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Forschungsprojekt: *4ME - RuME_n ME_{thano}plasmatales as target for ME_{thane} mitigation: eco-physiology and interactions assessed by integrated ME_{ta}-omics*

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Abstract: Methane (CH₄) is a very potent greenhouse gas. Most global CH₄ emissions are caused by human activities, with farming of cows and other ruminant animals being the largest anthropogenic CH₄ source. Rumen Methanoplasmatales (RMP) belong to a recently discovered and poorly characterised group of methanogenic archaea that produce CH₄ as a metabolic end-product. RMP can constitute up to 80% of ruminant methanogen populations, perform a unique type of methanogenesis and can be inhibited via dietary rapeseed oil (RSO) supplementation. This makes them a promising target for CH₄ mitigation strategies - much-needed to ensure ecologically and economically sustainable milk and meat production especially in times of global climate change. This PhD project wants to answer pressing questions about the poorly characterised RMP: With whom and how do RMP metabolically interact? What is their ecological niche in the complex rumen ecosystem? What is the role of RMP in the rumen nitrogen cycle? What are the inhibitory effects of RSO compounds? I will apply cutting-edge microbial ecology technologies (e.g. integrated meta-omics and FISH-nanoSIMS) combined with state-of-the-art in vivo and in vitro experiments. Interdisciplinary collaborations with excellent national and international experts will ensure that 4ME contributes new knowledge about these widespread, yet poorly understood methanogens and can pave the way for novel CH₄ mitigation strategies in agriculture.

During my first semesters studying Biology at the University of Salzburg and the University of Vienna I was intrigued by microbes - invisible to the naked eye - but tremendously affecting biotic and abiotic systems on planet Earth. Thus, I focused my studies on microbial ecology. I did my master thesis at the Department of Ecogenomics and Systems Biology investigating Methanoplasmatales - a fascinating novel order of methanogenic archaea. With my dissertation I want to continue and intensify my work on Methanoplasmatales.

Kontakt

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