UNIUNEA EUROPEANĂ

GUVERNUL ROMÂNIEI
MINISTERUL MUNCII, FAMILIEI ŞI PROTECŢIEI SOCIALE
AMPOSDRU

Fondul Social European
POS DRU 2007-2013

Instrumente Structurale
2007-2013

MINISTERUL EDUCAŢIEI CERCETĂRII TINERETULUI ŞI SPORTULUI
OIPOSDRU

Universitatea
Lucian Blaga
Sibiu

THE UNIVERSITY "LUCIAN BLAGA" SIBIU
FACULTY OF AGRICULTURE, FOOD INDUSTRY AND ENVIRONMENT

Summary of thesis entitled

RESEARCH ON TECHNOLOGY TO IMPROVE TECHNOLOGICAL FLOWS LEADING TO FERMENTATIVE PROCESSES IN THE WINE INDUSTRY

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SIBIU 2011

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LIST OF ABBREVIATIONS

CEP - intense pulsating electric fields
FA - alcoholic fermentation
RA-enzyme preparation for the liberation of varietal flavours
DS - selected yeast strain
VRz - Italian Riesling variety wine obtained by fermentation of corrected sugar must
VCz - Chardonnay wine obtained by fermentation of corrected sugar must
VR-DS - Italian Riesling variety wine obtained by fermentation with yeast selected must yield sugars / alcohols and other selected yeasts
VC-DS - Chardonnay wine obtained by fermentation with yeast selected must yield sugars / alcohols and other selected yeasts
VMO-DS - Ottonel Muscat wine obtained by fermentation with yeast selected must yield sugars / alcohols and other selected yeasts
VRcv - Italian Riesling variety wine obtained by fermentation of corrected grape must concentrated under vacuum
VCcv - Chardonnay wine obtained by fermentation of corrected grape must concentrated under vacuum
VR_L - wine grape variety Riesling produced by fermentation of corrected grape powder
VC_L - Chardonnay wine obtained by fermentation of grape must rectified with lyophilized must
VMO_L - Ottonel Muscat wine obtained by fermentation of grape must rectified with lyophilized must
VC_L-RA - Chardonnay wine obtained by fermentation of grape must correct the powder treated with enzymes revealing the flavor (towards the end of alcoholic fermentation).
VMOcv-RA - Ottonel Muscat wine made from concentrated grape must adjusted under vacuum, treated with enzymes revealing the flavor (towards the end of alcoholic fermentation).
VMOz-RA - wine made from Muscat Ottonel must correct sugar flavor revealing treated with enzymes (towards the end of alcoholic fermentation).
VMOcv-RA - Ottonel Muscat wine made from concentrated grape must adjusted under vacuum, treated with enzymes revealing the flavor (towards the end of alcoholic fermentation).
VMO_L-RA - Ottonel Muscat wine made from grape must correct the powder treated with enzymes revealing the flavor (towards the end of alcoholic fermentation).
VMO-DS-RA-variety wine Muscat Ottonel obtained by the fermentation of grape must with a selected yeast\/sugar yield higher alcohol treated with other yeasts selected from aroma enzymes revealing

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➢ Introduction

Wine is a drink produced exclusively by alcoholic fermentation of fresh grapes or partial uncrushed or crushed or fresh grape must ("Law on Vine and Wine in The Common Market Organisation for Wine", 244/2002 republished) and one of the most alcoholic beverages appreciated by consumers.

A general phenomenon observed worldwide is the gradual orientation of the wine consumer preference current consumer, to quality wines.

The quality of wine was and remains a very topical subject, which is absolutely justified because wine consumption is part of life hedonism and wine drinking only if it meets the requirements and consumer preferences. From another point of view, quality wine, is a very complex concept as a way of expression and as a way to dial this feature and originated as grapes, are also strongly influenced by the driving of each phase contributes to technological evolution and formation wines. Of these stages of the wines, winemaking is a primary determinant in the evolution and stability of wines.

Wine years of unfavorable climatic (natural calamities), with poor harvests, leading normally to obtain wines that do not meet quality standards desired by the manufacturer and not least by the consumer. In these situations the oenologist has an essential contribution to the wine and quality assurance, but if raw material is of poor quality and oenological practices law strictly restricts correction must, it is forced to work after technological unconventional schemes and with oenological higher materials.

In addition to quality materials, technology, conservation of raw material quality (with quality assurance role in wine) and antioxidant protection for taking the first steps of the process, are matters that should not be neglected. In these conditions, transport, crushing, advanced pulp processing to ensure maximum transfer of bioactive components, maceration and pressing, are technological operations with impact upon the quality of must raw material.

If transport and antioxidant protection of grapes at harvest to the winery can be performed under optimal conditions (closed trailers, protective ice or inert gas), the same can be said about the first stages of winemaking primary key to quality wine. Given the location from the skin level or seed compounds influential in shaping and typing wine, a selective extraction is required in utmost account.

By their nature, cells in tissues containing compounds with oenological value lose their integrity only by mortification, a process that takes place in a time under the influence of biological, chemical or physical environment.

Since the mechanical crushing of the grapes does not provide complete plasmoliza tissue, especially skin level areas around and in the wine industry extracting bioactive components depends on the grape variety, pulp temperature, and other technological factors, the mustification should be let to soak.

Pulp maceration enzymes in their action requires long time and therefore unjustified restraint of the production capacity. To accelerate the process of extracting the bioactive components, the mustification can be seeded with enzyme preparations, heat treated or pulsed electric fields.

Corrections to the composition of grape musts can be made with the highest quality (in which qualities were preserved during concentration), from the lyophilised musts category yet unspecified by the rules for the application of the law of the vineyard and wine into the common organization wine market with No. 244/2002 republished.

In these conditions, in addition to materials required oenological quality and improvement of fermentation technology flows to obtain wines with consistent quality, even in the processing of some calamited crops.

PhD thesis entitled " RESEARCH ON TECHNOLOGY TO IMPROVE TECHNOLOGICAL FLOWS LEADING TO FERMENTATIVE PROCESSES IN THE WINE INDUSTRY" includes 210 pages 11 tables, figures 111, 290 bibliographic sources and it is structured in two parts: documentary study and personal research.
The first part includes documentary studies iand it is systematized in three chapters and includes illustrated pages 69, 11 figures and 6 tables.
The second part contains studies and experimental results.
It is structured in four chapters and contains 141 pages 100 figures and 5 tables.

SCIENTIFIC OBJECTIVES OF THE THESIS

Obtaining quality wines whose physicochemical and sensory characteristics to remain constant from one year to another is a basic condition, followed by all renowned manufacturers of quality wines. There are enough cases that may occur in different years harvest, when certain climatic conditions make the accumulation of sugars, color and aroma substances to be poor. It must therefore approach research whose results ultimately lead to solutions whose application best practice less beneficial to counterbalance the influence of climatic conditions in a particular vintage. In the scientific approaches of this paper, I wanted to develop a particular technology in grapes and fermentation processes based on the management and corrective action elements in conformity with applicable legislation.

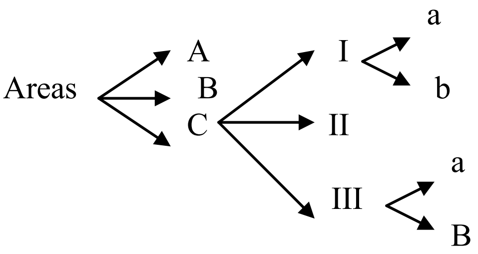
To achieve this central objective, research undertaken followed a series of secondary endpoints of combined results of which ultimately lead to finding the best options in central objective. These secondary objectives can be structured as follows:
A - analysis of some modern grape processing options to obtain deburbat must be subject to different types of alcoholic fermentation.
In this respect, were followed three directions:
1 - mustification treatment with pulsating electric fields.
2 - mustification processing by endogenous enzymes classic maceration
3 - process of mustification by maceration with pectolytic enzymes.
B - Analysis of options for applying correction musts before alcoholic fermentation achievement.
To achieve this objective have been studied the following:
1- use of selected yeasts with a higher alcohol yield sugars/other selected yeasts
2 - correction must undergo fermentation with sugar classical version
3 - correction must undergo fermentation with vacuum concentrated must
4 - correction must undergo fermentation with grape powder
each of the four methods applied were studied in version:
- With assets of fermentation, yeast selected sugar yield / higher alcohol or other selected yeasts selected yeast fermented mash dedicated type.
- With assets of fermentation, yeast selected sugar yield / higher alcohol selected yeast or yeast selected other type of dedicated and revealing fermented mash of flavors.
C - were reported different weight compounds such as polyphenols color, flavanols, anthocyanins, catechins during the processing of grapes and wine as part of obtaining verification of various methods processing and correction of the wine obtained.
In parallel with these compounds was determined antiradical power compared to a chemically stable or radical absorption capacity compared with oxygen radicals and antioxidant power in all phases of the technological flow.
For this purpose we used modern methods analysis of polyphenols, flavanols, anthocyanins, catechins and antiradical and antioxidant power determination.

DOCUMENTARY STUDY

The documentary study includes the first three chapters of the thesis.

Chapter 1. CURRENT STATUS OF VITICULTURE AND WINEMAKING IN ROMANIA

In the introduction to Chapter 1, several references are made to legislation on wine.
In subchapter 1.1. *Viticulture and winemaking in Romania*, is presented the current state of viticulture and winemaking in Romania with reference to the delimitation of wine according to EU.
Growing areas of U.E. are coded as follows: A, B, C (CI, CI B, C II, C III and C III b).



In accordance with EU legislation in Romania were delineated three vineyards: B, CI and C II (Figure no. 1).

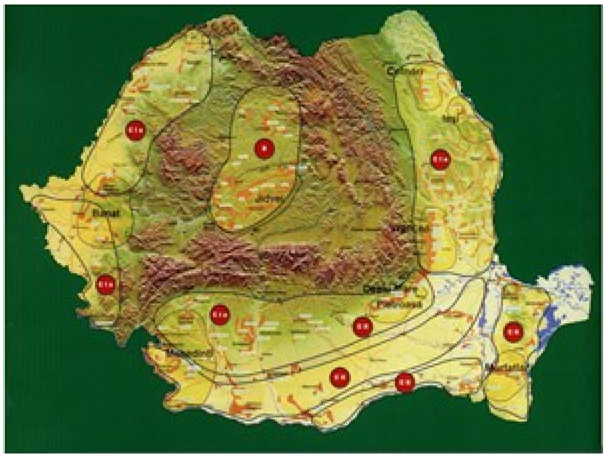


Figure no. 1 - *Romania's wine-growing areas, defined according to the European Union*

Also in this section is presented the legal framework of Vine and Wine in Romania, with reference to the regulations for making corrections to the composition of the wort (especially focused on enrichment methods must in sugars).
Subchapter 1.2. - *The influence of biota on vine culture*, defines the biotype and the oenoclimatical areas in Romania.

In Subchapter 1.3. - *Biocenotic influence on vine culture*, are summarized morphological and anatomical changes likely occurring in the grape berries under the action of pathogens that parasitize living cultures.

At subchapter 1.4. - *The influence of technical factors of culture*, is summarized the influence of several technical factors to the quantity and quality of grapes.

In subchapter 1.5. - *Legislative Vine and Wine in Romania*, are presented some legal issues concerning the corrections of composition that can be made to must in unfavorable years of production.

Chapter 2. QUALITY FACTORS OF RAW MATERIALS.

In subchapter 2.1 - *Mechanical composition of grapes*, are presented all uvological units of grape and the percentage composition.

Table no. 1 - *Percentage composition of the grape.*

Components of the grapes and berries	% To the weight of the grape	% Of grain weight
Clusters	3-5	
Skin	95-97	8-11
Core		84-89
Seeds		3-5

In subchapter 2.2. - *Biochemical composition of grapes*, is presented the biochemical composition of grapes.

Table no. 2. - *The chemical composition of grapes (values expressed in % of fresh weight) after Tardea Constantin and colab. 2010*

No. item.	The chemical components	In clusters	In the grains		
			skins	pulp	seeds
1	WATER	78-80	75-80	80-85	25-45
2	SUGARS				
	- Glucose	-	-	7-12,5	-
	- Fructose	-	-	8-13	-
	- Sucrose	-	-	0,1-0,15	-
	- Pentozans	0,5-1,5	0,5-1,0	0-0,1	4-5
3	ORGANIC ACIDS				
	- Tartaric acid	0,5-1,5	0,2-0,5	0,3-0,8	-
	- Malic acid	0,1-0,5	0,01-0,02	0,05-0,1	-
	- Citric acid	-	-	0,02-0,09	-
	- Gluconic acid	-	-	0,01-0,02	-
4	Polyphenols				
	- Tanins	3-5	0,5-1,0	0,01-0,02	5-8
	-Anthocyanins	-	0-2	Tinctorial varieties	-
5	Nitrogenous substances				
	- Aminoacids	-	0,02-0,1	0,5-1,0	-
	- Polypeptides	1-1,2	0,2-0,3	0,01-0,2	0,5-2,0
	- Proteins	0,5-0,8	0,05-0,01	0,01-0,1	0,2-0,5
	- Biogenic amines	-	-	0-0,02	-
6	Lipids				
	- Fatty acids	0,01-0,02	0,08-0,2	0,01-0,05	9-18
	- Phytosterols	-	0,01-0,04	-	-
7	Pectic materials				
	- Protopectine	-	0,01-0,05	-	-
	- Pectins	-	-	0,5-0,2	-
	- Gums	-	0,02-0,1	0,01-0,5	-
8	Primary aromatics				
	- Terpenols	-	0,01-0,1	traces	-
	- Terpene glycosides	-	0,1-0,5	traces	-
9	MINERAL SUBSTANCES	2-3	0,5-1	0,2-0,3	2-4
10	POLYSACCHARIDES				
	- Cellulose	5-10	3-4	0,1-0,2	44-57
11	VITAMINS (B,H,PP,C)	-	-	0,01-0,08	-
12	ENZYMES	-	Pectolaze	Oxide reductase, lyase	-

Chapter 3 - THE PROCESSING OF GRAPES AND THE OBTAINING OF WHITE WINES

Technologies for getting white wines.

To obtain high quality white wines (towards wines of current consume), using complex technology-based schemes: crushing and pressing grapes moderately, pre-fermentative skin maceration, moderate doses of sulfur dioxide and bentonite, the composition of musts corrections, use of selected yeasts and enzyme preparations, alcoholic fermentation ceasing to keep sugars in wine.
Scheme of the main technological operations of obtaining quality white wines is shown in Figure no. 2.
In subchapter 3.1. - *Technologies for getting white wines* are presented some of the principles underlying the way of obtaining the quality white wines and a general technological scheme of processing white grapes.

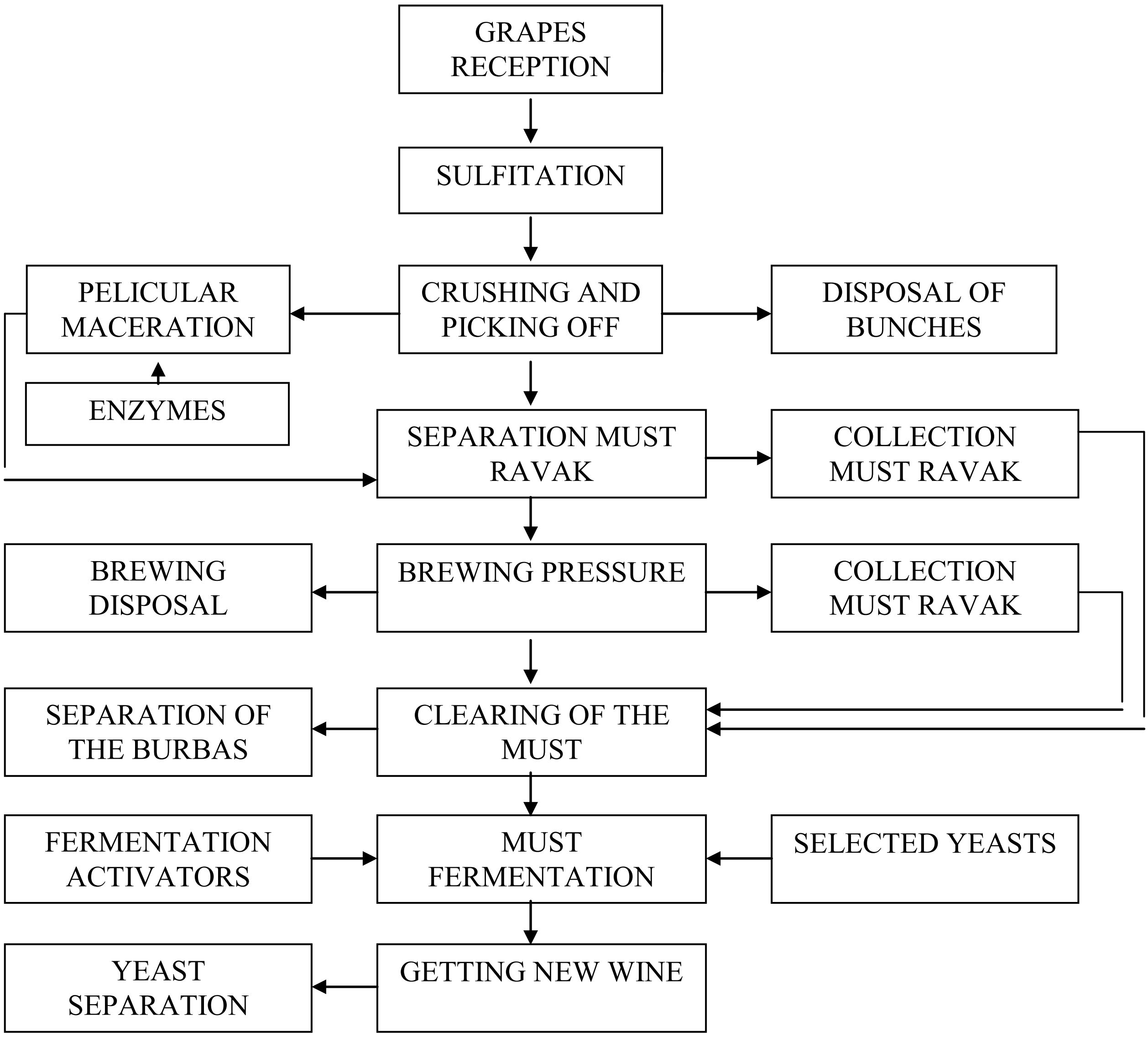


Figure no. 2 - *Technological scheme for obtaining high-quality white wines.*

In subchapter 3.2. - *Harvesting grapes* are summarized factors that promote maturation of grapes, grape maturation aspects and some criteria which establish the optimal time of harvest.
Subchapter 3.3. - *Transport grapes from the wine cellar*, presents some aspects of transport grapes (white) to cellar.
In subchapter 3.4. - *Grape antioxidant protection* - lists several ways of producing grape antioxidant protection to processing centers and antioxidant effects on yield.
Subchapter 3.5. - *Receipt of grapes*, deals with matters relating to reception and better grapes.
In subchapter 3.6. - *Unclustering and crushing of the grapes*, are presented aspects about unclustering and crushing of the grapes. Following the general technological scheme presented at the beginning of the chapter are pointed desciorchinare issues, evacuation bunches, grape crushing, treatment with electric pulsating fields , the sulfitation of the mustification and the processing of grapes in modified atmosphere and temperature controlled.
Subchapter 3.7. - *Mustification treatment with electric pulsating fields*
Classical machines of mechanical unclustering and crushing of the grapes, do not provide complete plasmolize cellular tissue, especially skin areas around grains (pericarps) and core (endocarps), so some juice, color and flavor compounds contained in the tissue of the mentioned areas do not reach the liquid phase remaining in the pressed one (marc).
To improve extractivity, the mustification can be heat treated. Using thermal agent improves extractivity, but some components are transformed, volatilise or cease. Traditional technology is characterized by high consumption of heat, require bulky and expensive equipment, special service and yields are low. For these reasons this technology is not widespread in the wine industry. However the need for increased rate of diffusion of color compounds in grape juice using heat pushed into the next phase of the technological process of processing, .ie maceration. It was studied the effect of heat upon mustification at the stage of maceration, there were developed technologies and equipments of thermomaceration or thermomaceration in continuous flow. Even this technology has its drawbacks on the extraction efficiency, energy consumption and quality of the must or wine.
In modern technologies the thermomaceration place is occupied by enzyme preparations to ensure rapid maceration and extraction of dyestuffs and odorant precursors in the skin of grapes, allowing 70-80% shortening of the maceration period of the mustification..
Thus it is required to seek an alternative, to develop and implement new technologies based on the use of higher forms such as the electrical energy.
An ultra-modern processing method of red grapes and not only would be technology implementation and installation for treatment of pulsating power of the mustification. The approach of this method in the red grape processing technology leads to reduced processing time classics, increasing the amount of liquid phase and to obtain a mash with superior color and aromatic features.
The electroplasmolize of the cellular tissue in the manufacture of grape must in color and aromatic features qualities is a superior technology in terms of techno-economic and ecological. The use of the power plant in pulsating form grapes can provide high efficiency. The plasmolize process can be achieved by installing flow treatment device electric fields of the mustification discharge path of technological line.
The use of technology and the facility of electroplasmolize has the following advantages:
- Increasing the amount of must ravak (leakage free) of the 8-12%;
- Increasing the amount of 1.5 to 3% must from pressing according to grape variety and technological maturity;
- Increasing the amount extracted by: sugar, dyes, phenolic substances and other components that determine the taste, aroma, the final appearance of wine;

- Reduce the liquid content of the pomace and thus energy savings in processing them by drying;
- With instant degradation of cell membranes protoplasm, is intensifying the release of intracellular juice
- Forced squeezing of the must at lower pressures with low energy consumption.

In subchapter 3.8. - *Sulphite pulp* - are summarized some considerations on antioxidant protection of the pulp.

Subchapter 3.9. - *Maceration*, treats in detail the ways of the mustification. General considerations are exposed regarding grape maceration, maceration role, principles of maceration, the main external factors that influence maceration. Also in this section are presented some considerations on the use of treats technology to obtain quality wines, namely: maceration of the marc, criomaceration, maceration enzyme preparations, maceration with microwave and ultrasound.

In subchapter 3.10. - *Separation of the must*, are summarized aspects of separation, separation ie leakage and separation by pressure with respect to the operation of pressing marc by presenting some features of grape presses.

Subchapter 3.11. - *Clearing and débourber of the must*, briefly presents the methods of clearing and debourbing (static and dynamic methods).

In subchapter 3.12. - *Treatment of the must before fermentation* - are presented some of the treatments applied to pulp ameliorative role to obtain high quality white wines. The category of these treatments have been mentioned: treatment with bentonite, heat treatment, treatment with charcoal, hyper – oxygen and corrections of composition of the wort.

Subchapter 3.12.1. - *Corrections to the composition of the wort*, lists some of the ways of achieving correction in the composition of in raw material characteristics and types of wine that is intended to be obtained.

orrection of acidity are presented aspects related to the sugar content by: blending, the addition of sugar / sucrose, the addition of concentrated must and rectified concentrated grape partial elimination of water (sustractive technology: heating under vacuum, and crioconcentration and reverse osmosis), reducing content of sugars.

A modern method of must concentration is lyophilization.

Cryo-desiccation or lyophilization is a process of concentration (conservation) which requires the removal of water from frozen grape in advance by vacuum sublimation with controlled heat input. From the diagram of saturation curves for water (Figure no. 3) is observed that water sublimation (solid state transition from the vapor) occurs only if the corresponding pressure is below the triple point (PT) and is therefore more than 4,579 mm Hg (0.006 bar) in Figure no. 3 it also results that, at constant pressure, sublimation takes place by raising the temperature, so with the heat input.

Thus the definition of lyophilization is justified, as a process of sublimation in vacuum (pressure much lower than normal atmospheric pressure) with heat input (for high temperature product).

It should be noted that the sublimation of ice occurs at normal atmospheric pressure:
- At a temperature of -5^0 C and a relative humidity of 20%, partial pressure of water vapor in air is 0.6 mm Hg (the pressure is lower than the triple point), ice sublimating to saturation vapor of the environment.

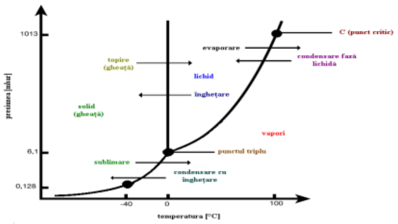


Figure no. 3 - *Diagram of saturation curves for water*

Lyophilization ensures quality of grape must (fresh keeping properties) compared to other methods of concentration, which allows any transport or store it in small spaces for long periods (even from one campaign to another) .
Must not require the development of lyophilized cold storage and transport. By lyophilization, the mass decreases by 75-85% products of the initial value, a phenomenon accompanied by volume reduction.
The main disadvantages of the process are:
- High investment costs, installations are about three times more expensive than other methods;
- Relatively complicated technical work and long process (about 24-48 hours);
- High energy consumption.
Concentration by lyophilization involve steps shown in Figure no. 4

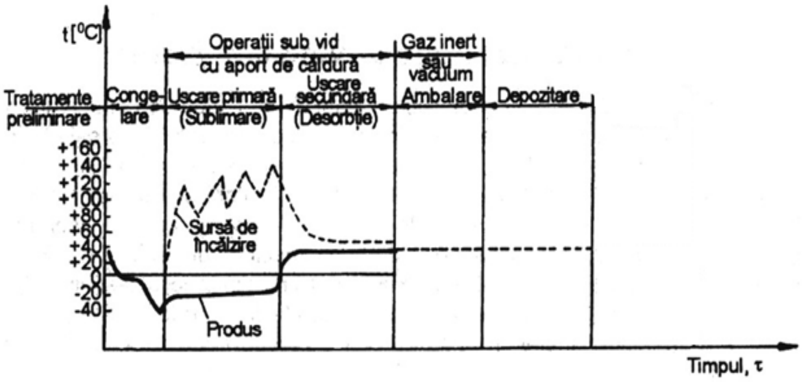


Figure no. 4 - *The scheme of the freeze drying process of grape must*

i.e - the execution of preliminary treatment;
- Freezing;
- Sublimation (primary drying);
- Secondary drying;
- Lyophilized product and packaging (if applicable);
- Storage.

In subchapter 3.12.2. - *Correction of acidity of the must* - are presented methods of acidification and deacidification of must.
If methods of acidification must be relatively limited (blending with musts containing acid or tartaric acid), the reduction of acidity are varied. Reduction by blending grape acidity is an optimal solution, but when it is not possible must be practical deacidification of chemical or biological way.
Subchapter 3.12.3. - *Correction in tannin content* – it shows things on the need for correction must tannin.
In subchapter 3.13. - *Technology of must fermentation* - are presented the priming operations to prepare alcoholic fermentation, regarding the influence of selected yeasts and fermentation activators. Also in this section are summarized stages of development of alcoholic fermentation.
In subchapter 3.14. - *The management of alcoholic fermentation* - is presented the fermentation chart and some notions about must fermenting at cold, fermentation with various selected yeasts and „super-quatre" fermentation.
Subchapter 3.15. - *Factors influencing guidance and control of fermentation*, present factors that influence the management and control yeast fermentation of the references to the importance of selected nutrients and growth, resistance yeast, revealing of flavors and of the development of alcoholic fermentation conditions (temperature, osmotic pressure , aeration).
Subchapter 3.16. - *Caring for wine*, wine has some notions about care again (pulling wine on the lees, sulfitation wine, filling gaps).

Part two

The studies and experimental results includes next four chapters of the thesis

CHAPTER 4 – RESEARCH ON THE QUALITY OF THE GRAPES RAW MATERIAL

Subchapter 4.1. presents - *Grapes raw material*
For conducting experiments in the study were three white grape varieties: Italian Riesling, Chardonnay and Muscat Ottonel. Since the white grape varieties, some components (anthocyanins) found in small amounts or not found at all, in parallel with the study's main white grape varieties, was taken in the study and a red grape variety - Cabernet Sauvignon (with greater weight in the culture of red grapes). Romania's wine map location of the vineyards studied is shown in Fig. no. 5

Figure no. 5 - *Location of the vineyards studied.*

Also in this subchapter are presented the growing conditions of 2010, climatic conditions of the two selected vineyards and the origin, agrobiological characteristics, agrotechnical and technological grape varieties studied.
In subchapter 4.1.1. - *Collection, transport and reception of grapes* - are presented: the method of harvesting, the method of inactivity of grapes and the antioxidant used, conditions of carriage, reception quality criteria and quantitative reception mode.

Subchapter 4.2. - *Methods of analysis*
4.2.1. - *Determination of sugars by refractometry*, with reference to: the principle of the method, method of determination (refractometry), how to prepare evidence, calibration device, mode and expression of results.
4.2.2. - *Determination of acidity* with reference to: the principle of the method, method of determination (titration indicator color), reagents, sample preparation, method of working formulas and expression of results.

4.2.3 - *Determination of Total: polyphenols, flavones, anthocyanins, catechins, tannins, resvelator and antiradical power, antioxidant power (capacity).*

In the subchapter is shown how to prepare samples, equipment and mode analysis.
Analytical measurements of these components or indices were performed in the accredited laboratory of Agricultural and Molecular Research Institute, University College of Nyíregyháza, Faculty of Engineering and Agriculture.
Analysis apparatus is shown in Figure no. 6

Figure no. 6 - *UFLC Shimadzu*

In section 4.3. - *Results and discussion* are presented experimental results obtained from measurements performed on the raw material uvological parts.
4.3.1. - *Polyphenol content of grape varieties analyzed*
Polyphenols – from grapes (with oenological importance) are represented by two main groups of substances: - anthocyanins and flavones, which are colorants,
- Catechin tannins, polyphenols represented by colorless.
The active components of the grapes are very valuable reason for their evolution during processing grapes into wine that is very important. Thus the content of polyphenols in grapes originally distributed in different uvological units of grain at the reception of grapes before processing is shown in Figures 7 and 8.

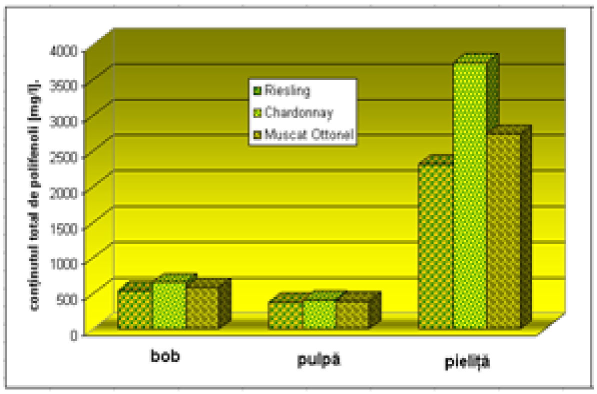


Figure no. 7 - *The total content of polyphenols in beans, pulp and skin of the grape varieties analyzed.*

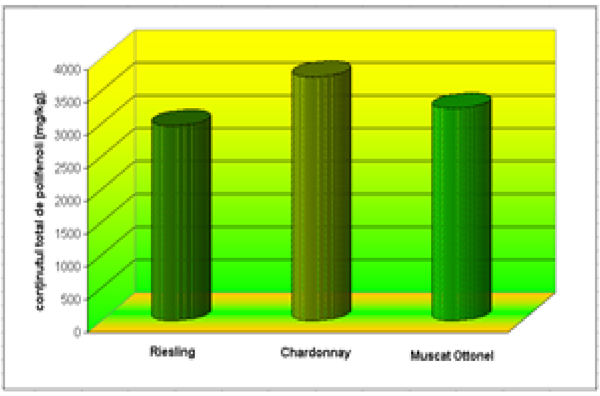


Figure no. 8 - *The total content of polyphenols in grape seed varieties analyzed.*

4.3.2. - *Flavone content of grape varieties analyzed*

Flavanols - the grapes are the yellow pigment that accumulates in grain husks, being found in all grape varieties (white, red rose). They have an important role in the formation of white wine color and the color intensifies during wine aging. Chemical structure is similar to that of flavanols anthocyanins. The presence of flavanols in grapes is good for the body (strengthens capillary resistance of blood vessels, inflammatory and antispasmodic effect). The initial content of flavones originally distributed in different uvological units grapes of grain at the reception of the grapes before processing is shown in Figure no. 9 and 10

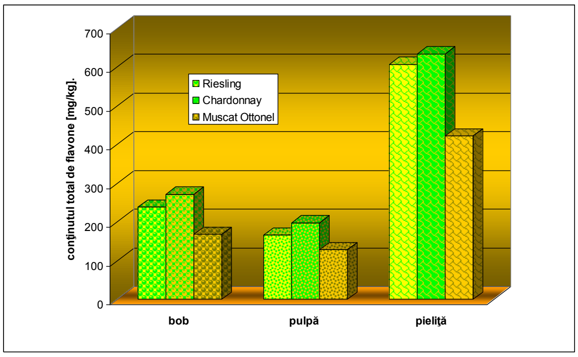


Figure no. 9 - *The total content of flavones in grain, pulp and skin of the grape varieties analyzed.*

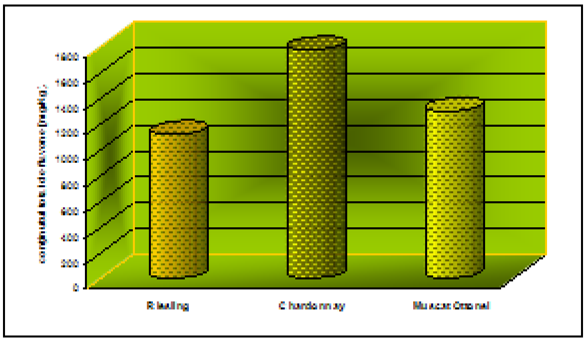


Figure no. 10 - *The total content of flavanols in grape seed varieties analyzed.*

4.3.3. - *The content of catechins of grape varieties analyzed*

Catechins are the basic oligomeric structural unit of the condensed tannins in grapes. Chemically, catechins may present four isomers („+" and, - "catechins,,, + 'and -' epicatechin), being found only in grapes,, +" catechins and - "epicatechin. The initial content of grapes catechin, the reception before processing, distributed in different uvological units is represented in Figures 11 and 12

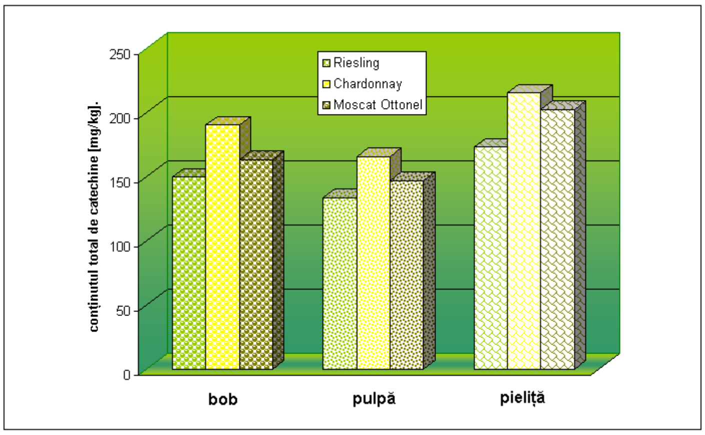


Figure no. 11 - *The total content of catechines in grain, pulp and skin of the grape varieties analyzed.*

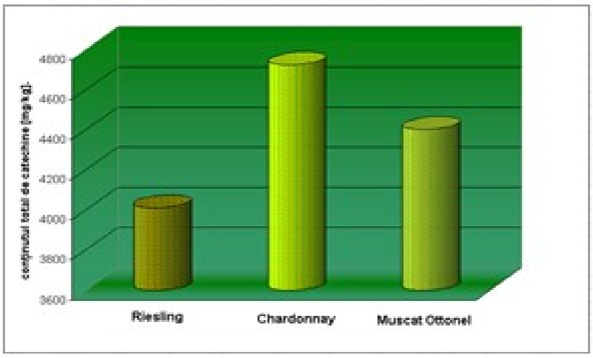


Figure no. 12 - *The total content of catechins in grape seed varieties analyzed.*

4.3.4. - *Antiradical power of grape varieties analyzed*

Antiradical power - is proportional to the content of polyphenols. Determination of antiradical capacity is done by determining the adsorption of oxygen free radicals (ORAC) and compared to a stable organic radical, 1,1 - diphenyl -2 - picrilhidrazil, DPPH (Brand-Williams W. and collaborators, 1995). Antiradical power is determined by reducing the initial concentration $DPPH^0$ 50% (effective dilution DE_{50}).

Free radicals are chemical molecules fragments, one of the atoms have a partially occupied orbital electrons (even electrons). Because of this they are very reactive. Formation of free radicals reactions are multiple, the most common reaction is to break the links between peroxo oxygen atoms (the weakest chemical bond). Antiradicals contained in grapes have the ability to react (neutralize) these free radicals.

Antiradical power of grape samples studied, determined by the two methods are shown in Figure no. 13 and 14

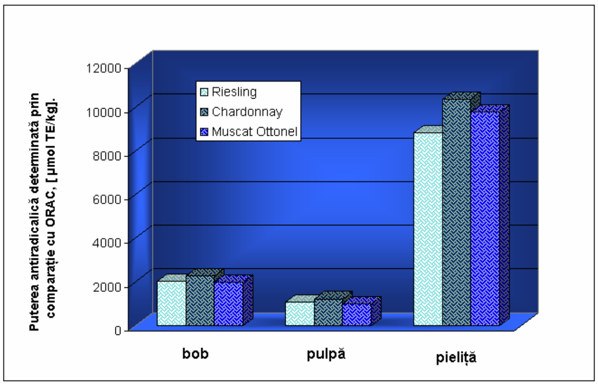


Figure no. 13 - *Antiradical power of grain, pulp and skin of the grape varieties analyzed, determined by comparison with the ability to absorb oxygen radical (ORAC).*

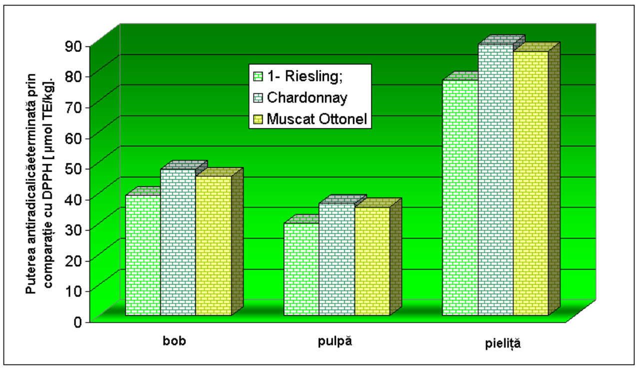


Figure no. 14 - *Antiradical power compared to a chemically stable radical (DPPH) in grain, pulp and skin of the grape varieties analyzed.*

Antiradical power of grapes is due to polyphenolic compounds, which among other features sanogene, acts against free radicals in the body that affects cells of various organs (lungs, liver, heart, eye).
Antiradical power of seeds of the grape varieties analyzed, determined by the two methods are shown in Figures no. 15 and 16.

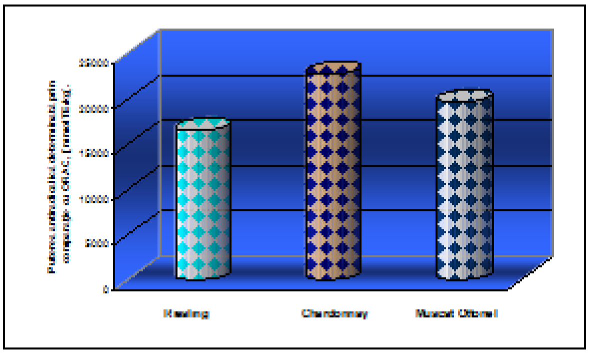


Figure no. 15 - *Antiradical power of seeds of varieties analyzed determined by comparison with the capacity to absorb oxygen radical (ORAC).*

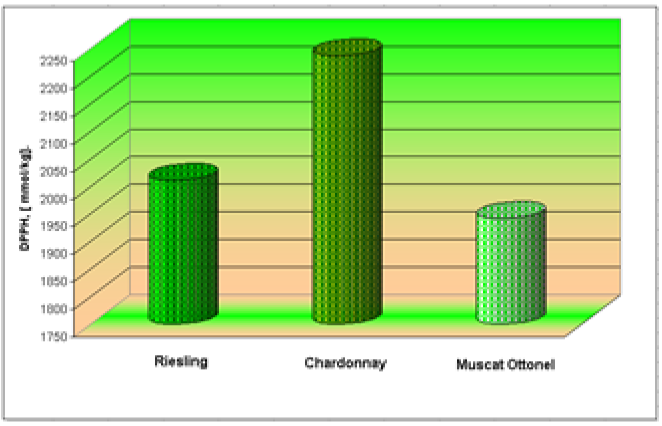


Figure no. 16 - *Antiradical power of seeds of the grape varieties analyzed determined by comparison with a chemically stable radical (DPPH).*

4.3.5. - *Antioxidant power of grape varieties analyzed*

Antioxidant power of grapes is ensured by the presence of polyphenolic compounds and flavones. These compounds are found in red grapes and white. Polyphenols contain a series of phenolic compounds _from the group of hidroxiamin acids (caffeic, caftaric, searching, coumaric, ferulic) flavone compounds (catechins and epicatechin) and flavonolici (quercitine).
Catechins have antioxidant power of 98.2%, 98.1% of caffeic acid, epicatechin quercitine of 97.7% and 96.4% (LP Teissedre et al., 1996).
Once inside the human body, these compounds prevent the formation of free radicals and lipid oxidation of low density (LDS) in the blood.
Determination of antioxidant capacity of grapes is done by studying the kinetics of a reaction that results in a free radical and providing its inhibition by antioxidants of grapes.
Antioxidant power of grape berries at the reception before processing, distributed in different uvological units is represented in Figures No. 17 and 18

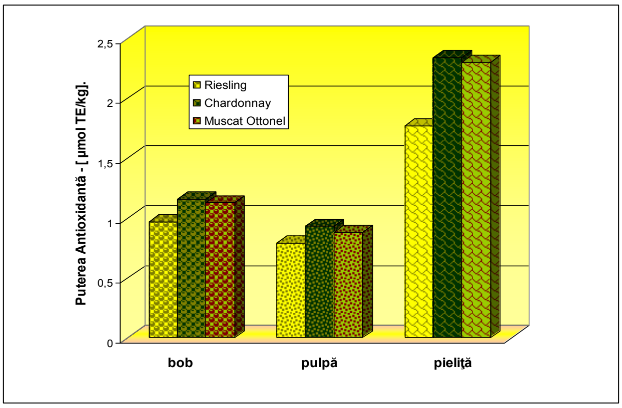


Figure no. 17 - *Antioxidant power of grain, pulp and skin of the grape varieties analyzed.*

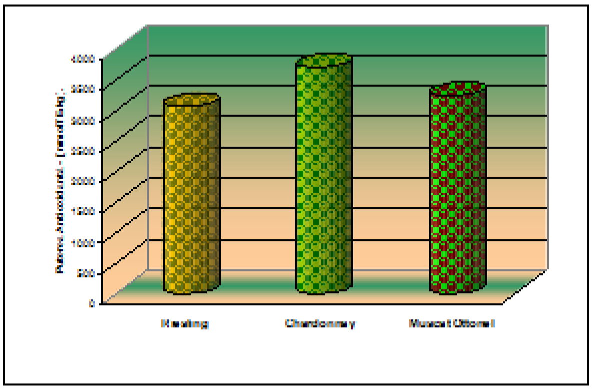


Figure no. 18 - *Antioxidant power of grape seed varieties analyzed.*

4.3.6. - *Comparative analysis of the determined values in white grapes reported to red varieties*

In the comparative analysis of the determined values reported in white grapes red grape variety Cabernet Sauvignon were presented the following data: total content of polyphenols, flavones, anthocyanins (not found in white grape varieties) and catechins.

Comparison was made and reflected power values antiradical and antioxidant power of grapes two distinct categories.

For further education and training of complex images on the two types of grapes, the same values were compared in the case of the seeds also.

4.3.7. - *Comparative analysis of the values determined from white grape seeds reported to red varieties.*

The content of polyphenols, flavones, anthocyanins, catechins, antioxidant power antiradical power of seeds of Cabernet Sauvignon grape is presented in Table. 3

Table no. 3 - *The content of polyphenols, flavones, anthocyanins, catechins, antiradical and antioxidant power of grape seed Cabernet Sauvignon*

Sample	Total polyphenol content [mg/kg]	Total flavone content [mg/kg]	Total anthocyanins content [mg/kg]	Total content of catechins [mg/kg]	Antiradical power determined by comparison with, ORAC [µmol TE/kg]	Antiradical power compared with a chemically stable radical [µmolTE/kg]	The antioxidant power [µmol TE/kg]
Seeds of Cabernet Sauvignon	13147,7	2110,8	2654,2	11388,6	42122,3	8410,3	16322,5

4.4. - Partial conclusions.

➢ Qualitative and quantitative content of polyphenols from grapes depends largely on soil type, climate and growing conditions, defining itself as a very important class of substances in grapes that are found in the composition of musts and wines default, influencing their sensory properties. These compounds are found mainly in seeds and skins where the grapes are taken, the relative yields, the composition of musts and wines during pulp processing or maceration.

➢ Phenolic compounds from grapes transferred in mustification assure the antioxidant protection of it, and those got in wine define the antiradical and antioxidant power of it.

➢ Given the location of polyphenols in the uvological parts of the grain of grape, the quantities in which they accumulate, the way of extraction and the quality of raw material (immature grapes) under study, they constitute a representative sample of bioactive compounds through efficiency technologies that can bring out the extraction, processing and correction must and wine.

➢ The three white grape varieties have been analyzed individually through the main uvological parts in terms of their share of phenolic compounds characterized, thus were obtained the following conclusions:

- the amount the highest total polyphenols as was expected was recovered in the skin and seeds of grape varieties analyzed, larger amounts were found in Chardonnay followed by Muscat Ottonel and Riesling Italian.
- flavones are found also in seeds of three varieties analyzed and processed as uvological part important in the processing process, the skin of these species ranked 2 in this regard.
- the total content of catechins varies quite closely in the case of three white grape varieties, the flesh being found between 110.5 mg/kg in Chardonnay and 146.6 mg/kg in Muscat Ottonel, because the bark of these species to vary from 172.6 mg/kg in Italian Riesling to 241.6 mg/kg to Chardonnay.

➢ Antiradical power in relation to absorption capacity of oxygen radicals (ORAC), the pulp of white grapes has values very close from 988.6 μmol TE/kg in Muscat Ottonel at 1214.3 μmol TE/kg for Chardonnay but this parameter has values 10 times higher in the peel of these varieties analyzed, so that operation of maceration is necessary to achieve the processing option.

➢ Antiradical power against a chemically stable radical (DPPH) has the same consistency for the three varieties ranging from 30.1 μmol TE/kg in the pulp of to 36.5 μmol TE/kg in pulp Chardonnay. For this parameter range from 76.9 μmol TE/kg in skin to 88.6 μmol TE/kg in the skin of Chardonnay.

➢ The antioxidant power has values of 1.77 recorded μmol TE/kg in the skin of Riesling and 2,3 in the skin of Chardonnay and Muscat Ottonel , because in the pulp this parameter is 2.5 times lower.

➢ The highest values of the analyzed parameters were found as was normal in the seeds of the grape varieties examined as uvological distinct part, which underlines the special importance that grape seeds have in obtaining useful compounds.

➢ Compared with white varieties Cabernet Sauvignon reported to red grape variety which I took as an element of comparison between white and red varieties presented values of 3.5 to 100 times more of these compounds, occurring with an order of magnitude substantially in total anthocyanins.

➢ To have a complex image there were comparatively studied white grape varieties with a red variety (Cabernet Sauvignon), taken as an element of comparison, observing that the red grapes have higher values of 1.8 ÷ 9 times large for all bioactive elements and analyzed capabilities, and the anthocyanin content appearing as a new bioelement.

Chapter 5. STUDIES ON THE INFLUENCE OF PROCESSING TECHNOLOGIES OF GRAPES IN THE MACERATING PHASE OF GETTING WORT.

Subchapter 5.1. - *Grape processing technology options* - in this chapter are presented aspects concerning the harvesting, transporting, receiving and sorting grapes, crushing, processing and sulfitation of the mustification; aspects of soaking in various ways, drainage must ravak and debourbing of the must.

In subchapter 5.1.1 – *The technological scheme of processing grapes in the laboratory* – is presented a schematic diagram of grape processing technology in laboratory conditions adopted for research.

Technological scheme for processing grapes under laboratory conditions

Technological scheme for processing grapes under laboratory conditions is shown in Figure no. 19

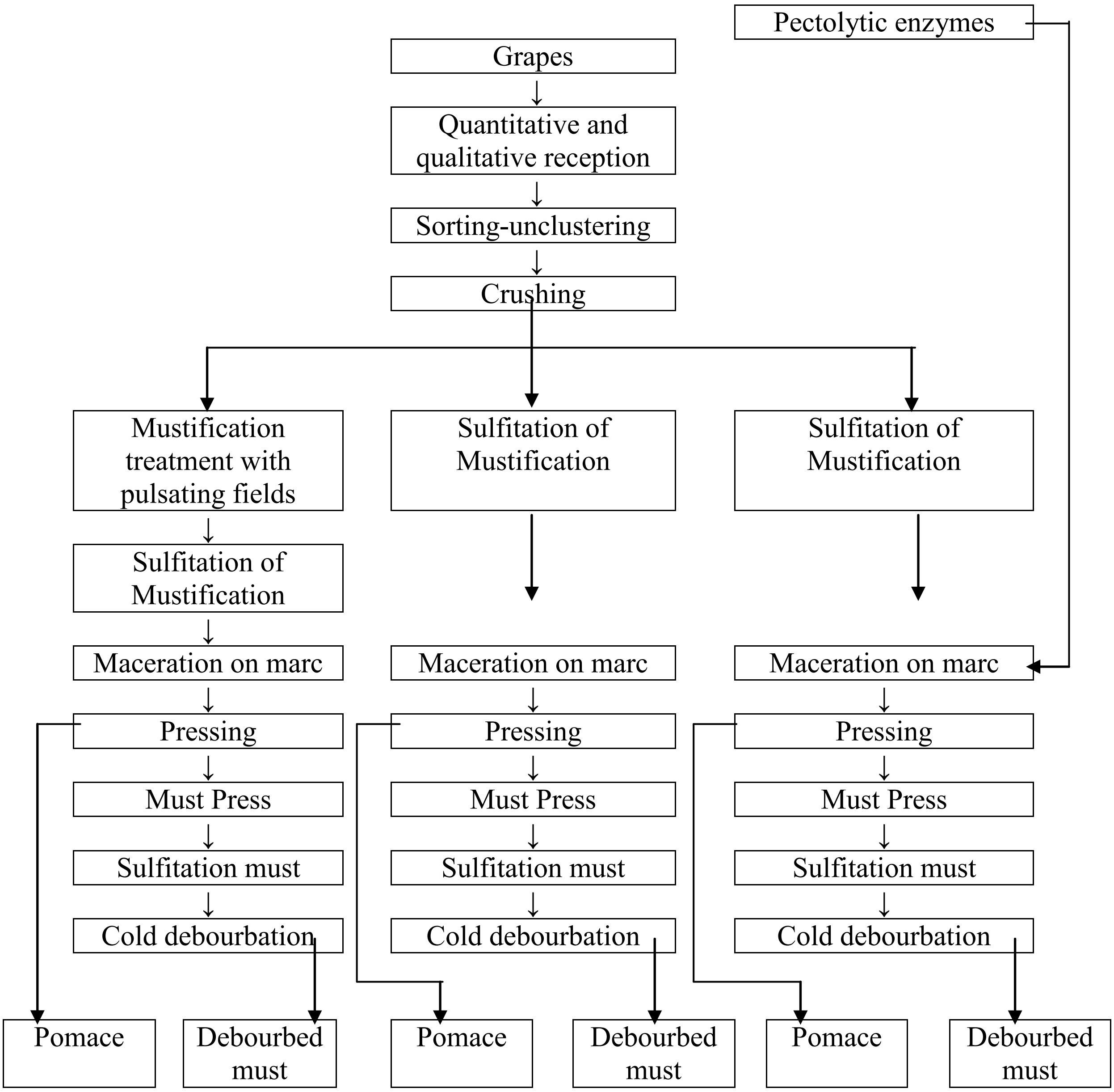


Figure no. 19 - *Technological scheme of grape processing in the laboratory*

In subchapter 5.2. - *Materials and analytical methods*, materials and methods are the basis for grape processing and analysis methods.
In subchapter 5.2.1. - *Crusher drum,* is presented the roller grape crushing grapes used in the laboratory.
In subchapter 5.2.2. - *Treatment of pulsating electric fields* is presented the treatment installation of the mustification with pulsating electric fields and the principle of the method.
Treatment with intense pulsating electric fields of high intensity was achieved with an experimental installation, made by own means, based on principles and schemes installations within specialty literature.
The principle of the method
Treatment of pulsating electric fields with high intensity requires passage of fresh grapes crushed (unsulfates) by an electric field amplitude from 10 to 30 kV/cm, the duration of the pulse is very short (2μs-1ms). Electrical impulses in a high field intensity (10-30 kV/cm) causes damage to plant cell membranes due to the chaotic distribution of electric charges. Cell membrane damage leads to release of the entire cellular content.
In figure no. 20 is represented the treatment of plant cells with pulsating electric fields.

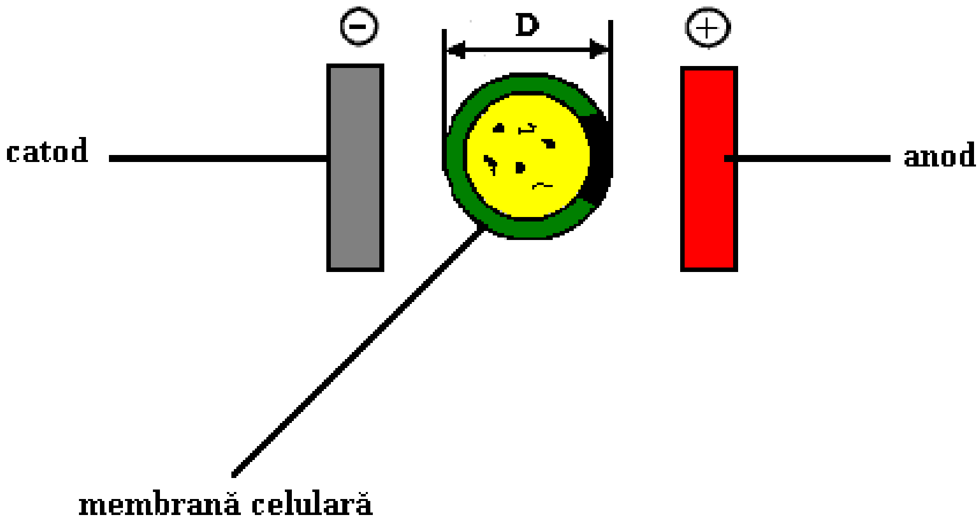
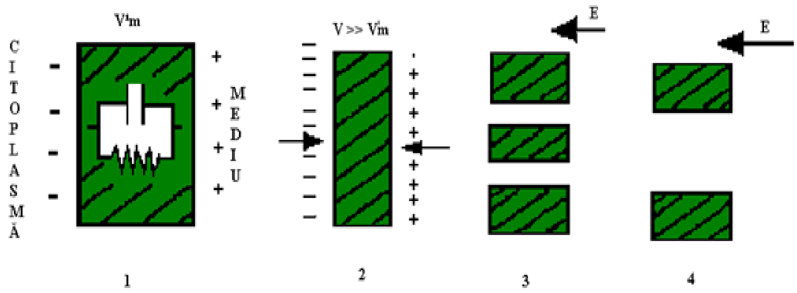


Figure no. 20 - *Scheme treatment plant cells with pulsating electric fields.*

Voltage application aims to, rapid destruction of cell membrane integrity and the release of all components in mass . This phenomenon is explained by, the theory of dielectric rupture. "Electric field can be applied at ambient temperature and at temperatures higher or lower than ambient temperature.
The mechanism of destruction of cell membrane integrity vegetables of high intensity pulsating electric fields based on irreversible porozing damage of the cell membrane. Due to the external electric field action, it induces an electric potential on the outer surface of the membrane, resulting in an alignment of electric charges in the cell membrane. Plant cell membrane acts as a capacitor with a transmembrane potential V^1 m.
With the application of electric current pulse, the cell membrane is compressed and the transmembrane potential is equal to V ($V >> V^1$ m), but lower than the critical potential. For most membranes, transmembrane potential critic is ≈ 1V. To achieve the critical potential of 1V, external electric field should be ≈ 10kV/cm (depending on the nature of the product).

Overcome the critical value of ≈ 1V, the phenomenon of rejection of molecules loaded with different electrical charges, the formation of pores (irreversible porozing) to the cell membrane. If the external electric field strength is substantially equal to the critical value of porozing intensity, permeability changes occurring at the cell membrane are reversible.
Membrane rupture occurs only when the critical intensity is far exceeded porozing. Under these conditions porozing phenomenon is irreversible and cell disintegration occurs (due to membrane damage).
Reversible and irreversible degradation mechanism of the cell membrane is shown in Figure no. 21



1 - [1] m membrane potential V, 2 - membrane compressed, 3 - porozing reversible; 4 - porozing irreversible (membrane damage).

Figure no. 21 - *The mechanism of reversible and irreversible degradation of the cell membrane.*

Cell membrane damage occurs in several stages: lipo-protein layer destabilization; irreversible porozing reversible membrane; irreversible porozing membrane (membrane damage).
- At the lipo-protein layer destabilizing the cell membrane becomes permeable to small molecules. Membrane permeability promotes the influx of water, causing cell swelling.
- The stage of reversible porozing tiny pores in the cell membranes appear which increase in diameter is proportional to the electric field intensity increased.
- porozing irreversible stage is the final stage in which the Cell membrane breaks and release of intracellular content.
Stages of electroporozing of the plant membrane are shown in Figure no. 22

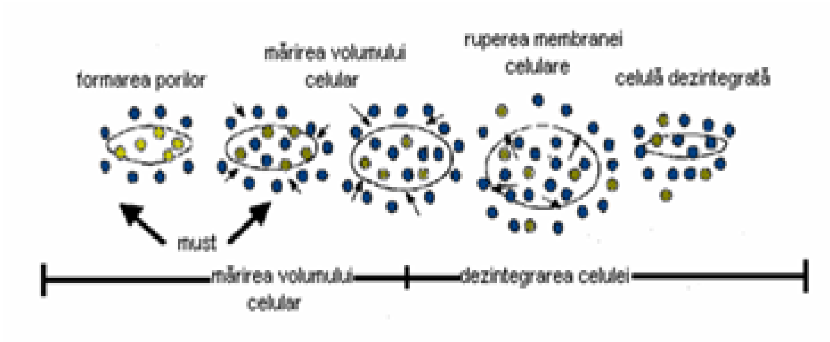


Figure no. 22 - *Stages of electroporozing of the plant membrane .*

Irreversible damage to Cell membrane depends on: electric field strength, duration of treatment (which is the product of pulse duration and number); pulse waveform.
Pulsed electric field shape depending on voltage and time, is shown in Figure no. 23

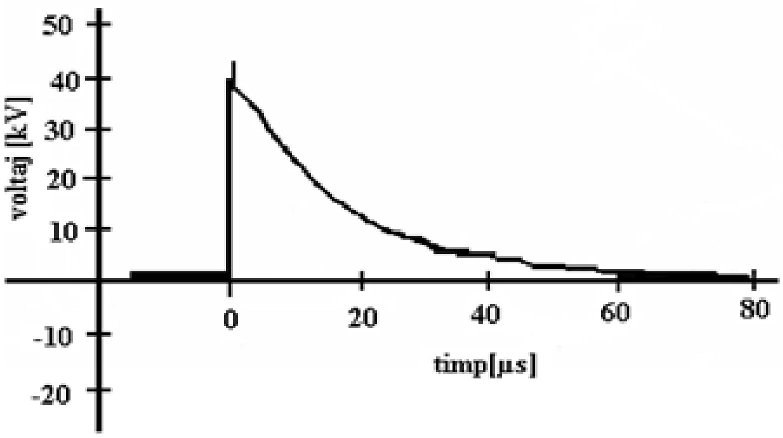


Figure no. 23 - *Form of pulsed electric field.*

Treatment effectiveness also depends on the pulsating electric fields: electrical conductivity of the treated environment, pH, ionic strength of the substrate coated product homogeneity, the presence of gas.
Subchapter 5.2.3. - *Press of the grapes*, presents the grape press laboratory used for pressing mustification as well as its functioning.

Methods of analysis
In subchapter 5.2.4. - *Determination of sulfur dioxide*, the principle method is presented, the method of determination (hydrogen peroxide oxidation method, Franz Paul), equipment (air current distiller SOLFOTECH) reagents, sample preparation mode, operating mode, calculation formula and the way of expressing the results.
Subchapter 5.2.5. - *Determination of density*, the principle of the method, method of determination (densimetry method), the equipment used (Anton Paar-DMA35 Portable Densimeter), sample preparation mode, operating mode, way of expressing the results.
In subchapter 5.3. - *Results and discussion* are presented the effects of processing technology: grape yield, density, acidity, content of polyphenols, flavones, anthocyanins, catechins, antiradical power and antioxidant power of grape processing according to the scheme of grapes processing technology in the laboratory from Figure no. 19.
In subchapter 5.3.1. - *Effect of grape processing technology on yield in wine*, are presented graphically the quantities of grape must obtained from processing. These quantities are influenced by: technology for wine, pectic substances content of grapes and their rate of hydrolysis.
In white winemaking, maceration time is very short or short, depending on the technology practiced. In some cases, length of maceration coincides with the length of time between the beginning and end of pressing crushing. In such cases the effect of endogenous pectolytic enzymes are insignificant. Even if short maceration, endogenous enzymes are unable to hydrolyse appreciable quantities of pectic substances.
Large quantities can be obtained by using must enzymatic maceration preparations, which can hydrolyse pectin in a more convenient percentage.
The contact time, the way of broad distribution in mustification, maceration temperature, dose and amount of SO_2 added enzymes influence the rate of pectin hydrolysis. For maximum

efficiency of enzymatic treatment applied, some manufacturers recommend a time of rest (≈ 6:00 dissolution of SO_2 necessary) between the antioxidant treatment mustification time and the moment of administration of the enzyme preparation. In such situations may arise mixing deficiencies of the enzyme preparation in mustification mass.
Switching mustification by intense pulsed electric fields provides a rapid deterioration and advanced cell walls, must reduce viscosity, increase extractivity, yield as well as total return must ravak.
Subchapter 5.3.2. - *Effect of grape processing technology on sugar content of wine*, presents graphically the quantity of grape sugars, processed from grapes in different technological options.
Quantitatively, sugars ranks second in the composition must, but first in terms of technology, the basic source of alcohol formation is the basic component of wine. Depending on the winemaking technology used, the sugars in the must obtained from the same batch of grapes may be slightly different. Since sugars are the source of food for living organisms, microorganisms can reduce endogenous or added sugars contained in the must.
Subchapter 5.3.3. - *Effect of grape processing technology on the density of wort*, wort density plots, which at this stage is related to the technological content of sugars in the must.
In subchapter 5.3.4. - *Effect of grape processing technology on the total acidity of must*, grape must acidity values are represented graphically processed in different technological options.
After water and sugars, acids occupy the next place in the composition of grapes and grape must, and the technologically hold second place. In addition to sugars, are the most important substances that accumulate in the grapes. They grape must give taste sour, refreshing, actively involved in extracting anthocyanins and aroma substances from grain husks. Acids favor the multiplication of yeasts during the alcoholic fermentation.
Subchapter 5.3.5. - *Effect of grape processing technology on the total polyphenols transferred in content of wine*, presents graphically the quantities of polyphenols transferred in must.
Various technological options applied to the processing mustification polyphenols transferred in influence the transfer must. Analyzing the experimental data is observed that the best option extractivity of polyphenols is presented by the variant of processing mustification with pulsating electric fields and submits the lowest extractivity is presented by the maceration method on marc endogenous enzyme. Variant enzyme maceration preparations filler has a medium extractivity.
In subchapter 5.3.6. - *Effect of grape processing technology on the total flavone content of wine,* are plotted quantities of flavanols transferred in must.
The amount of flavanols transferred in must is influenced by technological variants in the processing technology applied mustification. Analyzing the experimental data was observed that the best extractivity of the flavanols is the variant of processing mustification with pulsating electric fields and the lowest extractivity is presented by the maceration method on marc endogenous enzyme. The variant of maceration with addition of enzyme preparations presents a medium extractivity.
In subchapter 5.3.7. - *The effect of grape processing technology on the total content of catechins in the quantity of grape must*, are presented graphically the quantities of catechins transferred in must.
The technological variant applied in the mustification process influence the amount of catechins transferred in must. Analyzing the experimental data is noted that the best extractivity of the flavanols is presented by the variant of processing mustification with pulsating electric fields and the lowest extractivity is presented by the maceration method on marc endogenous enzyme. The variant of maceration with addition of enzyme preparations presents medium extractivity.

Subchapter 5.3.8. - *The effect of grape processing technology on the antiradical power of the must,* presents graphically the antiradical power of the must..
The antiradical power of must processed by different technological variants was determined by comparison with the ability to absorb oxygen radical (ORAC) and compared to a chemically stable radical (DPPH). Analyzing the experimental data is noted that the highest antiradical power compared with the capacity to absorb oxygen radicals and radical compared to a chemically stable can be found in the variant of processing mustification with pulsating electric fields, and the lowest antiradical power was determined at the method of endogenous enzyme maceration on beeswax. The variant of maceration with addition of enzyme preparations provides medium antiradical power.
In subchapter 5.3.9. - *The effect of grape processing technology on antioxidant power* is presented graphically the antioxidant power of the must .
Analyzing the experimental data was observed that the highest antioxidant power has been determined in the mustification process in the variant of processing mustification with pulsating electric fields, and the lowest antioxidant power was determined by the method of endogenous enzyme maceration on beeswax. The variant enzyme maceration preparations filler, the antioxidant power is sensitively equal to the antioxidant power determined in the mustification process due to processing pulsating electric fields. Comparing the antioxidant powers determined in the mustification process seedless grapes with average antioxidant values of musts processed by different technological options reveals the following reductions: 56% in the mustification process Riesling musts, with 55% Chardonnay musts and 59% in the mustification process musts Muscat Ottonel.
In subchapter 5.3.10. - *The comparative analysis of values determined at white grape musts reported in in the mustification process red varieties*, is made a comparison of the content of polyphenols, flavones, anthocyanins, of catechins, antiradical power and the antioxidant power of musts obtained from white grapes to red must obtained from varieties of Cabernet Sauvignon grapes.
In comparison with white grapes musts of the grape varieties studied, the red grape must registers higher values for all parameters compared (as well as uvological components of grains).

5.4. *Partial conclusions*

- Switching of mustification by electric fields provides a rapid and advanced deterioration in cell walls, reduces viscosity increases extractivity, yield and total return in must ravak .
- Quantities of white grape must obtained from processing technology are influenced by wine technology, pectic substances content of white grape and their hydrolysis rate and smaller quantities in must may be obtained by using maceration enzyme preparations that can hydrolyze pectin with a better output.
- The maximum amount of sugar extracted from grapes was obtained after treatment of mustification with electric fields achieving this variant and the highest values of density as well as greater acidity.
- The analysis of the main useful compounds from grapes, which are found in fresh red must point out that most of these compounds are found in it, enriching red must in these compounds (polyphenols, catechin flavones) as mustification evolves to maceration being helped by the contribution of exogenous enzyme preparations or by an advanced technology for processing mustification with pulsating electric fields.
- It also can be noted that the antiradical power of the must determined by comparison with the ability to absorb oxygen radicals and by comparison with a chemically stable radical remains within the limits of appreciable value after the processing of white grape and mustification , having quite convenient values in terms of the antioxidant power in the mustification processed.

CHAPTER 6. STUDIES ON OPTIONS OF CORRECTION APPLIED TO WHITE MUSTS.

Subchapter 6.1. - *Corrections to the composition of the must* - present graphically situations where musts require corrections, corrections benefits, legislative issues as well as ways to achieve.
Climate vagaries lead to incomplete maturation harvest, depending on variety, growing region and year.
For example in the years which have warm and dry autumns, the accumulation of sugars in the grapes freezes, and the acidity is degraded.
In such cases are required corrections of must composition (sugar, acidity) in relation to situations that are necessary and in accordance with viticulture and winemaking legislation.
According to the law , the composition corrections are applied only in unfavorable years, in order to achieve quality wines close to wines produced in normal production years. (Treaty of wine, p. 301-302 Tardea C. 2010).

The most common corrections practice found in wine composition are:
• correction of the sugars,
• acidity correction must.
Correction of must sugar content is the result of the following technological processes:
Increasing the sugar content is achieved by: additive technology (blending with musts rich in sugars or sugar industry in concentate must) or subtractive technologies (evaporation, reverse osmosis, must crioconcentration).
- Reducing sugar content from must (necessary only in musts rich in sugar) is made by blending with poorer sugar musts.
Implementing rules vineyard and wine law into the Common Market Organisation for wine no. 224/2002, republished as amended, set out in the annex which is an integral part of the decision published in the Official Gazette of Romania no. 595/23.08.2010, Section 2, Part C, specific "limits on certain features of wine". Article 40. para. 1. defines enrichment as oenological practice to correct the sugar content to increase the natural alcoholic strength by volume.

Article 41. - Specifies procedures for enrichment, as the addition of sucrose, concentrated grape must or rectified concentrated grape must (Article 41, paragraph 1, letter. A).
The letter. b. para 1, art. 41 shall specify the method of enrichment of grape must, by adding sucrose, concentrated grape must or rectified concentrated grape must, or by partial concentration including reverse osmosis.
Paragraph 6 of the same article regulates the initial volume reduction of grape must, wine that is made up to 20% and strength by volume of wine is not increased by more than 2%. (Rules for the application of Law vineyard and wine into the Common Market Organisation for wine no. 244/2002, republished as amended).

Blending assembly and musts
After debourbation and rinsing, the must lots can be assembled, in order to obtain homogeneous groups (before fermentation).
Musts assembling operation is the technological procedure of mixing must ravak with some of the red must release.
In this case this operation is not necessary, the fraction of must ravak not being separated .

For conducting experiments have been established must samples to whom have been apllied sugar composition corrections or concentrated musts (own variety), obtained by different methods as follows:
- concentration under vacuum.
- lyophilization.

Considering the need to correct sugar content in musts taken into the process, three methods are proposed to correct the sugar content from grape must:
- Correction of the must composition by sugar addition.
- Correction of the must composition by adding concentrated must under vacuum.
- Correction of the must composition by adding lyophilised must.

To form a picture of the influence on wine composition correction, in addition to corrected versions was also taken into study a lot of must to which no corrections were applied in the composition.
Given the need to achieve a higher degree alcohol as this group has undergone alcoholic fermentation with selected yeast sugar yield/higher alcohol other selected yeast (16.2 g/l).

Subchapter 6.1.1 - *Correction of the must by sugar* presents Chaptalisation technology, legislative issues and the calculation formula.
The addition of industrial sugar (beet or cane) in the must is allowed only in years with unfavorable accumulation of sugars in grapes, wine making process is known as the Chaptalisation.
Subchapter 6.1.2. – *Correction of the must under vacuum*
The concentration of the must under vacuum, presents the method of must concentration under vacuum, of the must as well as correction compositional advantages with this type of must.
Heating is a of the must subtractive method of partial removal of water from must, at low temperatures (20° - 30° C) (entropy).
This method used to enrich white must of the must, but especially the red wine to get high quality always with the same characteristics even under difficult harvesting.
Enrichment of the must means the increase in concentration of components that are essential for wine quality (sugar and acid) as a direct result of reducing the amount of water in the grape must.
In the case of red wines is also obtained in exchange an increase in content of polyphenols, tannins and coloring matter.
Subchapter 6.1.3. – *Correction of the must with lyophilized must*
Must lyophilization, freeze drying is presented as well as the advantages of this type of must composition correction.
Lyophilization ensures quality of grape must (fresh of the must keeping properties) compared to other methods of concentration, which allows any transport or store it in small spaces for long periods of time (even from one campaign to another) .
To achieve lyophilization, red must is frozen, then heat under control and sublimation of ice occurs at a temperature of -5° C under vacuum. In the primary drying phase is eliminated ≈ 90% of water content.
Then comes the secondary drying stage after which the amount of water remaining grape must is reduced below 2%.
Subchapter 6.1.4. - Adding grape sugar deficit from must by fermentation with top selected yeast - fill content must ferments sugars under the action of selected yeast conversion efficiency of fermentable substrate superior to other selected yeasts.

6.2. Materials and methods.

In subchapter 6.2.1. - *Installation of concentration under vacuum*, is presented the principle of the method, system, components and operation of vacuum concentration plant.
For partial dehydration of the must using the concentration method has been used vacuum laboratory facility, made by their own means, taking into account the technical specifications of the industrial plant. Concentration must vacuum leads to a quality concentrated must due to the low temperatures and lack of oxygen. Operation of equipment at these temperatures prevents caramelization of sugars in the must.
Principle of the method
The must heating under vacuum is a method of partial removal of water * of fresh wine grapes at low temperatures of 25-30° C.
Vacuum concentration plant can operate at ambient temperature (under industrial) or at controlled temperatures (in the laboratory determinations).
Evaporation temperature control, evaporator vessel of the plant can be placed in a thermostat tank of a laboratory water bath.
* The volume of liquid evaporated does not coincide with the volume of condensate liquid . Some of the liquid evaporated in the air is removed with a vacuum pump circulated air.
Subchapter 6.2.2. - *Installation of lyophilization* shows the principle of the method, system (scheme), the components and operation of freeze-drying facility.
For total elimination of water from grape lyophilization method was used for lyophilization device type "Armfield FT 33". The apparatus used is in the laboratory at the University College of Nyíregyháza, Faculty of Engineering and Agriculture, Department of Transportation Engineering.
Principle of the method
Lyophilization and cryo-desiccation is rapid drying process must, in advance, frozen, ice sublimation in a vacuum with controlled heat input.
The resulting product is a powder (dust), and contains: - sugars 890-920 g/kg; acids 450-1400 meq/kg water (below 20g/kg), minerals, amino acids, vitamins.

Technical scheme of operation of the freeze-dryer Armfiled FT 33 is shown in Figure No. 24

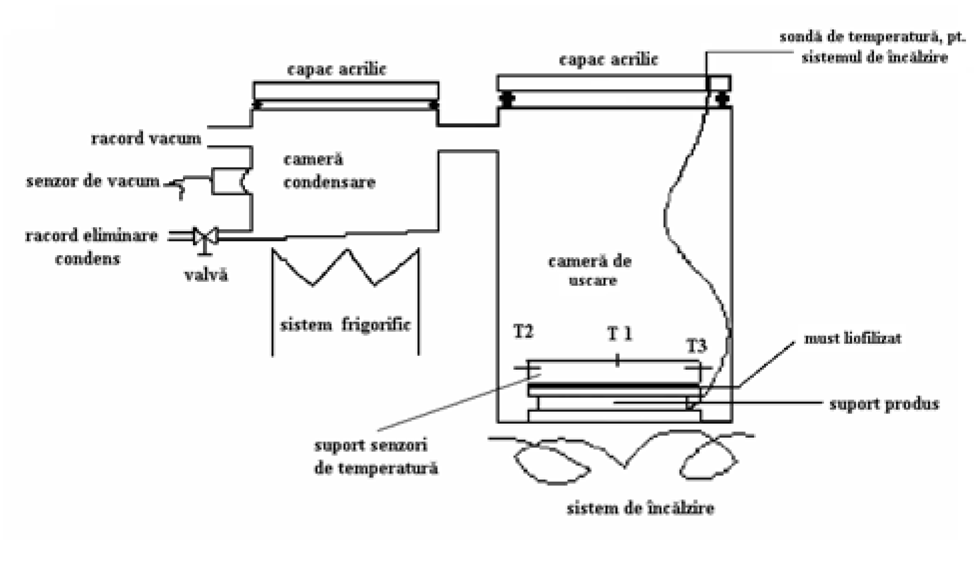


Figure no. 24 - *Scheme operation technique of the freeze-dryer Armfiled FT 33.*

Armfiled FT 33 - is a compact laboratory freeze-dryer composed of two chambers: the drying chamber (camera) and condensation chamber.
The two rooms are made of stainless alimentary steel , highly resistant to corrosion and easy to clean.
The drying chamber is equipped with electric heating system (electronically controlled), which provides water sublimation.
Condensation chamber is equipped with refrigeration system which ensures condensation and solidification of the product subject to sublimate vapor drying.
The two rooms are connected together and connected to a vacuum pump.
Pump connection is provided with vacuum sensor.
Condensation chamber is equipped with vacuum sensor and connection to eliminate condensation. Both rooms are fitted with transparent lids (which can monitor the process), and gaskets.
Armfiled FT 33 is equipped with temperature control system for drying.
To analyze the drying process, in addition to the camera monitoring system was installed an automatic data recording system (temperature, time).

6.3. Results and discussion.

Subchapter 6.3.1. - *The must lyophilization*, freeze drying phases presented graphically.
Lyophilization of musts graph is shown in Figure no. 25

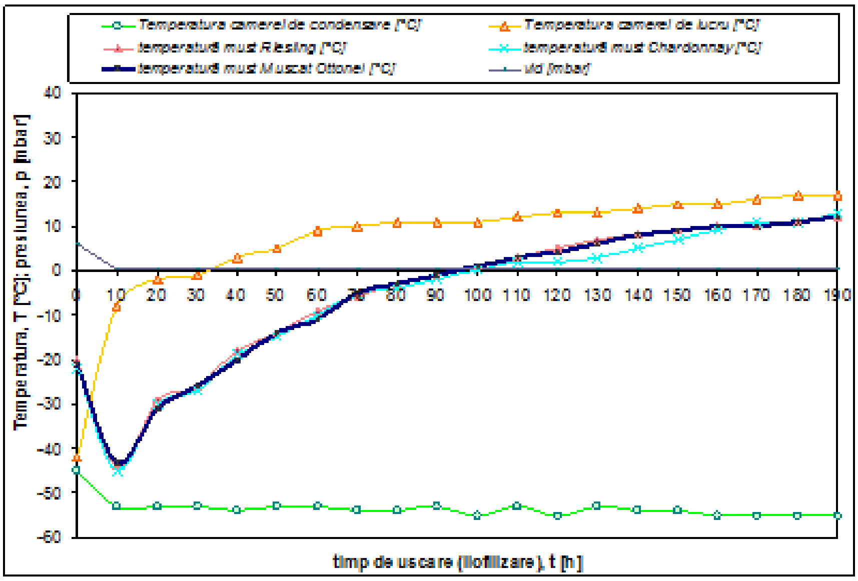


Figure no. 25 - *Schedule of lyophilization of musts.*

Having regard to the things presented it is established that the three musts had a similar evolution during lyophilization, time differences to achieve temperature differences of 0° C, being generated by different dry matter content.
At the end of lyophilization all musts had similar levels of sugar content.
Subchapter 6.3.2. - *The correction method on sugars in must*, indicate the quantity of sugars that enriched each wine.
To correct sugar content in must have been applied three ways: chaptalisation, the addition of concentrated grape must under vacuum and the addition of lyophilized must .
Chaptalisation was made with beet sugar high purity (99.5%), without taste, administered by homogenization.

Wines obtained from chaptalised musts contain larger quantities of reducing detectable substances .
Vacuum concentrated musts is a quality must because of the low temperatures and lack of oxygen .
After using the concentration much of tartaric acid is deleted and the increased acidity is due to malic acid.
Must powder obtained by removing all the water may contain acids 450-1400 between milliequivalents/kg.
Must have been enriched with 30-34 g sugar/l by musts Chaptalisation or by adding concentrated musts through the methods specified in section 6.1.
In section 6.3.3. - *The effect of correction method on density of the must*, is represented graphically the density of the must enriched in sugars through different methods.
Density at this stage of technology is closely correlated with the amount of solids (sugars) present in must had an increase in proportion to the amount of added sugars and solids added in the wine.
Subchapter 6.3.4. - *The effect of correction method method on the total acidity of must*, total acidity values presented graphically musts who underwent correction of composition compared with the control sample.
Due to the acid content of musts while enriching musts has also increased the acidity in corrected musts
As in the case of density the variations of enriched must with lyophilized must registers the highest values of total acidity.
In section 6.3.5. - *The effect of correction method on the total content of polyphenols from must* are graphically represented the values of polyphenols in the corrected must in different variants.
Products used for correction of the composition influences the amount of polyphenols in the must.
Sugar added at the Chaptalisation does not increase the amount of polyphenols in the must, after Chaptalisation noticing a slight initial polyphenol content added in the wine.
Correction options with must concentrated under vacuum or with lyophilized must have made an additional contribution of polyphenols in the the samples of corrected must.
Subchapter 6.3.6. - *The effect of correction method on the total content of flavanols in must* presents flavone content in the corrected must in different variants.
As in the case of polyphenols, products used to correct the composition influence the final content of flavanols in the must.
And in the case of flavones it keeps the order determined at the analysis of polyphenols, respectively Chaptalised must, witness must, corrected must with must concentrated under vacuum and must corrected with lyophilized must.
Subchapter 6.3.7. - *The effect of correction method on the total content of catechins in must,* represents graphically the content of catechins in the corrected must in different variants.
As in other cases (polyphenols), products used at the correction of the composition influence the final content of catechins in must.
The content of catechins in must determined in batches under study keeps the order determined in the analysis of polyphenols and flavones content.
In subchapter 6.3.8. - *The effect of correction method on the antiradical power of the must,* is represented graphically the antiradical power of the must corrected by different variants.
Analyzing the data resulting from the analysis is noted that the antiradical power compared with the capacity to absorb oxygen radicals and by comparison with a chemically stable radical is found at the corrected variant of mustification with lyophilized must closely followed by the corrected version with must concentrated under vacuum, Chaptalisation slightly reducing antiradical power of wort.

Subchapter 6.3.9. - *The effect of correction method to the antioxidant power of must*, presents the antioxidant power of must corrected through different variants.
Analyzing the data resulting from the analysis is noted that the highest antioxidant power was determined at the correction variant of the must with lyophilized must and the lowest at the variant corrected through Chaptalisation, the variant of correction with must concentrated under vacuum registering values a little inferior to the version of correction with lyophilized must.

6.4. Partial conclusions.

- Recovery superior grapes that for various reasons must be harvested before reaching technological maturity by obtaining quality wines requires the introduction of the technological scheme of operation for correction before the start of alcoholic fermentation of must composition.
- Of the three technological options for correcting the deficit of sugar in wine, grape powder enrichment option proved to be most effective.
- The lyophilization process was set in an advanced concentration must (max. 2% moisture), must that has been previously frozen and concentrated by vacuum sublimation with controlled heat input. The resulting product is a powder (dust), and contains sugars from 890 to 920 g / kg; acids 450 to 1400 meq / kg water (below 20 g / kg), mineral salts, amino acids, vitamins.
- Correction made with grape powder, calculated to enrich sugars also increased the density (almost proportional to the amount of sugars), total acidity of 9.3% and the amount of polyphenols, flavones, catechins with 15-16%. Antiradical and antioxidant power increases proportionally with increasing bioactive components that define them.
- The enrichment of must by concentration under vacuum resulted in: increased density (proportional to the sugars in the must), with 1 to 3.4% of total acidity, content of 10-11% bioactive components, reflected in values antiradical and antioxidant capacity of grape samples analyzed.

CHAPTER 7. INFLUENCE OF CORRECTION OF COMPOSITION AND TECHNOLOGY OF FERMENTATION ON WINE QUALITY.

In subchapter 7.1. – *The technology of fermentation*, describes the different versions and correction of conditions of fermentation of grape must samples.
To highlight the advantages of applying correction on wine and composition, corrected musts were subjected to alcoholic fermentation technology in two ways:
- The first way is treating must and with fermentation fermentation activator, seeding with yeasts and fermentation selected yeast controlled.
- The other way is treating must with the same fermentation activator and seeding with the same selected yeast but also with an enzyme preparation to release varietal aromas from the extracted precursors in the pre-fermentation stage dedicated to white wine .
This variant has been chosen to form a complete view of the efficiency of corrections for the must composition and their influence on new wine.

7.1.1. - *Technological schemes for processing Must*

Technological schemes for processing must are presented in Figures no. 26, 27, 28 and 29

Technological scheme for processing must corrected with sugar is shown in figure no. 26

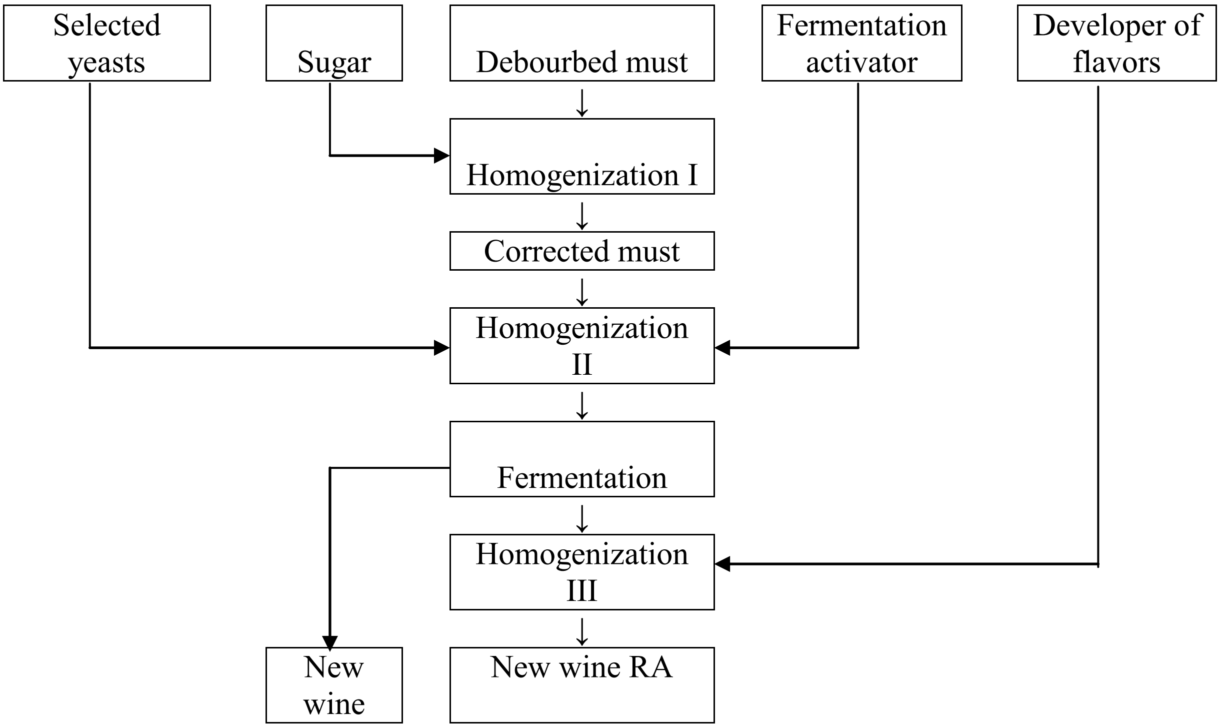


Figure no. 26 - *Scheme for processing must corrected with sugar.*

Technological scheme for processing must corrected with concentrated must is shown in Figure no. 27

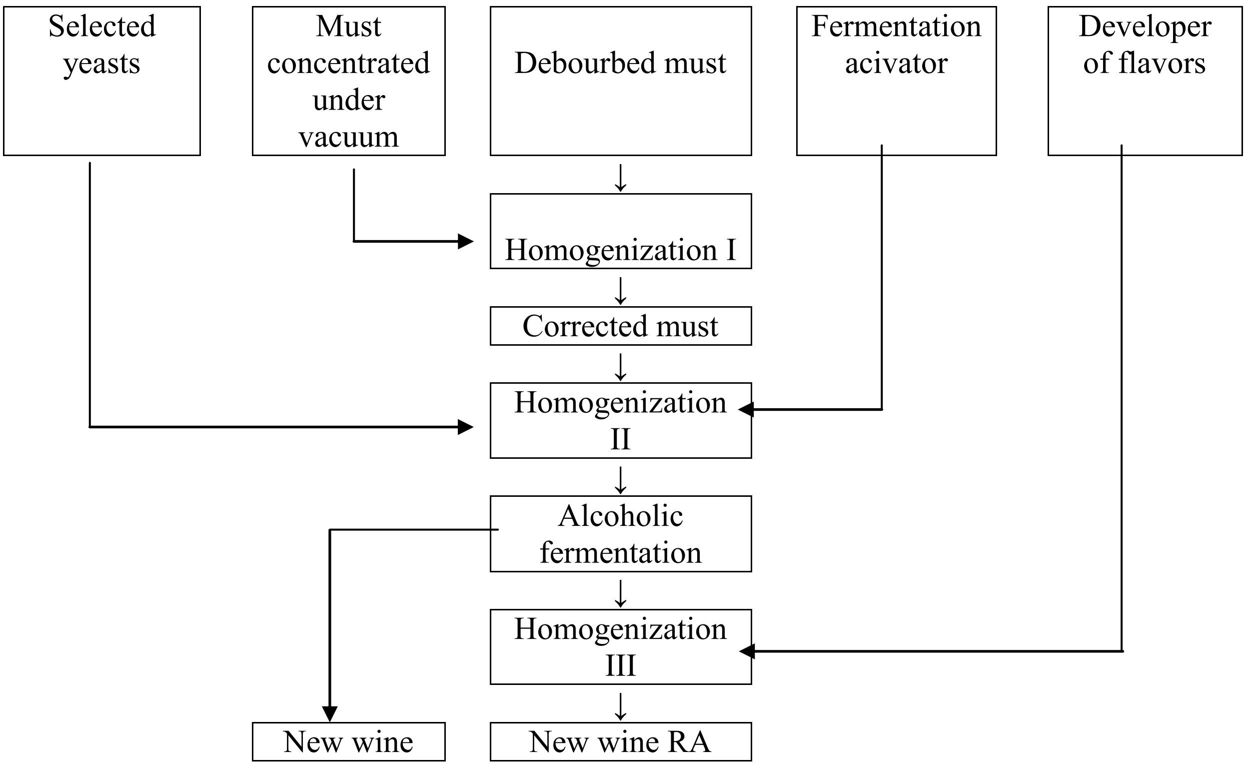


Figure no. 27 - *Technological scheme for processing must corrected with concentrated must under vacuum.*

Technological scheme for processing must corrected with lyophilised must is shown in Figure no. 28

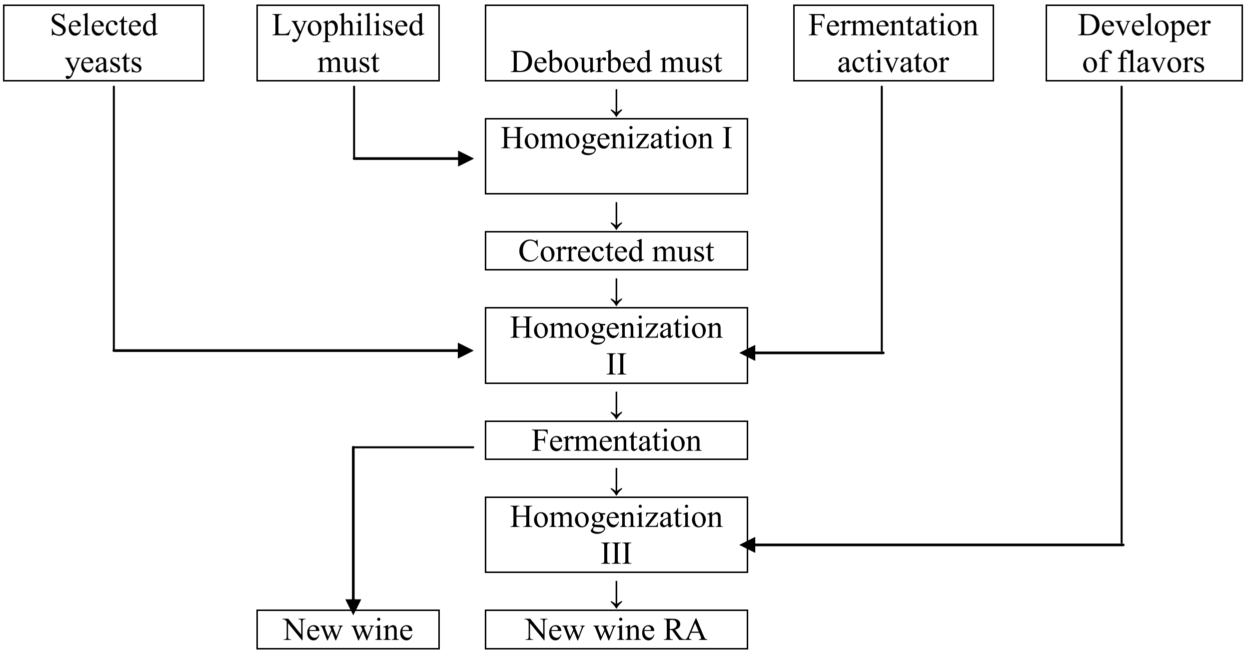


Figure no. 28 – *Technological scheme for processing must corrected with lyophilised must.*

Technological scheme for processing must with selected yeast with efficiency sugar/superior alcohols is shown in Figure no. 29

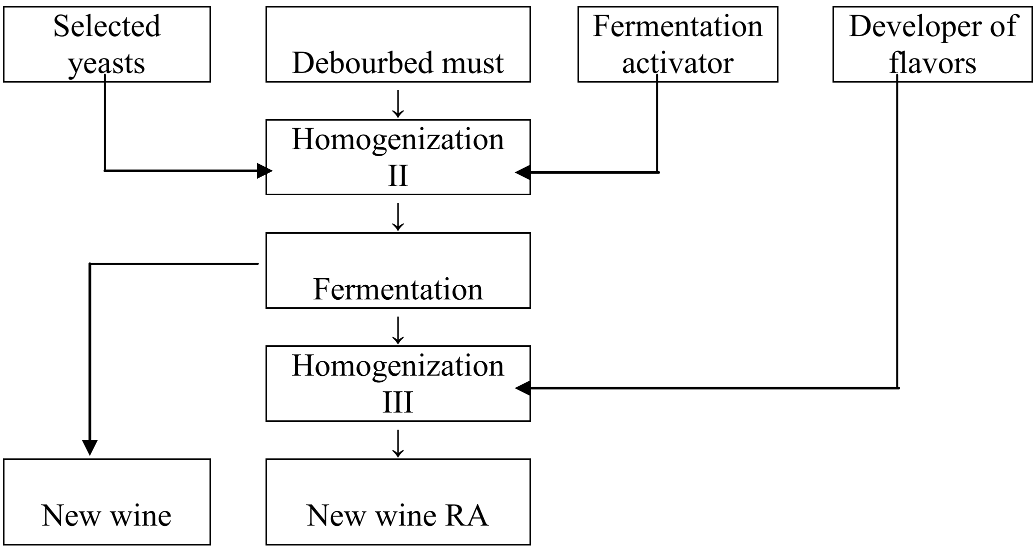


Figure no. 29 - *Technological scheme for processing must with selected yeast with high efficiency sugar/alcohol*

7.2. - Materials and methods

Subchapter 7.2.1. - *Oenological materials used in the fermentation of musts,* presents materials used and their main features (according to data sheets). Having regard to technological schemes of processing grapes chosen, achieving optimal FA and the necessity of obtaining higher quality wines, products offer on the Romanian market has been thoroughly studied.

The research literature on bio-activators of fermentation, the yeast strains FA leadership selected mining activity enzyme preparations for odorant precursors and the variety of different data sheets products on the market, were selected: bio -activator of fermentation, yeast strains selected (some dedicated) and extraction of the enzyme preparation odorant precursors varieties.

Subchapter 7.2.2. - *Determination of volatile acidity wines*, presents the principle of the method, apparatus, sample preparation, calculation formulas and expression of results.

Volatile acidity wines was determined by reference method - steam stripping volatile acids wine. Volatile acids were separated with wine distiller Raypa Alcotest. Volatile acids contained in wine sample are trained by the steam coming from the generator and fixed acids separated from remaining in the distillation apparatus. The distillate obtained is treated with 0.1 N sodium hydroxide solution in the presence of phenolphthalein as indicator.

In subchapter 7.2.3. - *Determination of alcohol*, is presented the principle of the method, apparatus, sample preparation, mode and expression of results.

Alcoholic strength of wine samples was determined by using spectophotometrical method Alcoolyzer device for Wine. The Alcoolyzer is a device designed to determine the alcoholic strength of wine, based on sample analysis with a Spectrophotometer „close infrared" of high performance. NIR measurement method used eliminates the influences of other components of wine providing precise determinations.

Subchapter 7.2.4. - *Determination of total dry extract*, presents the principle of the method, apparatus, sample preparation, mode and expression of results.

Total dry extract was determined by indirect method for Wine Alcoolyzer device. Principle of the method is to determine the sample density (Anton Paar with portable electronic densimetry-DMA35), determine the alcoholic strength of the sample and automatic calculation of dry extract (formula Emill camp) by the software unit.

In subchapter 7.2.5. - *Sensory analysis of wines*, this method of analysis is sensorial (taste and aroma) of the samples of wine.

To highlight the organoleptic profile of the new wine, chosen descriptors were: clarity, color hue, intensity odor, fine fragrance, harmony, smell, taste intensity, taste corpulence, harmony, taste, taste persistence, overall balance, and to represent the aromatic profile the descriptors are: mealiness/softness, fruitiness, floral aromas, flavors vegetable, acidity, astringency.

Awarded the maximum score was 7 points for excellent rating, 6 points for very good rating, 5 points for best grade, 4-point grade average, 3 points for acceptable rating, 2 points for the Poor, 1 point for inadequate.

7.3. - Results and Discussion.

In subchapter 7.3.1. - *The correction method of fermenting musts and technology on the alcoholic strength of wine*, the alcohol concentration of lots of new wines studied is represented graphically.

Alcoholic strength of wine is closely related to sugar content of grape, type of yeast used in fermentation technology.

The highest values of alcohol concentration, determined after completion of alcoholic fermentation were recorded for wines from lots of must enriched with grape powder,

fermented without revealing the flavors added, followed closely by processing the same type of wine that must developer of flavor was added in the second half of alcoholic fermentation.
Samples of wine fortified with grape concentrate under vacuum, following the order referred to in the evidence must enriched with lyophilized samples ranked second followed by Chaptalisation enriched samples, the last places being taken by the samples of wine fermented with selected yeast with sugar yield/higher alcohol samples of the same wine treated with RA.
Analyzing data obtained from the analysis shows that the most effective method of enrichment in sugar must is the variable correction with lyophilized must.
Variant compensation low sugar content of must fermentation with a yield of sugars DS/DS other higher alcohol, din not have the expected result, achieving the lowest alcohol concentration of all options of must subjected FA.

Subchapter 7.3.2. - *Influence of the correction method of fermenting musts and technology on the total acidity of wine*, total acidity plot new wine samples analyzed.

Acidity gives wine taste, fresh and refreshing, ensuring stability and brightness of color. The lack of acidity, the wine is vulnerable to attack of microorganisms. Organoleptic analysis assigns a pleasant taste to wines with higher acidity.
Total acidity values determined to keep lots of new wines from determining acid sequence established by the original lots must under study and the lots of must enriched by different methods (the acidity of wine is always less than the acidity of the wort). After determining the total acidity of wine samples studied, the highest values of volatile acidity were observed for samples of wine from grape musts enriched with lyophilized must. In second place is situated batch of samples from grape must concentrate enriched with vacuum, followed by the batch of samples obtained from the fermentation of must with a DS with a conversion efficiency of sugar/alcohol superior to other DS. It is noted that the batch of samples from acid enriched grape must concentrated under vacuum is very close to the acidity lot of evidence resulting from non-enriched fermented grape yield DS sugars/alcohols (lot that can be considered as control group). Batch of samples enriched with sugar suffered a slight acidity of acid to samples of wine from grape neîmbogăţit, DS fermented sugar yield/higher alcohol.

In subchapter 7.3.3. - *Influence of the correction method of fermenting musts and technology on the wine volatile acidity*, lots of new wine analyzed with volatile acidity values are represented graphically.

Volatile acidity is the total volatile fatty acids acetic series present in the free state or as salts (acetic acid, formic, propionic, butyric, valerian, izovalerianic). Volatile acidity formed during alcoholic fermentation exceeding 1 g/l. Volatile acidity defines the health of the wine, is an important parameter which relates to the evolution of new wine. The highest values of volatile acidity of wine due to the studied samples were determined in batches of wine from a grape-enriched FA lyophilized must. Maintaining the established order in the samples of wine fermented grape must rectified with lyophilized samples of wine fermented with grape must rectified concentrated under vacuum, have less decreased volatile acidity values (7-10%). Next new wine samples obtained from the fermented mash unriched DS with a conversion efficiency of sugar/alcohol superior to other DS samples of wine fermented with a new DS was added to the RA. This category of evidence, the acidity is reduced by 10-13% compared to samples with the highest acidity (in the same category). The lowest volatile acidity was determined in samples obtained from chaptalised must.

Subchapter 7.3.4. - *The influence of the correction method of fermenting musts and technology on the total dry extract of wine*, total dry extract presents graphically the new wine samples analyzed.

The extract gives corpulence to the wine (taste fullness), the extract components of wine taste conditioning qualities, stability and development capacity bouquet of aging. Total dry extract expresses the potential quality of the grape variety, with influence (along with other components) in the control of authenticity to naturalness of the wines.

After determining the total dry extract, new wine made from lots of must enriched with grape lyophilized must was added to the RA, it has the highest values, followed by samples from the same batch but RA was not added. Maintaining order in the first batch of samples determined, in the second place stands the new wine samples obtained from grape must concentrate enriched with vacuum, followed by samples of unriched must. The lowest values of total dry extract were determined in samples of wine from chaptalised must again. Overall, the evidence of Chardonnay presents the values of total dry extract samples followed by Riesling, the lowest values were determined for samples of Muscat.

In subchapter 7.3.5. - *The influence of the correction of musts method on the content of polyphenols in wine*, is represented graphically in new wine samples analyzed.

Polyphenols in wine are divided into two major categories: coloured phenolic compounds and colourless phenolic compounds. The colored compounds give colour to the wine and the colourless ones give the phenolic character that is responsible for flavor, astringency and hardness of the wine. Due to the complex molecular structure, chemical reactivity of great polyphenols, the center of oxidative processes (oxidation, condensation, polymerization, copolymerization), plays the role of natural antioxidants of wine. Data analysis determined from the analysis shows a maximum of polyphenols in wine samples from the batch of concentrated grape musts corrected under vacuum, followed by samples of wine fermented musts group concentrate under vacuum corrected to uncorrected wine from musts. The smallest amount of polyphenols are found in samples of wine obtained from chaptalised must. The content of polyphenols determined on lots of new wine follows the order established after analyzing the batches of wine.

The fermented wine from corrected must concentrated under vacuum registered a growth of content of polyphenols just below to the fresh wine witness by 14% and the fermented grape must rectified with of 17%.

Having regard to the insignificant differences between the two registered versions of processing technology (with or without RA) of the same batch of musts, these were not represented.

Subchapter 7.3.6. - *Influence of correction method musts on flavone content of wine polyphenols* presents graphically the content of new wine samples analyzed.

Flavones wine white wines participate in color formation. In the case of flavanols, products used for correction of raw material composition must influence the final content of flavones of new wine. Analyzing data obtained from measurements after determinations it appears that in the case of flavone content is determined to keep order at the polyphenols analysis, namely wine from concentrated grape must rectified with vacuum wine fermented grape must concentrated under vacuum, corrected the wine coming from uncorrected musts and wine obtained from chaptallized must. Growth rates of the determined polyphenols content polyphenol in wine processed from corrected must with concentrated must under vacuum, and lyophilized must are found in the case of flavanols too.

In section 7.3.7. - *Influence of correction method on the content of catechins in musts wine*, is the graphic content of catechins in new wine samples analyzed.

Correction methods must influence the content of catechins in the new wine. Catechins are substances such as protein with antioxidant properties and basic structural units of oligomeric tannins. Catechin content determined from the analysis of new lots of wine already established order to analyze the content of polyphenols and flavones. Increased content of catechins in musts processed wines from corrected musts with concentrated must by different methods, are within the limits established after analyzing the content of polyphenols and flavones.

In subchapter 7.3.8. - *The method of correction must on wine antiradical power*, are presented the antiradical powers determined at the lots of new wine.

Analyzing the data resulting from the determination of antiradical power of lots of wine made in the study it is observed that the antiradical power compared with the capacity to absorb

oxygen radicals and by comparison with a chemically stable radical group can be found in processed wine musts raw powder from corrected musts with lyophilized must closely followed by fermented wines from corrected musts with concentrated must under vacuum . The lot of fermented wines from uncorrected musts has an antiradical power intermediate between batches of wine musts processed from corrected musts with concentrated must and those fermented from chaptalised musts.
Comparing the data resulting from new wine antioxidant power of determining, with the data presented in subchapter 6.3.8 it appears that the antioxidant power hierarchy determined to the types of material from chaptalised musts is maintained in the case of new wine for each type of wine.
In subchapter 7.3.9. - *The method of correcting the antioxidant power of wine*, is represented graphically new wine antioxidant power.
Analyzing the data resulting from the determination of antioxidant power of lots of wine under study is observed that the antioxidant power was determined from the batch followed by processed raw material powder from lyophilised musts , followed closely by wine from fermented musts from corrected musts with concentrated must under vacuum. Antioxidant power of wines musts from uncorrected musts ranges from batches of wine musts processed from corrected musts with concentrated must and those from chaptalised musts.
Increases of the antioxidant power after the analysis of wines produced in batches of fermented wine from uncorrected musts is situated between the determined limits within subchapter 5.3.9. for corrected must with concentrated must under vacuum or lyophilized must to witness must.
Subchapter 7.3.10 - *Comparative analysis of the content of bioactive components, antiradical and antioxidant potential measured in processed white and red grapes*- presents a comparative analysis of the content of polyphenols, flavones, anthocyanins, catechins, antiradical and antioxidant power of grape musts from Cabernet Sauvignon, considered as an element of comparison, the average content of bioactive components, and antiradical power antioxidant due to white wines.

7.4. - Sensory analysis of wines

In subchapter 7.4.1 - *Sensory analysis of wines from Italian Riesling variety*, is presented sensory profile of Italian Riesling wines for variants analyzed according to the type of yeast used in fermentation and enzyme preparation for extraction of precursors the varietal odorant receptors.
In terms of sensory VR-DS has a certain constancy of the parameters analyzed, but in terms of qualitative assessment, it ranks a score inferior place to other Riesling wines analyzed.
However the use of selected yeast sugar yield/higher alcohol VR-DS has provided a rapid release of FA initiation of only 5 hours with the great advantage that they have a strong criophil character, keeping the fermentative capacity at low temperatures. The odorant intake into wine was very discreet easily bringing to acacia blossom and apple and apricot specific flavor oenological characteristics. At the other samples analyzed, we noticed more clearly the imprint of selected yeast oenological characteristics at higher capacity utilization potential of the varietal aromatic white wines, which favors allowing hydrolysis of terpene glucose release odoriferous fractions (aglicons) leading to increased olfactory character, varietal by enriching the typicity of the soil bringing pleasant floral notes. The yeast gave rise to high amounts of esters and acetates in the first phase and released odorant constituents of flavor precursors (terpenols) of skin in the final stage. Favorable effect of yeast fermentation aromas secondary possessing the ability to produce 2-phenyl ethanol and acetates of higher alcohols. The best sensory results were obtained for the sample of the highest accolades VR_L on overall balance, strength, finesse and harmony for full bodied smell and taste. Wines obtained showed intense and complex structure combining olfactory odorant varietal character of the fermentation (ie

primary and secondary aromas). This sample was identified as a wine with an elegant sensory held with floral notes of rose petals and green apple fruit. Second place on sensory assessment test stands VRcv, which achieved a certain constancy in terms of persistence and harmony of taste and smoothness . VRz sample analysis revealed a sensory approach, almost all sample parameters sensitive VR-DS is especially high in terms of odor intensity. Analyses performed on the same evidence but with the addition of RA, have shown a considerable improvement in sensory indices. Score was higher in all cases previously analyzed variant, hierarchy keeping the samples analyzed in this case. Score of VR_L VR-DS samples grew qualitative indicators. Also in this subchapter are the results of sensory analysis, samples of wine made in the analysis in terms of categories developed flavors, floral or vegetable flavors that in the context of acidity, astringency onctuozity (wines smoothness). In this case note VR_L overall sample was the best of all samples analyzed by developing a rich palette of floral and vegetal flavors due to a higher acidity, which gives the wine high freshness and fruitiness . Especially the presence of the enzyme preparation processing technology for management of AF resulted in the VR_L sample a wine with a lubricity (softness) less than astringent and a good overall balance. The most obvious value to support the relationship of the analyzed samples were obtained for the version with the addition of RA.

Subchapter 7.4.2. - *Sensory analysis of wines from Chardonnay,* have sensory profile of wines from Chardonnay.

The sensory analysis of samples analyzed revealed the following: VC-DS sample fermented of selected yeast yield superior sugars/alcohol which as we have shown has a power and a high alchooligene pronounced character received lower ratings in the evaluation indices sensory parameters of taste intensity. Parameters for harmony and harmony smell taste had higher ratings of taste persistence parameter was evaluated of average rating. Using selected yeast strain equipped with enzymes for revealing varietal flavors from Chardonnay wines smoothness development brought with it a plus of quality stressed as an added value greater scale for assessing quality indicators. This yeast has provided an appropriate fermentation without abnormal temperature rise, a rapid entry into fermenting wort, latency exceeding 6 hours, while having a strong criophil character.. The best scale for assessing quality scores were obtained for sample VC_L marks for assessing which presented good and very good appreciations. This showed good values of intensity and delicacy of smell, taste and harmony persistence overall a very good balance. Using this yeast has provided to the analyzed wines a harmonious and ample taste character, soft and elegant wine attributes characterizing recommended wines to evolve in barrel. In second place was evidence in assessing The sensory for assessing VCcv with mediocre-good grades, followed closely by VCz. Analyses performed on the same samples treated with RA showed a considerable improvement in the sensorial indices for all samples analyzed, maintaining the qualitative order given above, respectively the best results being reported in the following variants VC_L VCcv, VCz, VC-DS. Such ratings were given for assessing good, very good and excellent for VC_L sample in first place the excellent qualitative being given for harmony , smell, taste and balance in general. The sample situated the last received mediocre and good grades. In all samples treated with RA was revealed an olfactory character dominated by floral notes and ripe fruit typical to ripe fruits and exotic fruits. The most obvious considerations were for the sample VC_L and mainly for VC_L-RA sample, for the others there are quotes just below to this evidence, but sensitively close enough, the more acidic character being given by the fresh wine giving samples fresh fruitiness, high lubricity and lower astringency.

In subchapter 7.4.3 - *Sensory analysis of wines from Muscat Ottonel* is presented the sensorial profile of wines from Muscat Ottonel.

It is noted that in the case of Muscat Ottonel wine, signs of appreciation of sensory analysis have much larger values than the other two varieties analyzed but in this case, the order in terms of quality remains the same, first place is occupied by VMO_L. Wine sample VMO-DS has mediocre and good assessments of indices, higher values recorded parameters refer to fine smell, harmonious taste and persistent taste. For the other samples analyzed, using the recommended yeast for processing muscat crops or other crops of flavor grapes attributes highlighted better the qualities of the variety but also was highlighted the processing technology. The best considerations were awarded to the version VMO_L where most indices analyzed received good and and very good appreciations, superior considerations being given for intensity, finesse, smell and balance in general. The yeast pointed out an olfactive expression typical to ripe fruit with a metabolism that makes it possible to obtain high concentrations of glycerol, which prints persistent taste unctuous wine with pronounced sweet flavor slight traces of berries. The added enzyme preparation with revealing action contributed to a rather significant increase in the analysis of the sensory quality indices in the case of all four samples of wine analyzed, the order in terms of quality keeping it in this case recorded the highest accolades option is for VMO_L-RA, for which the analyzed indicators were rated excellent, the most popular the excellent qualitative being the intensity and finesse of smell, taste intensity and harmony, and balance in general. On the second place qualifier due to the obtained appreciation rates VMOcv-RA for the ratings given were good and very good, very good and they were given for the excellent qualitaty being awarded for odor intensity hue. The other two samples VMOz-RA, VMO-DS-RA got sensitively close enough better than the previous case without RA, located between mediocre, good.

7.5. Partial conclusions

- The content of total polyphenols in wine shows that they are kept in the wine mainly in comparison with their content in the must, the same observation also applies to any total content of flavonoids and catechins.
- The antioxidant power of wine is kept in convenient parameters even though suffering a slight decrease compared to the wort.
- Antiradical power of wine, determined by comparison with the ability to absorb oxygen radicals when compared with a chemically stable radical shall be maintained fairly close in value relative to the values measured in the must, which highlights the fact that processing methods grape musts and correction being given by alcoholic fermentation management and analyzed the chosen variants did not significantly alter the value of wines produced, being viable alternatives to current practice and correction processing.
- Optimal variant processing with the best results was recorded for musts processed with electric fields whose correction was made with grape powder.
- The use of the correct powder composition must undergo fermentation must bring an increase of 5% of total content of polyphenols, flavones, anthocyanins, catechins, tannins, revealing the antiradical power and the antioxidant power to the corrected version with must concentrate under vacuum.
- Using a selected yeast strains with yield superior sugars/alcohols to other selected yeasts, which favors allowing hydrolysis release glucose terpene fractions causing increased odoriferous an olfactory character varietal character and enrich the qualities of the variety the typicity of the soil bringing pleasant floral notes.
- The yeast gave rise to high amounts being given by esters, acetates and released in the first phase odorant constituents of aroma precursors (terpenols in the final stage).
- Enzymes revealing flavors (the fresh wine when sugar content present a slightly below 50g/l) resulted in a considerable improvement in indicators, which leads to a wine less than astringent velvety with a good balance in general.

CHAPTER 8 – FINAL CONCLUSIONS

8.1. Final conclusions

❖ Using electric fields must to the processing of the mustification demonstrated the appropriateness of this technique in obtaining the best results by increasing efficiency must increase extractivityand viscosity reduction must.

❖ Using must to the correction showed that at equal quantities of correction elements must this method leads to obtaining the best results, lyophilization process being an advanced concentration must, grape powder previously frozen concentrated by sublimation in vacuum controlled heat input.

❖ The corrective version of the composition must undergo fermentation with must powder showed a considerable improvement in the total content of polyphenols, flavones, anthocyanins, catechins, tannins, the antiradical power resvelator and the antioxidant power to the corrected version with must concentrated under vacuum.

❖ Application of pulsating electric field to the processing of grapes and grape showed that the correction factor can keep in the wine produced appreciable quantities of valuable components such as polyphenols, flavones, catechins and large amounts of beneficial effect antiradical power antioxidant profile elements configured valuable wine.

❖ Using an appropriate yeast fermentative process management has led to the enrichment of the wine with a new complex with a new taste and flavor enhancing substances an olfactory character, varietal and enriching the qualities of the variety. A quality addition to this effect brought preparations revealing flavors of a wine which leads to less than astringent velvety with a good balance in general.

8.2. Personal contributions

➢ Identification of modern opportunities for processing semi-aromatic and flavoring grapes respectively using the therapy with CEP as optimal processing option.

➢ Identifying new opportunities for making corrections to composition in compliance with legislation, respectively by using the optimal variant being given by correction must.

➢ Comparative analysis of the development of valuable components such as Bob polyphenols, flavones catechins during the processing of grapes, grape concentrate to demonstrate the correctness of obtaining wine research directions discussed.

➢ Chemical physical and sensorial evaluation of wines produced in different types being given by fermentation to justify the importance of using selected yeasts and dedicated developer being given by flavor.

8.3. Future research directions

- Approaching these trends proved to be viable also on red wines
- Opportunities to improve legislation on corrections to obtain the composition of natural wine, balanced and uniform production from one year to another.
- The use of lyophilized must at the correction of composition and color of red musts.
- Improving the sensory quality of sparkling wines using grape powder to prepare liquor circulation.
- Identifying technological opportunities whose utility have been demonstrated in various branches of scientific knowledge to improve processes for processing grapes producing wine grape conditioning.

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1. - Tuşa Ciprian1, Rădulescu Axenia1, Tiţa Ovidiu1* The influence of filtration conditions on the quality of muscat ottonel- Sipa 2011 Ungaria p. 251-254
2. - Rădulescu Axenia1,Tuşa Ciprian1, Tiţa Ovidiu1 The influence of the sowing with active yeats and additions of alcohol on the proces of maceration-fermentation in rotary tanks, - Sipa 2011 Ungaria p. 230-232
3. - Eniko GAŞPAR, Letiţia OPREAN, Ovidiu TIŢA, Ciprian TUŞA, Ramona IANCU Identification of the saccharomyces bayanus yeast strains by determining the vitamins content Sipa 2011 Ungaria p. 32-35
4. - Tuşa Ciprian, Rădulescu Axenia, Codreşi Cristian Constantin2), Militaru Ionel2), Tiţa Ovidiu - Aspects of the Influence of Filtration on Qualitative and of Composition of White Wines Bulletin UASVM Horticulture, 68(1)/2011 Print ISSN 1843-5254; Electronic ISSN 1843-5394 p. 190- 193.
5. - Ovidiu Tiţa, Letiţia Oprean, Ciprian Tuşa, Axenia Rădulescu, Eniko Gaspar, Ecaterina Lengyel, Mihaela Tiţa, Cristina Tiţa, Evolution of color and antioxidative proprieties of red wines, Proceedings of the Wine Active Compounds (WAC) 2011 International Conference, Beaune, France, wwwxhaireunesco-vinetculture.u-bourgogne.frAVAC2011, p.41-44
6. - Ovidiu Tiţa, Letiţia Oprean, Ciprian Tuşa, Axenia Rădulescu, Eniko Gaspar, Mihaela Tiţa, Ecaterina Lengyel, Cristina Tiţa, Influence of technological operations on enzymatic activity in wine vinification, Proceedings of the Wine Active Compounds (WAC) 2011 International Conference, Beaune, France, www.chaireunesco-vinetculture.ubourgogne.fr / WAC2011, p.95-96
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8. - Axenia Rădulescu, Ciprian Tuşa, Ovidiu Tiţa, - Determination du moment optimal de recolte des raisins Cabernet Sauvignon et Merlot dans le vignoble Drăgăşani, Sixieme Colloque Franco-Roumain de Chimie Appliquee, COFrRoCA-2010, Orleans, France, 7-10 Juileet 2010, ISSN 2068-6382, pag. 164.
9. - Axenia Rădulescu, Ciprian Tuşa, Ovidiu Tiţa, - Evolution des composes dans le processus de vieillissement des vins Cabernet Sauvignon de Drăgăşani, Sixieme Colloque Franco-Roumain de Chimie Appliquee, COFrRoCA-2010, Orleans, France, 7-10 Juileet 2010, ISSN 2068-6382, pag. 165.
10. - Ovidiu Tiţa, Mariana Păcală, Ciprian Tuşa, Cristina-Maria Tiţa - Quality management in enterprises of wine, Proceedings of the 4th International conference on manufacturing science and education - Trends in engineering and academic education, vol.II, Editura Univ. L. Blaga din Sibiu, 2009, ISSN 1843-2522, pag.251-254.
11. - Ovidiu Tiţa, Letiţia Oprean, Mariana Pacală, Ciprian Tuşa and Cristina Tiţa - The impact of supercritical liquids using in leading of extraction processes in training technological engineers for food industry, Conferences Proceedings - Balkan Region Conference on Engineering and Business Education & International Conference on Engineering and Business Education, 2009, Vol.II, ISBN 978-973-739-848-2, ISSN 1843-6730, pag.416-419.

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