

| | | | |
|------------------|-----------------------|----------------|---------------------------------------|
| Course Unit | Oenological Chemistry | Field of study | Chemistry |
| Bachelor in | Oenology | School | School of Agriculture |
| Academic Year | 2022/2023 | Year of study | 1 |
| Type | Semestral | Semester | 2 |
| Workload (hours) | 162 | Contact hours | T 30 TP - PL 30 TC - S - E - OT 4 O - |
| Level | 1-1 | ECTS credits | 6.0 |
| Code | 9998-705-1205-00-22 | | |

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Vitor Manuel Ramalheira Martins

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Identify the chemical components of the grape clusters, must and wine
2. Know the main chemical reactions that occur during grape ripening, winemaking and wine aging operations and understand their impact on wine characteristics
3. Know the main accidents of physical and chemical nature, identify their main causes and know how to minimize their impact on wine characteristics
4. Interpret the results of wine analysis bulletins

Prerequisites

Before the course unit the learner is expected to be able to:

1. To identify the distinct types of macromolecules and understand their biological functions.
2. To distinguish the main proteins, lipids, and carbohydrates
3. Understand the energetic metabolism of the cell.

Course contents

Structure of the grape clusters. Chemical composition of must and wine. The transformation of must into wine. Reactions during wine maturation and aging. Physical and chemical accidents. Oenological role of the different components of wines.

Course contents (extended version)

1. Structure of the grape clusters
 - Stem;
 - Grape berries;
 - Seed;
 - Skin.
2. Chemical composition of must and wine
 - Sugars;
 - Organic acids;
 - Polyphenols;
 - Compounds responsible for the aroma;
 - Pectic compounds;
 - Nitrogen compounds;
 - Vitamins;
 - Minerals.
3. The transformation of must into wine
 - Glycolysis and alcoholic fermentation;
 - Malolactic fermentation;
 - Clarification.
4. Reactions during wine maturation and aging
 - Oxidative processes (enzymatic and non-enzymatic);
 - Non-oxidative processes.
5. Physical and chemical accidents
 - Ferric Casse;
 - Oxidasic casse;
 - Cupric casse;
 - Protein casse.

Recommended reading

1. Cardoso, A. D. 2020. O vinho da Uva à Garrafa. Agrobok, Portugal;
2. Moreno, J. e Peinado, R. 2012. Enological Chemistry. Academic Press, London;
3. Moreno-Arribas, M. V. ; Polo, M. C. 2009. Wine Chemistry and Biochemistry. Springer, New York;
4. Ribéreau-Gayon, P. ; Glories, Y. ; Maujean, A. e Dubourdieu, D. 2006. Handbook of Enology - The Chemistry of Wine Stabilization and Treatments, Second Edition. John Wiley & Sons, New York;
5. Grainger, K. e Tattersall, H. 2005. Wine Production: Vine to Bottle. Blackwell Publishing, Oxford.

Teaching and learning methods

Theoretical classes: lecture, questioning and active methods. Practical classes: demonstrative, questioning and active methods, in laboratory.

Assessment methods

1. Continuous - (Regular, Student Worker) (Final)
 - Intermediate Written Test - 70%
 - Reports and Guides - 15%
 - Presentations - 15%
2. Final Exam - (Regular, Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 100%

Language of instruction

1. Portuguese
2. Portuguese, with additional English support for foreign students.

Electronic validation

| | | | |
|---------------------------------|-------------------------------------|------------------------|-----------------------------------|
| Vitor Manuel Ramalheira Martins | Clementina Maria Moreira dos Santos | António Castro Ribeiro | José Carlos Batista Couto Barbosa |
| 12-12-2022 | 13-12-2022 | 19-12-2022 | 19-12-2022 |