

Plain Language Research Summary - AgriScience Grape & Wine Cluster 2023-24

Activity 8: Prediction, prevention, and mitigation of smoke-taint (and other air-borne aromas) in grapes and wines

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1. What is the overall focus of this research activity?

Smoke-taint originates when ripening wine grapes are exposed to forest fire smoke. Smoke-taint is notoriously difficult to predict ahead of harvest because the chemicals in smoke that are responsible for its pungent aroma (these are called “volatile phenols”; VPs) are transformed by grape enzymes into a plethora of non-volatile—and hence non-detectable by smell—analogs. These masked VP are released by the activity of yeasts during the fermentation process. The overall focus of this research activity is three-fold, encompassing the development of predictive methods, early detection strategies and, most importantly, the development of preventative or mitigation techniques.

To improve our predictive abilities, research will be conducted in improving existing analytical tests, assess the differences in grape varietal sensitivity as well as attempt to correlate simpler atmospheric measurements with the air-borne concentrations of VPs. Detection efforts will also focus on the development of analytical procedures that can be used in nearly real-time by vineyard (or winery staff). Finally, prevention and mitigation strategies will explore the applicability of approved agro-sprays for blocking the absorption of VPs into grape tissues as well as several techniques enabling their targeted elimination either before or after primary fermentation.

2. What are the main progress updates/milestones in terms of work that was done on this research activity this year?

Due to the lateness of the finalization of funding agreements, we have decided to combine years 01 and 02 activities. In year 01, all of our efforts have focused on recruiting and building relationships with collaborating vineyards/wineries. 1 PhD and 1 MSc student have been recruited; the PhD will begin research May 01, 2024. A part time post-doctoral fellow has also been hired for these activities.

3. What is this research activity's intended impact on the Canadian grape and wine industry? What benefits could/will the growers, wineries, consumers, etc. see as a result of this research?

The major intended impact for these research activities is to devise ways to permit the Canadian grape/wine industry to continue to make high quality wines even if their grapes have been exposed to smoke, i.e. mitigation is our major goal. This will enable Canadian wineries to avoid financial losses and resource waste in the event of forest fires. Secondary impacts include novel wine making strategies that can be applied to other classes of wine taints, improved crop-protections strategies and finally, a clearer understanding of how environmental variables influence wine and grape quality. The ability to produce quality wines from smoke exposed grapes will benefit consumers by keeping the prices of wines lower due to increasing the supply of usable grapes.

4. Do you have any communications materials, publications, or other content related to this research activity that you would like CGCN-RCCV to share? If so, please provide a brief description here and either link it here or send the file as an attachment along with this summary.

None-to-date (see above).