

# In search of perfection

Researchers at The Australian Wine Research Institute are taking advantage of the flexible Freedom EVO® platform to help investigate a wide range of factors affecting the quality of wine.



Members of the AWRI team (left to right): Angus Forgan, Tina Tran and Simon Schmidt

The Australian Wine Research Institute (AWRI) is an industry-owned research and development center based in Adelaide, and has been helping to improve the consistency and quality of Australia's wine production for over 55 years. The multidisciplinary team at the AWRI studies all aspects of viticulture, from the properties of the yeast strains and grape varieties used to the aroma, flavor and packaging of the finished product, as well as studies of consumer preferences. With such a broad field of investigation, the AWRI team employs a wide range of chemical, microbiological and molecular biology techniques to help winemakers improve and refine their wines and production processes.

Angus Forgan, Research Laboratory Manager at the AWRI, explained the Institute's work: "We look at all stages of wine production, identifying and characterizing compounds which affect aroma and flavor, where these compounds arise and how to enhance or eliminate them during

the production process. Identifying the individual compounds responsible for a given characteristic, as well as whether it is a function of the grape, the yeast strain, the fermentation technique or the packaging, helps us to guide grape growers and winemakers, giving them better tools to produce the flavors they want in the future."

The AWRI has recently moved from its original building to a new, purpose-built facility, allowing the research and development team to implement high throughput screening for the first time. "An important aspect of our work is wine yeast strain development, looking for specific yeast strains that will lead to predictable, favorable characteristics in a wine," Angus continued. "Over the years we have established an extensive wine yeast culture collection, gathered from throughout the wine industry, as well as developing many strains in house, and wanted the ability to screen this collection for various

characteristics. Automation is vital to this, allowing a large number of small-scale fermentations to be carried out in parallel, and so we looked at various robotic solutions when designing the new laboratory."

The AWRI chose a Freedom EVO 150 workstation to meet its automation needs, equipped with liquid handling (LiHa) and MultiChannel (MCA) pipetting arms, a robotic manipulator (RoMa) arm with an extended Z-axis to access below the worktable, an integrated Infinite® M200 multimode microplate reader and various ancillaries including an incubator, a wash station and a vacuum manifold assembly. Comprehensive support is provided by the highly trained team at Tecan Australia, assisting users in developing applications and maintaining the system.

"Because we are a research group, flexibility is vital, and the Freedom EVO workstation allows us to perform a wide variety of different tasks, as well as continuously developing and implementing new processes. The platform's high throughput capabilities have changed the way we design our experiments, significantly expanding the scope of any given study. For yeast screening trials, the increased throughput allows us to test many different strains in parallel. By miniaturizing each fermentation – from over 100 ml down to just 100 or 200 µl – we can process hundreds of samples in a day, rather than the very limited number that could be achieved manually."

"It is a very versatile platform, and has certainly changed our approach to large scale studies. We also use the Freedom EVO for a number of other applications, such as enzymatic assays to determine the amount

Hunter Valley, Australia

of sugar left in a ferment, and encourage all our staff to think about how they can use the platform to advance their research. Although the instrument's Freedom EVOware® software is very easy to use, we have a core team of users responsible for programming the system and setting up new processes, and everyone else in the laboratory is trained to operate their specific programs. This strategy has worked very well for us, and the biggest problem we now face is scheduling time for all the different projects to use the system. Its ability to run completely unattended – overnight and at weekends – is a big help in this respect, and has really improved our productivity.”

“As an industry-driven organization, we are also keen on promoting collaborative research projects to help accelerate research in the field. There are a number of other research organizations located on the same science precinct with an interest in viticulture, including the University of Adelaide, the Commonwealth Scientific and Industrial Research Organisation and the South Australian Research and Development Institute, and we encourage researchers from these institutes to work with our staff to take advantage of the high throughput capabilities of the Freedom EVO system.”

To find out more about Tecan's Freedom EVO workstation, visit [www.tecan.com/freedomevo](http://www.tecan.com/freedomevo)

To find out more on The Australian Wine Research Institute, visit [www.awri.com.au](http://www.awri.com.au)

