Joshua S. Devore (SBN 318676)
DICKENSON, PEATMAN & FOGARTY
1455 First Street, Suite 301
Napa, California 94559
Telephone: (707) 252-7122
Facsimile: (707) 255-6876

Attorney for Plaintiff
LANGTRY FARMS, LLC

SUPERIOR COURT OF CALIFORNIA

COUNTY OF LAKE

LANGTRY FARMS, LLC, a Delaware Limited Liability Company

Plaintiff,

v.

HUGH REIMERS, an individual; TORICK FARMS, LLC, a California Limited Liability Company; and DOES 1-20.

Defendants.

AND RELATED CROSS-ACTION.

CASE NO. CV421774

DECLARATION OF DR. ANITA OBERHOLSTER IN SUPPORT OF PLAINTIFF LANGTRY FARMS, LLC'S OPPOSITION TO CROSS-COMPLAINANT TORICK FARMS, LLC'S REQUEST FOR PRELIMINARY INJUNCTION

I, Dr. Anita Oberholster, hereby state and declare:

1. I am currently the Cooperative Extension Specialist in Enology in the Department of Viticulture and Enology at the University of California, Davis California. I have more than 15 years of experience in the field of grape and wine chemistry. My research is multidisciplinary and focusses on factors that impact grape and wine characters so that the winemaking processes could

be tailored by individual winemakers to achieve the desired flavor and aroma profiles in the finished wine.

2. Since 2017, my research has focused on the impact of grape smoke exposure on grape and wine composition and quality. Initial research investigated potential mitigation actions during grape processing that can limit the extraction and expressions of smoke marker compounds in wine. Unfortunately, these compounds readily extract during winemaking and the use of yeast and other wood additives during winemaking results in only temporary masking of smoky characters, especially in the case of more impacted grapes. A follow-up focus was on potential amelioration techniques in the case of resulting smoke impacted wines. Current commercially available techniques tested were found to all decrease smoke exposure marker compounds but lacked specificity and impacted the overall quality of the wine (Oberholster, 2019). These treatment techniques were also found to work best with low-impacted wines where minimal treatment was needed.

3. Current research on the west coast is focused on developing ways to predict smoke exposure risk in the vineyard. This entails large collaborations between atmospherics scientists, plant scientists and chemists. Currently, there is no known link between current atmospheric measurements and grape smoke exposure risk. Based on anecdotal data, the best we can say is that smoke of less than 24 hours old has the highest risk. Grapes are susceptible to smoke at any time during development and can result in smoke impacted wines with relative short exposure time (Kennison et al., 2009; Szeto et al., 2020). Dense fresh smoke can result in smoke impacted grapes within hours.

4. There is no known method of assessing risk other than determining smoke exposure marker compound composition in the grapes using expensive analytical techniques. Obtained numbers are difficult to interpret as no baseline data for individual varieties grown on the west coast is available nor are threshold values and/or consumer rejection levels known in various wine styles. The known individual threshold levels for known smoke marker compounds (guaiacol, 4-methylguiacol, o-, m-, p-cresol, 4-methylsyringol, and syringol) have limited value

as these compounds have synergistic impacts with each other and other compounds in the wine matrix (McKay, Bauer, Panzeri, & Buica, 2020). Wine can be smoke impacted when all known smoke marker compounds are present at a fraction of their estimated threshold levels.

5. Currently the best way to estimate smoke impact is through fermentation of the grapes without any oak contact and evaluating the resulting wines sensorially in addition to obtaining the complete free and bound volatile phenol profiles. During wildfires excessive amounts of volatile phenols are released into the air due to the thermal degradation of lignin in wood (Krstic, Johnson, & Herderich, 2015). These volatile phenols have been shown to absorb onto the grapes within minutes. Enzymes within the grapes attach various glycosides to these volatile phenols within hours. Thus, the absorbed volatile phenols are present in grapes, in both the free and bound form. During winemaking a fraction of the bound volatile phenols will release, increasing the free amount (Ristic et al., 2011). It has been shown that even grapes showing no measurable amount of free volatile phenols, can in fact be smoke impacted as most can be in the bound form.

6. Additionally, it has also been shown that only analyzing the two marker compounds, guaiacol and 4-methylguaiacol, is not a foolproof indicator of smoke exposure risk. In fact, even when the full extended panel of both bound and free volatile phenols are measured, it can still be difficult to determine smoke impact as these compounds are also naturally present in grapes with an unknown impact due to variety, region, and climate. Another complexing factor is that the free and bound volatile phenol contents of the wines continually evolve during winemaking and aging (Ristic, van der Hulst, Capone, & Wilkinson, 2017). This can result in smoke taint only appearing several months to a year after grape processing.

7. The smoke marker compounds (volatile phenols) present in smoke are similar to those found in toasted oak products. Therefore, any contact of wine with oak will impact the free volatile phenol content in an unpredictive manner. It is known that the amount of free volatile phenols released by barrels made from the same oak source and cooper using the same toast profiles can vary significantly. Oak vessels more than three years old are generally considered to

be neutral. The amounts of volatile phenols released from oak decrease with subsequent uses until the extracted amount is insignificant.

8. As wood is porous, microorganisms are capable of penetrating into the structure and research in my own laboratory and others have shown that yeast cells can be cultured up to 10 mm depth in oak staves (Cartwright, Glawe, & Edwards, 2018). Thus, molecular compounds (substantially smaller than microorganisms) within wine such as smoke marker compounds can penetrate deeply into oak due to its porous nature. Permeability will depend on the wood structure.

9. It is not known whether standard cleaning and sanitation protocols for oak tanks and barrels will effectively remove any potential adsorbed smoke marker compounds. There is anecdotal evidence indicating a potential impact of storing smoke impacted wine in oak barrels on subsequent wines. Several winemakers are convinced that this is possible due to having 'clean' wines becoming smoke impacted after using barrels that contained previous smoke tainted wines. Research have shown that it is possible for aroma compounds to adsorb onto wood (Ramirez-Ramirez et al., 2001).

10. There is currently no established methodology to evaluate potential impact of smoke impacted wines on oak vessels. One possible approach would be to evaluate the potential risk of reusing oak vessels by storing an alcoholic solution such as a neutral un-oaked white wine in the vessels for a month and evaluate the wines before and after by sensory evaluations and smoke marker compound analysis.

I declare under penalty of perjury under the laws of the State of California that the foregoing matters are true and correct to the best of my knowledge and that this declaration was executed on June 7, 2021, at Davis, California.

Dr. Anita Oberholster

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