

Improved functional properties of dairy products by new process technologies through understanding the molecular mechanisms caused by hydrodynamic and acoustic cavitation

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Aim

The project goals are through basic understanding of the associations between the milk fat globule surface and milk protein to improve processing and reduce process time, improve the product quality of dairy powder by faster hydration, use less raw material and improve the quality of yoghurt, i.e. less syneresis and higher viscosity. The main aim is to elucidate, how cavitation based process technologies affects the proteins and the fat in milk and dairy products by studying the effects of acoustic cavitation (high intensity ultrasound) in comparison with hydrodynamic cavitation (cavitator) in relation to existing dairy technologies for homogenization and pasteurization.

Description

The project focus on how cavitation based technologies affect the proteins and milk fat of significance for their interactions, and how it may result in high quality yoghurt. The effect of different processing conditions under acoustic (ultrasound) and hydrodynamic cavitation is studied with the presently applied homogenization and pasteurization as reference. The cavitation-based homogenization of the milk fat globules (MFG) is expected to promote the protein adsorption to the MFG membrane; i.e. the acid gel strength increases. Association of proteins to the MFG membrane is studied by new advanced techniques. The obtained knowledge is used for implementation of new technology in the yoghurt production, including hydration of skim milk powder as ingredient. The outcome is shorter processing time, lower raw material usage and high product quality.