Metabolomics: a practical tool for plant science and food technology

General information

Tutor	Prof. Vladimiro Cardenia (Department of Agricultural, Forest and Food Sciences; University of Turin, Turin (Italy)
Number/types of classes	20 didactic classes (virtual lectures and laboratories)
Semester	Autumn-winter 2020-2021
Language	English
ECTS credits	2

Objective of the course
Exploring studies and applications of omics techniques (such as metabolomics and lipidomics) for improving knowledge in plant science and effects on food safety.

Topics
1. Introduction and definition of omics techniques
2. Metabolomic analysis
    Definition of metabolites
    Extraction of components
    Identification of compounds
    Analysis

3. Lipidomics
    Definition of lipids as markers
    Lipids as markers in biotic and abiotic stresses
    Isolation of lipids
    Recognition of markers

4. Applications
    Laboratory experiences

Effects of the course (in terms of knowledge, skills)
PhD students and researchers:
- know the main and most advanced metabolomic analysis techniques
- elaborate the results obtained from an analytical test and interpret critically the analytical data in order to define markers
- have the ability to apply and develop/optimize integrate analytical methods to target quali-quantitative approaches on plant matrices

Course content:
1. Introduction to the subject (2 h). Description of principal techniques used for metabolomics and definition of lipidomics (2 h).

2. Definition of principal techniques used for isolating metabolites (2 h). Studying the lipid metabolites and selection of appropriate analytical protocols; description of interference problems in lipidomic analysis (2 h).
3. Lipidomic applications in plant science (e.g. for evaluating the plant responses to environmental factors); *in vivo* studies to determine the impact of environmental factors on food quality processing (4.0 h).

4. Laboratories (6.0 h).
5. Personal consultation and/or oral exam (2.0 h).

Teaching methods:

- Lectures and video in English created by multimedia techniques will be recorded (also in the laboratory, showing the practical approaches); the lectures and classes can be downloaded by authorized students and researchers.
- Bibliography will be suggested by the tutor.

Evaluation of learning outcomes:

- Oral exam