

Swiss Focus - Analytical Sciences at the School of Engineering and Architecture of Fribourg

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The School of Engineering and Architecture Fribourg (HEIA-FR), part of the HES-SO, celebrated the 50th anniversary of its chemistry program in 2024. HEIA-FR offers Bachelor's level training in chemistry and a Master's program in Chemical Development and Production. Since its inception, Analytical Sciences have been central to both student training and research activities.

In this first Swiss Focus, we will present the current research conducted at HEIA-FR in analytical chemistry, physical chemistry, and highlight two key projects.

Firstly, we will discuss the research project aimed at discovering new antibiotics from marine fungi and extremophile organisms (Innosuisse project 54934.1 IP-LS), conducted in collaboration with the start-up Inflammalps SA. In this project, a bioassay guided fractionation process was conducted to study 6 filamentous fungi and one extremophile, whose extracts showed potent activity against multidrug resistant yeast and Gram + pathogens. In order to accelerate the dereplication of known compounds using High-Resolution Mass Spectrometry (HRMS) analysis, an open-source online tool was developed OctoChemDB (<https://octo.cheminfo.org>). Key results of the study will be presented.

Secondly, we will present an innovative non-lethal system for the protection of herds and livestock from wolf predation. This project, conducted in collaboration with the company Studio-Alpino, aims to develop a collar that can incorporate pheromone-like organic volatile compounds to create biological boundaries around individual animals. The identification of these volatile pheromone-like compounds is carried out using headspace Gas Chromatography Mass Spectrometry (GC-MS) on diverse samples of hair, urine, and feces collected from various wolves. The selected volatile compounds are loaded into a hydrophobic support with the aim of having both a slow release of the volatile compounds and a minimal degradation thereof [1].

[1] F. Tettamanti, D. Staedler, F. Lucarini, *A Non-Lethal System For Herd Protection* (Application No. PCT/EP2024/056878 – 14/03/2024).