Universidad Zaragoza

Academic Year/course: 2024/25

27133 - Wine Biochemistry and Microbiology

Syllabus Information

Academic year: 2024/25
Subject: 27133 - Wine Biochemistry and Microbiology
Faculty / School: 100 - Facultad de Ciencias
Degree: 446 - Degree in Biotechnology
ECTS: 6.0
Year: 4
Semester: First semester
Subject type: Optional
Module:

1. General information

The objective of this subject is for students to acquire a specific vision of the implication of biochemical processes and microorganisms in the wine production process, to know the existing products on the market, and to develop technical skills to analyse wines and musts, monitor their production, detect deviations and apply corrective measures. The subject includes theoretical classes, laboratory practices, a visit to a winery in full production, and the preparation of a paper.

These approaches and objectives are aligned with the following 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 their achievement: Goal 4: Quality Education; Goal 9: Industry, Innovation and infrastructure; Goal 12: Responsible production and consumption.

2. Learning results

Upon completion of the subject students will be able to:

- Plan an analysis of any stage of the winemaking process, plan the methods to be used, carry them out, and interpret the results.
- Identify the main factors (biochemical and microbiological) involved in fermentation or in the alterations of musts and wines, and know the methodologies at laboratory and industrial scale for their control.
- Search for and analyse specific information and convey basic concepts about the winemaking process Solve specific problems that may arise in an ecology laboratory, complying with the requirements of good laboratory practices, quality controls, traceability, annotated, annotated records of activities, etc.
- Explain and adequately argue the analytical, biochemical and microbiological fundamentals of wine production

3. Syllabus

THEORETICAL CLASSES

1. Winemaking
2. Wine composition, analysis and significance.
3. Sulphide in oenology
4. History of alcoholic fermentation.
5. Yeast biology.
6. Fermentation strategies. Starter crops.
7. Biochemistry of alcoholic fermentation.
8. Alterations caused by yeasts.
9. Lactic bacteria. Starter crops.
10. Biochemistry of malolactic fermentation.
11. Alterations caused by lactic acid bacteria.
12. Biochemistry of phenolic and aromatic compounds in wine.
13. Sensory analysis and aromas
14. Use of enzymes in oenology.
15. Special vinifications
16. Alterations caused by fungi and acetic acid bacteria.
17. Yeast genomics. Oenological biotechnology.
18. Cases of applied oenological microbiology.

The program is completed with laboratory practices, a visit to a winery and the writing of a paper.

4. Academic activities

The subject includes the following activities:

- Training Activity 1: Acquisition of basic knowledge of the subject (3 ECTS).

Methodology: Participative master classes in large groups.

- Training Activity 2: Laboratory practices (2 ECTS).

Methodology: Case-based learning. Team and individual work.

- Training Activity 3: Tutorial work (0.5 ECTS).

Methodology: Learning based on problems, seminars and case studies related to the subject.

Oral presentation in class. Team and individual work.

- Training Activity 4: Special practices (0.5 ECTS)

Methodology: Visit to a winery during the harvest season.

Supporting material: Tutorials (individual or in small groups) and complementary material via web.

5. Assessment system

Practical classes. Attendance will be mandatory to pass the subject. The evaluation will be based on the completion of a test with previous questions and a final test of the practices. Each test will be graded from 0 to 10 and together they will contribute 30% to the final grade.

Filling of a questionnaire related to the visit to the winery, which will be graded from 0 to 10 and will contribute 5% to the final grade of the subject. The visit will be mandatory to pass the subject.

Presentation of a work. It will be mandatory to pass the subject. It will be graded from 0 to 10 (using the same rubrics as for the evaluation of the Degree Final Project) and will contribute 15% to the final grade. There may be an additional test with questions on students' work.

Completion of an objective test on the theoretical contents of the subject and its applications. It will be graded from 0 to 10 and will contribute 50% to the final grade. To pass the subject it will be necessary to obtain a grade equal to or higher than 5 points in this objective test.

In addition to what has been previously described, students will have the possibility of being evaluated in a **global test** that will judge the achievement of the learning results previously mentioned.

6. Sustainable Development Goals

4 - Quality Education
9 - Industry, Innovation and Infrastructure
12 - Responsible Production and Consumption