



Interface structure and dynamics of protein stabilized food emulsions

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Oil droplets in food emulsions, such as milk, are typically stabilized with proteins and phospholipids, which influence the interface and emulsion stabilization mechanism on microscopic and macroscopic length- and time-scales. With neutron scattering techniques including contrast variation, details of the interface of an oil-water emulsion stabilized with the milk protein b-lactoglobulin have been investigated. Combining structural information on molecular length scales from small angle x-ray and neutron scattering (SAXS and SANS) [1] with time dependent neutron spin echo spectroscopy (NSE) allows to expand our understanding towards intermolecular interactions within the interface. These interactions are linked to the emulsion stability –the elastic properties of the protein or protein/phospholipid stabilized oil/water interface on molecular length scales.

NSE provides the time dependent correlation function of the proteins and the emulsion interface in reciprocal space, $S(q,t)$, on molecular length scales and time scales in the nanosecond range relevant for thermally driven motion of such mesoscopic systems. Insights into the interfacial elasticity can be drawn from the NSE experiments.

Connecting these emerging results with classical characterizations such as interfacial tension or viscoelasticity helps understanding the complex mechanisms of interfacial stability and may contribute to a knowledge driven development of sustainable food emulsions.

[1] T. Heiden-Hecht et al., Journal of Colloid and Interface Science, 655, 319-326 (2024).

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Sitzung Einordnung: Mounting Posters, Beer and light Dinner

Track Klassifizierung: Health & Life