OIV-MA-AS313-01 Total acidity

Type I method

1. Definition

The total acidity of the wine is the sum of its titratable acidities when it is titrated to pH 7 against a standard alkaline solution. Carbon dioxide is not included in the total acidity.

2. Principle

Potentiometric titration or titration with bromothymol blue as indicator and comparison with an end□point color standard.

3. Apparatus

3.1. *Water vacuum pump*.

3.2. *Vacuum flask, 500 mL*.

3.3. *Potentiometer* with scale graduated in pH values, and electrodes. The glass electrode must be kept in distilled water. The calomel/saturated potassium chloride electrode must be kept in a saturated potassium chloride solution.

3.4. *Beakers of 12 cm diameter*.

4. Reagents

1. *Buffer solution pH 7.0*:

- Potassium *di*-hydrogen phosphate, KH_2PO_4 107.3 g
- sodium hydroxide solution, NaOH, 1 mol/L 500 mL
- water to 1000 mL

Alternatively, ready-made buffer solutions are available commercially.

4.2. Sodium hydroxide solution, NaOH, 0.1 mol/L.

4.3. Bromothymol blue indicator solution, 4 g/L.

bromothymol blue 4 g

neutral ethanol, 96% (*v/v*) 200 mL

Dissolve and add:

water free of CO2 200 mL

sodium hydroxide solution, 1 mol/L, sufficient to produce
blue green color (pH 7) 7.5 mL
water to 1000 mL

5. Procedure

5.1. Preparation of sample: elimination of carbon dioxide.

Place approximately 50 mL of wine in a vacuum flask; apply vacuum to the flask using a water pump for one to two min, while shaking continuously.

5.2. Potentiometric titration

5.2.1. Calibration of pH meter

The pH meter is calibrated for use at 20°C, according to the manufacturer's instructions, with the pH 7 buffer solution at 20°C.

5.2.2. Method of measurement

Into a beaker, introduce a volume of the sample, prepared as described in 5.1, equal to 10 mL in the case of wine and 50 mL in the case of rectified concentrated must. Add about 10 mL of distilled water and then add sodium hydroxide solution, 0.1 mol/L, from a burette until the pH is equal to 7 at 20°C. The sodium hydroxide must be added slowly and the solution stirred continuously. Let *n* mL be the volume of sodium hydroxide, 0.1 mol/L, added.

5.3. Titration with indicator (bromothymol blue)

5.3.1. Preliminary test: end□point color determination.

Into a beaker (3.4) place 25 mL of boiled distilled water, 1 mL of bromothymol blue solution and a volume prepared as in 5.1 equal to 10 mL in the case of wine and 50 mL in the case of rectified concentrated must. Add sodium hydroxide solution, 0.1 mol/L, until the color changes to blue-green. Then add 5 mL of the pH 7 buffer solution.

5.3.2. Measurement

Into a beaker (3.4) place 30 mL of boiled distilled water, 1 mL of bromothymol blue solution and a volume of the sample, prepared as described in 5.1, equal to 10 mL in the case of wine and 50 mL in the case of rectified concentrated must. Add sodium hydroxide solution, 0.1 mol/L, until the same color is obtained as in the preliminary test above (5.3.1). Let *n* mL be the volume of sodium hydroxide solution, 0.1 mol/L, added.

6. Expression of results

1. Method of calculation

The total acidity expressed in milliequivalents per liter is given by:

- A = 10 *n*.

It is recorded to one decimal place.
The total acidity expressed in grams of tartaric acid per liter is given by:

- A' = 0.075 x A

The result is quoted to two decimal places.
The total acidity expressed in grams of sulfuric acid per liter is given by:

- A' = 0.049 x A

The result is quoted to two decimal places.
6.2. *Repeatability (r)* for titration with the indicator:(5.3):

- *r* = 0.9 meq/L
- *r* = 0.04 g sulfuric acid/L
- *r* = 0.07 g tartaric acid/L

6.3. *Reproducibility (*R*)* for titration with the indicator (5.3):
For white and rosé wines:

- R = 3.6 meq/L
- R = 0.2 g sulfuric acid/L
- R = 0.3 g tartaric acid/L

For red wines:

- *R* = 5.1 meq/L
- *R* = 0.3 g sulfuric acid/L
- *R* = 0.4 g tartaric acid/L

Bibliography

- SEMICHON L., FLANZY M., *Ann. Fals. Fraudes*, 1930, 23,5.
- FÉRE L., *Ibid.*, 1931, 24, 75.
- JAULMES P., *Bull. O.I.V.*, 1953, 26, no 274, 42; *Ann. Fals. Fraudes*, 1955, 48, 157.