

Improving the oxidative stability of side-streams from cod filleting by antioxidant dipping for increased utilization

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Introduction and aim

- In the cod filleting industry up to 60% of the weight ends up as side-streams, e.g. frames, heads and guts
- To increase utilization for food applications, new preservation solutions are needed to maintain a high quality of the side-stream
- The aim was to evaluate the effect of antioxidant dipping of cod frame, head and gut on the oxidative stability during subsequent storage



Experimental design

- Side-streams: frame, head and gut
- Antioxidant dipping: 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 rosemary extract in 0.9% NaCl.
- Storage: On ice at 5°C for 7 days
- Antioxidant selection was based on findings from preservation of herring solid side-streams with rosemary extracts (Wu et al., 2020).
- Effect of antioxidant treatment evaluated by: Peroxide value (PV), tocopherols, TBA-reactive substances (TBARS) and sensory profiling (trained and tested expert panel; selected samples).

Results

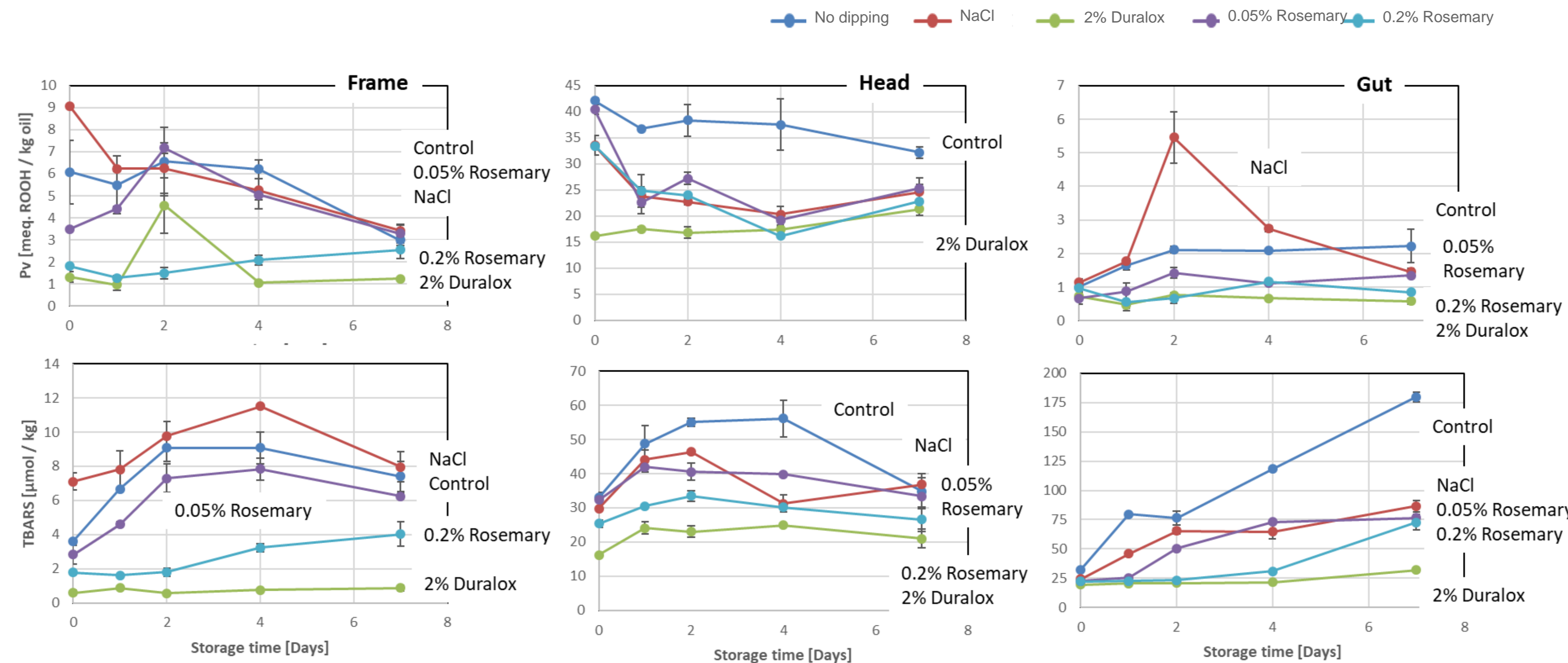


Figure 1. PV (top) and TBARS (bottom) measured during short-term cold storage in frame, head and gut.

- For the head side-stream, a higher initial PV was observed compared with frame and gut (Figure 1).
- Lowest PV was observed for side-streams treated with Duralox followed by 0.2% Rosemary independent of type of side-stream.
- The development of TBARS in control samples increased most in gut side-stream (Figure 1).
- Duralox inhibited the formation of TBARS throughout the storage, whereas for 0.2% rosemary TBARS

- were only inhibited for 2-4 days.
- Gut samples had higher levels of initial α -tocopherol than head and frame side-streams (data not shown).
- Tocopherols were consumed rapidly in samples with higher PV and TBARS (Gut: No dipping, NaCl and 0.05% rosemary, data not shown).
- Lipid oxidation was higher in side-streams with higher oil content: Gut 13-20% > Head 1.5-2.5% > Frame 1.0-1.3% oil (TBARS and Rancidity).

- 2% Duralox and 0.2% Rosemary had the highest effect on preventing rancidity (Figure 2).
- The description of off-odour for the gut sample (No dipping) was fermented / ensilage, whereas for frame samples (0.05 and 0.2% Rosemary), it was green tea / flowerish (Figure 2).

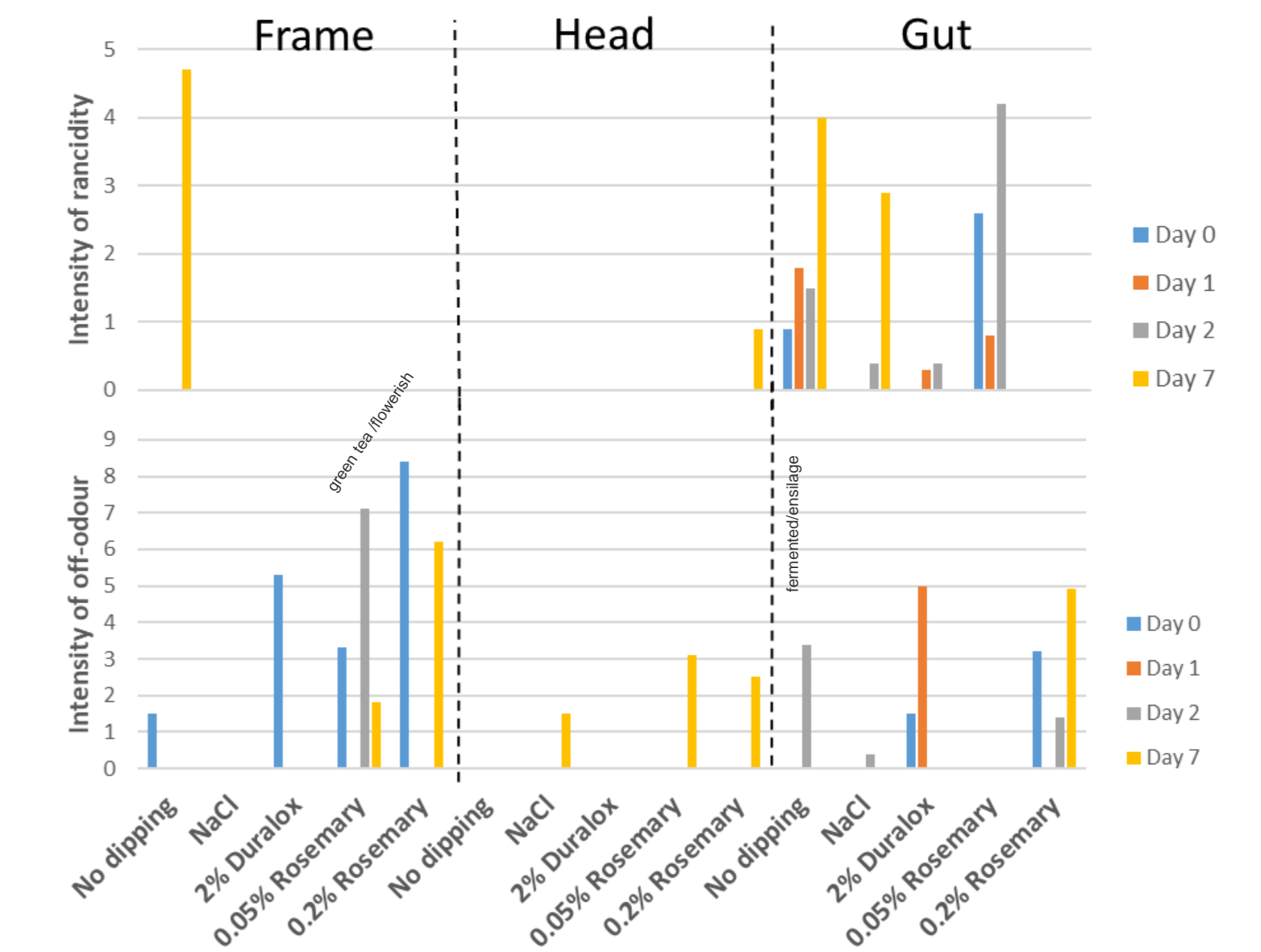


Figure 2. Intensity of rancid and off-odour developed during storage.

Conclusions

- Positive effect of the antioxidant dipping on the oxidative stability of cod side-streams.
- Duralox MANC most efficient commercial rosemary extract without any green tea / flowerish off-odour.

References and Acknowledgements

Wu et al., 2020. Food Chemistry, 316, 126337.
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