Universidad Zaragoza

Academic Year/course: 2024/25

68760 - Methodology for study of inactivation and microbial survival

Syllabus Information

Academic year: 2024/25
Subject: 68760 - Methodology for study of inactivation and microbial survival
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 elective subject is part of the research plan, which provides students with the opportunity to delve into the field of microbiology as a basic topic in the training of any specialist in food science and technology. Its main objective is to develop skills in microbiological techniques commonly used in research in food science and technology, as well as to facilitate the acquisition of the ability to design and develop a research work autonomously, present it and defend it publicly.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (https://www.un.org/sustainabledevelopment/es/), specifically, the learning activities planned in this subject will contribute to the achievement of target 2.4 of Goal 2, target 3.4 of Goal 3, target 6.3 of Goal 6, and targets 12.3 and 12.5 of Goal 12.

2. Learning results

1. To know and distinguish the most appropriate basic laboratory methods for the study of microbial survival against agents of different nature.

2. To plan an experiment, estimate the material and handling required, foresee methodological difficulties and problems, and propose possible solutions.

3. To perform the necessary handling and use appropriate laboratory techniques for the study of microbial survival against a given agent.

4. To interpret and analyze the results obtained experimentally, and draw conclusions.

5. To acquire critical capacity through the use of scientific bibliography related to the topic of work, and through self-evaluation.

6.To obtain and interpret the results of a research work, carried out in a team, on microbial survival against a given inactivation agent and present them orally.

3. Syllabus

Topic 1. Introduction: aspects of microbial physiology of interest for microbial death or survival.

Topic 2. Microbial inactivation: concept of live cell and dead cell. Survival graphs: obtaining and interpretation. Factors that determine microbial resistance.

Topic 3. Cell damage and repair: concept of sublethally damaged cells, importance, factors that determine their presence and detection techniques.

Topic 4. Strategies for the study of inactivation mechanisms: cellular targets involved in inactivation by various agents and their mode of study.

Topic 5. Resistance development. Microbial resistance responses: importance, types and study techniques.

4. Academic activities

- Participative master classes: 10 hours

- Practical classes: 15 hours in laboratory and computer classroom. Preparation of material and reagents, performance of the necessary experiments to obtain graphs of survival to a chemical and a physical agent. Analysis, representation and interpretation of the results obtained.

- Execution of a research work: group work. Consultation of the necessary bibliography for the design and proposal of a research work. Supervision by teachers. Preparation of means and material, execution of the proposal in the laboratory (5 hours), data collection, representation and interpretation of the data. Oral presentation and defense.

5. Assessment system

Continuous assessment system including three tests:

1) Design and execution of the research work (40% of the final grade). The acquisition of skills by the student during the research work and the degree of individual and group autonomy are valued.

2) Assessment of the presentation and defense in an oral session of the research work carried out (40% of the final grade). Correctness in the elaboration of graphs and graphic material, correct interpretation of the results, expository capacity and defense capacity will be valued.

3) Application of theoretical knowledge to a practical case (20% of the final grade). On the same date as test 2, students will respond in writing to a question related to the results obtained in their research work.

Overall test

Students who have not chosen the continuous assessment may be evaluated by means of a global test that will consist of the same evaluation activities that those for the continuous assessment. The grading percentages for each activity and the assessment criteria will be the same for the global test and for the continuous assessment.

6. Sustainable Development Goals

2 - Zero Hunger
3 - Good Health & Well-Being
12 - Responsible Production and Consumption