**COURSE**

**Microbial Metabolomics**

**SSD: CHIM01**

PHD COURSE: Food Science

ACADEMIC YEAR: 2024/2025

**COURSE DESCRIPTION**

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**GENERAL INFORMATION**

**SUGGESTED YEAR:**  I, II

**PERIOD**: from 27th of May to 1stth of July (indicate at least the month)

**CFU**: 4

**EXPECTED OUTCOMES**

Expected learning outcomes consist of the theoretical and practical knowledge of the main state-of-the-art analytical strategies in metabolomics, including lipidomics, which is a branch of metabolomics. The course comprehensively covers the analytical pipeline from metabolite extraction and separation to their detection and assessment of their possible functions. Special insights concern the detection of microbial and fermentation metabolites, recently referred to as post-biotics, produced from prebiotics through gastrointestinal digestion and processing by the human microbiome.

**CONTENTS/SYLLABUS**

Introduction to omics sciences

Experimental strategies: extraction, and separation techniques (liquid and gas chromatography, Field-flow fractionation and 2D)

Detectors: UV, FID, NMR, and mass spectrometry (scan ion modes of tandem mass spectrometry);

Bioinformatics, data analysis, and functional assessment

Lipidomics, a branch of metabolomics

Microbial metabolism and fermentation processes

Peptidomics of fermented dairy products

Characterization of plant metabolites affecting food digestion

Microbiome and prebiotics

Laboratory experience

**READINGS/BIBLIOGRAFY**

Douglas A. Skoog, F. James Holler, e al. Principles of Instrumental Analysis.

David J. Beale, Konstantinos A. Kouremenos, Enzo A. Palombo Editors. Microbial Metabolomics

Applications in Clinical, Environmental, and Industrial Microbiology

Vijay Soni, Travis E. Hartman Editors Metabolomics. Recent Advances and Future Applications

**TEACHING METHODS**

Extraction and separation techniques *e.g.*liquid and gas chromatography, Field-flow fractionation and 2D, spectrophotometry, FID, mass spectrometry, and NMR

**Lectures hours 18**

**Laboratory hours 2**

**Seminars hours**

**Other activities hours:**

**EVALUATION CRITERIA**

1. **Methods for acquiring eligibility**
* Written exam
* Oral exam

X Project discussion

* Other
1. **Evaluation pattern**

For the eligibility, a percentage of the attendance at the course of at least \_\_75\_% is requested.