RESOLUTION ECO 2/2004

BASIC LEVEL REQUIRED FOR PROFESSIONALS INVOLVED IN MAKING PRODUCTS DERIVED FROM GRAPES

THE GENERAL ASSEMBLY,

UPON THE PROPOSAL by Commission III "Economy", based on the works of the experts group "Training",

CONSIDERING the resolution ECO 1/2004 taking into account OENO 2/91 relating to the training of oenologists, upper training level and Resolution OENO 1/99 which defines the field of activity for wine professionals and which implies an explanation of each sector activity,

CONSIDERING that these competencies can only be acquired by guaranteeing basic training,

CONSIDERING that it is desirable to establish a general framework which each country can adapt to its particular situation,

RECOMMENDS TO MEMBER STATES that they take into consideration the following elements for developing training programmes for professionals involved in making products derived from grapes.

Theory

A. Viticulture

B. Oenology

I. Transformation of the grape into wine. Microbiology of wine.

II. Composition and development of wine

III. Work and treatment of wine

IV. Oenological engineering

V. Analysis and control of must and wine

VI. Products and co-products derived from vine and wine

C. Law and vitivinicultural legislation

D. Food safety

E. Wine and vine products in the human environment

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Tutorials and seminars

Viticulture
Applied oenology and microbiology
Oenological engineering
Sensory analysis

Detailed programme

The detailed programme given below is the minimum programme.

Theory

A. Viticulture

I. Basic elements

Rootstock and scions of the main vine varieties of the region.

Choice of vine variety depending on the type of product sought and legislative requirements.

II. Biology of vines

Annual cycle of vines.

III. Ecology

3.1.Climatology of vines.

3.2. Pedology.

3.3 Influence of the soil on the physiology of vines and the composition of vines.

I. Cultivation of vines

Consequences of cultivation techniques on yield and quality.

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I. Pathology and treatments

General knowledge.
Weather hazards (frost, hail, etc.).
Physiological accidents and diseases.
Cryptogamic diseases and animal parasites.
Treatment products.

B. Oenology

I. Transformation of the grape into wine. Microbiology of wine.

1.1. General study of the primary matter/raw material.

Description of the grape bunches and the berries.
Phenomena of berry maturation.

- Origins and biosynthesis paths of organic acids, sugars, phenolic compounds, nitrogen compounds.
- Influences of cultivation and climatic conditions.
- Indexes of maturity and predictive models for dates, quality and quantity of harvests.
- Variations of the composition of must.

Respective influences of the constituents of ripe grapes on the making, composition and storage of wine.
Influence of various parasites (insects, fungus) on the composition of must and wine.

1.2. Technology.

1.2.1. Pre-fermentative treatments and phenomena.

Enzymatic activities.
Study of oxidoreductases, pectinases, proteases, lipases, invertases, etc.
Technological consequences.
Exchange phenomena.
Colloidal phenomena.

Harvest, transport.
Mechanical treatments of the harvest: crushing, de-stemming, transfer, pressing.
Sulphiting.
Controlling temperatures.
Clarification of must.
Corrections of the raw material (enrichment, acidification, deacidification, etc.).
Yeasting.
1.2.2. Fermentations.
1.2.2.1. Yeasts.
Yeast cell. Ecology. Taxonomy of yeasts.
Notion of species.
Genetic isolation and identification of yeasts and selection.
Yeast metabolism.
Influence of physico-chemical and biological factors.
1.2.2.2. Alcoholic fermentation.
Description of the phenomenon. Aerobiosis and anaerobiosis.
Growth and fermentation.
Biochemistry of fermentation.
Conclusion of fermentation.
1.2.2.3. Bacteria.
Lactic and acetic bacteria. Ecology. Taxonomy.
Isolation and culture. Metabolism. Influence of environmental conditions.
1.2.2.4. Malolactic fermentation.
Description of the phenomenon. Biochemistry of fermentation. Fermentation conditions.
1.2.3. Winemaking.
1.2.3.1. Fermentation on skins.
Phenomena of maceration:
Different systems of vats. Performing vinification.
Pumping over. Aeration. Normal and abnormal conditions.
Stops in fermentation. Intervention of bacteria.
Control of temperatures.
De-vatting. Pressing.

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First pressings and press wine.
Continuous vinification. Vinification with carbonic maceration.
Vinification with heating of the harvest.
Other processes.
1.2.3.2. Fermentation off skins.
Techniques for must extraction.
Racking must.
Inoculation.
Performing fermentation. Temperature and aeration conditions.
Making dry wines. Skin maceration.
Making sweet wine and wines from over-matured grapes with or without intervention of Botrytis cinerea.
1.2.3.3. Rosé vinification.
Process by partial dripping by draining, complete pressing.
1.2.3.4. Vinifications of damaged harvests.
Different damage (rot, hail, etc.).
Appropriate measures to counteract.
1.2.3.5. Special vinifications.
Natural sweet wines and liqueur wines.
Sparkling wines.
Wines under veil.
Wines on lees.
This chapter will be oriented depending on characteristic national productions.

II. Composition and development of wine.

2.1. Composition of wine.

Alcohols. Sugars. Organic acids. Mineral constituents. Phenolic compounds. Nitrogen compounds. Neutral polysaccharides. Volatile compounds.
Aromatic compounds, other compounds, etc.
Comparison between the composition of must and wine.
Relation between the composition and sensory characteristics.

2.2. Acidity and pH.

State of acids in the wine, acidimetric balances.

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2.3. Oxidation-reduction phenomena.

Oxidation-reducing systems for wine.

Dissolution of oxygen in wines. Oxidisable substances in wine – mechanism of oxidation of wine constituents.

Application to oenology of the concept of oxidation-reduction potential. Determination of this potential.

2.4. Macromolecules and colloidal phenomena in wines.

Real solutions and colloidal state.

Stability factors of macromolecules and colloidal suspensions.

Flocculation. Sedimentation. Adsorption.

Concept of protective colloids. Natural wine macromolecules.

Colloids of accidental formation in wines.

2.5. Precipitations of physico-chemical origins in wines.

Tartaric precipitations.

Ferric precipitations. Chemical and physico-chemical phenomena of

“ferric casse”. Influence of pH and organic acids.

Formation of ferric complexes.

Cupric precipitations or “cuprous casse”.

Coagulation of proteins or “protein casse”.

Precipitation of colouring matter.

Precipitation of oxidasic origin.

Characteristics and predicting cloudiness and deposits.

2.6. Microbial alterations.

2.6.1. Microbial alterations.

2.6.2. Alterations of yeast origin, fleur.

2.6.2.1. Lactic bacteria.

Degradation of pentoses.

Degradation of citric acid.

Degradation of tartaric acid: tourne.

Degradation of glycerol: bitterness, “graisse disease”.

2.6.2.2. Acetic bacteria.

Formation of acetic acid and ethyl acetate.

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III. Working and treatment of wine.

3.1. Knowledge and quality of products used in oenology.

O.I.V. International Oenological Codex.

International Code of oenological practices.

3.2. Hygiene.

Hygiene of premises, materiel and facilities.

Hygiene of wine. Prevention of microbial and physico-chemical accidents.

3.3. Fining of wines.

Fining theory. Coagulation of proteins in wine. Physico-chemical phenomena in play. Over-fining. Fining practices and main fining agents used.

Lees from fining.

3.4. Filtration of wines.

Filtration theory. The mechanisms of filtration: straining and adsorption.

Frontal and tangential flow. Rate and clogging of filtering surfaces. Filtrating material: cellulose, diatomaceous earth, perlite, membranes, etc.

Filtration techniques. Choice of a filtration process. Filterability tests.

Comparison of fining and filtration effects.

3.5. Centrifugation of wines.

Centrifugation theory. Material principle.

3.6. Physical treatments.

Biological stabilisation of wines by heat: pasteurisation.

Stabilisation and concentration by cold.

Various processes.

3.7. Physico-chemical and chemical treatments.

Theory and practice of treatments.

Use of mentioned products according to the O.I.V. International Code of Oenological Practices and products authorised for experimentation.

Sulphurous acid in wines: role, state and techniques for use.

Inert gases in oenology.

3.8. Storing wine.

Manipulation. Blending. Topping. Racking.

Storing with inert gases.

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3.9. Winemaking.

In wood. In vats. In bottles and other techniques

3.10. Packaging.

Blending. Technical control of wine (stability and filterability).

Material, packaging processes and sealing methods.

I. Oenological engineering.

4.1. Importance of the mechanical equipment of vinicultural industries.

4.2. Fluids.

Transmission of heat (conductibility, convection, radiation).

Producing cold (compressors, condensers and evaporators).

Hydraulic elements. Flowing in the pipes. (Displacement/Volumetric and centrifugal pumps. Pressure and pressure drops).

Air flow. Ventilators and ventilation.

Air conditioning.

4.3. Energy and motors.

Electrical current. Functioning and protection of induction motors.

Electrical automatism. Safety rules.

Thermal motors. Main types, possibilities of use, yield, maintenance.

4.4. Materials.

Wood. Cork. Glass. Steel. Concrete. Plastic.

Mechanical properties, processing, corrosion resistance.

Coatings.

Resistance of materials and calculation of elements of machines and buildings.

Protection against humidity, water-tightness.

Isolation and insulation.

4.5. Material.

Piping, valves, heat exchangers.

4.6. Machines and apparatus.

Harvesting, transporting the harvests.

Reception and quantitative and qualitative control of the harvests.

Pre-fermentative treatment of the harvests.

Vinification in maceration and in liquid phase.

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Oenological practices (stirring up, racking, treatments, concentration, clarification, etc.).
Pressing.
Storing wines in bulk and bottled.
Bottling lines.

4.7. Rational establishment of vinicultural facilities.

I. Analysis and control of must and wine.

Sensory analysis.
General presentation on the wine tasting.
Sensory organs. Physiology of taste.
Relation between the composition of wines and their sensory characteristics.
Vocabulary for wine tasting.
Knowledge and recognition of primary tastes.
Concept of balance and harmony.
Initiation to wine tasting, spirit beverages of vitivinicultural origin and other products.
Determination of sensibility thresholds and differentiation of odours.
Search for defects and alterations.
Tasting wines from various vine varieties, various technologies and various vineyards.
Tasting panel.

I. Products and co-products derived from vine and wine.

6.1. Table grapes and raisins.

6.2. Mutated musts, concentrated musts, rectified concentrated musts, grape juice.

Stabilisation methods (storage, packaging).

6.3. Drinks made from grapes with little or no alcohol.

6.4. Aromatised wines, liqueur wines and other wine-based drinks.

6.5. Spirit beverages of vitivinicultural origin.

Brandies.
Marc brandy and lees.
Grape and raisin brandies.
Distillation and rectification processes.

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Composition, storage and ageing of spirit beverages of vitivinicultural origin.
Preparation for marketing.

6.6. Confectionary products.

Jams. Low calorie products.
Making and storage.

6.7. Wine vinegar.

6.8. Other derived products.

Tartaric acid, grape seed oil, piquettes. anthocyanic
pigments, compost and other products, etc.

C. Law and vitivinicultural legislation

I. General regional, national and international aspects.

II. Legislation concerning foodstuffs. Applied to vitivinicultural products.

III. Labour law. Economic law. Commercial law. Tax law. Expertise, etc.

IV. Rights and responsibilities of the oenologist.

D. Food safety.

E. Wine and vine products in the human environment.

I. Harmful effects and the environment: impact of cultivation practices, treatments of vines, from winemaking and other waste from vinicultural facilities.

II. Impact of the consumption of wine and other vine products on human health.

Seminars
Viticulture.
Applied oenology and microbiology.
Oenological engineering.
Sensory analysis.
Tutorials on the field and in the laboratory

Viticulture.
Applied oenology.
Sensory analysis.
Training period
A field work internship is highly recommended.

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