

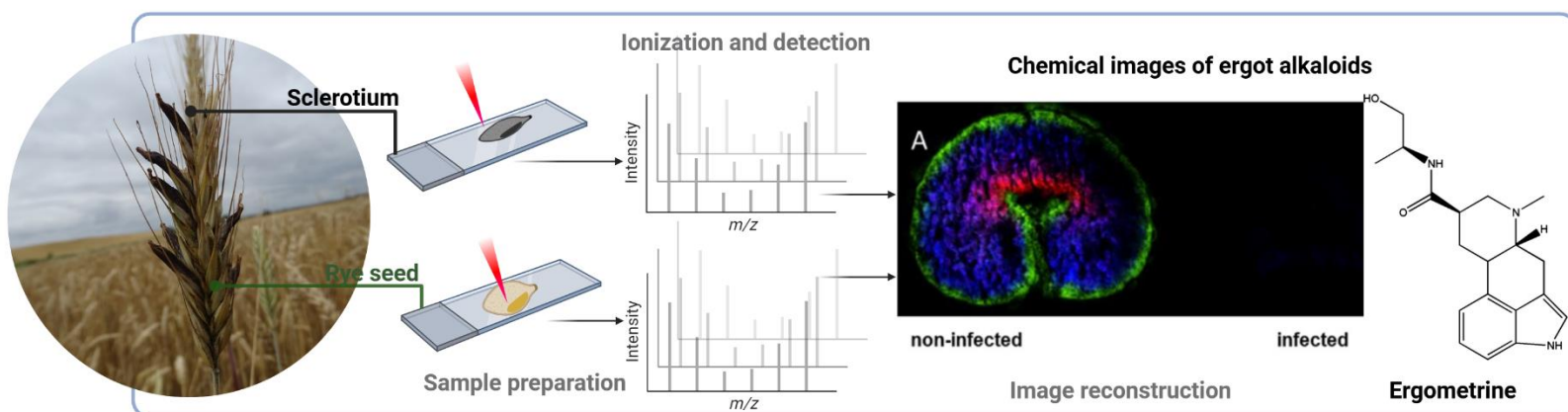
Group : Organic Chemistry (ORC)

Project : Mass Spectrometry Imaging for the Spatial Analysis of Ergot Alkaloids in Infected Rye

Supervisors: Laura Righetti

Background and research interests: In recent years, visualization has become an essential feature in metabolomics, enabling us to study the metabolites' distributions within a tissue. In this regard, mass spectrometry imaging (MSI) has become a powerful tool capable of achieving spatial distributions and chemical specificity by enabling unprecedented details of metabolic biology to be uncovered.

This is very useful for visualizing the spatial distribution of natural toxins. These secondary metabolites, produced by plants or fungi, can accumulate in the edible part of the plant and pose a food safety risk. This is the case, for example, with ergot alkaloids, which are produced by fungi that infect rye, forming structures called sclerotia. These sclerotia can be mistaken for rye grains and end up being used in flour.



Objectives

The aim of the study is to develop a protocol to visualize *in situ* the spatial distribution of ergot alkaloids in sclerotia and rye seeds using MALDI- Mass Spectrometry Imaging.

Methodology/what students can learn

After preparing the sections, the samples will be analyzed using a MALDI ion source coupled to high-resolution mass spectrometry (HRMS). Segmentation data analysis will be performed to identify different regions of interest (ROIs) within the sample and determine the metabolites responsible for these separations. Due to the structural similarities among ergot alkaloids, the HRMS data will be examined using molecular networking strategies to annotate EAs based on their fragmentation patterns.

Requirements

We are looking for a MSc student interested in learning advanced analytical techniques, data analysis and gather knowledge about food safety. The project will have a duration of 6 months.

Contact information: Laura Righetti (laura.righetti@wur.nl)