

# PHYSICAL - CHEMICAL NATURE PROCESSES THAT OCCUR WITH AGING WINE DISTILLATES (Abstract)

The work is presented along the 202 pages and has the following structure:

## **Introduction**

**Chapter I.** Research and studies on the factors that determine the chemical composition and sensory characteristics of raw wine distillates

**Chapter II.** Studies and research on aging wine distillates cruel

**Chapter III.** Aim. Research objectives. Material and research methods

**Chapter IV.** Results obtained.

**Chapter V.** General conclusions and recommendations

## **Bibliography**

Listed a number of 236 scientific papers, treaties and monographs, and published in Romania in other countries.

### **Aim and research objectives**

Given global concerns about the referral to multiple phenomena involved in developing aged wine distillates remained a long time the fog traditional practices, robust and accurate, but preserving nature a more artisanal, with an interesting collection of handy wine distillates, Didactic Station existing "Banu Maracine" University of Craiova, made in compliance with specific rules, the authenticity of wine distillates, we plan to continue research on such knowledge of physico-chemical processes that occur during aging of wine distillates in oak barrels of various capacities. I particularly like the observations, research and our studies should be continued in the distillate of wine from the wine produced from grape variety Cramposia. Research to date (Popa A., 1985: 2002) shows that wine produced from this grape variety is a good material for high-quality spirits of wine, also confirming Podgorenilor preference of Oltenia, the best wine spirits to outdated obtain, using as raw material Cramposia wine.

**The main objectives of the research program were related to:**

1. Determining the composition and organoleptic characteristics of raw distillate of wine from the wine Cramposia.
2. Evolution characteristics of the wine distillate 70% alcohol by volume with aging for 15 years in oak barrels of different capacity, development characteristics of the wine distillate with an alcoholic strength of 50 vol% over 15 years of aging.
3. Establishing loss occurred wine distillate over 15 years of aging.
4. Evolution of the contents of the main components of the extract distillate substances during aging for 15 years in various capacities vessels.
5. The chemical composition of the outer and inner layer of the staves of oak

barrels of various capacities, has been distilled from wine aged 70 vol% alcohol.

## **Results**

Scientific investigations during 2004 - 2009, to the knowledge of such physico-chemical processes that occur with aging wine distillates in oak barrels of various capacities, we have a number of general conclusions and recommendations of scientific interest but practically, as follows:

1. The chemical composition and sensory characteristics of wine distillate raw material are determined by wine-first, the preservation and packaging of wine by distillation, the distillation of wine and how physical and chemical processes that occur during the distillation of his;
2. In climatic conditions from Banu Maracine grape variety Cramposia fails to full maturity to gain and keep those grape grain chemical constituents, which provide field-premium wine, those components that confer qualities distilled future: sugar, total acidity, the latter represented mainly tartaric acid, an extract not reducing too high, a sufficiently large grape production and high efficiency in grape;
3. To obtain pneumatic presses must be used and not the continuous and alcoholic fermentation process takes place at relatively low temperatures (18 -20 °) C, ensuring a good yield of fermentation and preservation of flavor to the variety, the wine is not drawn on yeast and distils once alcoholic fermentation was complete calm. In the process the grapes free SO<sub>2</sub> doses should not exceed 10 mg / l;
4. Recovery of alcohol from wine was made by double distillation cut fractions (overheads, middle and tail) with a distillation plant type Charente "
5. Wine distillate, the composition characteristics and sensory attributes, has generously as a result of volatile compounds existing in appreciable quantities and precursor compounds fixed bouquet maximize distillate during aging in oak barrels, are also the proportions resulting in employment among the distillate quality;
6. To obtain aged wine distillates of the highest quality is imperative that the aging process takes place in oak low capacity (250-500 liters) made of staves made and put in a certain way (getting the cleft and maturation under natural conditions - sun and rain, a long time);
7. The distillate of wine with alcoholic strength of 70 vol% alcohol in aged vessels smaller capacity (250 l) has a chance to be aging faster, if to get that chemical composition, which attributes to render specific olfactogustativ fine spirits, noble more valued by consumers;
8. Spirits of wine with alcoholic strength of 50 vol% alcohol, passed from aging in oak barrels of 250 L or 500 l fly slower aging process. Although fixed component extraction process in oak are evident, the oxidation is slower that even after 15 years of aging, these spirits do not compete in terms of quality on the alcoholic strength of 70 vol% alcohol ;

9. In the first 3-4 years of aging wine distillates dominate the extraction process, then those oxidoreducere prevail;

10. An aging of distillates over a longer period of 10 years do not lead to an expansion of the compositional characteristics and traits olfactogustativ;

11. For spirits of wine with alcoholic strength of 70 vol% alcohol, passed in obsolescence in oak 200 l capacity is sufficient period of five years of aging, when spirits are finally filled with enough personality;

12. During aging wine distillates in oak Email address is its volume loss through evaporation. Losses are even higher since last alcoholic distillate from aging vessel is larger and has a capacity of less than oak;

13. Most significant losses to record summer distillate and smaller winter, changes are dependent alcoholic distillate and capacity vessel in which the aging process;

14. The high price of natural spirits Cognac type have a high price and because of these losses over long aging in oak small capacity, plus the fact that their technology involves developing and absorbs a significant volume of work and closely matched by an ability to work varied and full of finesse needed to be developed over a considerable length of time;

15. The first process which is obtained during aging of wine distillates are those relating to the dissolution of soluble principles of wood. The nature and quantity of substances extracted from wood are based on the quality wood, and how confectionery staves conditioning, conditioning drums before use, the volume and length of barrel aging;

16. Evolution components extract distillate aged for 15 years in various capacities vessels (200l, 500L) explains many physical and chemical processes that occur with aging:

- Tanning substances are more easily extracted in the first three years of aging, representing between 24 and 36% of distillate extract. During aging of 5-10 years, the substance remains constant, for the period from 10 to 15 years, these substances fall well below what is accumulated after the first year of aging, representing only 13% of the extract distillate;

- Lignin, important component of distillate extract comes from the barrel stave and is the precursor of aromatic substances distillate aged in oak barrels. In the first five years of aging distillate lignin ratio increased from 22% to 38%. After this aging period its share decreases, reaching after 10 years at 25% and after 15 years only 16% as a result of degradation processes of their suffering;

- Reducing sugars, which appear in the distillate during the aging, the fruit sugars are complex, especially lignin and are experiencing ever-increasing weight, the more evident as the aging time is higher distillate.

After the first year of aging only 15% reducing sugars extracted distillate, because after five years to represent 28% and after 15 years to be a 59% share of distillate extract stale;

17. Tanning substances developments, the lignin and reducing sugars during aging distillate in pots with capacity of 500 liters, has the same meaning as in 200-liter vessels, but extraction rates are slower. This explains the contribution that it has surface contact with oak wood distillate with important implications extractive processes, but also those of oxidoreducere and hydrolysis;

18. Our research surprised that the inner layer of oak staves (which came into contact with the distillate) is exhausted tanning substances, lignin and reducing substances. The same can not be found in the outer layer of oak staves not come in contact with the distillate. Depletion of these substances is more evident when aging wine distillate capacity is achieved in smaller vessels (200 liters to 500 liters);

19. Our research shows that the chemical processes leading to improved organoleptic qualities of wine distillate include:

- Etanolizis and other transformation of the lignin of oak;
- Tanning substances distillate initially printed a bitter taste, but it oxidizes quickly and cease with the sour-bitter taste lignin part in finishing the distillate. Tanning substances are assigned the role of antioxidants, especially aromatic aldehydes;
- Hemicelluloses hydrolysis of oak wood, turning it first into dextrin and sugar then, as pentose and hexoze;

20. Our research reconfirms that among the chemical reactions that occur during the distillation of wine aging in oak and esterification acetalizis be reported;

21. It confirms that the component substances of distillate aged wine is divided into two groups: those volatile - from wine distillation and volatile during aging and consisting mainly of oak and dry extract of the distillate form;

22. All observations and research carried out shows that fulfills the role of oak barrel to allow osmosis through the pores of the staves dialysis and distillate substances on the one hand and those of the ambient atmosphere on the other premises;

23. Our findings and other researchers explain involvement: carbohydrate processing, oxidative decomposition of amino acids, complex transformation of oak tannin, oak lignin extraction and processing (by chemical and biochemical) in shaping a broad but balanced compositions of distillate aged olfactogustative providing pleasant features noble spirit;

24. Many growing areas in Romania give chance to obtain high quality wine distillates. They should be highlighted by new research, to put this noble beverage in our country on stage that deserves respect and appreciation;

25. Decision-making bodies in the country should be ours to remove this natural beverage (wine distillate) of viticultural origin, provenance among distillates whose constitution does not confer a beneficial implications on human body. It must be protected as a national good than we can enhance appreciation of Romanian identity in the Austrian wine world.

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