THE INFLUENCE OF THE MACERATION PROCESS ON THE TERPENS AND POLYPHENOLS COMPLEX OF THE FLAVOUR WINES

Felicia STOICA, M. GHEORGHITA, Liviu GIURGIULESCU

University of Craiova, Faculty of Horticulture, Department of Enology, 13 A.I. Cuza Street, Craiova, Dolj, Romania, feliciastoica@yahoo.com

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Abstract: The maceration process in the technology of elaborating the flavour wines is obviously influenced by the temperature and the length of contact between the must and the solid parts of the grapes. At certain these factors exert a decisive influence on terpenes and polyphenols complex extraction which gives the basis characteristics of flavour wines. La macération dans la technologie de l'élaboration de l'arôme des vins est évidemment influencée par la température et la durée de contact entre le moût et les parties solides du raisin. À certains de ces facteurs exerce une influence déterminante sur les terpènes et d'extraction des polyphénols complexes qui donne la base des caractéristiques de la saveur des vins.

INTRODUCTION

The flavored wines which are obtained from the varieties of grapes that have the capacity to biosynthesize and to accumulate the flavor substances (linalool, geraniol, α terpenol) in the superficial or profound stratum of the peel reclaim an elaborate technology, specific to increasing their flavored potential.

Further, the flavored wines technology refers at two fundamental objectives: the extraction of primary flavors from the grapes and the favorisation of the formation of the secondary flavors in fermentation. Therefore, the prefermentative phase is crucial in obtaining flavored wines.

Terpenic flavors are those which dominate in grapes and the terpenics monohydroxilic alcohols are the most important, from an olfactory point of view. Still, any of those volatile compounds, considered as individual, can not provide a typical flavor of “muscat” kind, while their general mixture lead to a flavored, typical note of wines.

Maceration, fermentation-maceration is a complex process biochemical and biophysical but also a technological link with important implications in obtaining typical aromatic wine. Assume keep in contact for a certain period of time, the two phases of mixture resulting after pressing the grapes, in order to squeeze aromatic substances from the peel (Stoica Felicia, 2003).

Those two “coordinates” of the maceration process, temperature and duration, influenced definitively the quantitative aroma extraction and more qualitative, so independent one of other and also in interaction (Bayonove C., 1989; Canal-Llauberdes R.M., 1993; Stoica Felicia, 2006).
MATERIALS AND METHODS

For the following these desiderates, the experimental variants were effectuated on two flavour varieties grapes Muscat Ottonel and Tămâioasă românească.

For Muscat Ottonel the experimental variant was:
- \( V \)-vinification in white,
- \( V_1 \)-maceration 8 hours at 22°C,
- \( V_2 \)- maceration 12 hours at 22°C,
- \( V_3 \)- maceration 24 hours at 22°C,
- \( V_4 \)- maceration 12 hours at 8°C,
- \( V_5 \)- maceration 24 hours at 8°C.

For Tămâioasă românească the experimental variant was:
- \( V \)-vinification in white,
- \( V_1 \)-classic maceration of the frozen grapes,
- \( V_2 \)-cold maceration 24 hours,
- \( V_3 \)-cold maceration 24 hours + enzymes preparation (Ep),
- \( V_4 \)-classic maceration 24 hours,
- \( V_5 \)-classic maceration 24 hours + Ep,
- \( V_6 \)-classic maceration 48 hours,
- \( V_7 \)-classic maceration 48 hours + Ep.

Using in experiments the flavor grapes, variety with great expectation in vineyard, was take in consideration these factors with influence on the extraction by the solid parts of aroma compounds, for “muscat” specifically aroma, without other unwished nuances.

The investigations are, also for: the influence of the temperature and duration of the maceration and also, the influence of the enzymatic preparation on the composition and terpens structure of the flavour wines.

RESULTS AND DISCUSSIONS

The influence of the temperature of maceration dignify that the maceration process determined enrichment of the must in terpenes (Table 1).

<table>
<thead>
<tr>
<th>Variants</th>
<th>Terpenes, ( \mu g/l )</th>
<th>Polyphenol total, ( mg/l )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TVL</td>
<td>TLP</td>
</tr>
<tr>
<td>( V )</td>
<td>900</td>
<td>2200</td>
</tr>
<tr>
<td>( V_1 )</td>
<td>1400</td>
<td>2750</td>
</tr>
<tr>
<td>( V_2 )</td>
<td>1600</td>
<td>3270</td>
</tr>
<tr>
<td>( V_3 )</td>
<td>1700</td>
<td>3690</td>
</tr>
<tr>
<td>( V_4 )</td>
<td>1880</td>
<td>3775</td>
</tr>
<tr>
<td>( V_5 )</td>
<td>1800</td>
<td>4025</td>
</tr>
</tbody>
</table>

In the end, total polyphenols compounds at all 5 variants comparatively with the control sample are bigger. The most important values are registered at the variants with maceration at low temperature (\( V_4 \) and \( V_5 \)).
The variant V₃ with maceration at fever heat (22°C) is bigger than V₅, but the length of maceration is longer. But, the polyphenols content is also higher and this wine has a disagreeable, astringent taste.

At variant macerated at low temperature are indicated content higher in terpenes compounds (V₄) and a content polyphenols smaller (V₅) what confirm that the enzymatic activity at low temperature is minimal.

In case of Tămăioasă românească, we use the enzymatic preparation Novoferm 12 G knowing that the aroma are situated at this variety in deep layer of the bean peels (Table 2).

At all variants with maceration had increases of the aroma compounds contents, volatile and also bound comparatively with the control sample. The most important increase is at the variant V₃.

Between the variants with cold maceration (4-5°C) or by frozen grapes dignify V₃ follow by V₂ (maceration 24 hours) and V₁ (frozen grapes). The polyphenols evolution is similarly, the V₃ variant recording the highest values followed by V₁ and V₂.

At the variants with classic maceration the best was V₅ and V₇ where we use the preparation Novoferm 12 G, with bigger value for the volatile free and bound terpenes contents. The flavones contents follow the same ascendancy trajectory.

In the case of unflavone compounds, V₅ version has a lower content compared with V₃ (cold maceration 24 hours + enzymes preparation) and V₇ (classic maceration 48 hours + Ep).

The other parameters of quality of flavour wines obtained from Tămăioasă românească grapes are present in Table 3.
CONCLUSIONS

The maceration process determined the important growths in the flavor potential at the wines through increases at the free volatile terpenes and also bound terpenes contents. Through low temperature of maceration process, the extraction of flavor compounds is more slowly. The application thermic shock by maceration gives enrichments in free volatile terpene and bound terpene contents.

In the maceration in metallic rotary cistern (ROTO), the extraction of the flavor compounds by a solids fraction is highest comparative with the classic maceration process. The alcoholic fermentation produced a diminution of the free and bound contents because the adsorption or rallying CO$_2$ resulting at alcoholic fermentation by yeasts cells.

In conclusion, using the maceration process, the terpenes content increase. This process is accelerating by using the enzymatic preparation Novoferm 12 g.

Through maceration at low temperature, the extraction process of the aroma compounds is slower and the length of maceration is longer in this case.

REFERENCES

4. Stoica, Felicia, Camelia Muntean, C. Baduca, 2006, Researches concerning the enzymatic preparation influence on the flavors extraction from Tamaioasa romaneasca by Dragasani during the maceration process, 41$^{th}$ Croatian & 1$^{st}$ International Symposium on agriculture, Opatija, Croatia, pag. 753.