SIMEI 2015 – Wine, olive oil and decanters

In November **Simon Nordestgaard**, a senior engineer at The Australian Wine Research Institute, travelled to Italy to attend SIMEI. In this article he reports on some of the devices that were recognised as innovation challenge winners.

THE LATEST EDITION of the biennial SIMEI oenological and bottling equipment trade show was held in November 2015. This expansive event occupied four halls of the Milan exhibition centre. It was supported by an innovation challenge and workshops relating to viticulture, oenology, olive oil and beer production.

The innovation challenge winners were summarised in the November edition of *Australian & N.Z. Grapegrower & Winemaker*. This article will focus on a few of the winning/acknowledged devices - an ullage management tool, a new style of grape press and a decanter centrifuge used as a press substitute. It also covers some of the historical linkages between olive oil and wine production and the divergence in technologies used for expression. Decanter centrifuges rather than presses are the dominant technology used in olive oil production.

PARSEC TOPTUBE – AN ULLAGE PREVENTION DEVICE

Preventing ullaged storage is a major reason for moving wine between tanks and therefore a major cost and cause of inflexibility in wineries. Floating-lid variable capacity tanks are one solution but the lids can be cumbersome, particularly with larger tanks. At SIMEI, Parsec launched the TopTube ullage prevention system (Figure 1) which features a compensation chamber. When the sensor detects that the tank is not full, inert gas is injected into the compensation chamber to push the tank liquid level up.

This is not the first time this concept has been suggested but it may be an under-used strategy. The Ganimede fermenter (Figure 2), invented in the late 1990s, can be used in the same way. It features a compensation chamber around an inverted cone section mid-way down the tank. The principal purpose of the chamber is to capture and use CO2 to agitate red wine ferments - but it can also be filled with inert gas to prevent ullages during wine storage. The AWRI has also been considering work on the use of compensation chambers to manage ullages for some time – specifically forms that might be cheaply retrofitted to existing large winery tanks.

Figure 1. Parsec TopTube for ullage prevention

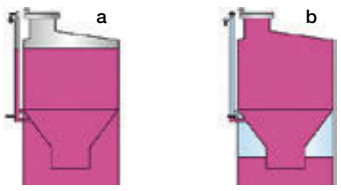

Figure 2. Ganimede fermenter used for storage (a) ullaged, and (b) after inert gas injection into the compensation chamber (the tank is now "full")

DIEMME QC620 – A NEW CONTINUOUS RED WINE PRESSING LINE

There have been few developments in pressing technology in recent decades. It was therefore interesting to see Diemme's new continuous red grape pressing line (Figure 3) featured at SIMEI. This includes a vibrating drainer followed by a high-pressure peristaltic pump that feeds a hydraulic press. The increasingly dry cake advances towards the exit. There is no crumbling and no screw and the operation and washing of the pressing line is highly automated. Diemme claims that the line can produce wine with solids levels, conductivity, and colour intensity in between that of a membrane press and a basket press at a capacity of 15 to 45 tonnes/hour (capacity is on an initial whole bunch grape basis – 70% of this might be racked from the fermenter). The pressing line is being marketed for processing fermented grapes. The yield with fresh grapes would not be sufficient given the lack of crumbling and short residence time. The first unit was sold to a South African winery.

Figure 3. Diemme QC620 red pressing line (a) actual, and (b) schematic

ALFA LAVAL FOODEC CENTRIFUGE – DECANTER + ADDITIVES AS A PRESS ALTERNATIVE

Decanter centrifuges (Figure 4) have been trialled as press alternatives in several studies over the last 20 years. Decanters from GEA Westfalia, Pieralisi, Hiller and Alfa-Lava have all reportedly been used in trials and decanters have been adopted to a limited extent in wine production. When asked about the total number of decanters in use worldwide for this purpose, two major suppliers gave estimates of 50 and 200 respectively. Estimates are complicated by the fact that decanters can also be used for lees clarification, and most likely the number in use substantially as press substitutes is closer to 50 than 200. Most of these are apparently used as part of thermovinification/flash détente lines for red wine production in Spain and South America. South Africa has seen some uptake in decanters for the processing of fresh white grapes – including at Waboomsrivier, Robertson and Namaqua wineries.

Alfa Laval's entry in the SIMEI innovation challenge was on the use of decanter centrifuges to juice fresh grapes, but in conjunction with clarification additives such that the resultant juice can go straight to ferment. As summarised in previous articles on the history of presses in the August and September 2015 issues of Australian N.Z. Grapegrower & Winemaker, the size distribution of suspended solids in juice from decanter centrifuges is skewed towards smaller solids than occurs with presses. This means that juice turbidity can sometimes be higher even if the overall level of suspended solids is lower than with a press. Alfa Laval is promoting the use of enzyme treatment in a holding tank after destemming and crushing and dosing in-line with gelatin or other agents to enhance flocculation of these small solids and separation in the decanter. If it is possible to consistently achieve sufficient clarity such that an additional clarification step is not needed prior to fermentation, that would obviously be a major selling point over a press.

When using a press for white wine production, two juice fractions are commonly collected. The first fraction is free-run and soft-pressings juice and the second fraction is hard-pressings juice containing more skin-derived phenolics. Winemakers may blend these fractions with other products or blend them back together later on after differential treatment (e.g. fining). This option is not available with a decanter centrifuge – there is only one fraction. Depending on the wine grade and product range this is not necessarily a bad thing. However, if decanter centrifuges are to ever gain broader acceptance, more data will be needed on how their juice compares with the different volume fractions from membrane presses. (Prior published studies on decanters have tended to only provide comparisons with the totality of juice/wine from a membrane press.) Decanter manufacturers claim that all the juice is the quality of the free-run/soft-pressing juice from a membrane press. This needs to be verified independently.

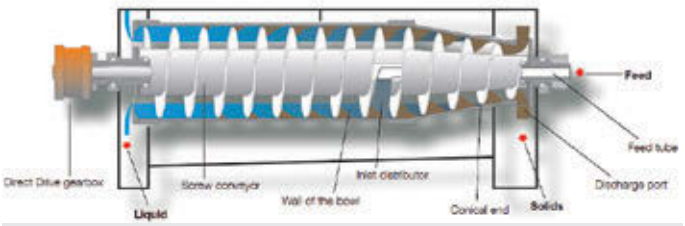

Figure 4. Decanter centrifuge operation

OLIVE OIL – PRESSES AND DECANTERS

Wine and olive oil have some historical similarities – they were both major agricultural products of the Roman world and presses were a feature of both wine and olive oil production (e.g. lever presses like that in Figure 5). While presses are still the dominant expression technology for wine production, decanter centrifuges now dominate olive oil production. The transition from presses to decanters began in the late 1960s and there were further major technical advances in the use of decanters for olive oil production in the late 1980s.

So why did olive oil production shift so largely to the use of decanter centrifuges, while it is still only a fringe expression technology in wine production?

The mesocarp (flesh) cells in olives are much stronger than in grapes and olives require more intense grinding if these cells are to release their contents. Historically millstones and now hammer mills have been employed instead of the relatively gentle roller crushers used for wine production. The resulting olive paste does not have sufficient structure for the slippery and viscous oil and water mixture to be easily pressed from it. To provide structure when pressing, the paste is first spread on fibre mats (Figure 6), which are then stacked and pressed (Figure 7). If these mats are kept clean, olive oil quality can be good, but in commercial practice the mats were rarely kept clean and quickly became a source of fermentation and oxidation defects. Processing with this arrangement was also slow and labour intensive. This inefficiency could not be addressed by scaling to large horizontal presses as are now used in wine production because very high pressures and an alternative to the fibre mats would have been required. Decanter centrifuges allowed for the contaminating fibre mats to be eliminated, labour requirements reduced and throughput increased. It is not surprising that olive oil producers shifted to using decanters. Even small olive oil producers now use decanters. While many olive oils are marketed in Australia as 'cold-pressed' they are almost all produced using decanter centrifuges.

Figure 5. Lever press with screw and counter-weight

CONCLUSIONS

SIMEI is worth a visit if you have the opportunity. This year's exhibition had a huge range of winery and packaging equipment on show. (For those with more interest in vineyard equipment,

Figure 6. Spreading olive paste on a press mat

Vinitech-Sifel in Bordeaux or SITEVI in Montpellier might be more appropriate.) In a break from tradition, the next edition of SIMEI will be held in Munich in September 2017 in conjunction with the drinktec trade show. SIMEI will then return to Milan in 2019.

ACKNOWLEDGEMENT

The author thanks Richard Gawel for an interesting discussion on olive oil production. The author also thanks equipment suppliers for equipment photos/schematics, the Olive Oil museum in Cisano, Italy (www.museum.it) for the photo of the lever press, and Anthony De Piante for the photos of the olive paste spreading on mats and hydraulic pressing.

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Figure 7. Pressing a stack of olive paste covered mats in a hydraulic press

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