

# Technology development for value addition of herring and sprat to protein-enriched ingredients

## Aim

- To investigate how different cuts/fileting form of small herring will affect the following process yields and mince storage stability.
- To evaluate "mince washing" as a post grinding method of whole and headed small herring to improve storage stability (i.e., removal of prooxidative heme-iron).
- To study the potential improvement of the mince washing effect on storage stability by including an antioxidant-mixture into the washing solution.

## Conclusion

- Promising routes shown for valorization of whole or partially cut herring to stable minces
- 55-76% of the mass recovered in cutting + mincing
- 66-81% of the proteins recovered in mincing + washing
- 57-61% lipid reduction from whole herring to washed minces
- Use of antioxidants at 0,5% concentration in 1<sup>st</sup> and 2<sup>nd</sup> washes created highly stable minces promising for production of e.g. burgers, balls and nuggets

## Introduction

Herring (*Clupea harengus*) and sprat (*Sprattus sprattus*) are two pelagic species natural to Swedish waters and have traditionally been very important for our food security in the Nordics. Despite these two species being recognized as having low effect on the environment and possessing high nutrition-based advantages, only 11% of these species caught by Swedish fishing vessels are used for food. The bulk of this loss is due to that small sizes (common in the Baltic Sea) of the fish goes directly to fish meal/oil production to be used in animal feed (ca 80% in 2022).

In this project we will study different processing methods, new to be applied on small herring and sprat as modern ways to better utilize this food raw material towards food, instead of animal feed.

## Outlook

- Applying modified versions of the process (including ethanol and/or oil washing steps) on small herring from the Baltic Sea.
- Investigate the processes potential in removing dioxin, dioxin like-PCB and PFAS.



## Contact

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## Material and Methods

### Different herring cuts



### Mechanical separation

Separating meat from skin and bones, producing a mince



### Mince washing

1:3 ratio mince:wash solution  
+/- inclusion of antioxidants (AO)



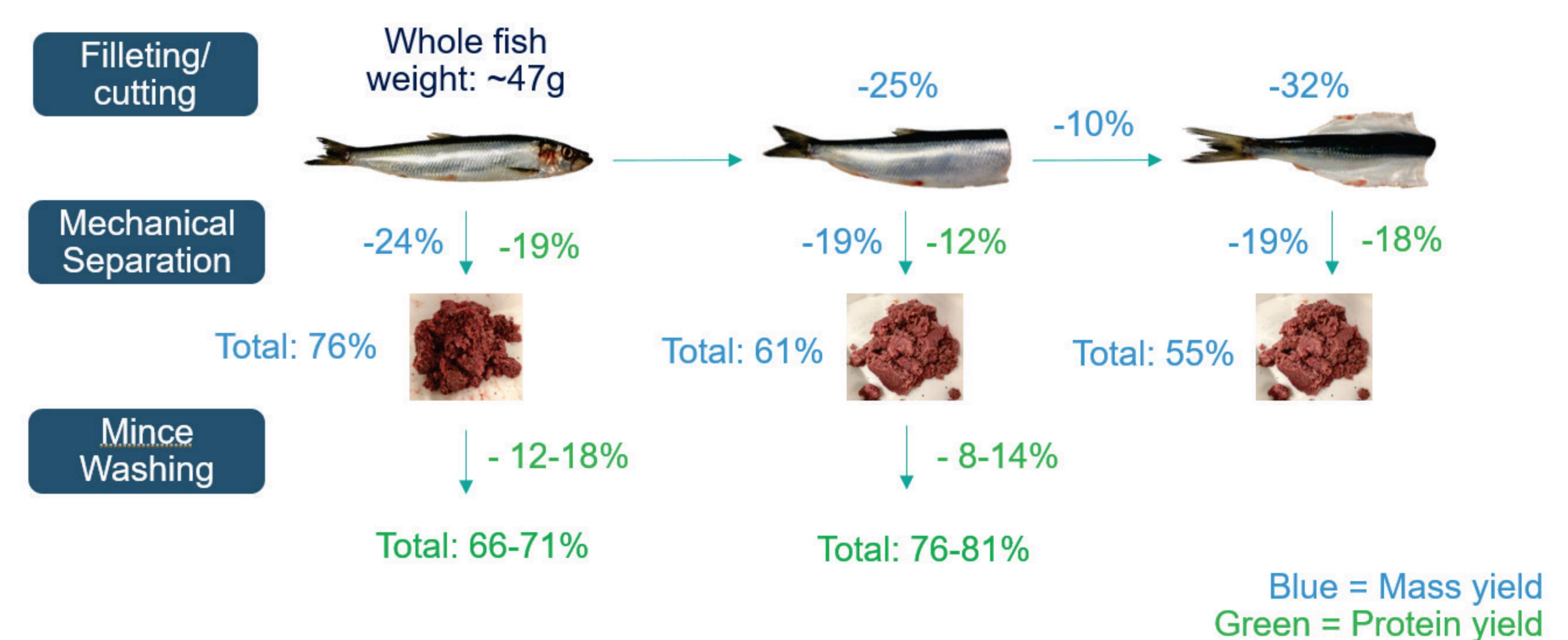
### Storage trial

Sampling for development of lipid oxidation



## Results

### Process yields



### Storage trial (headed herring)

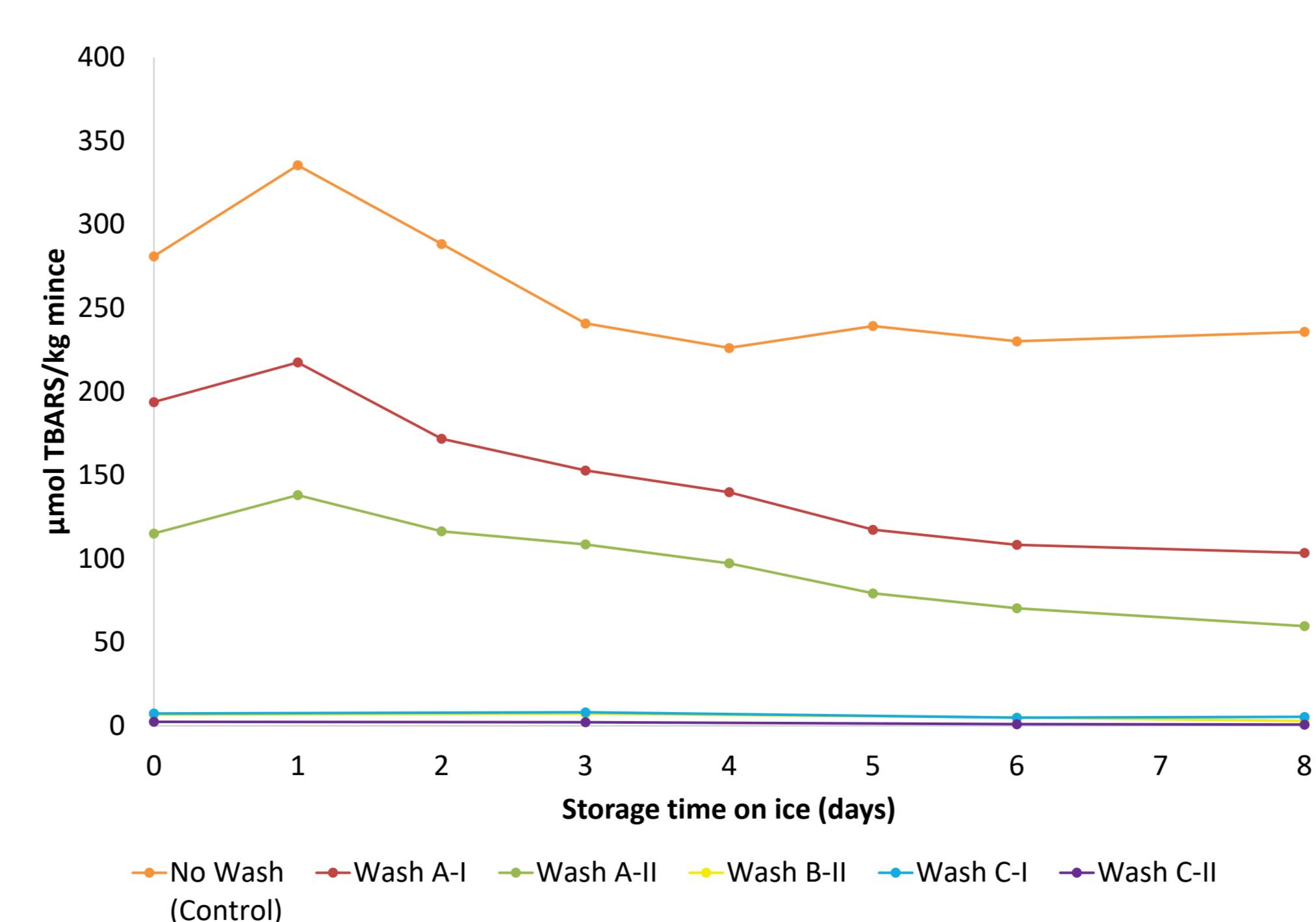


Figure 1. Lipid oxidation development in headed herring mince and succeeding washed minces.

### Proximate composition (headed herring)

Table 1. Proximate composition through the process reported as in g/100g wet weight.

	Protein [g/100 g]	Lipids [g/100 g]	Water [g/100 g]	Ash [g/100 g]
Headed (H)	11,5	6,1	76,4	2,6
H-mince	12,5	3,5	80,0	1,8
H-mince Wash I	10,3	2,6	84,4	1,3
H-mince Wash II	10,1	2,4	85,3	1,2