

John White Symposium



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On the structural changes of edible oils by using green biobased tools to control the functional properties

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Industry needs new natural ingredients – there is a lack of knowledge of the fundamentals of controlling lipolysis in complex matrices. Based on neutron and x-ray data we will show the nature of the oil/water-interphase and how the processes that can occur during lipolysis can change the structure and composition in the interfacial layer. We will discuss how triglycerides can orient at the interface and lead to uptake of water [1]. Neutron reflectivity shows that the internal structure is very complex after lipolysis. Modelling suggests a highly disorganised, stratified structure that depends on the pH. Based on these experiments we will discuss the modification of edible oils from plant raw materials. Such information can be used to predict stability of food formulations and can serve as a tool to design and build up new and more complex matrices. We show that a new thick creamy emulsion based on oat oil can be created without additives with green biobased tools. X-ray data show that this is due to the structural change in the oil. The conditions of the dispersing solution can be used to tune the final emulsion properties. The study is part of an ongoing project aimed at obtaining more sustainably produced food ingredients that needs less additives and energy. In the long term new healthy products can be developed as e.g., carriers for bioactive food ingredients.

References:

[1] B. A. Humphreys, J. Campos-Terán, T. Arnold, L. Baunsgaard, J. Vind, C. Dicko, T. Nylander, The influence of pH on the lipase digestion of nanosized triolein, diolein and monoolein films. *Front. Soft Matter* 2022, 2, 929104.

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