TARTARIC ACID
(LIQUID READY™)

PRODUCT INSTRUCTIONS

SKU: 700007893
K-TARTLQ

04/26

(50 Manual Assays per Kit) or
(500 Auto-Analyzer Assays per Kit)

Megazyme® by NEOGEN®

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INTRODUCTION:

Tartaric acid is one of the primary organic acids naturally present in grapes and plays a central role in shaping the taste, stability, and overall quality of wine. Alongside L-malic acid, it is among the most abundant acids found in grape must and finished wines, contributing significantly to the wine's sensory profile and chemical balance. In winemaking, tartaric acid is widely regarded as the main driver of total (titratable) acidity, and its concentration is therefore used as a key indicator of a wine's acid profile. Typical tartaric acid levels in wine fall between 1.5 g/L and 4.0 g/L , and maintaining the appropriate balance is essential for flavour, mouthfeel, and microbial stability. When total acidity is insufficient, winemakers commonly adjust it by adding tartaric acid to raise total acidity and lower pH. This adjustment not only enhances freshness and structure but also strengthens the wine's resistance to spoilage organisms.

PRINCIPLE:

The Tartaric Acid assay is based on the chemical oxidation of tartaric acid under strongly alkaline conditions in the presence of ammonium metavanadate, forming a yellow–orange vanadyl–tartrate chromophore that is measured spectrophotometrically. The increase in absorbance at 510 nm is directly proportional to the tartaric acid concentration.

Tartaric acid + Ammonium metavanadate (V^{5+}) → Vanadyl complex + oxidised tartrate products

SPECIFICITY, SENSITIVITY AND LINEARITY:

- The assay is specific for Tartaric Acid ($C_4H_6O_6$).
- The limit of detection (LOD) is 0.051 g/L, and the limit of quantification (LOQ) is 0.154 g/L (using a sample volume of 0.1 mL).
- The recommended measuring range is between 0.2 g/L and 6 g/L (using a sample volume of 0.1 mL). This corresponds to 20 - 600 µg of Tartaric Acid per assay.

INTERFERENCE:

Fructose interferes at concentrations above 100 g/L, D/L-Lactic Acid and L-Malic Acid interfere at concentrations above 1 g/L, Citric Acid interferes at concentrations above 1.5 g/L and Ascorbic Acid interferes above 0.1 g/L. is recommended that samples with stated contents of these interfering agents are diluted prior to testing.

SAFETY:

The general safety measures that apply to all chemical substances should be adhered to. After use, the reagents may be disposed of with laboratory waste, in accordance with local regulations and guidelines.

NOTE: For more information regarding the performance of this product please refer to the associated validation report available from the Megazyme website. For more information regarding the safe usage and handling of this product please refer to the associated SDS that is available from the Megazyme website.

KIT CONTENTS:

Kits are designed for use in both manual and automated workflows. The reagents are sufficient for performing 50 assays in manual format or 500 assays in auto-analyzer format. The kit contains:

Reagent 1 (2 x 50 mL): Buffer
Ready to use.
Store at 4°C. See individual labels for expiry date.

Reagent 2 (2 x 12.5 mL): Ammonium Metavanadate
Ready to use.
Store at 4°C. See individual labels for expiry date.

Calibrator (5 mL): Tartaric Acid (6 g/L)
Ready to use.
Store at 4°C. See individual labels for expiry date.

PREPARATION OF REAGENT SOLUTIONS:

Bring all reagents to room temperature (20 - 25 °C) before use.

MANUAL ASSAY PROCEDURE:

Wavelength: 510 nm
Cuvette: 1 cm light path (glass or plastic)
Temperature: 20 - 25°C
Final volume: 2.60 mL
Sample solution: 0.2 g/L to 6 g/L (i.e. 20 - 600 µg of Tartaric Acid per cuvette)
Read against air (without a cuvette in the light path) or against water

Pipette into Cuvettes	Blank	Calibrator	Sample
Reagent 1	2.0 mL	2.0 mL	2.0 mL
Calibrator	-	0.1 mL	-
Sample	-	-	0.1 mL
Distilled Water	0.1 mL	-	-
Mix*, incubate for ~ 3 minutes at 20 - 25°C, then read the absorbances (A_1) Add Reagent 2 as described below:			
Reagent 2	0.5 mL	0.5 mL	0.5 mL
Mix*, incubate for ~ 3 minutes at 20 -25°C, then read the absorbances (A_2). **			

* Seal each cuvette with Parafilm® and mix individually by gentle inversion. This mixing step is critical to ensure good repeatability.

** It may be necessary to check if the reaction has reached completion by continuing to read the absorbances at 1 minute intervals. If the reaction has not reached completion continue to measure absorbances until the values measured either remain the same, or increase constantly over 1 minute. If this "creep" rate is greater for the sample than for the blank, extrapolate the absorbances (sample and blank) back to the time of addition of Reagent 2.

NOTE: For each batch of samples that is applied to the determination of tartaric acid, a single point standard must be performed with the provided calibrator concurrently using the same batch of reagents. The reagent blank value must be determined once for each run and subtracted from each sample result.

CALCULATION:

NOTE: These calculations can be simplified by using the *Mega-Calc*™ tool, downloadable from the product page.

1. Calculation of the dilution factor (df)

Determine the dilution factor (df) based on the component ratios:

$$df = \frac{\text{Sample volume [mL] + R1 volume [mL]}}{\text{Total reaction volume [mL]}}$$

It follows for the Tartaric Acid manual assay procedure:

$$df = \frac{0.1 + 2.0}{2.6} = 0.808$$

2. Calculation of the absorbance difference $\Delta A_{\text{Tartaric Acid}}$

$$\Delta A_{Tartaric.Acid} = (A_2 - df \times A_1)_{sample/calibrator} - (A_2 - df \times A_1)_{blank}$$

It follows for the Tartaric Acid manual assay procedure:

$$\Delta A_{Tartaric.Acid} = (A_2 - 0.808 \times A_1)_{sample/calibrator} - (A_2 - 0.808 \times A_1)_{blank}$$

NOTE: Increasing or decreasing the sample volume with unchanged reagent volumes requires recalculation of the dilution factor; if volumes are changed, the system and performance may be affected.

3. Calculation of the Tartaric Acid content

The concentration of Tartaric Acid can be calculated as follows:

$$c = \frac{\Delta A_{\mathbf{Sample}}}{\Delta A_{Calibrator}} \times C_{Calibrator} \quad [g/L]$$

Since the concentration of the calibrator is 6 g/L, this gives the following calculation formula:

$$c = \frac{\Delta A_{Sample}}{\Delta A_{Calibrator}} \times 6 \quad [g/L]$$

If the sample has been diluted during preparation, the result must be multiplied by the sample dilution factor, F.

4. Calculation of the Tartaric Acid content in solid or semi-solid samples:

When analyzing solid and semi-solid samples which are weighed out for sample preparation, the content (g/100 g) is calculated from the amount weighed as follows:

$$\frac{C_{Tartaric.Acid}\ [g/L\ sample\ solution]}{weight_{sample}\ [g/L\ \ sample\ solution]} \times 100 \quad [g/100g]$$

AUTO-ANALYZER ASSAY PROCEDURE:

This kit has been designed for auto-analyzers and can be adapted to most instruments. A sample method is shown below (validated on the Awareness ChemWell®-T analyzer).

NOTE: For each batch of samples that is applied to the determination of Tartaric Acid a calibration curve must be created concurrently using the same batch of reagents.

Parameter	**Details**
Wavelength	510/630 nm (primary)
Temperature	20 - 37°C
Test	End-point test with following test sequence: – Add Reagent 1 **[0.2 mL]** – Add Sample or Calibrator **[0.01 mL]** – Pre-incubate 1 - 3 minutes [20 - 37°C] – Measure A_1 at 510/630 nm – Add Reagent 2 **[0.05 mL]** – Incubate 3 minutes at [20 - 37°C] – Measure A_2 at 510/630 nm – Calculate $A_2 - A_1$ against calibration curve
Calibration	Calibrate using 2 – 4 calibrators ranging from 0 – 6 g/L. The calibration curve is linear. An example of how to use the standard supplied with the kit to create a calibration curve is shown below: Calibrator 1 0 g/L (use distilled water) Calibrator 2 0.6 g/L (dilute Standard 10-fold) Calibrator 3 3 g/L (dilute Standard 2-fold) Calibrator 4 6 g/L (use Standard as-is) *Perform all dilutions with distilled water.*

SAMPLE PREPARATION:

1. Sample dilution

The amount of Tartaric Acid present in the sample should range from 0.2 g/L to 6 g/L. If the value of $\Delta A_{Tartaric.Acid}$ is too low (e.g. <0.1), weigh more sample or decrease the dilution. If the value $\Delta A_{Tartaric\ Acid}$ is too high (e.g. >3.0), increase the dilution in distilled water.

Sample Dilution Table

Estimated Concentration of Tartaric Acid (g/L)	Dilution with Water	Sample Dilution factor (F)
< 6	No dilution required	1
6 – 60	1 mL sample + 9 mL water	10
60 -600	1 mL sample + 99 mL water	100

2. General sample preparation guide

IMPORTANT NOTE: Carrez precipitation must not be used for tartaric acid testing, and deproteinization with acids is not recommended. These procedures can cause loss or alteration of tartaric acid during sample preparation, leading to inaccurate results. For reliable measurement, follow the specified protocol without additional precipitation or acid treatment steps. The below are suggested sample preparation examples only. If you have questions about these or other matrices, please contact your local sales representative for support.

- Clear, slightly colored, and approximately neutral, liquid samples at a concentration up to 6 g/L can be used directly in the assay.
- Turbid samples should be filtered or centrifuged.
- Samples containing carbon dioxide should be degassed by gentle agitation or stirring with a glass rod.
- Solid samples should be homogenized, extracted in water, and filtered or centrifuged if necessary.
- Strongly colored samples should be treated by the addition of 0.2 g of polyvinylpolypyrrolidone (PVPP) per 10 mL of sample in a tube. Shake the tube vigorously for 5 minutes and then filter through filter paper.

3. Suggested sample preparation examples

(a) Determination of Tartaric acid in wine. Pass through a 0.2 micron syringe filter to clarify. Alternatively, centrifuge an aliquot of wine for 5 minutes at 15,000 g. *Typically, no dilution is required.*

(b) Determination of Tartaric acid in soft drinks (e.g. Sprite): Remove carbon dioxide by stirring with a glass rod and dilute if necessary. *Typically, no dilution is required.*

(c) Determination of Tartaric acid in fruit juice (e.g. grape juice): Pass through a 0.2 micron syringe filter to clarify. Alternatively, centrifuge an aliquot of wine for 5 minutes at 15,000 g. *Typically, no dilution is required.*

SERVICES AND TECHNICAL SUPPORT

Please reach out to your local sales representative should you require any assistance, particularly in relation to:

Troubleshooting
Data analysis
Additional matrix testing
Application support in relation to automated analyzers

Supporting documents can be found on the product page:

Quick Reference Guide
Mega-Calc™
Safety Data Sheets (SDS)
Certificates Of Analysis (COA)
Validation Report

Contact us for more information: neogen.com/contact

Without guarantee

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User Responsibility:

- Users are responsible for familiarizing themselves with product instructions and information. Visit our website at neogen.com, or contact your local Neogen® representative or authorized distributor for more information.
- When selecting a test method, it is important to recognize that external factors such as sampling methods, testing protocols, sample preparation, handling, laboratory technique and the sample itself may influence results.
- It is the user's responsibility in selecting any test method or product to evaluate a sufficient number of samples with the appropriate matrices and challenges to satisfy the user that the chosen test method meets the user's criteria.
- It is also the user's responsibility to determine that any test methods and results meet its customers' and suppliers' requirements.
- As with any test method, results obtained do not constitute a guarantee of the quality of the matrices or processes tested.

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