



Stabilisation of raw tuna with FORTIUM[®] R-WS 20 Liquid natural rosemary extract.



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Introduction



- Fish products are inherently prone to the lipid peroxidation process due to their relatively high content of polyunsaturated fatty acids.
- Tuna has a relatively high myoglobin content, resulting in the bright red colour of the fish meat.
 - In the presence of oxygen, myoglobin is oxidised to met-myoglobin.
 - Colour shifts gradually from red to brown and shelf life is limited.
 - **FORTIUM® R-WS 20 Liquid natural rosemary** extract was added in the brine to stabilize the tuna and thus extend the shelf life with a clean label solution.



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Materials and methods



- 1.6 kg tuna sashimi without muscle was obtained from a fish store.
- Brine was made by adding 20 % of the clean label food safety solution BactoCEASE[®] NV Liquid buffered vinegar and the corresponding treatment (Table 1).
- The fish filet was cut into smaller pieces of 50 grams (1 cm thickness).
- Each piece was soaked in 100 ml brine for respectively 5 or 60 minutes.
- Each tuna filet was grounded and divided into 7 aliquots of 4 gram in plastic weighing dishes.
- Each batch of 7 samples was then put into a closed plastic container and stored in the refrigerator at 4°C.

Table 1. Tested tuna treatments, dosage calculated in the brine.

Treatment	Active ingredient	Dosage tested (%)
Negative control	/	/
FORTIUM [®] R-WS 20 Liquid	Rosemary extract	0.5 %
FORTIUM R-WS 20 Liquid	Rosemary extract	1.0 %



TBARS – 5' brine soaking

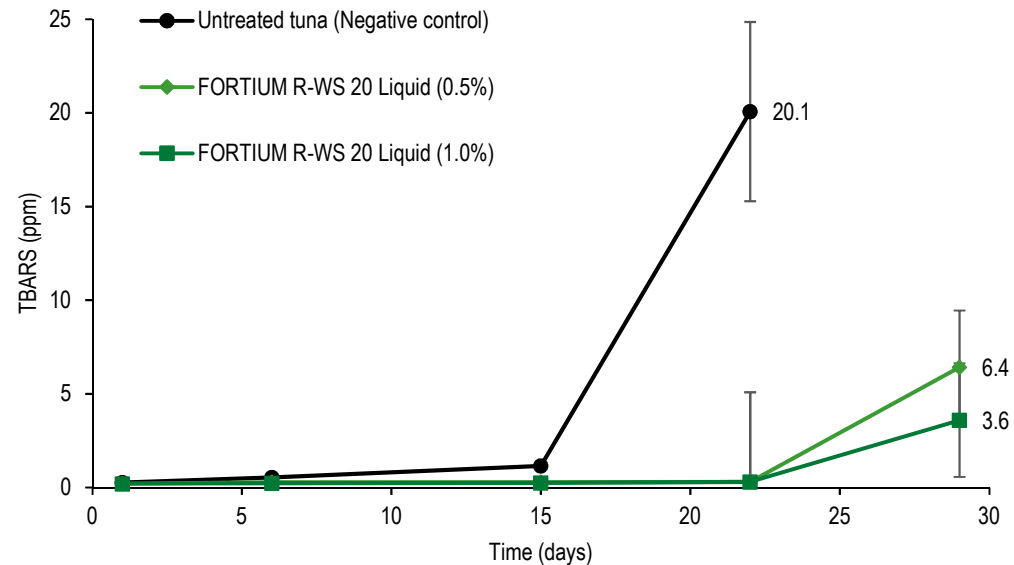
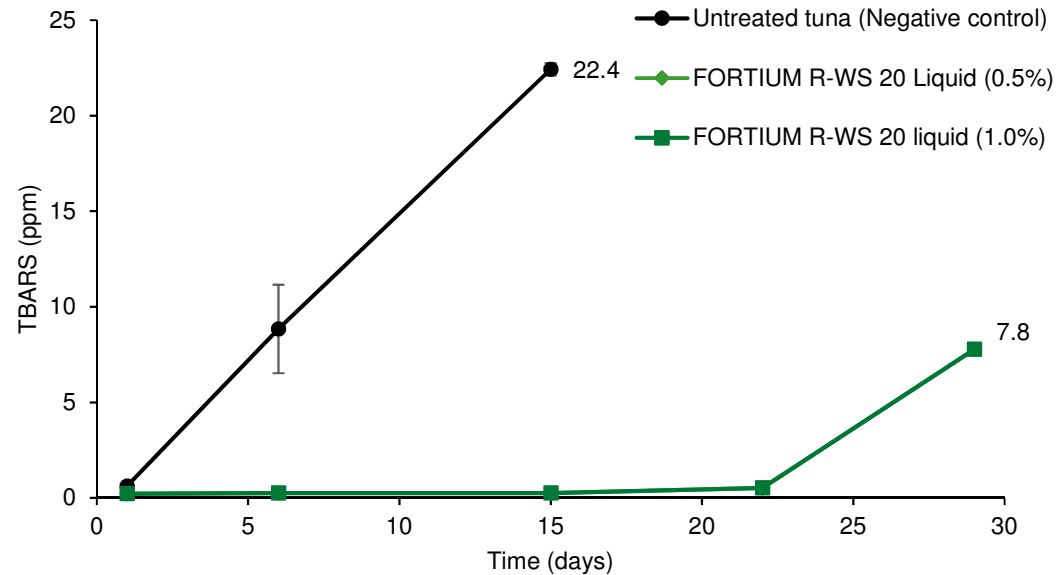


Figure 1: Mean (n=3) TBARS values (ppm) of tuna treatments, soaked for 5 minutes in brine and stored in the dark at 4°C.

- Formation of TBARS increased gradually during the first 15 days of the study for the untreated tuna samples which were soaked for 5 minutes.
- Thereafter, TBARS values exponentially increased and reached critical values of around 20 ppm.
- Both FORTIUM® R-WS 20 Liquid treatments could delay the lipid peroxidation process. Only after 29 days, TBARS values increased



TBARS – 60' brine soaking



minutes in brine and stored in the dark at 4 °C.

- Untreated tuna became more prone to oxidation when dipping time was increased to 60 minutes.
- Already after 6 days of refrigerated storage the untreated samples showed a relatively high degree of oxidation (>5 ppm).
- However, the oxidative stability of the two FORTIUM® R-WS 20 Liquid treatments remained similar compared with the shorter 5-minute dipping duration.
- During the entire study, treatments with FORTIUM R-WS 20 Liquid outperformed ($p < 0.05$) the untreated tuna



Conclusion



- Brine bath dipping promotes the release and distribution of pro-oxidant metal ions. Consequently, a long dipping time considerably decreases the oxidative stability of raw tuna.
- This oxidative stability can be greatly increased when the fish is dipped in a brine containing **FORTIUM® R-WS 20 Liquid natural rosemary extract**.
- Even a relatively short dipping time of 5 minutes significantly increased the oxidative stability of the tuna.



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