

Group: Laboratory of Organic Chemistry (ORC)

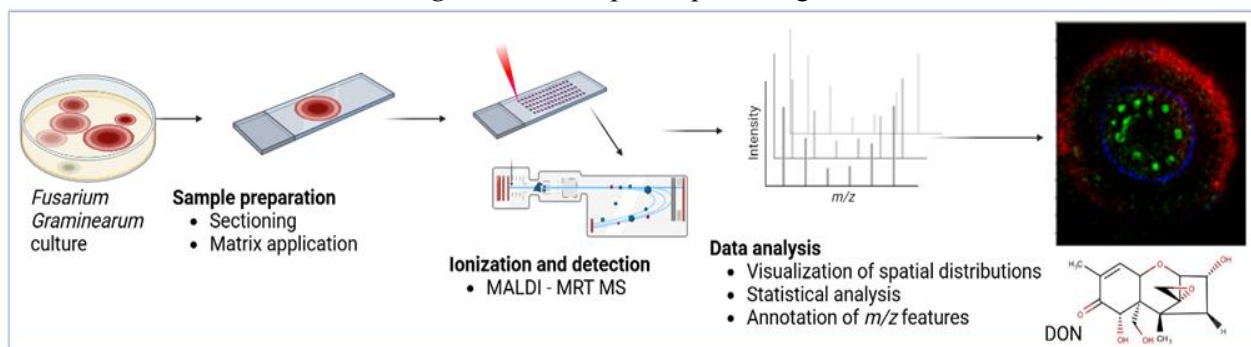
Project: Imaging of growing *Fusarium graminearum*.

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Keywords: *F. graminearum*, mycotoxins, MALDI, mass spectrometry imaging

Introduction

Fusarium Head Blight (FHB) is a major preharvest disease of cereal crops caused by various mycotoxin-producing *Fusarium* species. In Europe, deoxynivalenol (DON) is the most prevalent mycotoxin associated with FHB in food and feed, with *F. graminearum* species producing DON, nivalenol, and zearalenone.



Accurate monitoring of fungal growth dynamics and detecting mycotoxin production are essential for understanding *F. graminearum* behaviour and developing effective mitigation strategies. Traditional analytical methods for studying mycotoxin-producing fungi provide limited insights into real-time growth and biotoxin production. For that reason, there is a need for advanced tools that can simultaneously monitor fungal growth and visualise in-situ the production of mycotoxins. To overcome these challenges, advanced analytical techniques able to accurately measure the molecular weight of molecules and their spatial distribution, such as MALDI Mass Spectrometry can be applied. In addition to detecting mycotoxins, MALDI-MRT MS may allow indirect monitoring of fungal growth by visualizing, identifying, and detecting markers such as fungal-specific metabolites, pigments, and changes in the growing medium. A combination of high mass resolution and high spatial resolution (in terms of pixel size) enables the detailed characterisation of these complex biological samples.

Objectives

The objectives of the project are to develop a protocol for sample preparation and MS detection of mycotoxin of *F. graminearum*. Moreover, it focuses on indirect monitoring of fungal growth by identifying fungal-specific metabolites and chemical changes in the growing medium.

Methodology

Fungal cultivating (*F. graminearum*), using microscopy (for initial observations), applying MALDI Mass Spec Imaging (to detect mycotoxin production and monitor fungal markers), and data analysis.

Requirements

MSc or BSc thesis student with full-time availability – the project duration is 6 months.

Contact information

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