

TECHNOLOGY AND CONTROL IN WINE INDUSTRY

(III rd Year of study, VI th Semester)

Credit value (ECTS): 4

Course category

Domain (compulsory)

Course holder:

Prof. PhD. Valeriu V. COTEA

Discipline objectives (course and practical works)

The "Technology and control in the wine industry" course aims to provide students with updated information related to winemaking, the specific equipment used in making wine, authorized oenological practices, stabilization and conditioning wines, viticulture legislation and wine analyzes, common and specific and also other information to help prepare future professional engineers in food industry.

Contents (syllabus)

Course (chapters/subchapters)
1. Introduction. Definitions. The purpose and content of oenology. Statistics on wine production around the globe.
2. Constructions and wine tanks. Winemaking complex organization. Wine vessels. Classification of wine vessels. Different types of wine tanks.
3. The grapes used in the wine industry as raw material. Constituent parts of the grape and the correlation between them. The chemical composition of the grapes. Grape maturation and development phases of their composition. Establishing the optimal time for harvest.
4. Technology for grape processing and the obtainment the must. Transport and unloading the grapes; reception for processing. Grape destemming and crushing. Treatments applied to marc. Must separation of the pomace. The yield of grapes into wine.
5. Chemical and biological composition of the must. The chemical composition of the must. Sugars from grapes, must and wine. Pectic substances, gums and mucilaginous substances in must. The acids in wine. Nitrogenous substances in grapes, must and wine. Tannins in grape and wine. Coloring substances (pigments) of must and wine. Odorous substances in grape and wine. Minerals of must and wine. Biocatalysts from must and wine. Vitamins in grapes, must and wine. Enzymes derived from grapes. The enzymes produced by microorganisms. Enzymes from industrial enzyme preparations.
6. Grape processing technology. Assembly and blending of musts. Clearing must. Different treatments applied to must before fermentation. Corrections applied to the composition of must and wine.
7. Antiseptics and antioxidants used in the wine industry. The use of sulfur dioxide in wine. Use of sorbic acid in wine. The use of ascorbic acid in wine. Dialkyl pyrocarbonate use in winemaking

8. The fermentation and maceration in wine production technology. Alcoholic fermentation of must. Deployment phases of alcoholic fermentation. The fermentation and maceration in wine production technology. White wines maceration technology. Maceration - fermentation technology of making red wines. Malolactic fermentation. The factors that influence the malolactic fermentation.
9. The chemical composition of the wine. Alcohols in wine. The acids in wine. Phenolic compounds in wine. Minerals in wine. Aldehydes wine. Acetals and esters of wine.
10. Technological operations of wine stabilization and conditioning. Wine storage in partly filled vessels. Decanting wine. Equalization and blending of wines.
11. Evolution and development phases of wine. The evolution and development phases of wine. Fermentation and formation phases of wine. Wine maturing stage. The main processes that occur during maturation of wine. Quick maturing wine processes. Wine maturation in small oak barrels. The wine aging phase. The degradation of the wine.
12. Unwanted changes that may occur in wines Undesirable physico-chemical changes. Foreign scents and tastes accidentally occurring. Unwanted microbiological changes of wine.
13. Clarification and stabilization treatments applied to wines. Spontaneous wine clarification. Wine clarification by centrifugation. Clarification of wine by fining. Filtering the wine.
14. Stabilization treatments applied to wine. Chilling the wine. Treatment with metatartaric acid. Pasteurization. Wine bottling technology. Technological bottling lines. Sterile filling.

Practical works
1. Safety rules of and fire protection in the Laboratory of Enology. Description of laboratory equipment and utensils used in the analysis of musts and wines.
2. The sampling methods used for analysis. Determination of soluble solids in the must by refractometry and areometry.
3. Determination of total acidity of musts and wines by potentiometric and colorimetric methods. Determination of pH and buffer effect.
4. Evaluation of the grape ripening process in choosing the the optimal time for harvesting.
5. Determination of volatile acidity of wines by the titrimetric method.
6. The rational use of sulfur dioxide in wine. Determination of free and total SO ₂ in wines by using the titrimetric Ripper method.
7. Determination of the alcoholic content of wines by areometry and ebulliometry.
8. Determination of reducing sugars in wines by using the Luff-Schoorl chemical method.
9. Determining the optimal dosage of bentonite and gelatin by using microsamples in order to clarify
10. The Determination lactic, malic and tartaric acids in wine by rapid reflectometry methods in order to monitor the malolactic fermentation.
11. Wine blending. The determination of the wine proportions used based on physico-chemical parameters
12. Determination of chromatic parameters wines by Cie-LAB 76 method and the computerized simulation of wine color.
13. Determination of aromatic profile of wines through sensory analysis (wine tasting)
14. Test

Bibliography

1. Cotea V. D., 1985 – *Tratat de Oenologie*, vol. I – Vinificația și biochimia vinului, Editura Ceres, București.
2. Cotea V. D., Pomohaci N., Nămoșanu I., Stoian V., Popa A., Sîrghi C., Gheorghiu M., 2000 – „*Oenologie – Prelucrarea strugurilor și producerea vinurilor*”, vol. I, Editura Ceres, București.
3. Cotea V. D., Sauciu J., 1988 – *Tratat de Oenologie*, vol. II – Limpezirea, stabilizarea și îmbutelierea vinului, Editura Ceres, București.
4. Cotea V. D., Zănoagă C., Cotea V. V., 2009 – *Oenochimie*, volumele I și II, Editura Academiei Române, București.
5. Cotea V. V., 2012 – *Note de curs*;
6. Cotea V. V., Cotea V. D., 2006 – *Tehnologii de producere a vinurilor*, Editura Academiei Române, București.
7. Cotea V. V., Zănoagă C., Cotea V. D., 2010 – *Oenologie. Construcții, vase și utilaje vinicole*, Editura Academiei Române, București.
8. ***2015 - *Legea nr. 164 din 24 iunie 2015 a viei și vinului în sistemul organizării comune a pieței vitivinicole*, Monitorul Oficial nr. 472.

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Exam	examination	60%
Appreciation of the activity during the semester	Course attendance	10%
	Oral assessment during the semester, verification tests and final laboratory test.	30%

Contact

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