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Optimal utilization of seafood side-streams through the design of new holistic process lines

Improving the oxidative stability of guts from cod filleting by antioxidant dipping - a route to better seafood side-stream utilization

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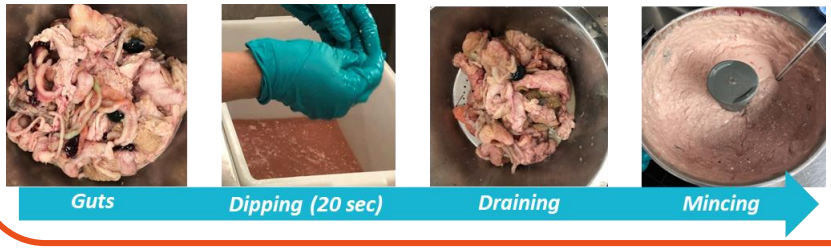
INTRODUCTION & AIM

- Growing interest for sustainable food production
- Cod filleting industry up to 60% of the weight ends up as side-streams, e.g. guts, heads and frames
- The majority of these side-streams ends up as low value products for feed
- To increase utilization for food applications, new preservation solutions are needed to maintain a high quality of the side-stream
- To evaluate the effect of antioxidant dipping of cod guts on the oxidative stability during subsequent storage
- Selection of antioxidants was based on earlier findings with commercial formulations of rosemary extracts for preservation of herring solid side-streams (Wu et al., 2020).

EXPERIMENTAL DESIGN

Raw material: Gut from cod filleting (July 2020; Royal Greenland)

Dipping treatments: No dipping, 0.9% NaCl, 2% Duralox MANC (rosemary preparation fortified with ascorbic acid, α-tocopherol and citric acid) in 0.9% NaCl, 0.05% Lipophilic rosemary extract in 0.9% NaCl, 0.2% LIpophilic extract in 0.9% NaCl



Storage: Short term (5°C, 7 days) and long term (-20°C, 6 months)

Effect of antioxidant treatment: Peroxide value (PV), tocopherols and TBA-reactive substances (TBARS)

Other analyses: Free fatty acids (FFA), Oil %, Protein % & Dry matter

RESULTS & CONCLUSION

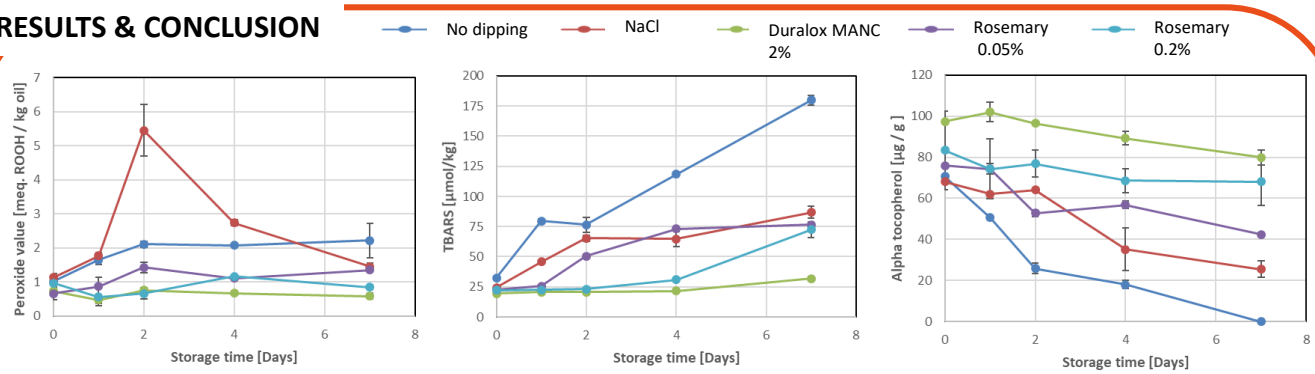


Figure 1. PV , TBARS and alpha tocopherol measured at different time points [Days]. Sample code and curve colour is described above the figure.

- Duralox MANC (**Green curve**) inhibited the formation of PV throughout storage, TBARS inhibited for 4 days and lowest consumption of tocopherol
- Rosemary extract 0.2% (**Turquoise curve**) also inhibited formation of PV. TBARS only inhibited for 2 days and low consumption of tocopherol
- Rosemary extract 0.05% (**Purple curve**) inhibited formation of PV compared to control (**Blue curve**) and NaCl (**Red curve**), however, formation of TBARS and consumption of tocopherols similar to NaCl treatment
- For the control (**Blue curve**), PV and TBARS already increased after 1 day and all tocopherol consumed after 7 days of storage

Conclusion: Positive effect of the antioxidant dipping on the oxidative stability of cod guts (PV, TBARS and tocopherol); Duralox MANC most efficient

Reference: *Wu, H., Ghirmai, S., & Undeland, I. (2020). Stabilization of herring (Clupea harengus) by-products against lipid oxidation by rinsing and incubation with antioxidant solutions. Food Chemistry, 316, 126337*

Acknowledgements: Laboratory technician Thi Thu Trang Vu for excellent work in the laboratory work; Kalsec for providing the commercial rosemary extract Duralox MANC.

This project has received funding from the Bio Based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 837726. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio Based Industries Consortium. This output reflects only the author's view and the JU cannot be held responsible for any use that may be made of the information it contains.

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Horizon 2020 European Union Funding for Research & Innovation