THE INFLUENCE OF pH AND LATE MICROOXYGENATION ON SOURNESS, BITTERNESS AND ASTRINGENCY OF RED WINE

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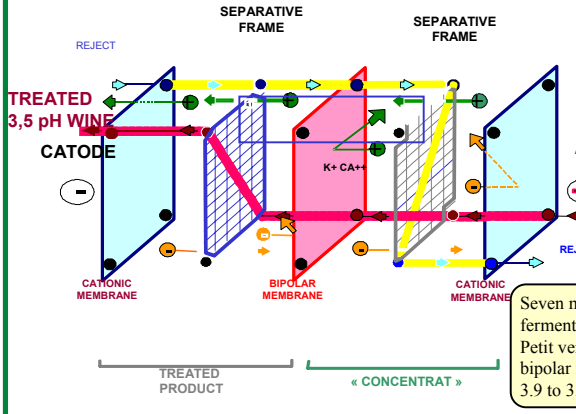
Introduction

Several factors such as pH (1,2,3) and micro-oxygenation (4,5) influence wine evolution during storage, affecting its sensory properties. In Mediterranean regions, pH values are often considered too high. Acidification by addition of tartaric acid is often used with random results up to date. To decrease K+ contents and consequently pH, an electro-membrane process with bipolar membranes has been recently tested in wine. The influence of these processes on taste perception (sourness, bitterness, astringency) was investigated.

Materials and Methods

BIPOLAR MEMBRANE ELECTRODIALYSIS



Seven months after alcoholic fermentation, a third of the volume of a Petit verdot wine was treated with bipolar membranes to lower pH from 3.9 to 3.5

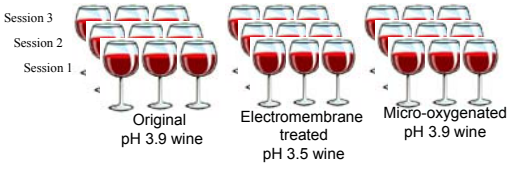
Electromembrane treated 3.5 pH wine

ORIGINAL 3.9 pH wine

ORIGINAL 3.9 pH wine Microoxygenated (2 mL/L/month) the last 3 months of storage.

Each treatment had three repetitions. Wines were stored at 15ºC during 9 months.

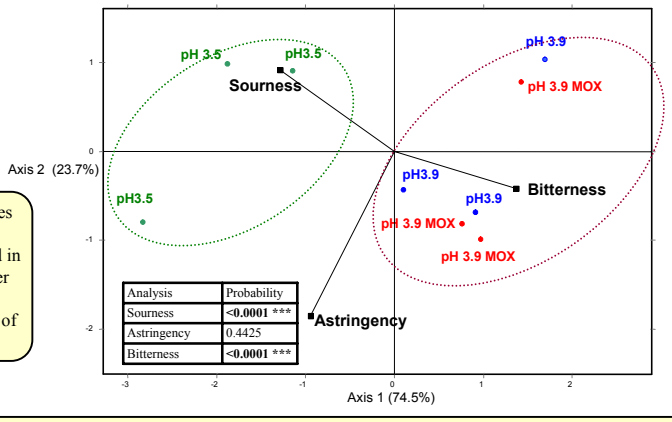
DESCRIPTIVE SENSORY EVALUATION



19 paid judges were trained during 5 sessions of 2 hours each for the attributes of sourness, astringency and bitterness. The formal sensory evaluation was conducted in individual computerized booths. Nine 10 ml samples, presented in black OIV standardised wine glasses in a monadic service, were evaluated per session following a sip and spit protocol with a pectin rinse. The session was repeated three times giving a total of 27 samples. Judges then rated intensity of astringency, bitterness and acidity on an unstructured 10-cm line scale.

Results

Principal Components Analysis of descriptive sensory rating means. Product/Attribute



Conclusions

Decreasing wine pH values by 0.4 points using an electromembrane technique significantly reduced bitterness and enhanced acidity of a Petit verdot red wine, while no effect on astringency was observed. Late micro-oxygenation did not affect astringency, acidity or bitterness.

Tannin composition was not modified by the electromembrane treatment. Slightly lower tannin levels were found in micro-oxygenated wines but this was not detected by sensory analysis.

Differences in the pigment composition were observed. Wines at pH 3.5 presented lower levels of monomeric anthocyanes (HPLC) but showed a higher colour intensity (abs 420+520+620) than pH 3.9 wines. These changes reflect a higher rate of conversion of monomeric anthocyanins to derived pigments at the lower pH value. The effect of pH on anthocyanin reactions has been demonstrated earlier (6). Whether these reactions are related to changes in taste properties (especially reduced bitterness of the lower pH wine) remains to be investigated.

References

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Acknowledgements

This study has been carried out with the financial support of the French Ministry of Education by the Biennal Invitation of Mrs. Müller, with the support given by the 19 judges from the sensory panel (INRA Montpellier), D. Bouissou3 and B. Saint Pierre3 for their responsability on the pH diminution of the wine, and EURODIA INDUSTRIE S.A.

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