

Phenolipids as Antioxidants in Emulsified Systems

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Lipid oxidation is a major issue in foods containing LC PUFA and substantial efforts have been made to protect lipids against oxidation. Recent studies carried out with phenolipids (lipophilized phenolics) in emulsified systems have shown that increased lipophilicity did not necessarily lead to an increase of the antioxidative effect. When the phenolic compound reaches a certain point of lipophilicity its antioxidative effect decreases. Thus, the polar paradox hypothesis is not valid when the alkyl chain length is above a certain length. Furthermore, the length of the alkyl chain for optimal antioxidant effect has been shown to be influenced by the specific phenolic compound and the type of emulsion.

The overall aim for our work was to evaluate phenolipids with different lipophilicity as antioxidants in emulsified food. In the study presented here caffeic, ferulic and coumaric acid were selected along with their corresponding alkyl esters (C4-C20). The methods used to evaluate the antioxidative effect of the different phenolipids were the CAT assay (o/w emulsion), antioxidant assays (DPPH, Iron chelating and reducing power) and partitioning studies. Moreover, the results from the CAT assay on caffeates were compared to results (PV and volatiles) from a storage experiment with an o/w emulsion.

Keywords: Lipid oxidation, Caffeic acid, Ferulic acid, Coumaric acid, Lipophilization, Cut-off effect