Australian Government

Wine Australia

Wine Australia for Australian Wine

Aussie Wine Group and MOG Removal Trials – Vintage 2022

Background

Wine Australia has been supporting Aussie Wine Group (AWG) with a number of field trials and wine analyses from Vintage 2022. The purpose of these trials is to develop a comprehensive understanding of the Return on Investment of this technology to the Australian wine value chain.

This work follows a number of trials undertaken in V21 which focused on measuring the volume of Matter Other than Grape (MOG) that was being eliminated from the production chain as a result of selective harvesting with the AWG berry sorters. The outcomes of these trials highlighted the advantage of removing MOG from fruit harvesting "in-field" using one of either of AWG's retro-fitted boom arm sorters or bin-mounted units, with the following range of outcomes:

- The lowest reduction saw a 3.5 times reduction in MOG being delivered to the winery
- The highest reduction saw 68 times the amount of MOG being removed to lower the % MOG present to around 0.02%
- All of the five trials saw MOG grading reduced to zero as assessed at the winery
- Significantly higher berry integrity for fruit harvested with an AWG berry sorter with less maceration of berries as they were picked, and reducing the development of unfavourable phenolics caused by the contact of juice with macerated berries

Since the V21 trials, Wine Australia and AWG has identified the three major supply chain advantages of selectively harvesting fruit in-field:

1. Cost savings be reducing MOG transported to wineries, and the subsequent costs of removing MOG off the winery site
2. Winery efficiency by allowing smoother processing of fruit through the crushing systems of wineries, reducing breakdowns and creating more reliable, faster and steady workflows
3. Stylistic advantages for wine making. The reduction of MOG doesn't necessarily create greater "wine quality" outcomes, we've seen a shift in wine-making requirements to produce a range of different styles of wines to compliment existing wine portfolios. The reduction of MOG allows wine makers more flexibility to design wines of specific flavour and colour profiles.

2022 Trials

Wine Compound Analysis

Consistent feedback from numerous wine producers with a requirement to reduce MOG centred around the reduction of methoxypyrazines, and more importantly cineole (specifically C6 cineole) for the reduction of green characteristics within red wines. The primary purpose in lowering these compounds is related to the opportunity for stylistic flexibility in the wine making process.

As such a number of juice and wine analyses were performed on samples from several producers with the intent to understand the reduction of methoxypyrazines and cineole as a result of removing MOG from fruit harvesting. A key learning from this process was that these compounds cannot be clearly identified and measured with juice samples, and that the fermentation process is required to express these compounds. Thus, analyses were only considered for wines and not juice samples.

Two samples were captured for the trial, with alternate rows of grapes of Coonawarra Cabernet Sauvignon being harvested within the same vineyard. One sample was picked using a selective harvester, whilst the other sample also included an AWG in-field sorter to further reduce MOG. These two grape samples were considered highly representative of the vineyard block. Both samples were then processed in the same crusher and sent to two separate fermenters, eventuating in two separate wines.

Results:

Compound	MOG Present	MOG Excluded
Isobutylmethoxypyrazine GM95	5.5 ng/L	5.6 ng/L
Isopropylmethoxypyrazine GM95	1.4 ng/L	1.5 ng/L
sec-butylmethoxypyrazine GM95	0.7 ng/L	0.8 ng/L
1,8-Cineole	2.44 ng/L	1.62 ng/L

It is important to note that these analyses were performed with a limit of quantification of less than 2.

Conclusions

- 34% reduction in Cineole compound in finished wine product by removing MOG from the ferment
- Change in methoxypyrazine negligible
- Future analyses will be conducted on wine only, with an opportunity to ferment small batches to analyse wine chemistry where large-scale ferments are unachievable

Harvesting Optimisation

One of the most critical considerations for operators of mechanical harvesters is the reduction of berry and juice loss throughout the harvesting process. Since their first use in the 1960s mechanical harvesters have allowed for the rapid and reliable harvesting of wine grapes, vastly reducing the costs of harvesting and allowing producers to pick fruit at optimal ripening stages.

Additional functionality has been developed in the past two decades to onboard selective harvesting techniques to these mechanical harvesters, allowing onboard sorting of fruit via a number of different mechanisms. One common piece of equipment to this process is the use of fans to blow leaves, stems and rachis off the berry sorting belts whilst letting the heavier berries fall through the sorting belts. However, these fans also blow away juice from macerated, broken and crushed berries that would normally be captured in the harvesting process, ultimately reducing yield. Managing this issue has been to slow down the fans to reduce juice loss, which means slowing down the harvester, and also allowing more MOG to enter the onboard receival hopper. "Tuning" the harvester for optimal operation requires experienced operators, and varies according to the type of harvester, the variety of grape, the size of the canopy.

De Bortoli Trials

Wine Australia undertook a series of harvesting trials in Yarra Valley, Victoria, with De Bortoli Wines, with the intention of understanding the net difference between using a conventional harvester compared with and without the AWG infield sorter attached. This unit is mounted to the boom arm of the Gregoire G-65 harvester and run alongside the same model harvester without selective capabilities. The trial was conducted on both Pinot Noir and Chardonnay, but due to low yields this vintage the Pinot Noir trial was not usable. The trials were conducted across blocks with high uniformity (soils, irrigation, terrain, clones, etc.)

Results

Harvest Data						MOG Removed at Winery			
Variety	Harvester	Metres picked	Kg harvested	Kg/m	T/ ha	MOG removed (kg)	% MOG delivered	Fruit delivered (T/ha)	Difference (% yield / ha)
Chardonnay	AWG Sorter	6,145	13,480	2.19	7.83	62	0.46%	7.80	10.05
Chardonnay	Conventional	4,025	8,090	2.01	7.18	104	1.29%	7,09	

Conclusions

- The % of MOG removed was not significant (~0.8% reduction using the AWG sorter) but the yield weight gained was ~10%.
- This weight gain was primarily due to managing juice and berry loss by reducing fan speed on the harvester. Harvesting speeds (km/h) were the same.
- This outcome highlights the potential for selective harvesting using these methods to add yield to the final harvest outcome, off-setting the loss of MOG weight that growers have experienced when selectively harvesting

Kingston Estate Trials

Aussie Wine Group trialled one of their boom-mounted cleaning systems to a Gregoire G140 harvester for V22 with the aim of understanding the quantum of MOG reduced at winery intake by cleaning their pick in-field. Measurements were taken at the winery for the gross weight of the loads delivered with the MOG removed at the winery, representing the reduction of MOG delivered by sorting in-field. Two vineyards were selected for the trial, one planted to Semillon and another with Merlot.

Results

Semillon							
Sample	Harvested Fruit (T)	Tare on	Tare off	MOG weight (kg)	%MOG	kg MOG/T	Reduction (kg/T)
AWG Sorted	117.06	15.38	14.38	1,000	0.85	8.54	2.9
Standard	98.20	16.34	15.28	1,060	1.08	11.44	

Merlot							
Sample	Harvested Fruit (T)	Tare on	Tare off	MOG weight (kg)	%MOG	kg MOG/T	Reduction (kg/T)
AWG Sorted	82.94	15.00	14.50	500	0.6	3.01	39.95
Standard	78.80	17.28	15.44	1,840	2.34	42.96	

Conclusions

- MOG reduction was negligible with the Semillon block with only a 0.3% reduction of MOG delivered to the winery
- MOG reduction was around 4% of the harvested fruit for Merlot which presents a significant reduction in the MOG processed at the winery
- Operators within the winery recorded an approximate 40% increase in throughput speed at the winery with the cleaned fruit intake, this is anecdotal however