

Sheet No.

GT-310-FO-012E Food &amp; Beverage

# Acidity Analysis of Wine

— 1/3

Related standard: The Official Analysis Method of the National Tax Agency, 9-10 total acid (free acid) of fruit liquor

## Outline

Wine, contains various acids, including tartaric acid, malic acid, and lactic acid. These acids influence the color and taste of wine. The Official Analysis Method of the National Tax Agency describes the method for analyzing the total acid of fruit liquor. In this method, 10 mL of a sample is titrated with 0.1 mol/L sodium hydroxide solution to a specified pH, and the volume consumed is used to calculate the acidity.

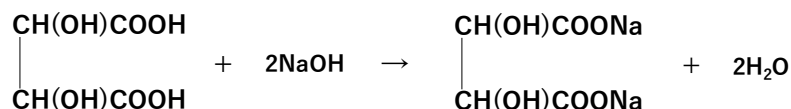
For this application sheet, the acidity of red wine and white wine was measured using automatic titration. The measurement results were obtained, with a relative standard deviation (RSD) of less than 1 %.

## Principle

The acid in the sample is neutralized with sodium hydroxide.

Titration is performed while recording pH with a glass electrode. The titration end point is set at pH 8.2. The volume of sodium hydroxide solution titrated up to the end point is used to calculate the acidity and tartaric acid equivalent acidity.

[Reaction equation for tartaric acid]



## Apparatus

Automatic titrator: GT-310  
Electrodes: GLASS ELECTRODE, L=105 (GTPH1B),  
REFERENCE ELECTRODE, L=105 (D-J) (GTRE10B) (Outer solution: 1 mol/L potassium nitrate solution, Inner solution: 1 mol/L potassium chloride solution)

## Reagents

[Titrant] ■ Sodium hydroxide solution 0.1 mol/L (for volumetric analysis)

## Analytical Procedure

- 10 mL sample was taken using a volumetric pipette and transferred to a 100 mL beaker.
- 60 mL\* of water free of carbonic acid was added and mixed, and then the solution was titrated with a solution of 0.1 mol/L sodium hydroxide.

\* The standard states that between 0 mL and 100 mL may be added as needed.

Sheet No.

GT-310-FO-012E

Acidity Analysis of Wine

2/3

[Calculation]

$$\text{Acidity} = A1 \times f$$

$$\text{Tartaric acid (g/100 mL)} = \text{Acidity} \times X1$$

A1: Volume of 0.1 mol/L sodium hydroxide solution consumed by the titration end point (mL)

f: Factor of 0.1 mol/L sodium hydroxide solution (= 0.9956)\*

X1: Factor to convert acidity to amount of tartaric acid in 100 mL (=0.075 g/mL)

\*: The factor was standardized referring to the Official Analysis Method of the National Tax Agency.  
(Refer to application sheet GT-310-FO-013E)

### Other Requirements

- Confirm reagent labels and safety data sheets for safety.
- Wear safety goggles, gloves, and/or other safety equipment when handling reagents.
- Replace the reference electrode inner and outer solutions at regular intervals.
- Perform pH calibration before measurement.
- Analysis values may fluctuate due to acid evaporation.

### Measurement Results

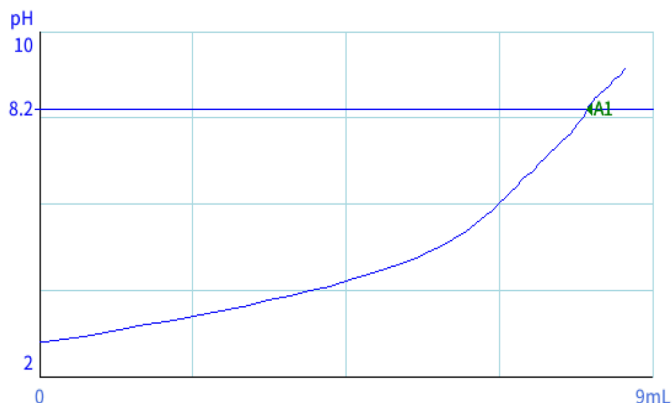
Sample	Sample amount (mL)	Titration volume (mL)	Acidity	Average	Tartaric acid conversion average (g/100 mL)	RSD (%)
Red wine	10	8.0181	8.0	8.0	0.6	0.0
		8.0226	8.0			
		8.0247	8.0			
White wine	10	9.9026	9.9	9.8	0.7	0.3
		9.8468	9.8			
		9.8709	9.8			

Sheet No.

GT-310-FO-012E

Acidity Analysis of Wine

3/3



Sample name:	Red wine	
End point:	8.0181 mL	pH 8.2000
Start of measurement:	0 mL	pH 2.8316
End of measurement:	8.5850 mL	pH 9.1269
Measurement time:	3 min 51 s	

■ Default values were used for parameters not listed below.

Detector:	pH
Titration mode:	General titration
Drop volume control:	Individual [Normal*1]
Max. drop volume:	300 µL
Min. drop volume:	20 µL
Gain:	10
Stability criteria:	Individual [Fast*1]
Delta potential:	pH 0.1
Delta time:	3 s
E1:	Set potential
E1 potential:	pH 8.2
Max. titration volume:	30 mL

\*1: Parameters other than the "Individual" may be used.

\* This application sheet is provided as reference, and does not assure the measurement results. Please consider the analysis environment, external factors and sample nature for optimal conditions before the measurement.