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University of Queensland Researchers Test Yeasts to Restore Aromas Lost in Dealcoholized Wine

A Wine Australia-funded team is pairing chemical analysis with consumer tastings to see whether fermentation can make no- and low-alcohol wines seem more like conventional bottles

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University of Queensland researchers said Wednesday, November 18, that they are testing yeast strains that could help restore some of the aromas lost when wine is dealcoholized, a problem that has limited how closely no- and low-alcohol products resemble conventional wine.

The work is part of a Wine Australia-funded project led by Professor Heather Smyth at the Queensland Alliance for Agriculture and Food Innovation, known as QAAFI. The research combines chemical analysis with consumer sensory testing to identify which volatile compounds are reduced or missing after alcohol is removed from wine, and whether putting those aromas back improves how drinkers judge the product.

The focus is on one of the main technical hurdles for the growing no- and low-alcohol wine category. Producers have been able to remove alcohol, but doing so often changes the smell and taste of the wine in ways that consumers notice quickly. If researchers can find a way to recover those aromas through fermentation rather than heavy reformulation, it could improve consumer acceptance while helping producers avoid a meaningful increase in alcohol content.

Huanhuan Li, a QAAFI doctoral candidate working on the project, said lowering alcohol changes a wine's sensory profile in major ways. "Reducing alcohol content changes a wine's sensory characteristics considerably. It seems that important volatile aroma compounds are lost or altered during the dealcoholisation process," Li said.

To measure that effect, the research team recruited regular white wine drinkers and asked them to evaluate no- and low-alcohol wines after selected aroma compounds were added back. The researchers wanted to know whether those additions improved perceived vinosity, a term they use to describe how closely a no- and low-alcohol product resembles conventional wine, as well as fruitiness and overall acceptance.

Li said vinosity is a central concept in the project because it captures more than simple pleasantness. "Vinosity is an important concept in our research because it describes how closely the aroma of a NOLO product resembles that of conventional wine," she said.

According to the researchers, consumer testing helped connect the chemistry work to practical product development. The testing first identified what drinkers felt was missing, then showed which missing elements mattered most to them, and finally pointed the team toward ways those traits might be restored biologically.

The next stage of the project moves away from directly adding flavor compounds and toward generating them during fermentation. Li is studying selected non-Saccharomyces yeasts, a group of yeasts outside the standard Saccharomyces strains commonly used in winemaking, to see whether they can produce desirable aroma compounds while generating less ethanol.

“Rather than simply adding flavour compounds back into the wine, our approach is to screen yeast strains with desirable fermentation and aroma-producing properties and use them in a controlled natural secondary fermentation,” Li said.

That approach matters for wineries trying to market no- and low-alcohol products as closer to traditional winemaking methods. Using yeast to rebuild aroma through fermentation could offer a more natural flavor-restoration platform than relying only on post-processing additions. It also addresses a commercial pressure facing the beverage industry: no- and low-alcohol buyers often want the moderation benefits of these wines without giving up the sensory cues they associate with wine.

The project also involves the University of Queensland’s Australian Institute for Bioengineering and Nanotechnology, adding a broader technical base to work that sits between flavor chemistry, microbiology and consumer research.

Smyth said demand for products in the category is being driven by health and wellness trends and by consumers who want to reduce alcohol intake without abandoning familiar drinking occasions. “Driven by health and wellness trends and a desire to moderate alcohol consumption, there is increasing demand for products that deliver the flavour and aroma of traditional wine without the alcohol,” she said.

For producers, aroma retention has become one of the biggest obstacles to scaling up no- and low-alcohol wine. Removing alcohol can also strip or alter compounds that contribute to fruit, floral and wine-like notes, leaving products that may be technically

sound but less convincing to regular wine drinkers.

Industry investment suggests companies see room for growth if that sensory gap can be narrowed. In February, Treasury Wine Estates opened a $15 million low- and no-alcohol wine facility in the Barossa Valley. The company said the site uses customized dealcoholization equipment and patent-pending processes designed to preserve aroma and flavor, underscoring how central that issue has become in the category.

The University of Queensland research addresses the same problem from a different angle. Instead of focusing only on better removal technology, the team is examining whether wine can recover part of what is lost during dealcoholization through carefully chosen yeasts and controlled secondary fermentation. If the method works at commercial scale, it could give winemakers another tool to improve no- and low-alcohol products for consumers who still want a drink that smells and tastes recognizably like wine.