

Visualisation techniques in the consumer goods industry.
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In the consumer goods research, new products are constantly developed or older ones are adjusted to meet the demand for novel products. Consumers call for healthier food products and home and personal care products that are e.g. sustainable, clean better and can make you look younger.

On the product level, for example, food products are developed with less saturated and trans fat, and the aim is to further reduce salt and sugar intake. In addition, beneficial nutrients should be increased, such as dietary fibres, calcium and iron. This adjustment will influence product composition and can be a challenge on the (micro)structural level. For example, how can a low-fat mayonnaise be made with the same properties and flavour compared to a full-fat mayonnaise? Oil droplets will make a mayonnaise firm and these should be replaced by a low-calorie ingredient that stabilises the water phase and give a product the specific mayonnaise properties.

On the consumer level, it is necessary to study the effect of the product on the target, like the effect of teeth whitening, self-tanning skin cream and in the case of detergents, stains on textile.

The Imaging and Microstructure Expertise Team of Unilever R&D Vlaardingen mainly focus on the structure analyses of (food) product structures from centimetre down to the nanoscale. For this, several imaging techniques, usually used in combination, are needed to gain insight into the product structure after changing product properties during and after preparation and consumption.

These techniques are LM, CSLM, (cryo-) TEM (tomography), (cryo-) SEM, and X-ray Micro Tomography. The combination of various modes of microscopy can unravel various properties of products like the spatial distribution and interaction of food components. This presentation contains some recent challenging cases in which we have used these techniques.