

# **Antioxidant effect of Quercetin on the Oxidative deterioration of Bulk oils and oil-in-water emulsions**

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Quercetin is a flavonoid, which is a type of pigment found in almost all herbs, fruits, and vegetables. Quercetin has been shown to help prevent the development of a variety of conditions related to inflammation and free-radical damage, including arthritis, allergies, macular degeneration, heart disease, gout, and various forms of cancer. Its use as natural antioxidant in food systems is challenging, considering consumers' demand for the consumption of natural food ingredients. So, the antioxidant effect of quercetin on the oxidative stability of bulk oils and oil - in - water emulsions (o/w) was examined.

Quercetin was added (1 mmol/kg oil) in oils with high percentage of polyunsaturated fatty acids (corn and sunflower oils), which were left to oxidize at 60 °C, while their oxidative deterioration was determined by measuring peroxide value. Its antioxidant activity was further evaluated in dispersed systems. Therefore, it was added at a concentration of 1 mmol/kg oil in the oil phase of 10 % sunflower and corn oil - in - water emulsion, stabilized with Tween 20 or sodium caseinate (Na - CAS) or a mixture of them at equal concentration (1%), that were left to oxidize at 60 °C. The results revealed that quercetin had a good antioxidant activity in bulk oils as well as in o/w emulsions stabilized with Tween 20, while no significant difference was observed in protein based emulsions by measuring both primary (conjugated dienes) and secondary (TBAR related substances) oxidation products.

Furthermore, quercetin (1 mmol/kg oil) was microencapsulated with the technique of spray drying in 10% Na - CAS solution, in order to remain in the oil - water interface of the emulsions. Conjugated dienes production was used again as oxidative marker of lipid deterioration in the emulsions and indicated encouraging results about the antioxidant activity of quercetin in the microencapsulated form.