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DEVELOPMENT OF A NOVEL MICRO-SCALE TECHNIQUE FOR MONITORING FOOD PROTEINS UNDERGOING CLEANING

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ABSTRACT

This paper introduces initial work carried out on the development of an experimental methodology for the use of a cleaning flow cell for the tracking of protein dispersion within a whey protein deposit during a NaOH cleaning cycle *in situ*. The challenge of this approach is to integrate two techniques – namely confocal laser scanning microscopy (CLSM) and fluid dynamic gauging (FDG) – so as to obtain dynamic, mechanical and structural, information. The former yields information on the microstructure and chemical nature at different depths with the film, while the latter provides information on the thickness, strength and the factors governing dynamic changes of such films.

The practicalities of the work are as follows: a flow cell has been built containing a viewing window within a reservoir. A protein film is attached to this viewing window, while the reservoir contains the cleaning solution. The dynamic gauge is placed just (100-200 μm) above the viewing window. This allows cleaning behaviour to be monitored from above the film, while microstructural data are obtained from below by using an inverted microscope to view the film through the viewing window. By scanning the protein film interface, in real time, it is possible to observe cleaning solution-film interactions.

The successful implementation of such a methodology would allow long-term studies to characterise the structural changes associated with a milk fouling/cleaning cycle and to determine the effect of the gauging technique on whey protein deposit microstructure.