Canadian Grapevine Certification Network
CGCN • RCCV
Réseau Canadien de Certification de la Vigne

Plain Language Research Summary - AgriScience Grape & Wine Cluster - *2024-25*

Activity #11: Wine flavour modification through non-traditional yeasts, oenological treatments and taint remediation

Principal Investigator(s): Dr. Debra Inglis (Brock University)

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

The Ontario, and broader Canadian, wine industry is searching for ways to further improve wine quality through flavour modification to increase the competitiveness of domestic wines to capture a higher percentage of wine market share. Canadian wine has always competed on quality rather than price. Our research program will focus on processes that will provide new and improved wine attributes, making our industry more resilient to the challenges of climate change that negatively impact fruit quality, and more resilient to market pressure requiring our wines to be price competitive but with added quality.

Although it is widely accepted that making great wines begins in the vineyard with quality fruit, winemakers still require additional oenological tools to enhance the aroma profile of wines to offer resilience in winemaking to overcome threats from climate change. Those tools include non-traditional yeast strains that alter and improve the volatile aroma compounds in wine, oenological additives and fermentation temperature that allow yeast to create flavours that further enhance wine character. This program will use all of these tools to address industry priority issues facing winemakers.

This project has two main objectives in wine flavour modification, addressing key areas of concern in the Ontario grape and wine industry with application to industries in British Columbia, Quebec and Nova Scotia.

Objective 1: Assess the commercial application of locally isolated *S. uvarum* strains to mitigate the impact of botrytis and sour rot taints in white grape varieties through consumption of acetic acid and assess their use to form volatile fatty acids and acetate esters that increase the fruity volatile aroma compounds in Riesling and Chardonnay wine.

Objective 2: Increase volatile thiol concentrations in Vidal table wine through a yeast micronutrient additive, fermentation temperature and yeast strain to enhance the “Sauvignon blanc” characteristic of Vidal to diversify uses of the Vidal grape, improve marketability and increase the domestic wine market share.

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

Mitigation of the impact of Botrytis and sour-rot infected fruit on wine quality

S. uvarum CN1 did mitigate the impact of sour-rot on wine quality. *S. uvarum* CN1 strain implanted and dominated the Riesling fermentations containing clean fruit, sour rot/botrytis infected fruit with 0.2 g/L acetic acid and sour rot/botrytis infected fruit with 0.4 g/L acetic acid. All fermentations went to dryness consuming all the sugar. CN1 significantly decreased the acetic acid in the wines as compared to the control *S. cerevisiae* EC1118 at each rot level while also increasing the glycerol by 2 g/L and lowering the ethanol by 0.5% v/v. CN1 did produce wines with a different aromatic profile compared to EC1118. There were significant differences in the volatile organic compounds and free fatty acid levels in the wines fermented with CN1 and EC1118.
Chardonnay fermentations were trialed with 6 additional local *S. uvarum* strains along with CN1 and EC1118. All yeast implanted into the fermentations and all *S. uvarum* strains dominated their fermentations and fermented to dryness. All wines produced with *S. uvarum* strains had lower acetic acid, higher glycerol and lower ethanol in comparison to the commercial control.

Improving the aromatic profile of Vidal table wine

All 7 fermentation conditions varying temperature and the yeast nutrient additive Sauvignon Blanc Stimula™ were trialed for increasing the aromatic profile of Vidal Table wine. All 21 fermentations went to dryness. There are no significant differences in wine pH, Titratable acidity and ethanol in the wines. There are sensory differences between the wine treatments. Analysis of the volatile aroma compounds and volatile thiols are underway and are expected to show differences since sensorially, the wines produced from the treatments are different.

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?**

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allowing our wines to be price competitive but with added quality.

Threats from our changing climate are creating erratic weather patterns within a growing season that can result in wet damp conditions close to harvest. These conditions can result in *Botrytis*/sour rot infections in fruit at harvest, which in turn cause fermentation issues and negatively impact wine quality. At the end of 2028, it is expected that the outcome from the research activities will provide solutions or at least tools for the winemaker and find a home for grapes that may otherwise have been discarded for the grower. Using indigenous local *S. uvarum* yeast to consume acetic acid during wine fermentation and form new fruity volatile fatty acids and esters may minimize the flavour impact from rotted fruit and provide new competitive markets for aromatic white wines. These solutions may provide resilience to the sector in dealing with challenges from climate change (erratic weather events) and ensure continued economic growth of the $11.5 billion industry across Canada.

Enhancing the volatile aromatic profile in wines from the leading white sustainable varieties, Vidal IN Ontario and Seyval in Quebec by enhancing the production of volatile thiols can offer new growth opportunities for these wines at a competitive price-point that consumers are willing to pay. Our research has already shown consumers will buy a local dry Vidal wine that has a fruity profile in the $13-$16 category. Research results from the proposed program would have significant benefits in Ontario, where 20% of the grape crop is from Vidal and the Icewine market is shrinking, thus offering resilience to this sector of the industry by diversifying the wine style that Vidal can be used for. In Quebec, where both Seyval and Vidal are common white sustainable varieties, and in Nova Scotia where their growing conditions are ideal for aromatic sustainable white wines, improving the aromatic nature of these wines will further mitigate the impact of climate change on grape quality and improve the economic growth of the sectors in these provinces. Finding an application for indigenous Canadian yeast, none of which are currently available in the marketplace, would further help Canadian wine differentiate itself in the marketplace not only in terms of aroma/flavour profile, but also in terms of marketing local wine made with local yeast using local 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?**

Inglis, D.L. (2025) Locally isolated indigenous yeast: Can they improve wine quality?. CCOVI Lecture Series, Brock University, St. Catharines, ON, Canada. February 24, 2025. **February 24 CCOVI Lecture Series**

Inglis, D.L. (2025) The use of non-traditional yeast to mitigate the negative effects of botrytis and sour rot in wine production. Ontario Fruit and Vegetable Convention, Niagara Falls, ON, Canada. February 19-20, 2025. OENOLOGY-CIDER25 - Google Drive