



## Module 7.2

# Superchilling

## Results of experimental investigation

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# Outline

1. Experimental investigation: superchilling of Salmon filets
2. Experimental investigation: superchilling of 7 day old pork loins
3. Conclusions

# Learning Outcomes

- ⇒ Understand the how superchilling can be applied in industry.
- ⇒ Identify the difference between superchilled and conventional chilled products.
- ⇒ Evaluate how different results can be used to bring superchilled products to the market.
- ⇒ The presented results are the outcome of a specific experiment and indicate what benefits can be achieved by superchilling.

## Experimental set-up:

- Storage temperatures of  $-1.5^{\circ}\text{C}$
- Benchmark with chilled storage at  $3^{\circ}\text{C}$
- 1. Organic Salmon (*Salmo Salar*)
  - Send express from slaughtering on ice (1 day)
  - Salmon piece, 150-200 g, thickness from 1-5 cm.
- 2. Organic loin of pork
  - ⇒ As fast as possible from organic supplier,
    - 7 days in the cold chain (fastest possible!)
    - 7 days left

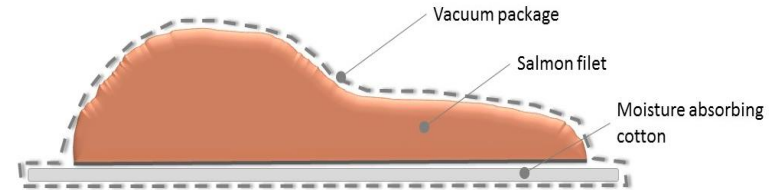
# Experiments of Organic Salmon and Pork

## Analyses:

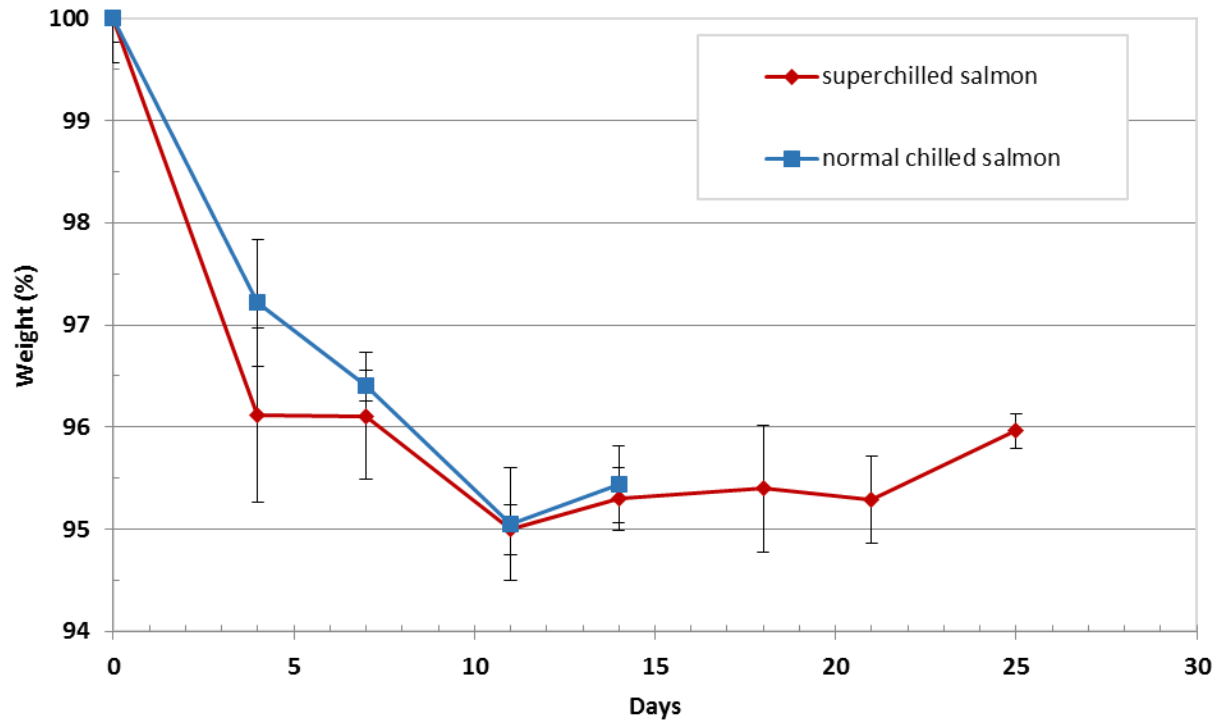
- DSC – fat extraction
- Ice content determination
- Water content
- Bacteria growth rate
- Water loss
- Colour
- Water holding capacity
- Stored a sample for further analyses (?)

## Procedure

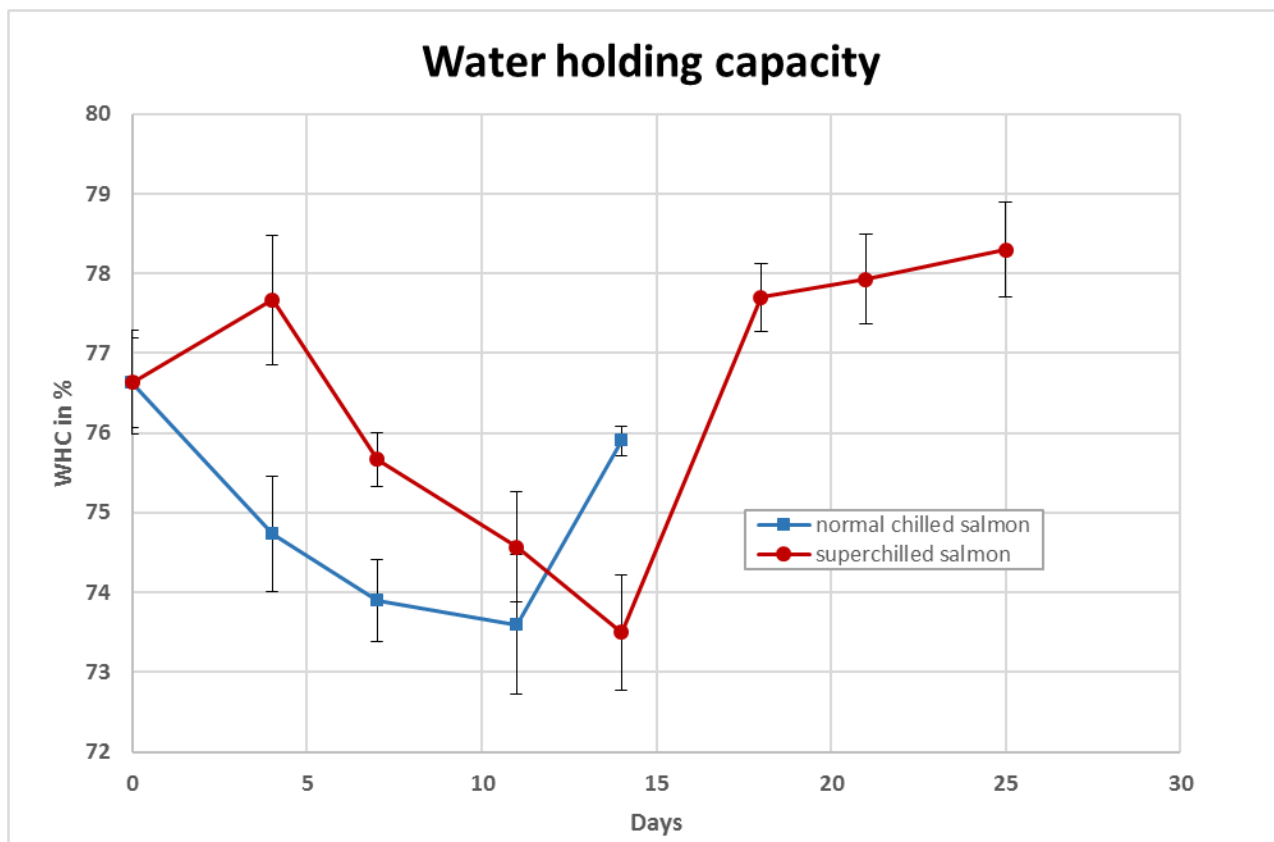
- Receiving of chilled samples
- Cut the samples if necessary
- Vacuum packing
  - With a water adsorption tissue
- Impingement Freezing, around 2 minutes, - 40°C
- Storing for X amount of days
- Sampling and analysing
  
- Total of 100 samples for each trial



## Drip loss

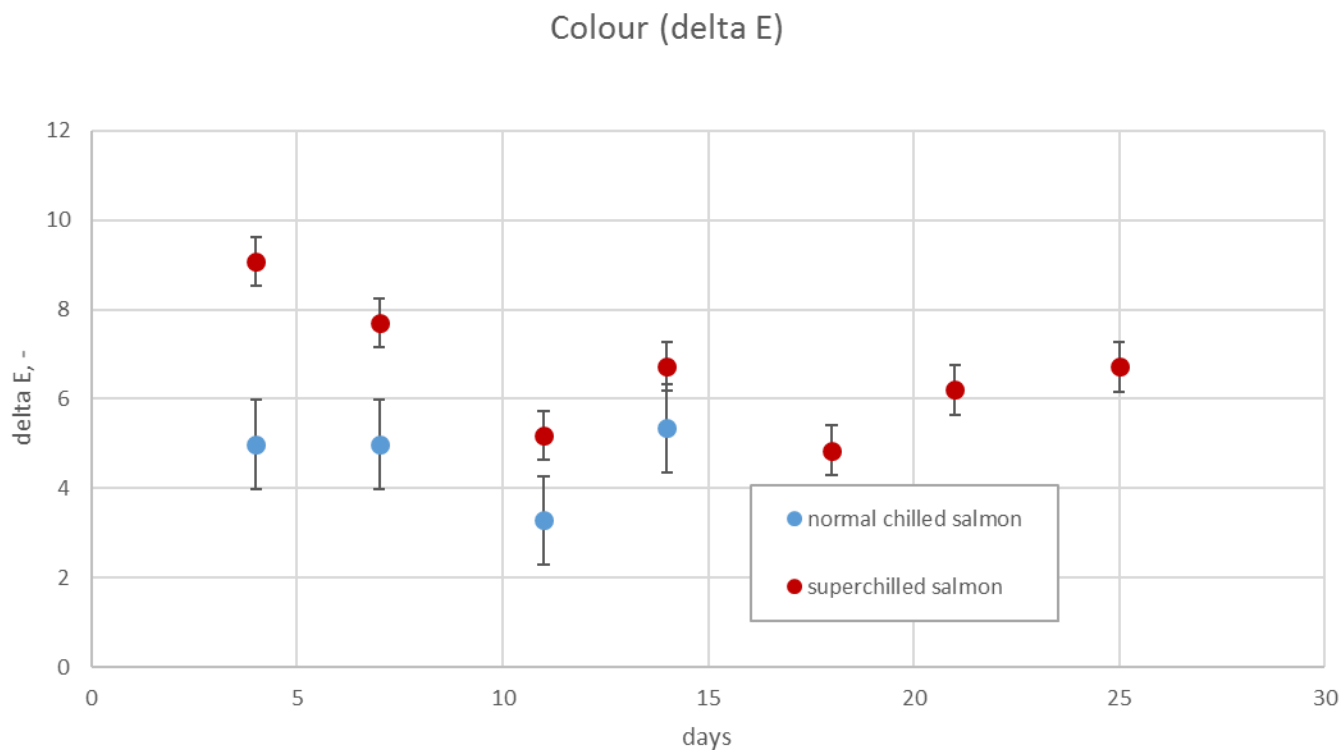


# Results of Organic Salmon



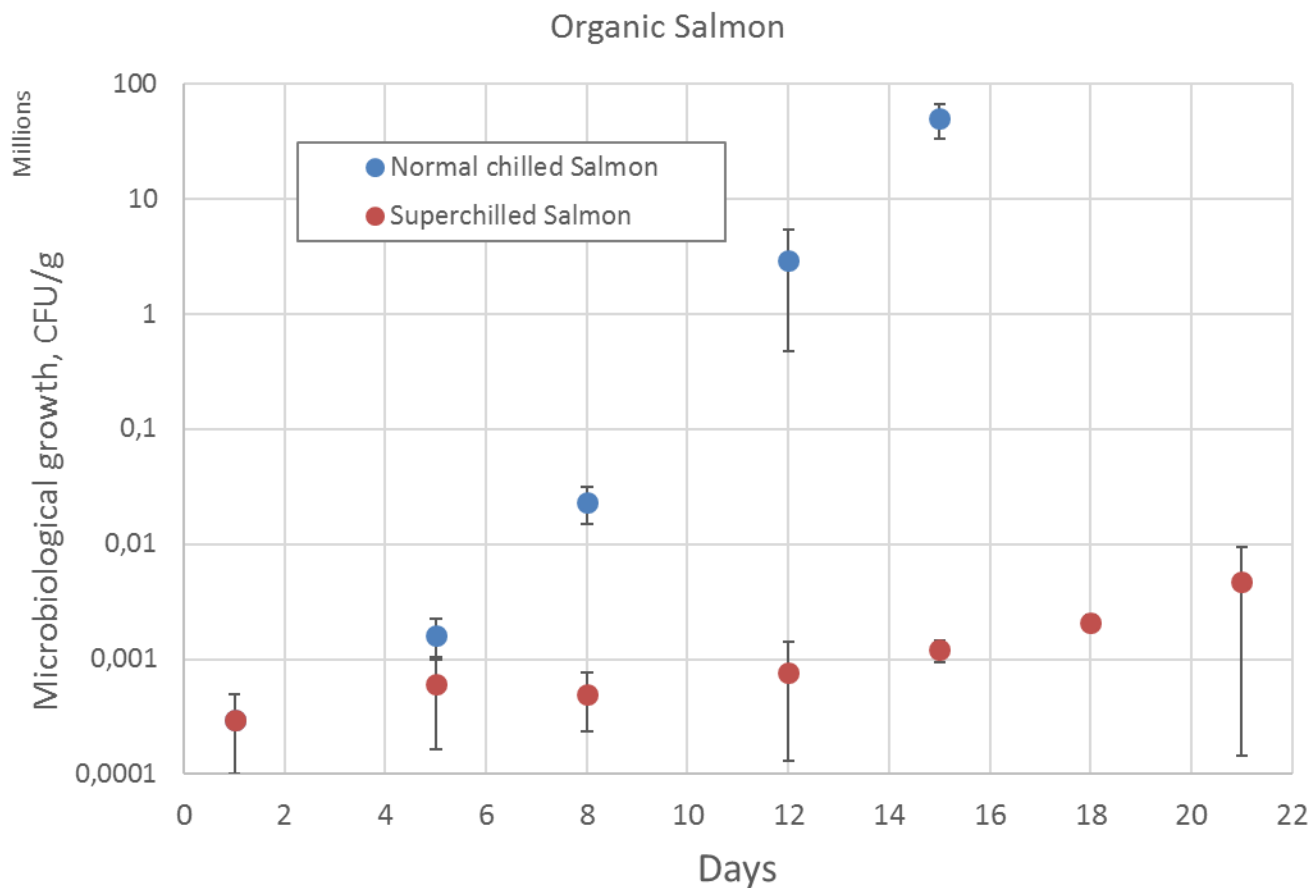


# Results of Organic Salmon



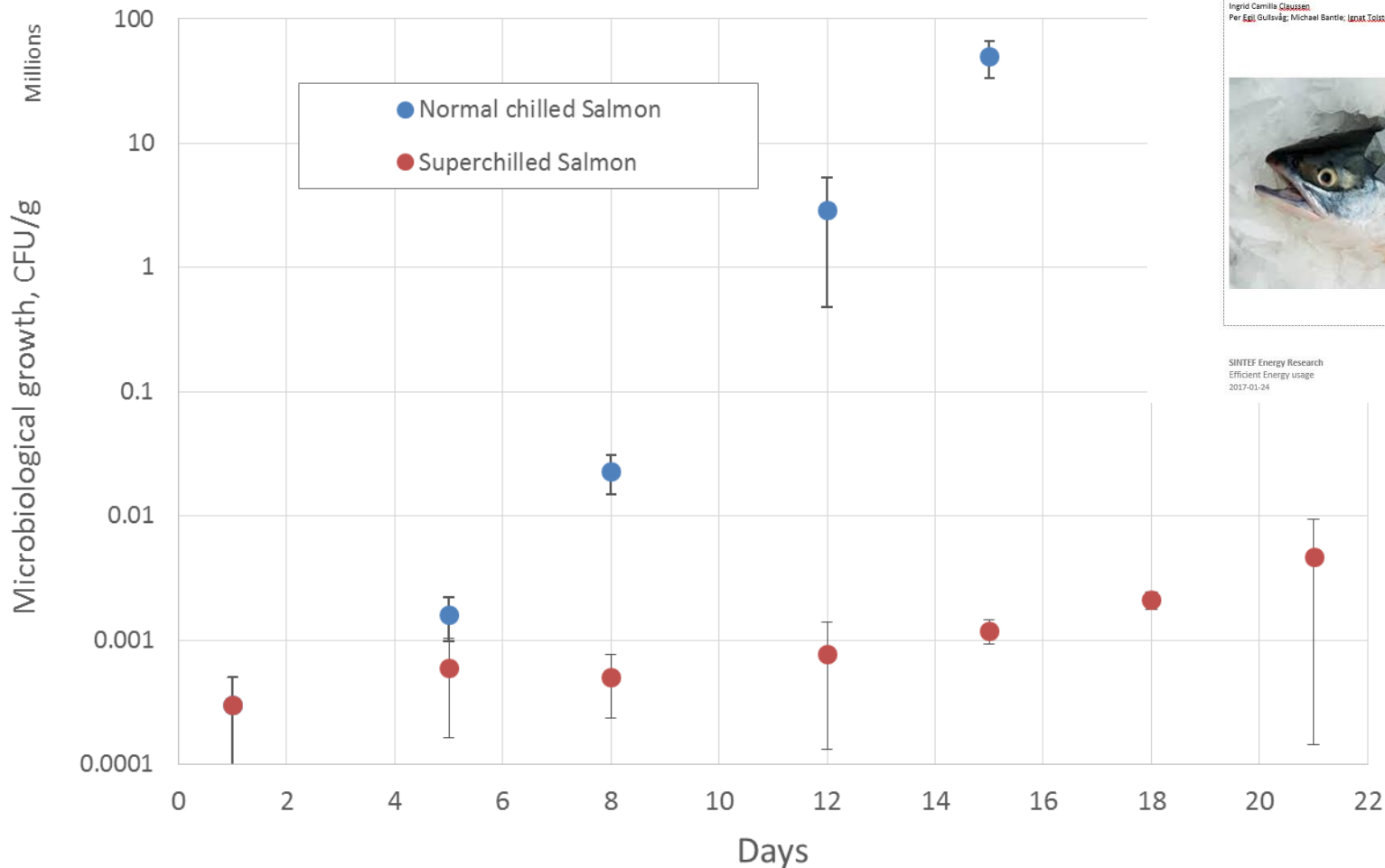
$$\Delta E = \sqrt{(L^*_2 - L^*_1)^2 + (a^*_2 - a^*_1)^2 + (b^*_2 - b^*_1)^2}$$

# Results of Organic Salmon



# Superchilling

Organic Salmon



Report No - Unrestricted

## Report

### Super-Chilling of organic food

Part 2: Storage test with super chilled organic salmon and pork chops

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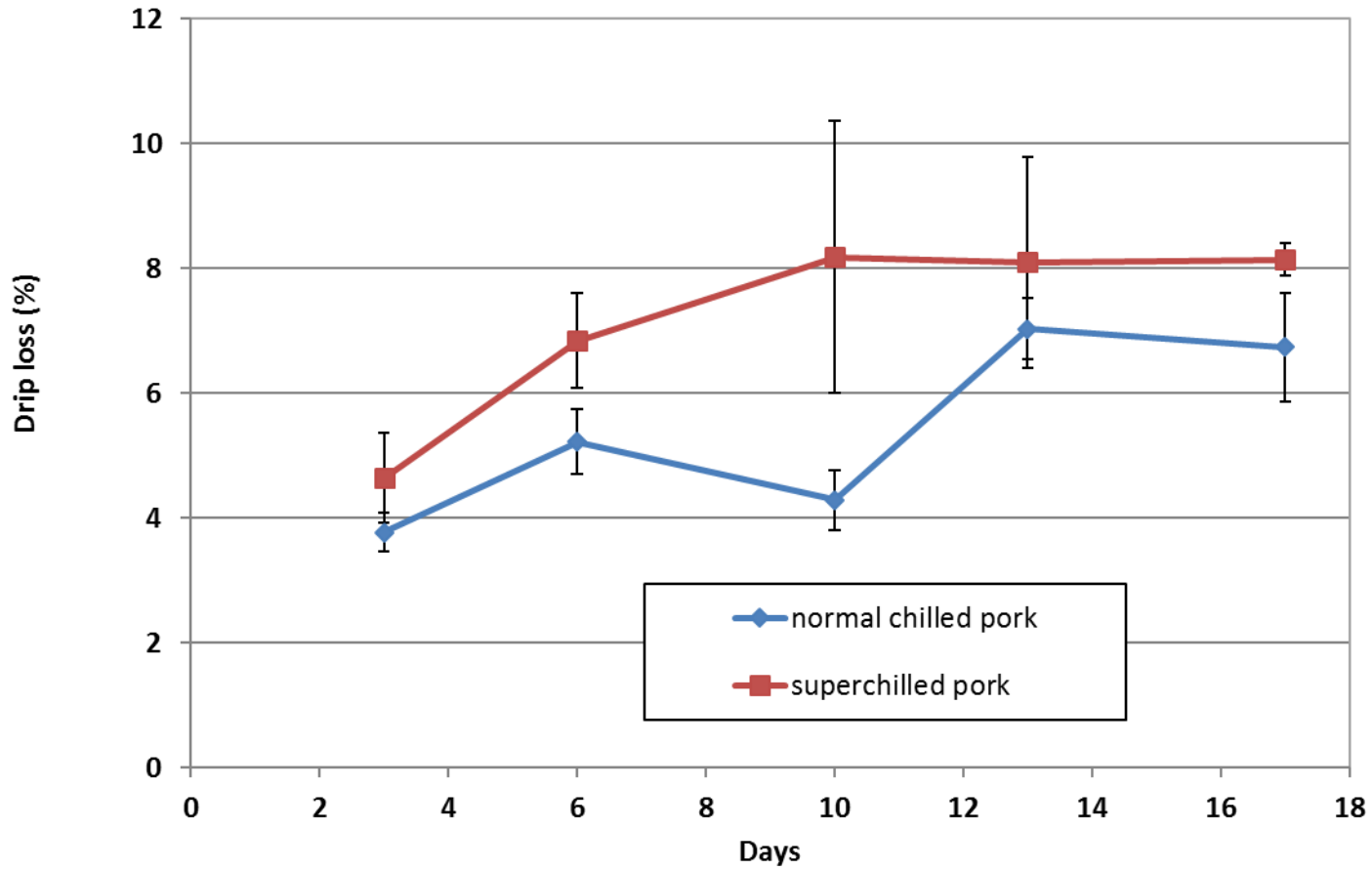
# Experiments of Organic Pork

## Procedure

- Receiving of chilled samples, which were **already 7 days in the cold chain.**
- Vacuum packing
  - With a water adsorption tissue
- Impingement Freezing, around 2 minutes, - 40°C
- Storing for X amount of days
- Sampling and analysing
  
- Total of 100 samples for each trial

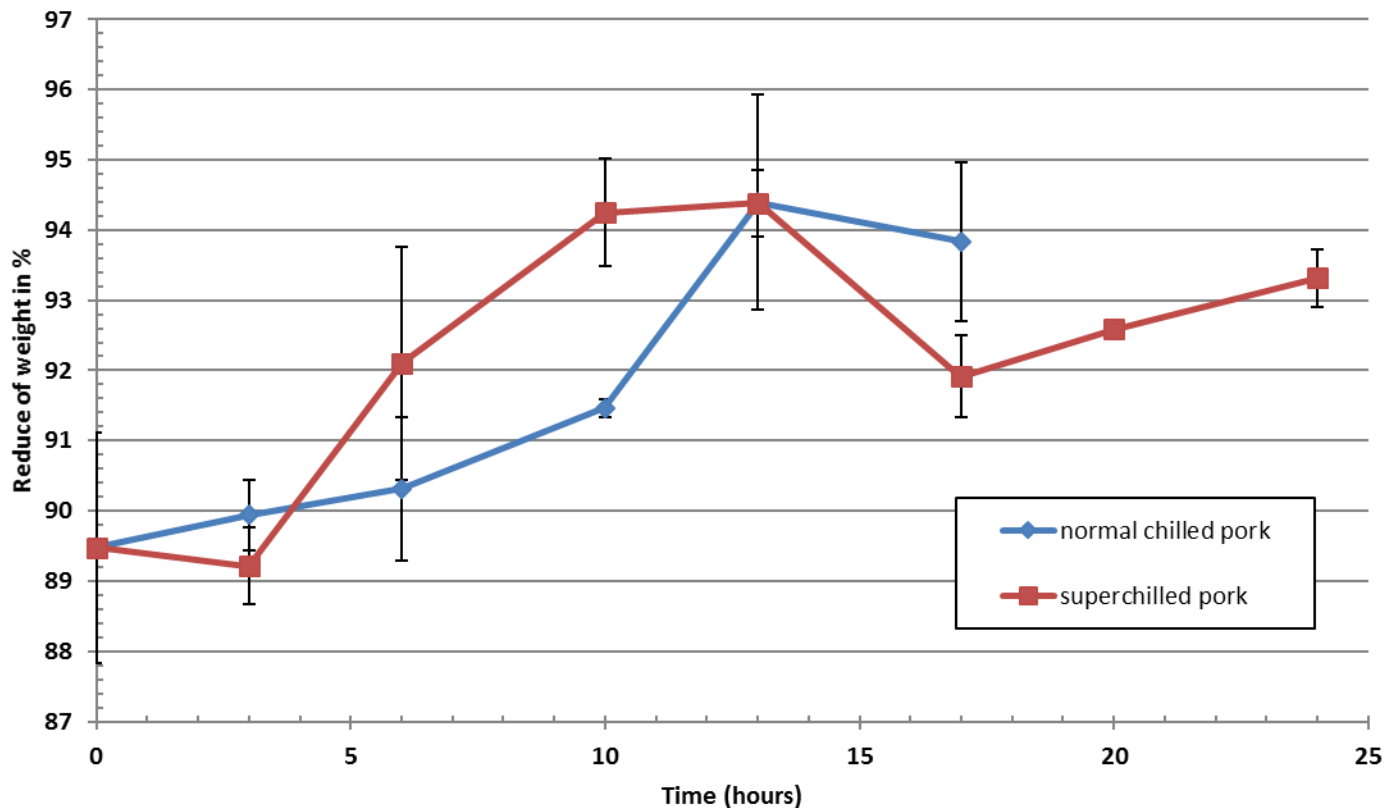
# Results of Organic Pork

## Pork chop: Drip loss

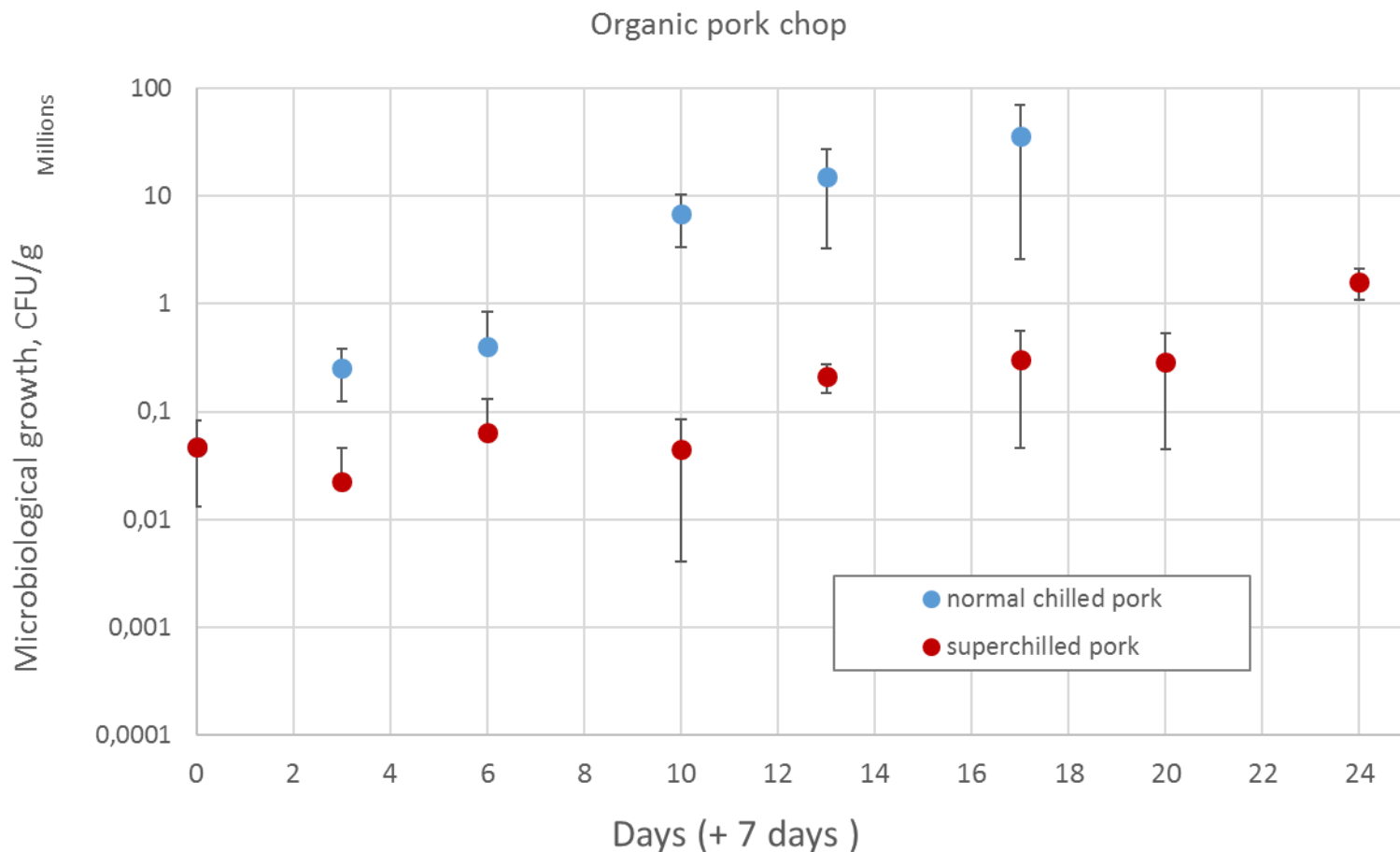


# Results of Organic Pork

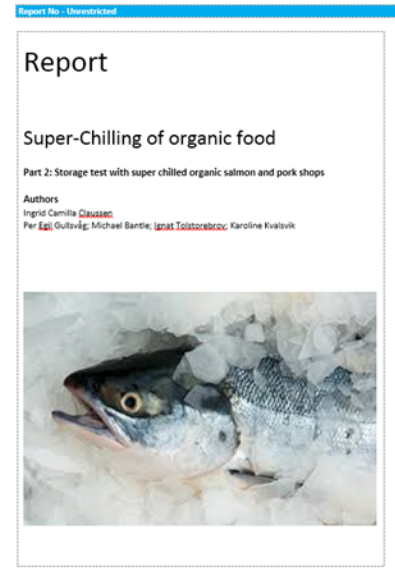
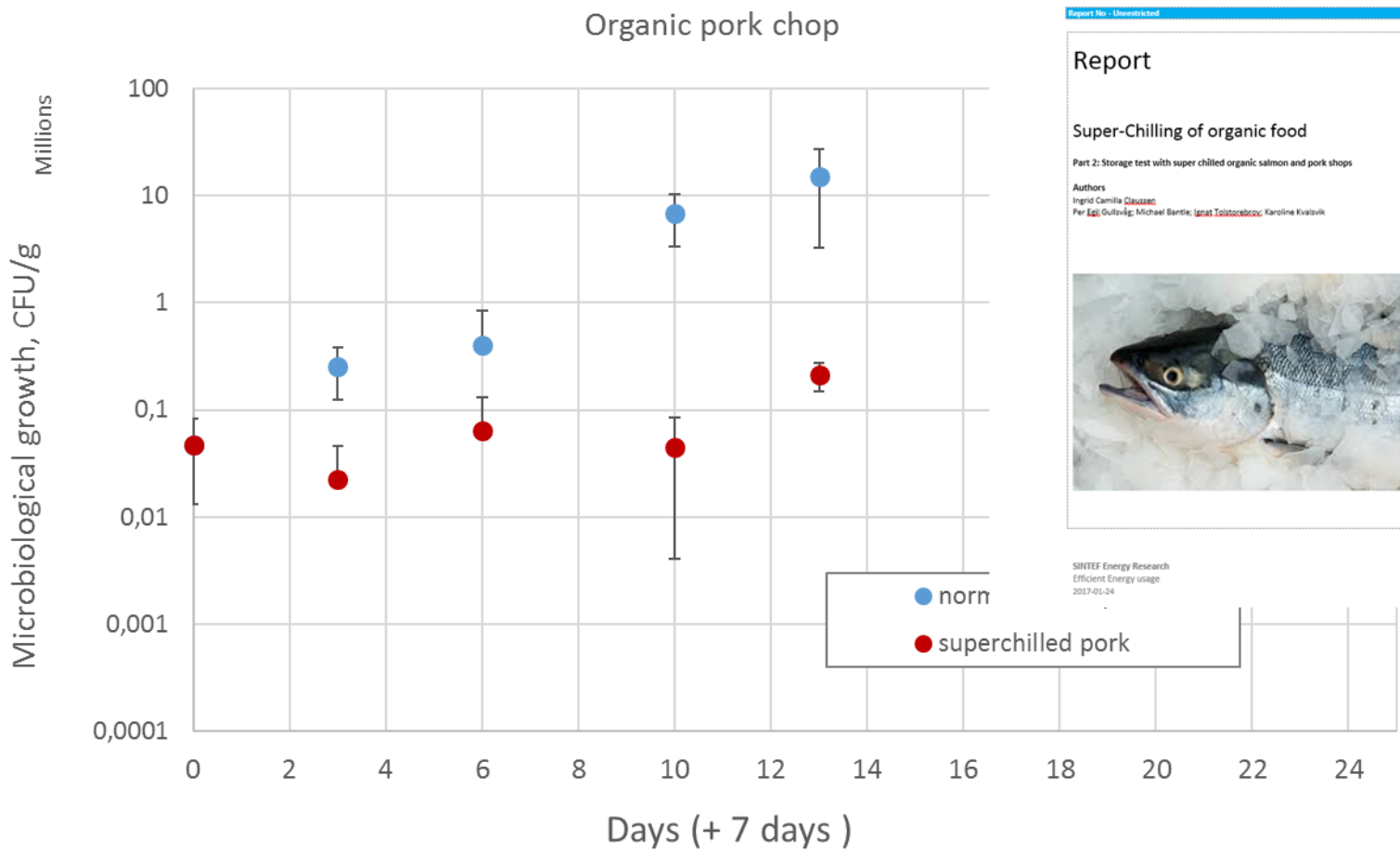
## Water holding capacity of pork chop



# Results of Organic Pork



# Results of Organic Pork



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# Conclusions

- **Significant shelf life extension, especially for the pork loins**
- **Quality parameters difficult to interpret**
  - Water holding capacity and drip loss is influence due to ice formation under
  - Colour (?)
- **Potential for small organic producers to extend shelf life**
- **SusOrganic report is giving more details about the experiments**
- **The results are valid for one specific production site and cannot be transferred without further verification**



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