

## Monitoring dynamic processes in food using microfluidics

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Humanity faces the huge challenge to supply a growing world population with sufficient and healthy food. To make this a reality we need to rethink how we produce food at large scale. This implies rethinking production ‘on the land/in the greenhouse’, fractionating raw materials, understanding their functionality during processes used in food production, as well as under digestive conditions to make the connection to health effects that can be created by smart food design.

Today’s presentation will focus on investigation of processes that take place at micrometer scale, and even smaller scales, and often within very short times. These processes underly the food structure that we get, but the dynamics thereof are very difficult to capture due to time and size challenges. Most examples that I will discuss use microfluidic tools to visualize these processes. For example, for formation of two phase systems such as emulsions and foams, and that also includes their digestion, and the control thereof by clever food structure design.

I hope to discuss with you how these techniques can contribute to more flexible use of ingredients. For example, replacement of animal-based products with their plant-based counterparts, and the use of other streams that are currently considered waste but can truly contribute to more sustainable food production practice. I am convinced that the techniques developed are ultimately used to do fast screening, will allow comparison of ingredients, link with digestion, and connect with more classic processing technologies (e.g., high pressure homogenization) thus contributing to smart food design.

**Keywords:**

Sustainable food processing, microfluidic analysis, alternative proteins, food digestion, high speed imaging