



Master's Thesis Title: Technological approaches to preventing stuck or sluggish secondary fermentations through alcohol reduction for the overall improvement of sparkling wine quality

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Abstract (max 300 words):

Topic position and objectives:

In order to address the continually rising alcohol contents in wine, in this case specifically looking at sparkling wine, technologies including alcohol reduction in base wine and alternative sugar sources for secondary fermentation were explored. By looking at osmotic distillation for the reduction of alcohol in base wine as well as two alternative sugar sources, dextrose and unfermented must, the goal was to determine a way or ways to prevent stuck or sluggish secondary fermentations without compromising the quality of the product. Focusing on these two crucial factors in secondary alcoholic fermentation for the production of sparkling wine, the hope is to discover the key to reducing the chance of stuck or sluggish secondary fermentations while also improving sparkling wine quality through the reduction of alcohol.

Methods:

Both sparkling and base wines were evaluated to determine the most effective treatments to preventing stuck or sluggish secondary fermentations and their impacts on the final quality of the sparkling wine.

By comparing wine that had been dealcoholized using osmotic distillation for the base wine used for secondary alcoholic fermentation along with different sugar sources dextrose and unfermented must to the standard tirage practice used in the production sparkling wine four treatments and one control were defined.

Sparkling wine: a full chemical analysis panel including amino acids and polysaccharides was performed post-secondary fermentation in order to determine the long-term effects of the treatments on the wines compositional components. In addition to this a sensory evaluation of the wines was employed to discern the effect on the wine quality.

Base wine: base wines with the same treatments as the sparkling wines from the previous year were fermented in

the same way and the fermentation kinetics tracked. Daily pressure readings were taken as well as RS levels in the wine done once a week to track the secondary fermentations. Primarily looking at the time it took for the treatments to complete their secondary fermentation (if possible), speed at which the secondary fermentation started, as well as the final RS in the wine was tracked.

Results:

Overall- the most profound effect of the treatments was seen during the secondary fermentation of the base wines. Very few significant differences could be observed on the sparkling wines post-secondary fermentation.

Sparkling wine:

Few statistically significant differences were observed in the sparkling wine portion of the experiment. The only major relevant differences seen were in the final alcohol levels of the treatments. In the sensory evaluation section, panelists were unable to distinguish a difference between the control and the treatments, indicating that the dealcoholization and alternative sugar sources did not negatively or positively affect the quality of the wine.

Base wine:

A multitude of significant differences were observed between the control and the treatments during the secondary fermentation of the base wines. The most notable results were as follows- reduced alcohol content in the base wine was the most effective way to prevent a stuck or sluggish secondary fermentation. Use of the alternative sugar sources: dextrose and unfermented must was inconclusive, being very effective in some trails while in others not being able to complete a successful fermentation.

Main conclusions:

The most effective way to combat a stuck or sluggish secondary fermentation is to reduce the initial alcohol content in the base wine. Using alternative sugar sources in some cases aided in a more rapid, complete and successful fermentation; however, not all trails yielded this positive result. Overall there was neither a positive or negative effect on the final wine quality through the reduction of alcohol in base wine or the use of alternative sugar sources.

Keywords (5): sparkling wine, alcohol reduction, stuck / sluggish fermentation, dextrose, unfermented must