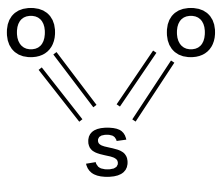
SO_2 Analysis

It is important to monitor Sulfur Dioxide (SO_2) levels in wine throughout the winemaking process. SO_2 is added to must, juice or wine to aid in the prevention of oxidation and microbial spoilage. Due to binding reactions, it is necessary to determine the actual concentration of free and bound SO_2 present in juice or wine after additions. The molecular component is active against microorganisms, however if you have too much free and bound SO_2 it will inhibit malolactic bacteria during ML fermentation. High concentrations of SO_2 can cause adverse sensory effects and the bleaching of certain red wine pigments.

Compounds

Both free and bound SO2 are present in wine. The molecular portion of free SO_2 is the form that is antimicrobial. Bound SO_2 occurs when free SO_2 binds to compounds present in juice or wine, such as aldehydes, pyruvic acid, and sugars. Total SO_2 is the sum of free & bound SO_2.



When to Test for SO_2

- After SO_2 additions, it is necessary to determine the actual concentration of free and bound SO_2 present in juice or wine. It is difficult to predict how much of the added SO_2 will be free and how much will be bound.
- After malolactic fermentation is complete, microbial activity is no longer desired. Now is the time to ensure that there is enough SO_2 present to eradicate any remaining microorganisms.
- SO_2 acts as an antioxidant during the bottling process, so testing for SO_2 before bottling is essential.

Analysis

Vinquiry offers three methods for Free and Total SO_2 analysis:

- The **Ripper** method is the most basic method for testing for SO_2. The set-up is inexpensive and the procedure is quick, however there is a high margin of error. It involves the redox reaction in which sulfur dioxide reacts with iodine in the presence of a starch indicator. Sulfuric acid is added to a wine sample, along with starch indicator. Any SO_2 present reacts and binds with the titrated iodine. Unreacted iodine in the presence of starch forms a blue color indicating the end point of the titration. Total SO_2 can be determined in this way by first breaking the bonds of the bound sulfur with a strong alkaline solution such as sodium hydroxide.
- **Aeration-Oxidation (AO)** is an accurate way of testing for SO_2. It takes longer than the ripper method, but is still relatively simple. Free SO_2 is removed from the juice or wine by passing a stream of air through the acidified sample. The released SO_2 passes through a neutral hydrogen peroxide (H_2O_2) solution, where the reaction between H_2O_2 and SO_2 takes place. Sulfuric acid is formed and titrated with standardized sodium hydroxide. For total SO_2, strong acidic conditions and heat disassociate the bound SO_2, releasing it as free SO_2.
- The **Segmented Flow** Analyzer is the latest SO_2 analysis method. It is as accurate as the AO method, but exceptionally quick. It is a sophisticated instrument good for a high volume of samples. The instrument uses bubbles to separate a wine sample into segments then passes those segments through a dialysis membrane. The SO_2 is extracted across the membrane and measured by a spectrophotometer. Using one small sample, the instrument can test for both free and total SO_2 as well as volatile acidity at the same time.

Sampling

Vinquiry requires 200mL of juice or wine for accurate results of free and total SO_2. Minimal headspace is essential. After SO_2 additions, allow 1 day for the free and bound forms to equilibrate before sampling. Total SO_2 can be determined immediately after additions. Thorough mixing of tanks is best for a homogenous sample.

For further information on SO_2 testing, please call 707-838-6312.

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