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Publication date:
2018

Document Version
Version created as part of publication process; publisher's layout; not normally made publicly available

[Link back to DTU Orbit](#)

Citation (APA):
Qiu, X., Jacobsen, C., & Sørensen, A-D. M. (2018). The oxidative stability of fish oil enriched cow and soy milk and the effect of adding rosemary extract. Abstract from 2018 AOCS Annual Meeting & Expo, Minnesota, United States.

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AOCS Annual Meeting May 6-9, 2018 (Minneapolis, USA)

The oxidative stability of fish oil enriched cow and soy milk and the effect of adding rosemary extract

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There is a growing interest in enriching food with long chain (LC) omega-3 polyunsaturated fatty acids (PUFAs), especially EPA and DHA, due to its health beneficial effects. However, it is challenging to incorporate the PUFAs to food and keep them oxidative stable during shelf life. This is due to the highly susceptibility of these LC PUFAs towards lipid oxidation. One strategy for the food industry is to use antioxidants e.g. natural antioxidants.

Rosemary extract is one of the most popular natural antioxidants on the market. The extract contains carnosic acid and carnosol as major components and other minor components which can act as antioxidants. Therefore, the aim of the study was to evaluate the effect of rosemary extract on the oxidative stability of fish oil enriched cow and soy milks. Both peroxide value and volatile secondary lipid oxidation products were determined to monitor the progress of lipid oxidation during storage (12 days, 2°C). Rosemary extract could inhibit the lipid oxidation in the cow milk. Soy milk samples having much higher unsaturated fatty acid content showed better oxidation stability compared to cow milk regardless of the inclusion of rosemary extract or not. The concentration of carnosic acid and carnosol, arrived from the rosemary extract addition, was significantly more reduced in soy milk samples compared to cow milk. Analysis of the bioactive compounds in the fish oil enriched soy milk demonstrated that chlorogenic acid could contribute to the lipid oxidation stability of this product.

Key words: n-3 PUFA, carnosic acid, carnosol, chlorogenic acid, isoflavone, soy milk, cow milk, TPC, HPLC