

# **Effect of emulsifier type, iron and pH on the oxidative stability of 5% fish oil-in-water emulsions**

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Long-chain highly unsaturated omega-3 fatty acids (HUFA) have a wide range of beneficial health effects, according to an increasing body of evidence. Therefore, incorporation of these HUFA from fish oils into foods has received increasing attention from both academia and industry during the last decade. However, their polyunsaturated nature render them very labile to oxidation, and their use in food products can be limited due to development of unpleasant off-flavours caused by lipid oxidation. The majority of omega-3 enriched foods on the market are emulsified products. Previous data shows that the extent of oxidation depends on the emulsifier type, e.g. proteins, such caseins, may offer protection of omega-3 lipids against oxidation. In contrast, the effect of phospholipids, which are often used as emulsifiers in foods, has only been investigated to a limited extent. In addition to the emulsifier type also the concentration and the pH may affect the structure of the interface and this, together with the presence of iron, can affect the oxidative stability.

Therefore, aim of this study was to investigate the above mentioned parameters on oxidative stability of 5% fish oil-in-water emulsions. This was done by comparing the effect of different phospholipid based emulsifiers on lipid oxidation in 5% fish oil-in-water emulsions with the effect of different protein based emulsifiers. The phospholipids were soy lecithin and two milk phospholipid concentrates (MPL20 and MPL75, with around 20% and 75% phospholipids, respectively), and the protein based emulsifiers were whey protein isolate and sodium caseinate. Lipid oxidation was studied at two different pH values (3 and 7), at two different concentrations and with or without the addition of iron. Preliminary results showed that higher concentration of emulsifier resulted in better protection both with and without iron added. In addition, sodium caseinate seemed to be most efficient in protecting the fish oil against oxidation.