



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> Nelly M. Turley	<b>Project Number</b> <b>S0524</b>
<b>Project Title</b> <b>The Effects of Higher Fermentation Temperatures on the Phenolic Compounds and Color of Wine</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> In the winemaking process, there are many different components that affect the wine's flavor and color. There also are a multitude of chemical changes going on in the wine during the fermentation process. I tested the effects of fermentation temperature on epicatechin, polymeric phenols, polymeric anthocyanin, malvidin glucoside as well as the color of the wine, the intensity of the coloring (Chroma) and the L* value, the lightness of the wine. These different compounds are known as phenolics. There are many more different phenolic compounds but those are the four that will be analyzed in the experiment. Both a phenolic report and color analysis allows winemakers to analyze the quality of their wine.</p> <p><b>Methods/Materials</b> In this experiment I tested pre-fermented syrah wine in four 5-gallon buckets. Two of the buckets had fish tank heaters set at 80° F while the others did not. The buckets without the heaters were the control because during normal fermentation the wine is left in barrels and not heated. All the buckets were kept in a temperature controlled barrel building set at 60° F and 76% humidity</p> <p><b>Results</b> At the end of a nine day period three of the four phenolic compounds from the heated treatments were higher than that of the control. Malvidin glucoside was the only compound where the final amount was almost equal for both treatments. The final chroma levels of the hot treatments were only one higher than that of the cold treatments, and this makes no difference in the final color of the wine. This is also true for the L* values of the wine they were so close that I had to accept my null hypothesis because the higher temperature had no effect on the final product. The hue angle of the hotter treatments was higher making the wine more orange.</p> <p><b>Conclusions/Discussion</b> With these results a winemaker will know how to manipulate their wine in order to achieve the desired result. The final data points are not to be used as values that define a good or bad wine, but as a reference value so that someone would know how a higher temperature would change their wines.</p>	
<b>Summary Statement</b> My project sought to discover how higher fermentation temperatures affects how the compounds, the color and ultimately the taste of wine.	
<b>Help Received</b> In order to determine the levels of each phenolic compound as well as the color, I had the assistance of ETS Laboratories because the equipment needed was not available to me.	