



Fakulta rybnářství  
a ochrany vod  
Faculty of Fisheries  
and Protection  
of Waters

Jihočeská univerzita  
v Českých Budějovicích  
University of South Bohemia  
in České Budějovice  
Czech Republic



HR EXCELLENCE IN RESEARCH

**Laboratory of Nutrition** as part of the **Faculty of Fisheries and Protection of Waters** (<https://www.frov.jcu.cz/en/>) at the **University of South Bohemia** (<https://www.jcu.cz/en/>), České Budějovice, Czech Republic.

## Opening for a thesis or internship in the field of analytical chemistry

**Project:** Fathoming the potential of matrix-assisted laser induction-ionization time-of-flight mass spectrometry (MALDI-TOF MS) for the assessment of fish spoilage

### Background:

The use of MALDI MS is a convenient and very fast way to identify microorganisms. It is therefore commonly used in fields where it is important to know if and, if yes, what kind of microorganism is growing on a substrate. One example is the assessment of food quality and, more specifically, the spoilage of fish (for instance, Böhme et al., 2011). Until now, the commonly applied workflow requires the pre-cultivation of microbial samples to obtain single colonies that can eventually be analyzed. However, this intermediate step is still time-consuming (approx. 24 h) and can thus only provide an impression of the past. This is problematic for time-critical applications as the fish does not get any better over time. It would thus be advantageous if the pre-cultivation step could be skipped.

An indicator for fish spoilage is the occurrence of a set of microorganisms called specific spoilage organisms (SSO), which cause its characteristic bad odor due to their metabolic activity (Gram and Dalgaard, 2002). Considering that the number of those organisms increases fast once the natural control mechanisms of a living fish cease to function, it might be possible to determine those target organisms directly after a certain time. Alternatively, the presence of the smelly substances that are being excreted by the SSOs might be detected at concentrations below the threshold of human sensory organs. The potential of approaches that do not focus on the microorganisms themselves has been shown (Ulrich et al., 2017).

### The job:

During your stay, you will be supervised by our Ph.D. students Felix Kuebutornye and Anil Tellbüscher. Your tasks will comprise the cultivation of microorganisms, the identification of isolates using MALDI, data analysis and all other tasks related to the project. You will be taught all relevant techniques upon arrival. The main working place will be the laboratories of the Institute of Aquaculture and Protection of Waters at Husova Street.

### What we are looking for:

We are looking for a student of analytical chemistry or related fields (or a keen learner), ideally with prior experience in MALDI and microbiology, who can quickly comprehend, is an analytical thinker, flexible, and has a strong interest in applying knowledge to real-life problems.



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Proficiency in English is a must, as the working language in our team is English. In addition, the thesis must be written in English. We welcome international students to our multinational team and encourage your application.

### **What we offer:**

The Laboratory of Nutrition combines a young team with state-of-the-art research in the field of aquaculture. As a student, you will be involved in all lab activities and receive individual mentorship throughout your stay. We as a team will try our best to let you benefit from your work not only through getting rid of an obligation such as a thesis but also in the form of a scientific publication, if possible.

Foreign students from EU countries are, for instance, eligible for an “Erasmus+” grant of 750 EUR/month (state: 2024). This will cover personal expenses easily. Affordable accommodation can be arranged in one of the student dorms on campus.

Interested students shall send their CV and a short motivation letter to Radek Gebauer, with Anil Tellbüscher in copy. We will fill the position at our earliest convenience.

### **Contact information:**

Radek Gebauer, Ph.D.

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Anil Axel Tellbüscher, M.Sc.

[atellbuscher@frov.jcu.cz](mailto:atellbuscher@frov.jcu.cz)

### **References:**

Böhme, K., Fernández-No, I.C., Barros-Velázquez, J., Gallardo, J.M., Cañas, B., Calo-Mata, P. (2011): Rapid species identification of seafood spoilage and pathogenic Gram-positive bacteria by MALDI-TOF mass fingerprinting. *Electrophoresis*, 32, 2951-2965.

Gram, L., Dalgaard, P. (2002): Fish spoilage bacteria – problems and solutions. *Current Opinion in Biotechnology*, 13(3), 262-266.

Ulrich, S., Beindorf, P.-M., Biermaier, B., Schwaiger, K., Gareis, M., Gottschalk, C. (2017): A novel approach for the determination of freshness and identity of trouts by MALDI-TOF mass spectrometry. *Food Control*, 80, 281-289.au