



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Vivian Gerstein	Project Number S0909
Project Title The Effect of Wildfire Smoke on Fermented Grape Products	
<p style="text-align: center;">Abstract</p> <p>Objectives The purpose of this experiment was to determine 1) if wildfire smoke affected grapes grown in Lake County and 2) if this smoke affected people s opinions of fermented grape products (single fermentation wine and vinegar) made from grapes grown in a range of wildfire smoke exposures. I hypothesized that as exposure to wildfire smoke increased, samplers ability to detect smoke taint would increase in both wine and vinegar made from wildfire smoke exposed grapes.</p> <p>Methods Five different samples of Cabernet Sauvignon wine grapes from Lake County were collected, all from varying exposures to wildfire smoke generated during the 2018 Mendocino Complex Fire. The crushed grapes and their juice were processed through a single fermentation, then split into two groups. One juice group s fermentation was ended and called a single fermentation wine and the other was fermented into vinegar. Adult samplers tasted and smelled each wine or vinegar sample and were asked to rank them in order of most to least similar to the control (i.e. the sample that contained no smoke). Their rankings were compared to the chemical analysis of the Lake County wine grapes that documented the presence of common compounds associated with wildfire smoke (e.g. the volatile phenols guaiacol and 4-methylguaiacol released from the combustion of woody plants).</p> <p>Results In general, the samplers were able to detect the difference between the control and tainted samples, but for the tainted samples, they were not able to tell relative smoke exposure levels. Single fermentation wine and vinegar sample results followed this same pattern.</p> <p>Conclusions With the increase in fire severity in California, fire and smoke damage are becoming more common. The drier conditions and longer fire season associated with climate change may increase the number of wildfires and thus exacerbate the situation. My results partially supported my hypothesis. All samplers were able to differentiate smoke tainted fermented grape products from control (non-exposed) grape products; however, only some samplers were able rank the level of smoke exposure relative to the control. California s grape growers will continue to have the long-term challenge of growing grapes in fire-prone areas and the strong possibility of wildfire smoke interactions.</p>	
Summary Statement I determined that wildfire smoke affects grapes and their fermented products, though the detection of this taint is not uniform.	
Help Received I received guidance from Glenn McGourty, UC Cooperative Extension viticulture advisor in Lake County.	