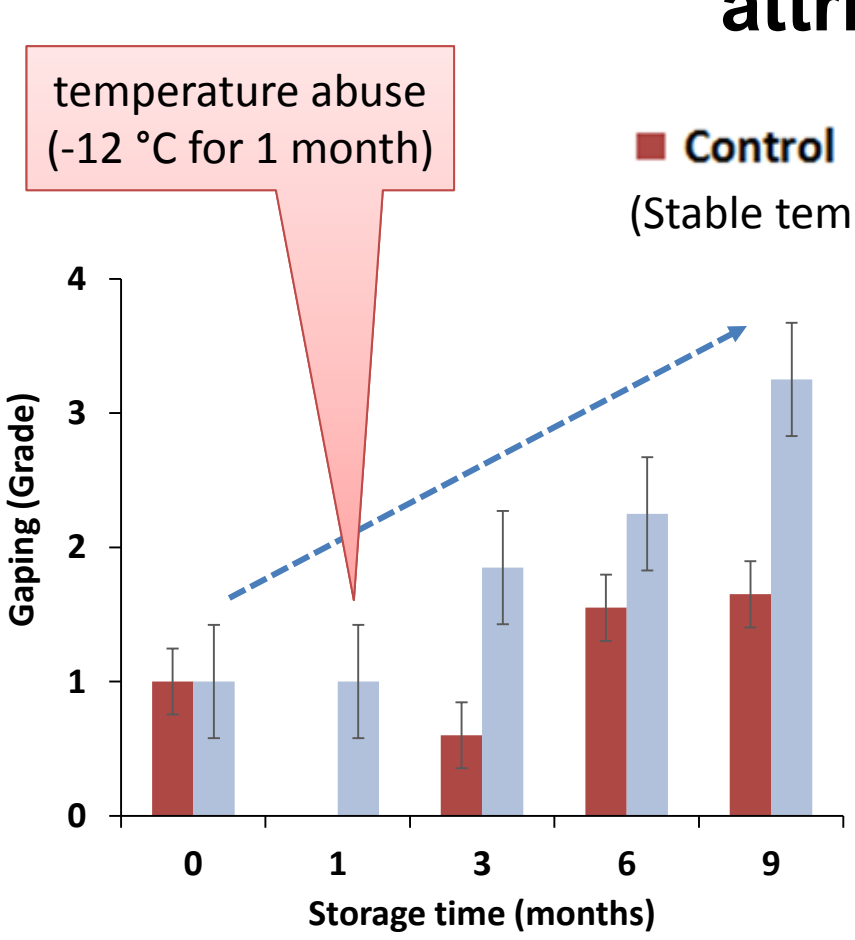


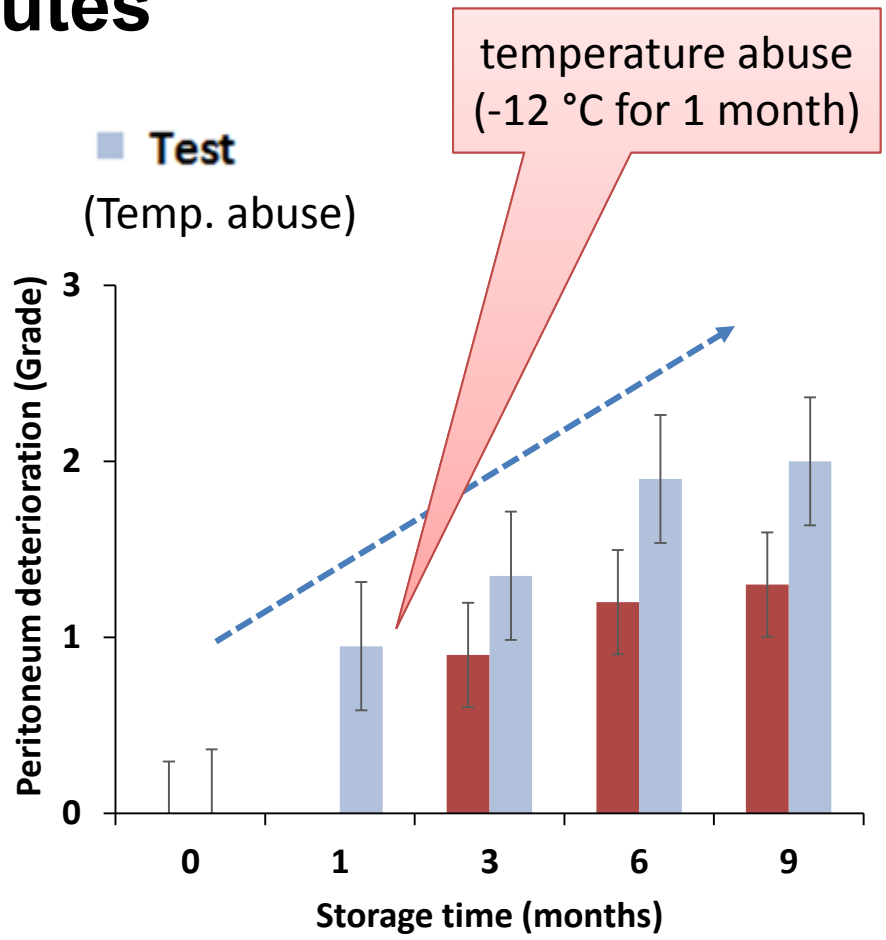
Effect of frozen storage temp. on lipid oxidation



Paper III

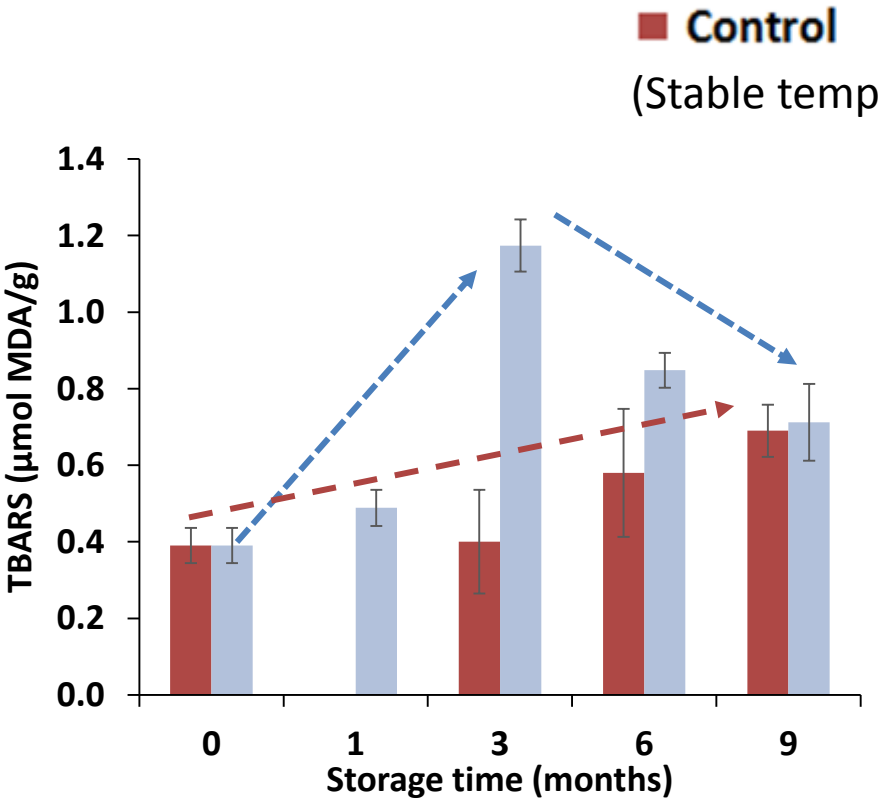
The effect of temperature abuse on quality attributes

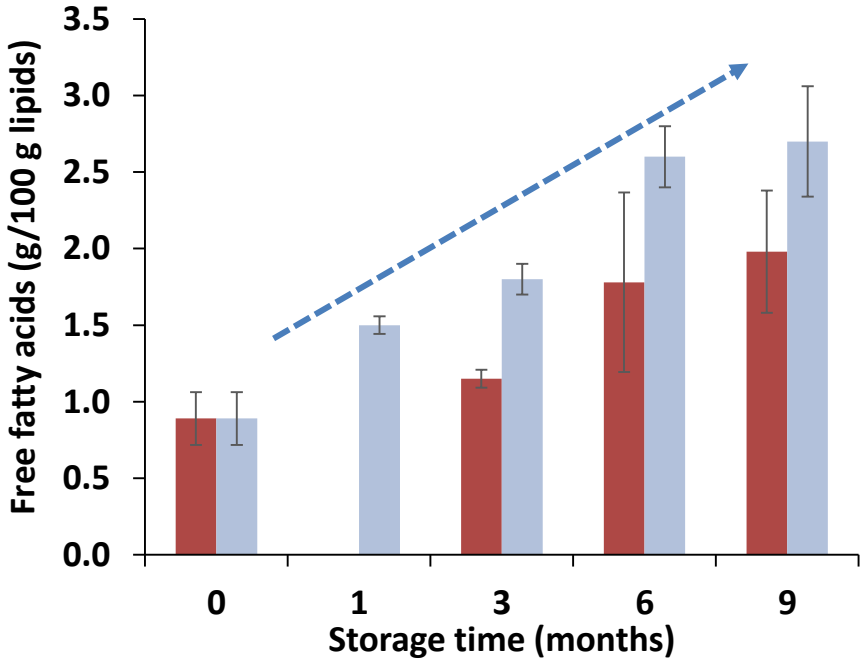




Paper III

The effect of temperature abuse on lipid stability





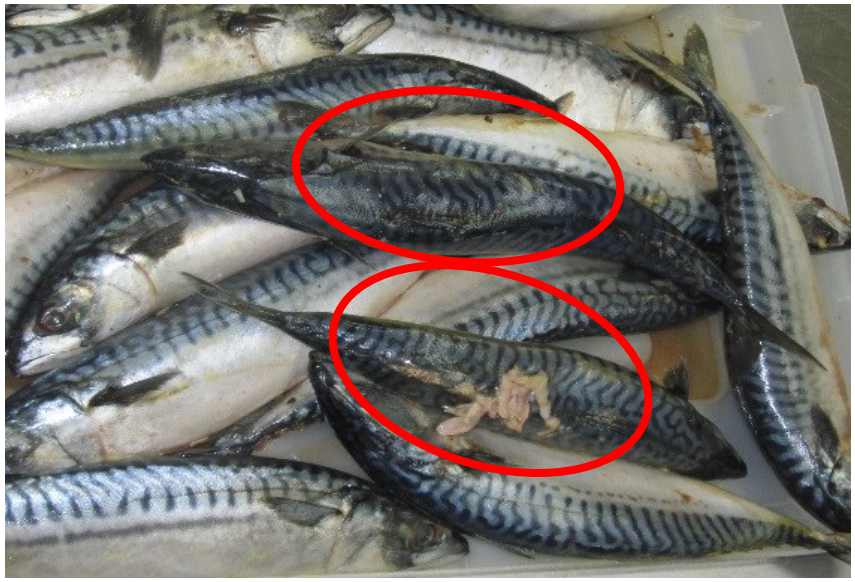
Paper IV

Mechanical deformation of frozen Atlantic mackerel products

Deterioration due to **enzymatic activity**

Deterioration due to **mechanical deformation**

Whole; plate frozen



Headed/gutted; plate frozen

Paper IV

Effect of frozen storage duration on lipid oxidation

Whole mackerel

Headed/gutted mackerel

Paper IV

Effect of frozen storage temperature on fish yellowness

- 18 °C

- 25 °C

Paper IV

Effect of frozen storage duration on lipid oxidation

- 18 °C

- 25 °C

Conclusions

- ✓ Fish from early summer (**August**) had a higher **nutritional value**, since its polyunsaturated fatty acids level was greater than for fish caught in late summer (**September**)
- ✓ **Temperature abuse** is responsible for physicochemical quality loss, as well as loss of food safety (oxidative and hydrolytic rancidity). Therefore it is necessary to keep **temperature constant** during transportation, processing and storage
- ✓ It can be recommended to store frozen products of Atlantic mackerel at **-25 °C rather than at -18 °C** in order to maintain its quality during long term storage
- ✓ The present study indicated a higher sensitivity of **whole mackerel** toward enzymatic deterioration in comparison to headed and gutted products. On the other hand, **headed and gutted** fishes showed high mechanical deformation as affected by processing techniques as well as lipid oxidation development.

THANK YOU

matís

AVS
rannsóknasjóður
í sjávarútvegi