

# **Lipid Oxidation in Fish Oil Enriched Oil-in-water Emulsions and Cream Cheese with Pre-emulsified Fish Oil is affected differently by the Emulsifier used**

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It is well-documented that a high intake of long chain omega-3 polyunsaturated fatty acids has several health beneficial effects in humans. Consequently, the interest in food products enriched with marine oils has increased during recent years. However, addition of these highly unsaturated fatty acids to foods invariably increases the risk of lipid oxidation. A possible strategy to avoid lipid oxidation and the consecutive development of unpleasant off-flavours is to protect the oil in a delivery emulsion in which the oil droplets are shielded from its possible pro-oxidative surroundings by an emulsifier. The antioxidative properties of milk proteins make them an obvious choice as emulsifiers in delivery emulsions. Previous studies have furthermore shown that a combination of proteins and phospholipids may increase the thickness of the interfacial layer in an emulsion.

This presentation will include results from studies on lipid oxidation in simple oil-in-water emulsions prepared with milk proteins alone or combinations of milk proteins and phospholipids. In addition, a study on fish oil enriched cream cheese will be presented. In this study, the cream cheese was enriched with either neat fish oil or a fish oil-in-water delivery emulsion prepared with whey protein isolate, sodium caseinate or a commercially available emulsifier that consisted of ~20% milk phospholipids and ~50% milk proteins. Results showed that simple emulsions prepared with a combination of milk proteins and phospholipids as emulsifier had lower oxidative stability compared with emulsions prepared with milk proteins only. In cream cheese the opposite was the case. Furthermore, delivery emulsions prepared with milk proteins only were even found to increase oxidation compared to cream cheese prepared with neat fish oil. The findings in cream cheese could to some extent be explained by differences in the microstructure as observed from confocal laser scanning microscopy.