Volatile Acidity

Volatile acids can be formed by yeast activity during fermentation and by spoilage bacteria during fermentation or ageing. Testing for volatile acidity (VA) is important to maintain quality and monitor the possible presence of spoilage organisms. Performing a test for volatile acidity early in the winemaking process is best for establishing a baseline for tracking the increase of VA. The incidence of volatile acidity can be reduced by diligent monitoring of both volatile acidity and the presence of bacteria. Once wine has a high VA there are a few options available to winemakers to reduce the concentration and improve sensory effects.

Components

The term VA is used to encompass all volatile acids in wine with acetic acid being the main component. During fermentation, acetic acid can be formed from bacteria or as a by product of yeast. The temperature of the fermentation and the juice chemistry play a large part in acetic acid product from yeast. Post fermentation, acetic acid may be formed from Acetobactor contamination in an aerobic environment or from lactic acid bacteria metabolizing sugars. Other volatile acids found in wine include butyric, formic, and propionic. Each of the mentioned acids are considered volatile because they are able to be steam distilled.

When to Test for VA

Frequent monitoring for changes in VA is vital to detect the onset of spoilage. Vinquiry recommends testing for VA after each time wine is moved or at the very least, quarterly. Wine with high pH or large amounts of bacteria should be analyzed more often. The legal limits for volatile acidity are 0.140g/100mL for red wines and 0.120g/100mL for white wines. Late harvest wines (from grapes over 28° Brix) have legal limits of 0.150g/100mL for white wines and 0.170g/100mL for red wines.

Analysis

The following methods are available to test for volatile acidity. Vinquiry will use the Cash Still or Segmented Flow methods unless otherwise requested.

- The **Cash Still** method is the traditional method for testing for VA. The volatile acids are steam distilled from the wine sample. The steam travels through a condenser and the resulting liquid is collected and titrated against sodium hydroxide. Since SO_2 interferes with the measurement of volatile acids, a correction, or back titration, is done using iodine.
- The **Segmented Flow Analyzer** is latest VA analysis method. It is as accurate as the cash still method, but exceptionally quick. The Segmented Flow Analyzer is a sophisticated instrument good for a high volume of samples. The instrument is calibrated daily with VA standards and wines with known VA values are checked throughout the day. An autosampler retrieves each sample and air is used to separate the sample into small bubbles. The sample passes through a miniature cash still and a color reagent is added to the condensed liquid. The color change is then measured by a spectrophotometer to give the quantity of VA.
- The **Enzymatic** method is a fast way to test for acetic acid, the main component of VA. A Konelab Enzymatic Analyzer tests for organic acids and sugars with efficient and quick throughput. Through automated steps, a wine sample, reagents, and enzymes are added according to procedure. After incubation, the resulting solution is read by a spectrophotometer to give an acetic acid value.
- The **HPLC** is another instrument used to test for acetic acid. The wine sample is injected into the instrument after undergoing a filtration and extraction process. A specialized column inside the HPLC separates the juice sample into components that are read by a detector. A chromatogram is produced that allows an analyst to quantify the acetic acid in the sample.

Sampling

Vinquiry requires 50mL of wine to test for VA. Minimal headspace is essential. Results are reported in g/100mL.

For further information on volatile acidity testing, please call 707-838-6312.

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