

Grape Sampling for Maturity Analysis

Monitoring grape ripening

From veraison to harvest, the chemical and physical composition of grapes changes dramatically in ways that include the following:

- Increasing sugar and pH.
- Decreasing organic acids and titratable acidity.
- Increasing aroma and flavor compounds.
- Changes in color and mouthfeel.
- Ripening and browning seeds.
- Softening berries.

Grape sampling is a way of monitoring the progress in the vineyard. The question of whether it is time to pick can't be answered by sampling once, but by looking at multiple factors as they change over time. Typical measurements include Total Soluble Solids (TSS) measured as °Brix, pH, and titratable acidity, and should be supplemented by sensory analysis.

Regardless of the exact sampling protocol used, the following guidelines are suggested:

- Sample and taste often in the days and weeks leading up to harvest.
- Be consistent in the time of day that samples are collected.
- If possible, collect samples at the same time of day that you will harvest.
- Be aware that weather such as heat spikes or rain events will affect the results.
- Make a sampling plan ahead of time and stick to it.
- Avoid sampling bias by rejecting abnormal vines, choosing a representative selection of positions (berry position on cluster, cluster position on vine), and so on.
- Crush and juice samples thoroughly. Smaller berries and those on the interior of clusters are often left intact and will bias your sample.
- The person collecting the sample must be trained in correct sampling technique. Consistency is key.



Representative sampling

When deciding how to sample, the most important considerations are variation and bias.

There is a high amount of natural variation in the vineyard between blocks, rows, vines, clusters, and even individual berries within a cluster. The goal of representative sampling is to capture that variation in a way that accurately represents what will be harvested. Sources of variation within a vineyard can include:

- Elevation
- Slope
- Soil type
- Sun exposure
- Disease
- Cluster position on vine
- Berry position on cluster
- Fertilization timing

A vineyard or block with a higher degree of variation requires a larger sample number to adequately capture that variation. Alternatively, if the source of variation is known and can be delineated geographically, such as topography or soil type, the block may be divided into subsections to be sampled separately. Ideally, the sample site should reflect the portion of the vineyard that will be harvested together.

The goal of accurately capturing the variation within a sample site also requires avoiding disproportionate influence from non-representative variation, or bias. Sources of bias include:

- Sampling from only the sun-side or only the shade-side.
- Sampling only clusters near the outside of the canopy.
- Sampling the largest, most obvious, or easiest-to-grab clusters or berries.
- Sampling from diseased or other non-representative vines.
- Sampling from end vines and perimeter rows.
- Sample processing that doesn't thoroughly crush the berries and homogenize the juice.

For example, if 20 clusters are collected from a block, and one cluster was taken from a diseased vine, its contribution will account for 5% of the results. Unless 5% of the block is diseased, the results will be biased by its inclusion.



Sampling methods

There are two basic grape sampling methods: cluster sampling and berry sampling. In either case, be sure to:

- Select sampling area and sample size based on variability within the vineyard.
- Select well-distributed vines throughout each sampling area.
- Follow a consistent protocol.
- Sample at a consistent time of day.



Cluster sampling of berries using a five gallon bucket.

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Cluster sampling method

- Label sample containers.
- Depending on variation, sample approximately 30 clusters per sampling region. A five-gallon bucket works well.
- Plan distribution in advance and stick to the plan.
- Skip end vines, perimeter rows, and atypical vines.
- Alternate left and right sides of the aisle.
- Facing the vine, rotate sampling from the left, center, and right positions on the vine.
- Alternate canopy depths (near vs. far).
- Alternate between high and low position on vine.
- Use “blind” cluster choice.
- Optional: Take cluster weights before crushing.
- Crush and juice grapes thoroughly before straining, tasting, and analyzing.
- Record data and note trends.



Berry sample in labeled ziplock bag.

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Berry sampling method

- Label sample containers.
- Depending on variation, sample 100–200 berries per sampling region. A zippered plastic bag works well.
- Plan distribution in advance and stick to the plan.
- Samples can be taken from well-distributed positions throughout the sampling area, or from a specified row for tracking trends from day-to-day and year-to-year. If sampling a single row, be aware that it may not be representative of the block as a whole.
- Skip end vines, perimeter rows, and atypical vines.
- Alternate sides of the aisle.



Multiple zippered plastic bags containing two variations of berries.

- Facing the vine, rotate sampling from the left, center, and right positions on the vine.
- Alternate canopy depths (near vs. far).
- Alternate between high and low position on vine.
- Select berries from all sides (sun vs. shade) and positions (high vs. low) on cluster.
- Avoid choosing only the largest and most easily accessible berries.
- Use “blind” cluster and berry choice.
- If not performing lab analysis immediately, keep berries cold and avoid crushing them.
- Optional: Weigh collected berries and calculate average berry weight.
- Crush and juice grapes thoroughly before straining, tasting, and analyzing.
- Record data and note trends.

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