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University of Queensland researchers track aromas lost in dealcoholized white wine

The team pairs chemical analysis with consumer testing to close the sensory gap between NOLO bottles and conventional wine

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Researchers at the University of Queensland said on Thursday, November 12, that they are trying to identify the aroma compounds that disappear when wine is dealcoholized, in an effort to make no- and low-alcohol white wines smell and taste more like

conventional wine.

The work focuses on what scientists describe as a clear sensory gap between no- and low-alcohol, or NOLO, wines and standard wines. According to the research team, aroma is a major part of that difference and plays a central role in whether consumers judge a product to be appealing or recognizably wine-like.

Huanhuan Li, a Ph.D. candidate at the Queensland Alliance for Agriculture and Food Innovation, said lowering the alcohol level changes a wine's sensory profile in significant ways. The team's starting point is the idea that some volatile aroma compounds are either lost or altered during the dealcoholization process. To pinpoint those changes, researchers are combining chemical analysis with sensory testing.

The consumer testing relied on regular white wine drinkers, rather than casual drinkers, because the project needed people familiar with what a typical white wine should smell like. Participants were asked to evaluate whether adding compounds identified through chemical analysis made the NOLO wines seem more wine-like, and whether those changes also improved perceptions of fruitiness and overall acceptance.

The researchers use the term vinosity to describe that wine-like quality. In practice, the concept refers to how closely the aroma of a no- or low-alcohol product resembles that of a conventional wine. That is an important measure for this project because the challenge for producers is not only to remove alcohol, but also to preserve the sensory identity that drinkers expect from wine.

The team said the consumer panel serves as a link between laboratory work and production methods. First, chemical tests identify which aroma compounds are reduced or missing. Then consumers help determine whether restoring those compounds actually changes how the wine is perceived. After that, the research moves to fermentation strategies that might rebuild those aromas in a more natural way.

Rather than relying only on adding flavor compounds back into finished wine, Li is exploring whether selected non-Saccharomyces yeasts could help generate desirable aromas while producing less ethanol. The researchers are also studying whether a controlled secondary fermentation could be used as a natural platform for flavor

restoration in NOLO wines.

That approach matters beyond a single academic project because aroma retention is one of the main technical barriers for alcohol-reduced wine. If producers can better preserve or recover the smell and flavor cues that define wine, it could improve consumer acceptance and help a fast-growing segment of the beverage industry compete more effectively with traditional wines. The issue is especially relevant as wine makers, brewers and spirits producers all look for ways to serve consumers who want lower-alcohol options without giving up the sensory experience associated with standard products.

Professor Heather Smyth, who leads the research, said interest in no- and low-alcohol wines has risen quickly in recent years. She linked that demand to health and wellness trends and to a broader desire among consumers to moderate alcohol intake while still finding products that deliver the flavor and aroma associated with traditional wine.

The project is funded by Wine Australia and involves the Australian Institute for Bioengineering and Nanotechnology. It is being carried out through the Queensland Alliance for Agriculture and Food Innovation, a research institute at the University of Queensland that was established with and is supported by the Department of Primary Industries.