

Technical University of Denmark



## Antioxidant efficacy of caffeates in emulsions and the effect of tocopherols

**Sørensen, Ann-Dorit Moltke; Aleman, M.; Durand, E.; Villeneuve, P.**

*Published in:*  
246th ACS National Meeting & Exposition

*Publication date:*  
2013

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Sørensen, A-D. M., Aleman, M., Durand, E., & Villeneuve, P. (2013). Antioxidant efficacy of caffeates in emulsions and the effect of tocopherols. In 246th ACS National Meeting & Exposition (Vol. 246). (Abstracts of Papers of the American Chemical Society).

## DTU Library

Technical Information Center of Denmark

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# **Antioxidant efficacy of caffeates in emulsions and the effect of tocopherols**

Ann-Dorit Moltke Sørensen<sup>1</sup>, Mercedes Alemán<sup>2</sup>, Erwann Durand<sup>3</sup>, Pierre Villeneuve<sup>3</sup>,  
Charlotte Jacobsen<sup>1</sup>

<sup>1</sup>Division of Industrial Food Research, National Food Institute, Technical University of Denmark, Kgs. Lyngby, Denmark

<sup>2</sup>Nutrition and Food Science Department, Faculty of Pharmacy, University of Barcelona, Barcelona, Spain

<sup>3</sup>UMR IATE CIRAD, Montpellier, France

Lipid oxidation is a major issue in foods containing LC PUFA. Lipid oxidation can be inhibited or reduced by the addition of antioxidants. Many food products are emulsions. According to the “polar paradox” hypothesis, polar compounds are more efficient as antioxidants in bulk oil, whereas lipophilic compounds are more efficient antioxidants in emulsions. Lately, extensive work has been performed on phenolipids and their antioxidant efficacy in emulsions. It was found that the “polar paradox” hypothesis was too simple to explain the observed efficacy of the phenolipids. The antioxidant efficacy increased with increasing length of the alkyl chain up to a certain length after which the efficacy decreased. Therefore, a new term, “cut-off effect”, was introduced to describe this behavior. Furthermore, the length of the alkyl chain for optimal antioxidant effect has been shown to be influenced by the type of emulsions.

The aim of this study was to evaluate the antioxidative effect of caffeic acid and its esters C<sub>1</sub> – C<sub>20</sub>, caffeates, in two different emulsion systems. In the first system we used stripped fish-rapeseed oil (50:50) and for the second system we used non-stripped fish-rapeseed oil (50:50) and for both systems Tween80 was used as emulsifier. Hence, the first system was without tocopherol and the second system was with tocopherols from the oil. In addition, caffeates were evaluated as antioxidants in two fish oil enriched food products: milk and mayonnaise. Lipid oxidation was evaluated from three parameters measured over time: peroxide value (PV), secondary volatile oxidation products and tocopherol concentrations. The results demonstrate the efficacy of caffeates in simple emulsions and food emulsions. Furthermore, the two different simple emulsion systems reveal possible interactions between caffeates and tocopherols.