O·I·Analytical

Methodology

Total Acidity in Wine by Segmented Flow Analysis (SFA)

(Cartridge Part #A003132)

1.0 Scope and Application

1.1 This method is used for the determination of total acidity in red and white wine, as well as grape juices.

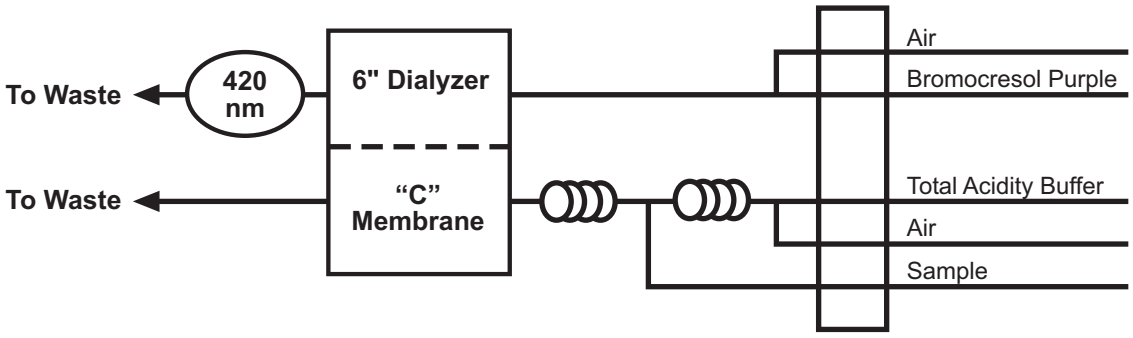
1.2 The applicable range of the method is 0.35–15 g/L or 0.035–1.5 g/100 mL as tartaric acid. The range may be extended to analyze higher concentrations by sample dilution. The Method Detection Limit (MDL) of this method was not determined because total acidity concentrations below 0.01 g/L are not of interest in the analysis of wine.

2.0 Summary of Method

2.1 The wine sample is mixed with the total acidity buffer. The sample acidity neutralizes a proportionate amount of hydroxide ions (OH^-) in the buffer. The decreased concentration of OH^- ions dialyzes across a membrane, causing a color change of the bromocresol purple indicator. The absorbance is measured at 420 nm.

2.2 The quality of the analysis is assured through reproducible calibration and testing of the Segmented Flow Analysis (SFA) system.

2.3 A general flow diagram of the SFA system is shown below (see Section 17.0 for a detailed flow diagram).



3.0 Definitions

Definitions for terms used in this method are provided in Section 16.0, "Glossary of Definitions and Purposes."

4.0 Interferences

4.1 Proteins and colored compounds that could interfere are removed by dialysis.

5.0 Safety

5.1 The toxicity or carcinogenicity of each compound or reagent used in this method has not been fully established. Each chemical should be treated as a potential health hazard. Exposure to these chemicals should be reduced to the lowest possible level.

5.2 For reference purposes, a file of Material Safety Data Sheets (MSDS) for each chemical used in this method should be available to all personnel involved in this chemical analysis. The preparation of a formal safety plan is also advisable.

5.3 The following chemicals used in this method may be highly toxic or hazardous and should be handled with extreme caution at all times. Consult the appropriate MSDS before handling.

5.3.1 Bromocresol Purple, $C_{21}H_{16}Br_2O_5S$ (FW 540.24)

5.3.2 Ethanol, anhydrous, C_2H_5OH (FW 46.07)

5.3.3 Potassium Phosphate Monobasic, KH_2PO_4 (FW 136.09)

5.3.4 Sodium Hydroxide, NaOH (FW 40.00)

5.3.5 Sodium Metabisulfite, $Na_2S_2O_5$ (FW 190.10)

5.3.6 Sodium Phosphate Dibasic Dodecahydrate, $Na_2HPO_4 \bullet 12H_2O$ (FW 358.14)

5.3.7 Tartaric Acid, $C_4H_6O_6$ (FW 150.09)

5.3.8 Triton® X-100, $4\text{-}(C_8H_{17})C_6H_4(OCH_2CH_2)_nOH$, n~10

5.4 Unknown samples may be potentially hazardous and should be handled with extreme caution at all times.

5.5 Proper personal protective equipment (PPE) should be used when handling or working in the presence of chemicals.

5.6 This method does not address all safety issues associated with its use. The laboratory is responsible for maintaining a safe work environment and a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method.

6.0 Apparatus, Equipment, and Supplies

6.1 Segmented Flow Analysis (SFA) System (OI Analytical Flow Solution® IV) consisting of the following:

6.1.1 Model 502 Multichannel Peristaltic Pump

6.1.2 Random Access (RA) Autosampler

6.1.3 Expanded Range (ER) Photometric Detector with 5-mm path length flowcell and 420-nm optical filter

6.1.4 Data Acquisition System (PC or Notebook PC) with WinFLOW™ software

6.1.5 Total Acidity in Wine Cartridge (Part #A003132)

6.2 Sampling equipment—Sample bottle, amber glass, with polytetrafluoroethylene (PTFE)-lined cap. Clean by washing with detergent and water, rinsing with two aliquots of reagent water, and drying by baking at 110°–150°C for a minimum of one hour.

6.3 Standard laboratory equipment including volumetric flasks, pipettes, syringes, etc. should all be cleaned, rinsed, and dried per bottle cleaning procedure in Section 6.2.

7.0 Reagents and Calibrants

7.1 Raw Materials

7.1.1 Brij®-35, 30% w/v (Part #A21-0110-33)

7.1.2 Bromocresol Purple, $C_{21}H_{16}Br_2O_5S$ (FW 540.24)

7.1.3 Deionized Water (ASTM Type I or II)

7.1.4 Ethanol, anhydrous, C_2H_5OH (FW 46.07)

7.1.5 Potassium Phosphate Monobasic, KH_2PO_4 (FW 136.09)

7.1.6 Sodium Hydroxide, NaOH (FW 40.00)

7.1.7 Sodium Metabisulfite, $Na_2S_2O_5$ (FW 190.10)

7.1.8 Sodium Phosphate Dibasic Dodecahydrate, $Na_2HPO_4 \bullet 12H_2O$ (FW 358.14)

7.1.9 Tartaric Acid, $C_4H_6O_6$ (FW 150.09)

7.1.10 Triton X-100, $4\text{-}(C_8H_{17})C_6H_4(OCH_2CH_2)_nOH$, n~10