

## 68754 - Food metabolites analysis at trace levels

### Syllabus Information

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**Academic year:** 2023/24

**Subject:** 68754 - Food metabolites analysis at trace levels

**Faculty / School:** 105 - Facultad de Veterinaria

**Degree:** 631 - Master's Degree in Food Quality, Safety and Technology

**ECTS:** 3.0

**Year:** 1

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

This subject aims to provide students with the basic skills necessary to design and validate a method for trace metabolite analysis in food.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), specifically the acquisition of the intended learning results provides training and competence to contribute to the achievement of SDG 2, SDG 3, SDG 6, SDG 8, SDG and SDG 12.

### 2. Learning results

1. To identify and rank order the molecular clues that determine the detectability and ease of isolation of a metabolite.
2. To choose, in a reasoned manner, the most appropriate analytical technique for the quantification of a given metabolite according to its properties.
3. To propose the most appropriate GC-MS isolation and determination procedure depending on the molecular properties, nature of the sample and information sought in the analysis of volatile substances,
4. To propose the most appropriate isolation procedure, HPLC-MS determination and quantification strategy according to the nature of the analytical problem and the information sought in the analysis of non-volatile substances.
5. To calculate, from raw experimental data obtained in the laboratory, the basic quality parameters characteristic of a trace analytical method and the results associated with such method, and to relate the magnitudes of these parameters to the method's specific characteristics (analytical technique, detection mode, type of preconcentration).

### 3. Syllabus

Master Class 1: Basic keys to trace analysis in food

Master Class 2: Gas chromatography

Problem Class 1: Databases and tools

Master Class 3 : Analysis of volatile metabolites.

Practice 1: Optimization and evaluation of a GC system

Practical 2: Isolation and determination of volatile compounds

Master Class 4: Liquid Chromatography.

Master Class 5: Development of non-volatile trace analysis methods.

Practical 3: Optimization of an HPLC system.

Practical 4: Analysis of capsaicin in spicy sauces

Master Class 6: Identification of metabolites.

Problem Class 2: GC-MS and LC-MS data processing

### 4. Academic activities

The subject includes the following activities:

1. Six theoretical sessions (12 hours on-site)
2. Two sessions of problem solving and case studies in a computer classroom of 3 hours each (6 hours on-site).
3. Four practical laboratory sessions (12 hours on-site)
4. Preparation of papers and reports (15 h non face-to-face)
5. Resolution of questionnaires (30 h non face-to-face)

## **5. Assessment system**

### **Continuous assessment**

Assessment of learning results by means of a questionnaire with key questions and model exercises, including the use of the computer tools presented; 50%.

Assessment of learning results through the analysis of bibliographic references; 25%. The ability to correctly identify the different methodological steps and the types of methods and instruments will be assessed.

Assessment of learning results through work performed in the laboratory, results obtained and discussion of the results; 25%. In this section, the assessment criteria will be based on the quality of the results obtained and their presentation in an appropriate manner in terms of expression of the associated uncertainty.

### **Overall test**

For students who have not followed the above continuous evaluation process, there will be a global test to pass the subject. This test will have three parts; 1.- theory questions, whose evaluation will make up 25% of the final grade; 2.- numerical problems and solving of practical cases (25% of the final grade); analysis of a scientific text (25% of the final grade); 3.- semi-practical test in the laboratory (25% of the final grade).