Contribution ID : **238** Type : **Oral**

The effect of surfactant type on the secondary crystallisation of milk fat at the oil-water interface

Friday, 20 November 2020 16:55 (20)

The crystallisation of lipids within a dispersed oil phase has the potential to stabilise or destabilise the system, depending on the size and position of the crystals. Interfacial crystallisation within dairy emulsions is of particular interest owing to the role of lipid crystals in partial coalescence, an essential process in the stabilisation of products such as whipped creams. Despite the critical importance of lipid crystallisation at droplet interfaces, little is known about this phenomenon. Our work utilises two complementary techniques to analyse the effect of thermal cycling on interfacial crystallisation within a simulated milk system. Profile analysis tensiometry (PAT) allows us to monitor the kinetics of interfacial lipid crystallisation by tracking the interfacial tension of a single droplet as a function of time and temperature. PAT analysis enabled determination of the temperature at which interfacially-active crystals affect the interfacial properties and highlighted the differences in behaviour of these lipid crystals due to the presence of an emulsifier. Additionally, the effect of emulsifier type was studied using both a protein and non-ionic emulsifier. We found that the presence of emulsifiers delays the effect of interfacial crystals on the interfacial tension, as well as altering the rates of change in interfacial tension. Synchrotron small angle X-ray scattering (SAXS) was conducted on emulsion systems (for the same composition as in PAT experiments) to study the formation, growth and structure of lipid crystals, following a similar temperature cycling regime to that of the PAT experiments. The SAXS results also indicated a suppression of interfacial crystallisation in the presence of emulsifiers, and a difference in the degree of suppression due to the type of emulsifier used.

Primary author(s) : Dr SEBBEN, Damien (University of South Australia); Ms MACWILLIAMS, Stephanie (University of South Australia)

Co-author(s) : Dr CLULOW, Andrew (Monash University); Prof. FERRI, James (Virginia Commonwealth University); Dr GILLIES, Graeme (Fonterra Co-Operative Group); Prof. GOLDING, Matt (Massey University); Prof. BOYD, Ben (Monash University); Prof. BEATTIE, David (University of South Australia); Dr KRASOWSKA, Marta (University of South Australia)

Presenter(s) : Dr SEBBEN, Damien (University of South Australia)

Session Classification : Session 13 - Chemistry, Catalysis and Soft Matter

Track Classification : Chemistry, Catalysis and Soft Matter