

Determination of Reducing Sugars in Wine

Description:

AN #: 19_006_11_001

Market: Wine

Subcategory: Determining Reducing Sugars **Product:** HI902 & HI3131B

Sugar is an essential component in the production of wine. During alcoholic fermentation, yeast consume sugars found in the grape juice, or must, and converts it to ethyl alcohol and carbon dioxide. In the case of certain styles of wine such as semi-sweet or dessert wines, some sugar is allowed to remain post-fermentation. This residual sugar can serve to provide a sweeter character to the final blend or play a role in microbial stability.



The primary fermentable sugars found in grapes are glucose and fructose. These two simple sugars are also known as reducing sugars because they contain functional groups capable of being oxidized under certain conditions. A winemaker interested in confirming the residual sugar content of a product post-fermentation, or a finished wine product, can use a redox titration to facilitate the oxidation and analysis of these sugars. For this titration, an alkali solution of copper complex, known as Fehling's reagent, is combined with a sample of wine. Expediting the reaction with heat, the reducing sugars present reduce the copper from Cu(II) to Cu(I). Potassium iodide is added to reduce any excess Cu(II), resulting in iodine as a product. The iodine, present in an amount equal to the residual Cu(II), is then titrated with sodium thiosulfate to determine the original amount of residual sugar present in the wine sample. The results are reported as g/L of reducing sugar. This type of analysis should not be confused with a oBrix measurement which accounts for the total soluble solids (TSS), including but not limited to sugars, in a sample. Typical residual sugar values range from <2.0 g/L for dry wines upward to 15.0 % (150.0 g/L) for some dessert wines.

Application:

A mid-sized winery was looking for a way to understand the residual sugar content of their new Riesling and Gewürztraminer varietal wines. They were aware that a digital refractometer would not be appropriate for this type of measurement, as it would be subject to interferences from alcohol and carbon dioxide. The winemaker was seeking a very accurate measurement as semi-sweet and dessert wine offerings were the next step in the evolution of their product line. The **HI902** automatic titration system with two burettes and **HI3131B** ORP electrode was recommended. The winemaker planned to use the additional burette purchase for other titrations such as titratable acidity and sulfur dioxide that he

planned to automate. He also valued the unit's versatility serving as a bench-top pH meter. Since some sweeter wines require a dilution for this method of analysis, they appreciated that separate titrator methods could be created containing specific dilution options settings for each product. This allowed for consistency with written procedures and reporting of final results. Overall, they felt the titrator was a simple, flexible, and affordable addition to their laboratory

