

68758 - Molecular tools in food science

Syllabus Information

Academic year: 2023/24

Subject: 68758 - Molecular tools in food science

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

The main objective of this subject is the management and integration of different molecular tools. For this purpose, it includes both practical and theoretical classes. The theoretical classes aim to introduce the tools, their rationale, advantages and disadvantages. In the practical classes the student will become familiar with these techniques and will be able to apply the knowledge acquired in the theoretical classes for the design of experiments and analysis of results.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), so that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to the achievement of goals 2, 3, 4, 8, 9 and 12.

2. Learning results

- 1.To know and differentiate between methodologies used in molecular biology for the study of different areas of food science.
- 2.To design a mutation in an organism of interest to the food industry.
3. To use different bioinformatics tools necessary for the design and analysis of experiments.
4. To raise bioethical issues on the use of molecular biology tools and techniques in food science.
5. To do an oral presentation and write a work on the necessary steps for the study of a case study related to the subject.

3. Syllabus

Theoretical topics:

Topic 1. Introduction.

Topic 2. DNA polymerase chain reaction (PCR).

Topic 3. Bioinformatics.

Topic 4. Cloning strategies and mutant generation.

Topic 5. Bioethics.

Practical topics:

Practice 1. Bioinformatics I: Sequence Search and Comparison

Practice 2. Bioinformatics II: BLAST

Practice 3. Bioinformatics III: primer design

Practice 4. Design of mutant organisms.

Practice 5. Bioethics

4. Academic activities

-**Participative theoretical classes:** 5 lectures (15 hours).

-**Practical classes:** 5 sessions in laboratory and computer room (15 hours).

-**Autonomous work:** Solving of a case study proposed by the teacher. Design of synthetic organisms using computational tools

and selection of a marker for fluorescence study. Reflection on expected results and technical limitations.

-**Oral presentation and defence of** the research project before the class. Assessment of clarity, organization and ability to answer questions.

5. Assessment system

The subject will be evaluated as follows:

- **Individual written work**(60% of the final grade): the student must design an experimental plan for the study of a case study related to food quality, safety and/or technology. They must apply the knowledge acquired and the bioinformatics tools used in the subject. The work must reason the use of the tools employed, include bioethical considerations and have a maximum length of 10 pages. The grade will be based on the originality of the work, the approach to the problem and possible solutions (20%), the appropriate use of the tools and knowledge acquired (30%), as well as the understanding of the bibliography and the correct search for data (10%).

- **Oral presentation**(40% of the final grade): oral presentation of the individual work, where the student will talk about the steps followed, the results obtained and possible explanations. This presentation will help to assess the expository capacity, including the organization of the materials, coherence and structure (30%), as well as the discussion of the results (10%).

By successfully completing both activities, students will confirm the achievement of the proposed learning results. Both the written work and the oral presentation are mandatory. Both activities will be graded from 0 to 10 and will contribute to the final grade of the course.

If the student has not passed any of these activities during the semester, they will have the opportunity to pass the subject by means of a **global test** in the two official calls.