



INCREASING VOLATILE THIOLS BY FREEZING GRAPES

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AIMS OF STUDY

To investigate the presence of intraregional variation in volatile thiol concentrations; to determine the relationship between amino acid concentrations in juice and thiol precursor concentrations, as well as final volatile thiol concentrations in wines and; to investigate the effect of pre-fermentation freezing on volatile thiol concentrations in final wines. This summary will focus mainly on the third aim of the study, i.e. the effect of pre-fermentation freezing of grapes and juice on final volatile thiol concentrations in wines.

EXPERIMENTAL LAYOUT

- Sauvignon blanc grapes were picked from seven commercial vineyards in the Adelaide Hills region of South Australia and stored in plastic bags overnight at 4°C.
- Each sample (five in total) of approximately 8 kg whole grape bunches were divided into two subsets of 5 kg and 3 kg each.
- The first subset of 5 kg grapes was sulphured and crushed immediately. The resultant juice was collected in plastic bottles and cold settled overnight. The clear juice was divided into two groups.
- The first group was fermented immediately with Anchor VIN 13 at 16°C. The other group of juice was stored at -20°C for one month (thus frozen).
- The remaining +/- 3 kg of fresh grapes were sealed in food-grade plastic bags and wrapped in foil and also stored at -20°C for one month.
- After one month the frozen grapes were thawed, crushed, settled and fermented. The frozen juice was thawed and fermented. Both fermentations were done exactly the same as the control juice that was fermented immediately.
- Fermentations were conducted on very small scale on an automated fermentation platform (TEE-BOT). All fermentations went to dryness.
- Thiol precursors were measured in juice samples and volatile thiol concentrations were measured in wines using SIDA HPLC-MS/MS.



MAIN RESULTS

- Pre-fermentation freezing of fresh grapes or juice both significantly enhanced thiol precursor concentrations in juice, as well as final volatile thiol concentrations in wines.
- Freezing grapes is much more effective in enhancing thiol precursors in juice as well as final wine volatile thiol content, than freezing only the juice.
- Increases in volatile thiol content in wines of up to ten fold was observed for wines made from juice from frozen grapes versus wines made from juice immediately after crushing.

SIGNIFICANCE OF THE STUDY

The study presents a potentially very powerful tool for winemakers to increase volatile thiol content of wines where this group of compounds play an important role in final wine quality. The limitation of the study is that fermentations were done on small scale and it would be interesting to see what results commercial style trials will deliver.

REFERENCE

Liang Chen, Dimitra L. Capone, Emily L. Nicholson and David Jeffrey (2019). investigation of intraregional variation, grape amino acids, and pre-fermentation freezing on varietal thiols and their precursors for *Vitis vinifera* Sauvignon blanc. *Food Chemistry* 295: 637-645.