Oxidative stability and microstructure of 5% fish-oil-enriched granola bars added natural antioxidants derived from brown alga Fucus vesiculosus - DTU Orbit (03/03/2019)

The aims of this study were to; 1) investigate the ability of Icelandic brown algae Fucus vesiculosus extracts to inhibit lipid oxidation in granola bars fortified with fish oil-in-water emulsion; 2) investigate whether addition of the seaweed extracts affected the physical microstructure of the oil droplets in granola bars. The oxidative stability of the bars at 20°C was evaluated over a period of 10 weeks by measuring the development of peroxides and volatile compounds using dynamic headspace gas chromatography mass spectrometry (DHS GC-MS). The physical microstructure was determined using microscopy.

All extracts - except water extract in low concentration - reduced lipid oxidation during 10 weeks of storage when added in a concentration of 0.5 or 1g extract/100g emulsion. EE and AE (in the lowest concentration) were found to be most efficient as antioxidants in the bars. The antioxidant efficacy of these two extracts was among other related to an improved incorporation of the fish oil-in-water emulsions in the bars, high total phenolic content, high radical scavenging activity together with high interfacial affinity of phenolic compounds and probably regeneration of tocopherol.

Practical applications: The work showed the application potential of Fucus vesiculosus extracts as a natural antioxidant in low-moisture foods such as granola bars. These findings implied that the multi-functional nature of these extracts provides not only oxidative stability of the food but also a physical stability.

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