



CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

Name(s) Sean T. Carroll	Project Number J2107
Project Title The Effect of Wine Bottle Closures on Dissolved Oxygen Levels in Wine	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of the experiment was to determine which of the following wine bottle closures would deliver the greatest dissolved oxygen level in wine over a 57 day period: Nomacorc premium closure (synthetic), Portocork highest grade natural cork, Stelvin screw top capsules. I believe that the order of highest to lowest dissolved oxygen level will be Nomacorc, Portocork natural, then Stelvin.</p> <p>Methods/Materials 12 wine bottles were filled with the same amount of Merlot wine from the same keg, at the same time, using the same hand bottling technique. Twelve bottle closures were obtained; 4 each of Nomacorc premium, Portocork natural highest grade, and Stelvin screw tops. Eight bottles were corked using a floor corker and the 4 screw top bottles were closed using the Alfatek bottling line- a bottling line is necessary to apply the screw top. The bottles were stored in the same wine case in a wine cellar at 12.8 ° Celsius for 57 days. At day 57, the bottles were opened and dissolved oxygen readings were taken with an Orion probe.</p> <p>Results The screw cap and natural cork had identical four trial average dissolved oxygen readings. The synthetic closure had the lowest 4 trial average by .03 mg/ L.</p> <p>Conclusions/Discussion The experiment did show that there were differences in dissolved oxygen levels but not in the order expected. An automated bottling procedure or using liquid nitrogen to remove oxygen from the head space of the bottle may have decreased the oxygen in the screw cap bottles and made the result closer to expectation. Even though the hypothesis was not fully proven, the small differences in mg/L found in levels of dissolved oxygen are not likely to affect the quality of wine over a short period of time. My research supports that if you drink a wine within 57 days, the type of closure may not be of as much importance as people think. Therefore, more important issues should be considered such as the environmental impact of using synthetic closures over natural cork. Natural cork creates jobs, fixes carbon and decreases deforestation.</p>	
Summary Statement This research helps to answer whether there is an important difference between natural, synthetic and screw cap wine bottle closures on wine oxidation	
Help Received Kevin Mills, Trinitas winemaker gave access to materials and acted as a teacher and mentor regarding winemaking. Mom typed and arranged meetings. Because of the topic, I wasn't able to complete all of the project in my home but I did not work with a professional research mentor	