

Impact of grape ripening and post-harvest withering on must composition and fermentation kinetics

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INTRODUCTION

- ✓ Grape dehydration is the dynamic process of water loss from the berries occurring under more or less controlled environmental conditions, leading to weight loss and the concentration of sugars and secondary metabolites
- ✓ Different grape varieties exhibit varying responses in terms of dehydration rate and the resulting chemical composition
- ✓ Different harvest time and consequently grape ripeness levels can significantly influence this process [1].
- ✓ Therefore, further research is necessary to deepen our understanding of how the interaction between harvest time and grape withering influences must and wine composition.

AIMS

To investigate the impact of ripening level on the composition of must and the resulting straw wine.

MATERIALS AND METHODS

- ✓ *Vitis vinifera* L. cv 'Corvina', 'Moscato di Scanzo' and 'Nebbiolo' were harvested at three ripeness levels: low (LR; 18° Bx), medium (MR; 21° Bx) and high (HR; 23° Bx).
- ✓ Grapes were subjected to controlled postharvest dehydration until achieving 20% grape weight loss.
- ✓ The musts were analysed for general chemical composition: sugars (g/L), readily assimilable nitrogen (mg/L), pH, titratable acidity (g/L).
- ✓ Micro scale winemaking trials were performed with skin maceration, monitoring the inoculated fermentation by weight decrease.

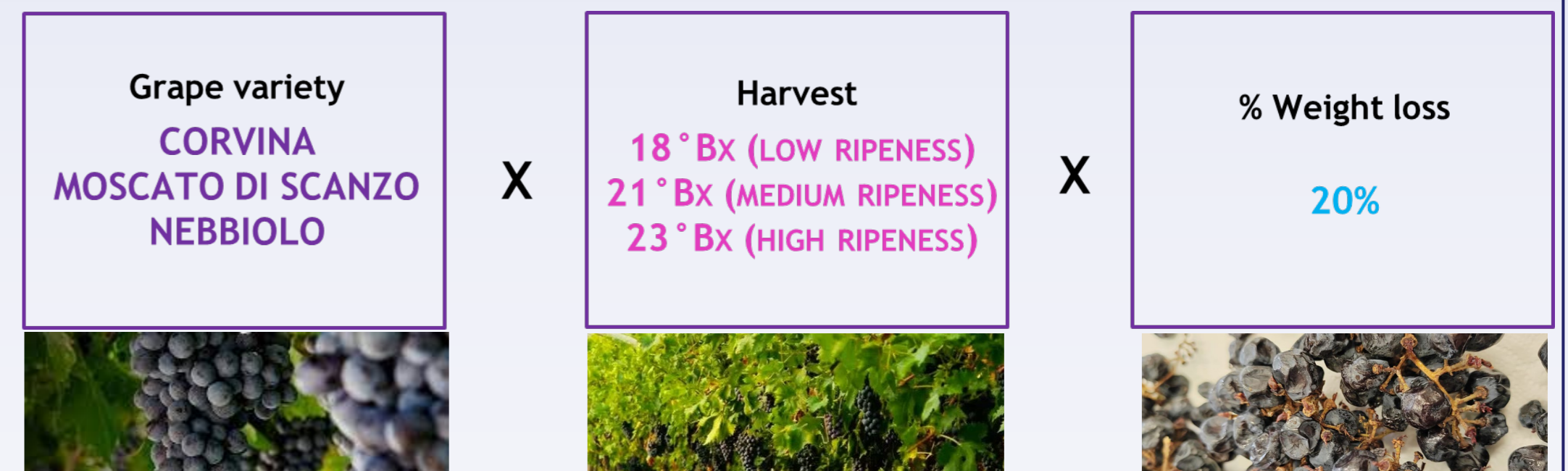


Figure 1: Experimental plan

RESULTS

- ✓ The concentration of acetaldehyde dropped notably (up to -68%) at -4% ethanol level in most of the wine samples (Figure 1).
- ✓ A moderate decreases in titratable acidity (up to -14%) and tartaric acid (up to -10%) was found for -2% ethanol reduction by RO, while the losses were more relevant for -4% ethanol (up to -31% and -34% for titratable acidity and tartaric acid). No change of titratable acidity and tartaric acid was found in the wine dealcoholized by CM.
- ✓ A -4% ethanol reduction by RO led to significant drop in flavonoids (up to -46%) (Figure 2) and anthocyanins (about -50%) compared to control wines, while CM led to slight decrease of anthocyanins (Figure 3).
- ✓ Color intensity decreased consistently for 4% ethanol removal by RO, while it increased in wine dealcoholized by CM (Figure 4)

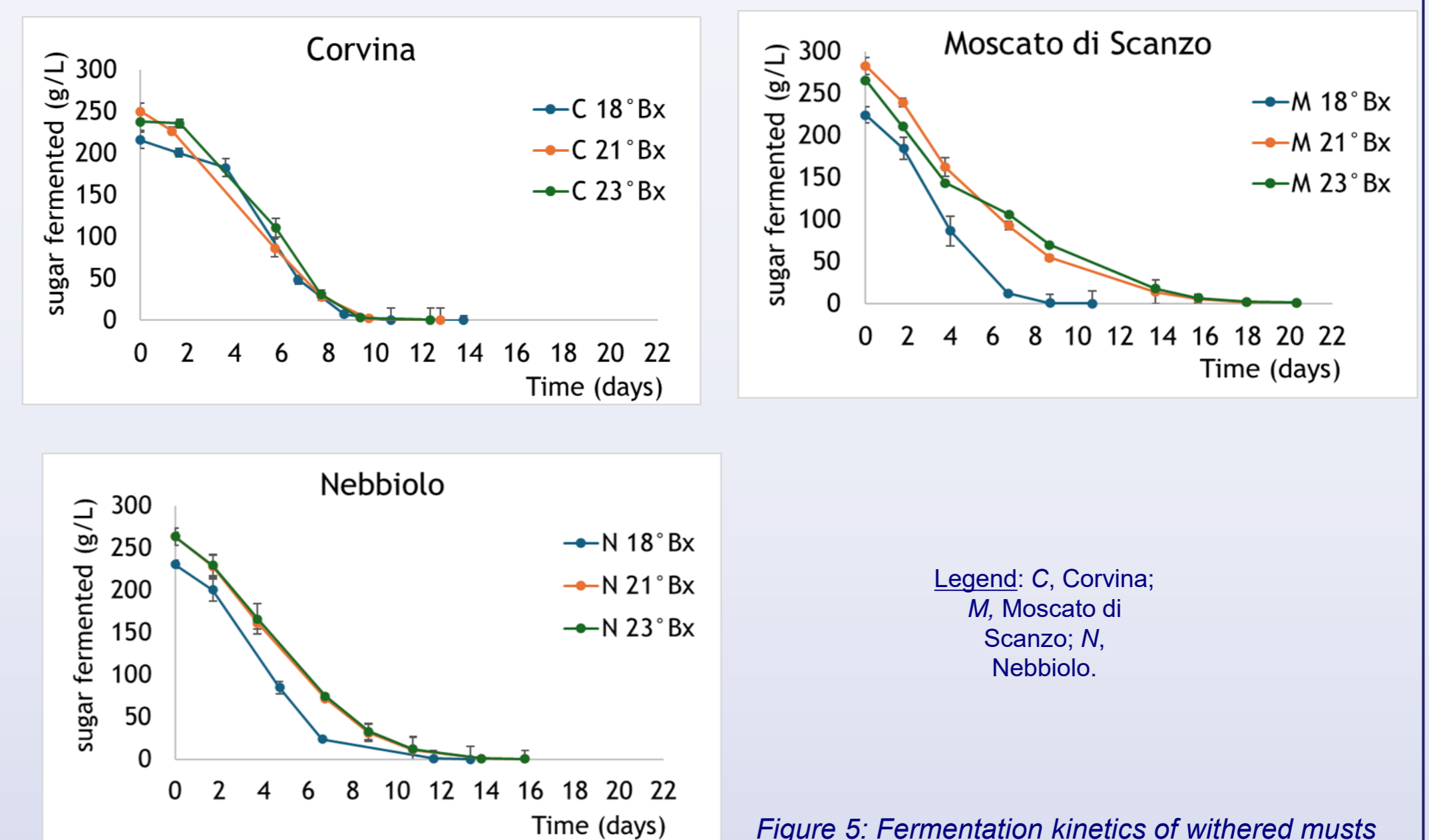


Figure 5: Fermentation kinetics of withered musts

- ✓ Wines with -2% of ethanol were perceived as fruitier and more floral, with greater aromatic intensity than those with a -4% ethanol reduction (Figure 6).
- ✓ Wines with -4% of ethanol were perceived less bitter and astringent and showed less body (Figure 6).
- ✓ The wines dealcoholized by CM up to -2% of ethanol were perceived less intense than those with ethanol removal up to 4% (Figure 6, wine D).

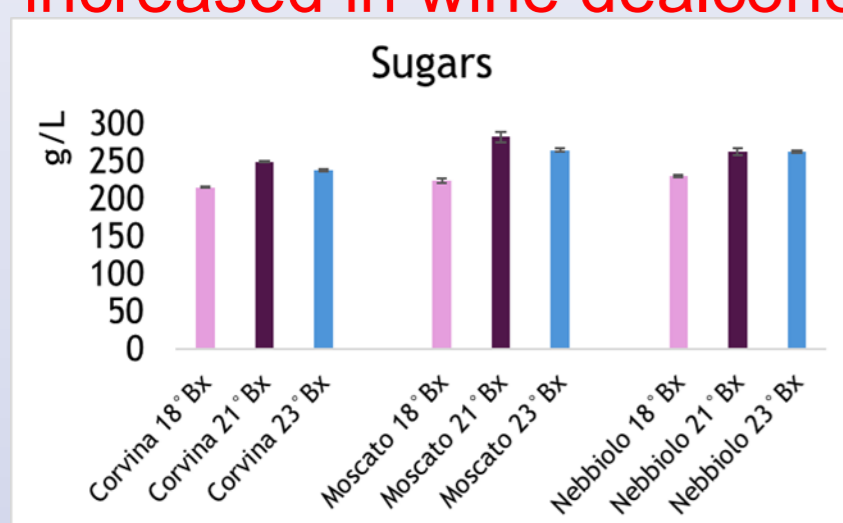


Figure 1: Sugar concentration (g/L) in withered musts

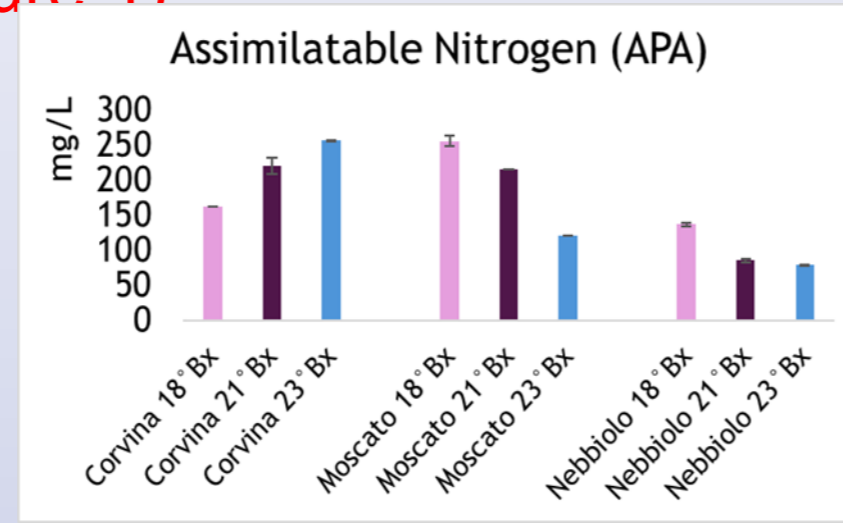


Figure 2: Assimilable nitrogen (APA, mg/L) in withered musts

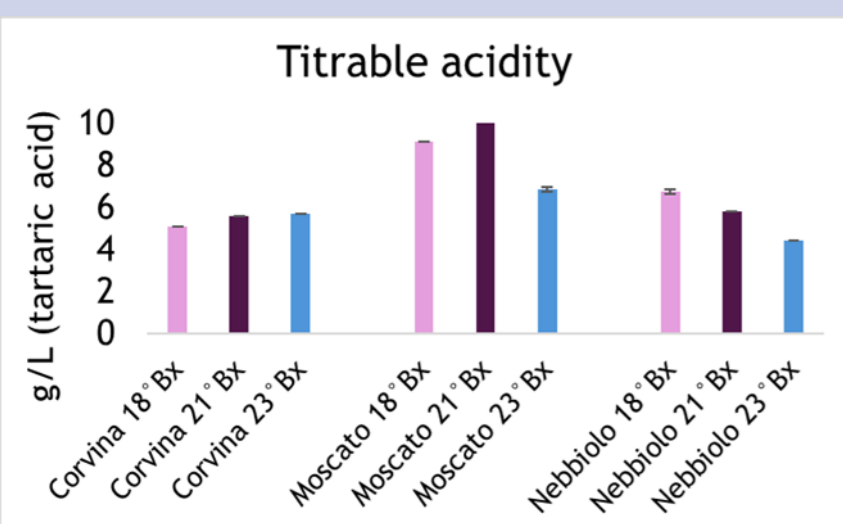


Figure 3: Titratable acidity (g/L) in withered musts

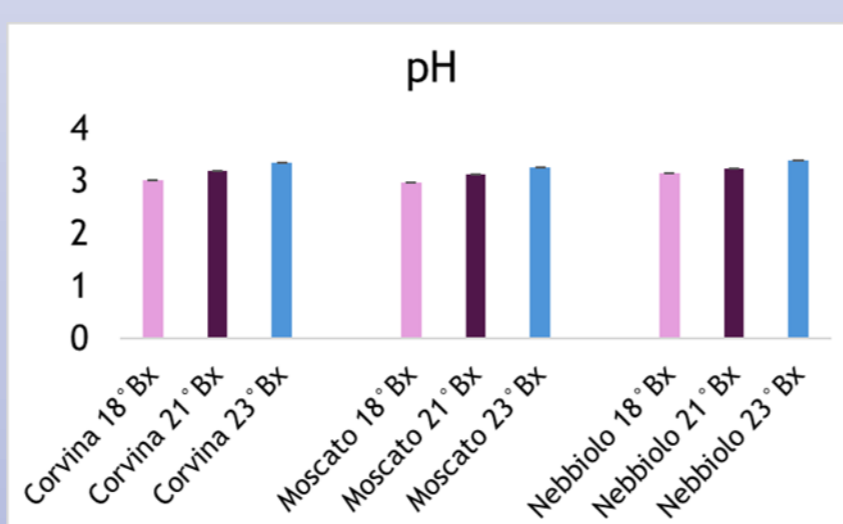


Figure 4: pH in withered musts

CONCLUSIONS

- ✓ Concentration effect (of sugars) till MR, depletion from MR to HR.
- ✓ Withering time is variety dependant.
- ✓ Fermentative kinetics is slowed down by MR and HR grapes for Moscato di Scanzo and Nebbiolo.
- ✓ Grapes harvested at higher ripening levels were more susceptible to pathogen infections
- ✓ This study enhances the understanding of varietal effects during grape postharvest dehydration, focusing on red grape varieties commonly used in this production technique.
- ✓ Further researches will consider the impact of ripeness level and post-harvest dehydration on wine composition.

REFERENCES

[1] Scalzini et al. 2021



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