The Australian Wine Research Institute

Standard Method for Sampling Grapes in the Vineyard for Assessing Berry Composition at Harvest

Version Control

Version	Changes made in this version
1.0	First version of this method
1.1	Revised to reflect feedback from reference group
1.2	Revised to reflect feedback from reference group: 16th September 2021
1.3	Revised to reflect feedback from reference group: 25th January 2023

1. Introduction/Foreword

The purpose of this method is to define a standardised approach for sampling grapes in the vineyard for assessing berry composition at harvest. This method is specifically to address situations where grapes are to undergo quality indicator analysis, including Brix (or Baumé), pH, titratable acidity (TA - g/L tartaric acid equivalents) and/or colour [anthocyanin mg/g (Iland et al. 2000)] measurements as required for the determination of payment.

This protocol specifically focuses on vineyard sampling at harvest for payment determination. This protocol does not include requirements for sampling of grapes in the vineyard for maturity assessment however can be adopted and used in principle to meet those requirements.

The industry recommended best practice with regard to vineyard sampling is outlined in the publication: Krstic et.al. 2003 Growing Quality Grapes to Winery Specifications (CRCV project 1.1.2 Compendium of Winegrape Specifications and Measurement).

The basic principles of achieving a good representative sample include:

- Sampling from multiple locations within a defined vineyard (block, patch, section, harvest unit or row).
- Incorporating pooled (consolidated) grape samples to ensure that analysis is representative of a defined vineyard block, patch, section, harvest unit or row.
- Incorporating enough grapes to ensure that at least minimum sample size requirements are met for specific grape analysis.

It should be noted that this procedure represents the current industry best practice for the sampling of grapes in the vineyard. It is expected that this method will be open to modification and improvement as experience within industry, and specific operational needs dictates, as technology improves or the understanding of the science behind representative sampling and grape chemistry assessment improves.

2. Scope

This method applies to sampling of grapes in wine grape vineyards. Additional considerations need to be monitored when sampling at the winery weighbridge or sampling of harvested grape bins to collect representative grape samples for compositional analysis and these are the subject of a separate procedure.

3. Terminology

A vineyard 'block' (patch, section, harvest unit or row) might represent a single variety, a particular soil type, or topographic feature that separates the area from the remaining part(s) of the blocks that create the entire vineyard planting.

A harvest unit is defined as a patch of grapes which may be harvested in the same day, which again may differ from the total vineyard area.

4. Health and Safety Considerations

Prior to vineyard access, ensure conditions of entry are complied to if and when accessing the property owned by a third party. Ensure work, health and safety protocols are complied with and knowledge of chemical residues and biosecurity considerations have been factored into the entry requirements for all vineyards upon entry.

Appropriate personal protective equipment should be worn at all times when sampling grapes in the vineyard, especially eye and sun protection. Good workplace health and safety practices should be employed to protect the wellbeing and safety of personnel involved in grape sampling and sample management.

5. Materials/Apparatus

- Hand tools (e.g. snips) for removing whole bunches from vine;
- Collection container able to hold a minimum of 20 bunches;
- Insulated container for post-sampling storage and transport able to hold a minimum of 20 bunches
- Ice cooling blocks; and,
- Marker pens for labelling collected samples.

6. Environmental Conditions

Ensure conditions of entry to the vineyard are complied to with regards to WHS, chemical residue understanding and biosecurity requirements. A vineyard access checklist could be used for external entry requirements.

Sampling should ideally be carried out during the morning period, to limit the impact of high temperatures on the physical sampling of grapes and the relevant compositional quality attributes. This is especially the case for Brix (Baume) as elevated temperatures can yield artificially high sugar concentrations in the grapes. In addition, depending on the time between collection and measurement there can be particular post-harvest changes in compositional parameters such as pH, TA and colour. Sampling should be delayed if there has been recent rain, heavy fog, or dew, as this can influence the compositional quality attribute being measured.

7. Measurement Procedure

This protocol recommends that the process of sampling grapes in the vineyard for assessing berry composition at harvest be conducted through whole bunch/cluster sampling. There are a number of general factors that should be considered when developing a grape sampling plan:

- Determine the size and shape of a block by driving or walking along the headland prior to entry.

- Any sub-blocks that need to be harvested separately, due to different rootstocks, vine age, growth, stress levels or other influencing factors should be identified prior to entering the vineyard.
- Samples should not be taken from vines at the end of a row or the rows at the edge of the vineyard, as these tend not to be representative of other vines within the block, section, patch or harvest unit.
- Differences in soil types across a block or row can create regions with differing vine growth/vigour, which in turn can influence grape composition.
- Pest and disease may also vary throughout the vineyard resulting in variable growth and maturity levels.
- Clogged or leaking irrigation drip lines may cause differences in vine growth and vigour, and thus berry composition.
- Areas containing lots of weeds may exhibit variable and often reduced vine growth and vigour.
- Small changes in vineyard topography can create dramatic differences in vine growth and subsequent ripening.
- Aerial images of vineyards can be useful when designing a spatially representative grape sampling program.
- Global positioning system (GPS) technology is a recommended approach to mapping vineyards to achieve high precision information specific to samples collection and spacing. Different integrated GPS technology and vineyard management platforms could increase sampling efficiencies and consistencies.

Representative bunch samples should be collected by sampling whole clusters to create a pooled sample for a randomly defined block, patch, section or harvest unit.

If colour measurement is not required or a factor influencing fruit payment at harvest, then a minimum of 20 whole bunch samples per harvest unit or patch are required for key indicator chemical analysis (Brix and pH).

If colour (anthocyanin mg/g) and titratable acidity (TA - g/L tartaric acid equivalents) measurement is a required quality indicator for harvested fruit, a minimum of 40 whole bunch samples per harvest unit or patch are required due to the inherently increased vineyard variability associated with these key compositional parameters.

For each representative grape sample collected, the following procedure is recommended.

- Bunch samples should be collected as close to harvest as possible. Sampling within 2 days (48 hours) before harvest is preferable, however within 3 days (72 hours) is acceptable. Sampling should be delayed if there has been recent rain, heavy fog, or dew, or heavy irrigation prior within the proceeding 24 hours.
- Prior to entering the vineyard, establish a system for randomly selecting a row and vine within a harvest unit/block/patch and develop a system for recording this position as to easily identify the location when in the vineyard.
- Repeat the above procedure until the required number of sampling points have been allocated (i.e. 20 or 40). The objective is to sample one bunch per vine, each bunch to be randomly selected from within each vine.
- Ensure the defined procedure encompasses some level of proportional or evenly spaced sampling reflective of the harvest unit or block as to not concentrate sampling points.
- In the vineyard at the pre-defined randomly selected sampling points, ensure bunch selection is alternated between both sides of the canopy (e.g., east facing and west facing).
- Ensure vine selection alternates between the right and left side of the row.

- When selecting a bunch, reach into the selected vine and randomly select a bunch. Ensure bunches are taken from both sides of the canopy and samples taken randomly along the cordon. Ensure both exposed and shaded (non-exposed) fruit is sampled.
- Samples should be kept at a constant cool temperature (i.e., in an esky) and clearly labelled with the date, variety, vineyard identification (including block/patch/row if necessary) on the container.
- Samples should be stored at less than 15°C and preferably between 5-10°C prior to and during transport and up until the commencement of processing for analysis.
- Samples collected in the morning period should ideally be processed for compositional analysis later that same day within the laboratory. If samples cannot be processed on the same day as collection, samples should be stored at 1 - 4 °C until the following day for processing.
- Samples should not be processed after more than 2 days since the period of sampling.
- At the point of quality measurement, to eliminate bias from the sample, when selecting fruit for measurement, most or all berries are to be removed from each of the bunches and then mixed before randomly selecting a subset for processing.

8. References

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