

MEDIA RELEASE

Scientists sniff out key wine aroma in breakthrough research

Lovers of Shiraz might soon be enjoying an even better tasting (and smelling) version of Australia's most popular red wine.

Scientists at The Australian Wine Research Institute (AWRI) have identified the single aroma compound that produces the spicy, 'black pepper' smell so popular with many Shiraz drinkers. This breakthrough might enable winemakers in the near future to manage this aroma compound to better suit the tastes of wine drinkers.

AWRI scientist, and team member, Mango Parker said that a spicy 'black pepper' aroma is an important characteristic of some high quality Australian Shiraz. "Shiraz is one of the most widely planted grape varieties in Australia", she says. "It currently represents 40% of the total red grape crush and constitutes one-fifth of all wine grape production in Australia. It is without doubt Australia's favourite red variety, both domestically and internationally."

"We set out to find the compound or compounds that are responsible for this distinctive aroma," AWRI group research manager, Markus Herderich says. "What we discovered was a previously unrecognised major aroma compound which is responsible for the peppery characters in Shiraz grapes and red wine. It's a very significant breakthrough – perhaps one of the most significant in a generation."

The discovery was part of a global collaborative research project overseen by Dr Markus Herderich and involved wine industry partners in Australia and international flavour company Symrise, based in Germany.

Another AWRI scientist closely involved in the discovery, Tracey Siebert, says work on identifying the 'pepper aroma' compound began in 1999 and the current AWRI team spent nearly five years trying to unlock the mystery.

"It was always a very ambitious project and we were very pleased that we found one single compound that was responsible for the pepper aroma," Tracey says. "We were concerned that after all our years of hard work, we would discover that this aroma was caused by a mix of compounds all working together in various ways. If that was the case, it would have been much more difficult for winemakers and grape growers to modulate the spicy character of red wine."

Wine comprises a very complicated array of aromas – there is no single 'wine aroma' – and scientists say the popular drink has hundreds of aroma compounds. However, the so-called pepper aroma is among the 10 most powerful compounds in wine.

“Just one drop of this compound would be enough to make an entire Olympic-sized swimming pool smell peppery,” Mango says. “Because it is so potent, that also means it is present in extremely low concentrations in wine which makes it rather difficult to detect, even using state-of-the-art equipment.”

“The concentration of our compound in ‘peppery’ grapes is less than 1 part per billion. To give you an idea of just how small a concentration that is, imagine trying to find one person out of the world’s population of six billion people - if you don’t know what they look like, how old they are or even whether they’re male or female. That’s the size of the needle we were looking for in this particular haystack,” Mango explains. “And in wine, the concentration is even less.”

However, the degree of difficulty was seen as a challenge and not as a deterrent by the AWRI scientists.

“We were interested in the pepper aroma because it is so elusive,” she says. “If you can measure something, you can understand its behaviour and how to control it. From the perspective of wine, it is considered by many a very desirable aroma and even very Australian when you consider the Shiraz that we produce in this country,” Mango says.

For the AWRI team, discovery of the ‘pepper aroma’ compound involved identifying grapes that seemed to have a high concentration in the first place, then using chemical analysis and even the sensory skills of wine experts to track down the source (or sources) of the aroma.

“Despite the complexity of the science behind what we did, at the end of the day a lot of people did a lot of sniffing throughout the research,” Mango says. “Our noses were our most sensitive and reliable detectors.”

Reflecting on her team’s years of persistence and the occasional lucky break that contributed to the discovery, Mango says for her, the work in tracking down the elusive pepper aroma compound was an enjoyable exercise in scientific endeavour.

“It was a huge breakthrough for our team and, yes, I very much enjoy drinking wine. And fortunately, I really like the pepper aroma compound in Shiraz.”

Another important aspect of the discovery was that the pepper aroma compound can be found in Shiraz grapes **and** Shiraz wine – that is, it is not altered by the winemaking process. This key finding could enable grape growers and winemakers to select, in advance, particular versions (clones) of Shiraz grapes or particular parcels of land that either minimise or maximize the pepper aroma characteristic.

While climate, soil and the vagaries of each particular vintage will always have a major impact on wine aroma, the AWRI breakthrough opens the door for winemakers to alter the level of ‘pepper aroma’ in Shiraz in addition to age-old winemaking techniques of adding yeast and oak barrel fermentation.

Dr Herderich said the breakthrough will be the launch pad for further research.

“Our next step is to conduct viticultural and winemaking trials to work out just how much we can manage the pepper aroma compound,” he says. “If it’s something that consumers find delicious, winemakers could maximize it. This breakthrough really spurs us to conduct further research. It could even help other scientists working in the area of aroma compounds in food and beverages.”

The AWRI, which has about 100 staff based in Adelaide, prides itself on its ability to pursue the quest for scientific knowledge and still deliver findings with practical industry application.

“Our work at the AWRI is unique, as we conduct cutting-edge research to give the industry a deeper understanding of things they might know intuitively and, at the same time, provide the tools to help them tailor-make their wine better, according to consumer preferences,” Dr Herderich says.

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