UNITECH SCIENTIFIC CALIFORNIA, USA

UNIFLEX™ REAGENT

Tartaric Acid

Amm-Vanadate *Colorimetric Method* for wine

12-2015 Revision

***Automated Testing** improvements*

Product # **TA-F40 (20 Tests)**
TA-F120 (60 Tests)

INTENDED USE

This Tartaric Acid reagent (Ammonium Vanadate method) is intended for the determination of tartaric acid in wine or fruit juice.

KIT CONTENTS	20T	60T
Reagent #1	40	120
Reagent # 2	10	30
Tartaric Acid Std, 5G/L	2	5

STORAGE & REAGENT PREPARATION

All reagents are liquid and ready to use; components are stable until the labeled expiration date when stored in original container at room temperature (15-30°C.)

SAMPLE PREPARATION

Clarification

Centrifuge or filter turbid juice or fermentation samples. Samples with Tartaric results >6 G/L should be diluted and reassayed; multiply result by dilution factor.

Decolorization

Decolorize dark red wines (e.g. 0.1 G PVPP Powder/10mL, stir 5', then filter).

SYSTEM PARAMETERS: Wavelengths: Measure 492nm/ Differential 750nm*; Range 0-2.0A at 1cm pathlength.
*Subtracting differential Absorbance minimizes the need to decolorize red wine.

PROCEDURE

Prepare Standard Curve: Dilute the 5 G/L Tartaric Acid Standard, provided, as shown below:

5 G/L Std. (undiluted, as provided)
3 G/L Std. (180 uL 5G/L Std. + 120 uL D.I. Water)
1 G/L Std. (60 uL 5G/L Std. + 240 uL D.I. Water)

Protocol: Label one cuvette for Reagent Blank, each Standard and Sample.

1. Pipet 100 uL standard, samples, and water into cuvettes, as shown on the following table, using micropipettes.
2. Zero the spectrophotometer using D.I. water
3. Add Reagent 1 to each reaction cuvette (per table.) Mix and wait 1 min. Read Initial ABS (492nm).
4. Dispense Reagent 2 into each reaction cuvette. Mix, wait 5 minutes. mix each cuvette and read final ABS.

Pipet into ...	Blank Cuvette	Standard Cuvette	Sample Cuvettes
DI Water	100 µL		
Standard		100 µL	
Sample			100 µL
Reagent 1	2 mL		
Mix and wait 1 minute Read initial absorbance (A_i) of each cuvette.			
Reagent 2	500 µL		
Mix and wait 5 minutes Read ABS_{FINAL} of each Cuvette			

CALCULATIONS

1. Our online "Flex Calculator™-TA" spreadsheet at *http://unitechscientific.com/calculators.htm* is available for download. G/L values will be calculated automatically.
2. Manual Calculation: Calculate Delta-A values for Rgt Blank, each Standard & Sample:
   $\textbf{\textit{Delta}}A = ABS_{FINAL} - (ABS_{INITIAL} * 0.808)$
   (The 0.808 factor corrects for Rgt 2 Volume change.)
   a. Calculate **Net-A** for each Standard & Sample:
   $\textbf{Net-A}_{SAMPLE} = \textbf{\textit{Delta}}A_{SAMPLE} - \textbf{\textit{Delta}}A_{REAGENT\ BLANK}$
   $\textbf{Net-A}_{STD} = \textbf{\textit{Delta}}A_{STD} - \textbf{\textit{Delta}}A_{REAGENT\ BLANK}$
   b. Determine Tartaric Acid (G/L) through Interpolation or spreadsheet calculation from standard curve.

L-Malic Acid causes a negative interferrence which is quantitatively corrected using Malic (G/L) values as follows:

$\textbf{Tartaric Acid}_{CORRECTED}$ = Tartaric Acid + (Malic Acid * 0.15)

APPENDIX

METHODOLOGY & CHEMICAL PRINCIPLES

This colorimetric Tartaric Acid reagent is the Ammonium Vanadate method. In the presence of Tartaric acid, an colored metapervanadyl tartrate complex is formed which is read photometrically. The reagent is specific for Tartaric Acid when Malic Correction is applied.

AUTOMATED TESTING

'ChemWell for Wine'

To automate Tartaric Acid analysis, use the R1 & R2 Reagents. **Prepare Standards** as for manual procedure. Run the Tartaric Index to automatically correct for Malic Acid.
Contact Unitech Scientific for the updated Tartaric Procedures.

:SIGNIFICANCE OF MEASUREMENT

Tartaric Acid is the most abundant organic acid in grape juice and wine, with typical concentrations up to 3G/L in Wine, and up to 6 G/L in Juice. Tartaric Acid measurement is useful for assessing total wine acidity as well as estimating Tartrate Stability of a wine.

Total acidity is the content of the total organic acids concentration in wine (e.g. Tartaric, Malic, Citric, Succinic, Lactic, Acetic -- e.g. total G/L of Acids.) Tartaric and Malic acids are the predominant organic acids in wine, their sum is a fair is estimate of Total Acidity.

On the other hand, Titratable Acidity, titration of wine acids with a strong base, is a standard way to assess a wine's buffering capacity. Buffering depends on K^+, Na^+, H^+ (i.e. pH) and their varying affinities to weak acids present. The combination of these weak organic acids and alkaline metals, predominantly Tartaric Acid / Potassium Bitartrate and L-Malic Acid and salts, is responsible for pH buffer capacity - this is determined by measuring Titratable Acid.

TRADEMARKS:

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