Effect of emulsifier type, pH and iron on oxidative stability of 5% fish oil-in-water emulsions - DTU Orbit (18/12/2018)

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The effect of using different emulsifiers on lipid oxidation in 5% w/w fish oil-in-water emulsions was investigated. Emulsifiers included two of milk protein origin (whey protein isolate (Whey) or sodium caseinate (Cas)), soy lecithin (Lec) or emulsifiers high in milk phospholipid (20 or 75%). Forty different emulsions were produced with the five different emulsifiers. For each emulsifier, emulsions were prepared at two concentrations (0.2 and 0.75 wt%) at pH 3 or 7 and with or without added iron. Emulsions were stored in closed bottles in the dark at RT (20°C) for up to 7 days (with added iron) or 42 days (without added iron). Physical parameters and oxidative stability of the emulsions were investigated by analysis of particle size, zeta potential, primary and secondary oxidation products. Increase in emulsifier concentration generally increased the oxidative stability. Type of emulsifier and physical conditions affected the physical and oxidative stability of the emulsions. A general observation was that emulsions produced with the milk protein based emulsifiers were more oxidatively stable compared with the other emulsions. Practical applications: The overall conclusion from this study was that the oxidative stability of 5% o/w emulsions depended on both emulsifier type, concentration, pH and iron content. An analogous conclusion is most likely also valid in more complex food emulsions with similar or higher lipid contents such as milk drink, dressing, etc. Hence, in such foods the emulsifier and the emulsifier concentration should be carefully chosen in order to minimise lipid oxidation. However, milk protein-based emulsifiers could be a better choice than emulsifiers with higher content of phospholipids independent of emulsifier concentration, pH and iron content.

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