

Determining and controlling flavor-active compounds in food

Summary

The doctoral thesis firstly aims to set up methodology to determine and quantify taste-active compounds in food and beverages including fractionation, 2D-NMR, LC/MS(/MS), ICP-MS and applying other advanced instrumental analysis methods. Understanding flavor in food includes also sensory analysis and working with expert panel. Part of the thesis includes research in applying supramolecular and nanoemulsion systems to encapsulate off-flavors.

Research field:	Chemistry and biotechnology
Supervisors:	Prof. Dr. Riina Aav Kristel Vene
Availability:	This position is available.
Offered by:	School of Science Department of Chemistry and Biotechnology
Application deadline:	Applications are accepted between June 01, 2020 00:00 and July 03, 2020 23:59 (Europe/Zurich)

Description

Food flavor has been and always will be an important driver of eating behavior. Food flavor drives our nutrition as well as \$40 billion global food industry. Food flavor refers to food components that are responsible for chemosensory stimulation. They are volatile odor and non-volatile taste compounds. Latter, non-volatile compound determination and quantitative analysis is analytically much more challenging and therefore often overlooked by flavor research groups. The importance of volatiles over non-volatile flavor compounds is always debatable, but we know that the non-volatiles play an important role and that they are strongly interacted with odor and often synergistically. It is clear, that both volatile and nonvolatile compounds need to be present in food at the right concentrations and proportions to present pleasurable sensations. TalTech together with CFFT has set up and applied odor-active compound analysis for more than 10 years now, but it is necessary to build competence in non-volatile taste-active compound analysis in food as well. It is only possible thanks to the large high-end instrumental basis in TalTech Institute of Chemistry and Biotechnology.

Secondly, once we are able to separate, identify and quantify taste-active molecules, it is necessary to understand how to control their release from food systems. We plan to look more into biocompatible and biodegradable surfactants, nano/micro emulsions and supramolecular complexes to study recognition, encapsulation and delivery of flavor compounds. For that, we are collaborating with Green Chemistry as well as Supramolecular research groups in our institute.

Responsibilities and tasks

- Part of the thesis is method development on how to analyze taste-active compounds in food with the focus on plant-based/insects-based foods and their off-tastes.
- Secondly to look into their encapsulation options and flavor changes during shelf life. It is strictly suggested to carry out some of the research in Technical University of Munich (at least 4 months).
- The PhD student will be responsible for planning and conducting all the necessary research activities related to topic of the current thesis, and which lead to the publication of minimum three papers in the peer-reviewed journals (in at least one of which being the first author) by the end of nominal studies time 4 years after matriculation.

Qualifications:

- Master's degree on organic chemistry, food chemistry



- skills in advanced instrumental analysis are highly recommended



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