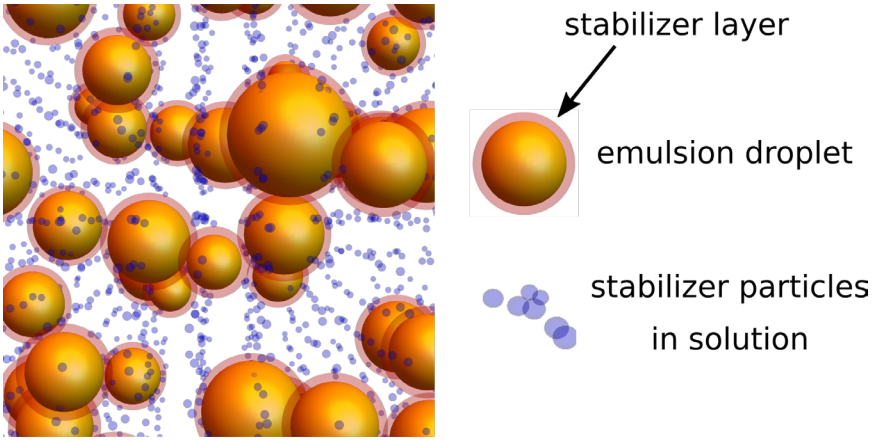
Stabilizing emulsions for beverages

In this project, researchers from University of Copenhagen used small-angle X-ray scattering (SAXS) to study the distribution of stabilizer molecules in oil based emulsions used to carry ingredients in beverages.

Einar Willumsen is a flavour house, producing food-approved flavours for the food industry. Ingredients for beverages are one of Einar Willumsen's core competencies and an important part of their business.

The structure of emulsion droplets with stabilizers at the oil/water interface can be of crucial importance for keeping an emulsion ingredient stable in the beverage. The experiments show that only a small fraction of the stabilizer is bound to the oil/water interface and most of it remains freely suspended in the water



SAXS experiments show that the majority of the stabilizer particles retain their solution structure, and only a small fraction are bound to the surface of the emulsion droplets.

What we did

- Samples of Einar Willumsen cloudifier emulsions with two different stabilizers were measured with SAXS at the Niels Bohr Institute.
- Mathematical modelling was used to extract information about the structure of the stabilizers.
- The data was used to estimate the amount of stabilizer bound and the thickness of the stabilizer shell on the emulsion droplets. In both cases, most of the stabilizer was found to be in solution, and only a small fraction bound to the emulsion droplets.
- The nanoscale stability of both stabilizers were verified by repeat measurements during a month.

What's next?

A next step could be to analyse emulsions that become unstable to understand why some ingredients have undesired effects on the appearance of beverage products.

"In this project, we learned that SAXS can reveal the nanostructures in our emulsions. The increased understanding could potentially help us improve the stability of our formulations."

- Jan Grøndal, CEO, Einar Willumsen

In the LINX project, researchers at leading Danish universities collaborate with scientists in industry to solve industry relevant problems using advanced neutron and X-ray techniques. The Arleth group at University of Copenhagen contributes with their expertise in small-angle scattering techniques.

Read more
linxproject.dk

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LINX Linking Industry to Neutrons and X-rays
Innovation Fund Denmark
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Einar Willumsen When speed and taste matter