2D Static Light Scattering for Dairy Based Applications - DTU Orbit (04/11/2019)

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Throughout this thesis we investigate a recently introduced optical technique denoted 2D static light scattering (2DSLS). The technique is remote sensing, non-invasive, highly flexible, and appears to be well suited for in-line process control. Moreover, the output signal contains contributions from several different optical phenomena, which can be utilised to provide information on chemical composition and underlying microstructure of an investigated sample.

The main goal of this thesis is to provide an exploratory study of the 2DSLS technique in relation to dairy based applications. This includes getting an understanding of the various parameters in the setup as well as understanding the output signal in terms of potential and limitations. Furthermore, suitable ways of quantifying the signal are investigated. Here, both established physical models and statistical descriptions of the signal are evaluated and discussed.

There is a major emphasis on using 2DSLS to discriminate between different protein microstructures in yogurt products. This potentially allows for process control, in relation to microstructure, during yogurt manufacture. As microstructure is critical for consumer acceptability, this specific process control can be highly beneficial. To provide suitable reference measures on the actual microstructure, we investigate how to quantify micrographs of yogurts objectively. We provide a comparative study, that includes a broad range of different image texture descriptors.

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