OIV-MA-F1-05 Total acidity

Type IV method

1. Definition

The total acidity of the rectified concentrated must is the sum of its titrable acidities when it is titrated to pH 7 against a standard alkaline solution.

Carbon dioxide is not included in the total acidity.

2. Principle of the method

2.1. Potentiometric titration or titration with bromothymol blue as an indicator and comparison with an end-point colour standard.

3. Reagents

3.1. Buffer solutions

3.1.1. pH 7.0:

monopotassium phosphate, (KH_2PO_4)	107.3 g
1 M sodium hydroxide (NaOH) solution	500 ml
Water to	1000 ml

3.1.2. pH 4.0

Solution of potassium hydrogen phthalate, 0.05 M, containing 10.211 g of potassium hydrogen phthalate ($C_8H_5KO_4$) per litre at 20 °C.

Note: commercial reference buffer solutions traceable to the SI may be used.

For example:

- pH 1.679 $\pm$ 0.01 at 25°C
- pH 4.005 $\pm$ 0.01 at 25°C
- pH 7.000 $\pm$ 0.01 at 25°C

2. 0,1 M sodium hydroxide (NaOH) solution.

3. 4 g/l bromothymol blue indicator solution:

Bromothymol blue ($C_{27}H_{28}Br_2O_5S$)	4 g

Neutral ethanol 96 % vol 200 ml

Dissolve and add:

Water free of CO_2	200 ml
1 M sodium hydroxide solution sufficient to produce blue-green colour (pH 7) approximately	7.5 ml
Water to:	1000 ml

4. Apparatus

4.1. Potentiometer with scale graduated in pH values, and electrodes.

As a reminder, the glass electrode must be kept in distilled water. The calomel/saturated potassium chloride electrode must be kept in a saturated potassium chloride solution. A combined electrode is most frequently used: it should be kept in distilled water.

4.2. Conical flask 100 ml.

5. Procedure

5.1. Preparation of sample:

Introduce 200 g of accurately weighed rectified concentrated must. Make up to the mark with 500 ml water. Homogenize.

5.2. Potentiometric titration

5.2.1. Zeroing of the apparatus

Zeroing is carried out before any measurement is made, according to the instructions provided with the apparatus used.

5.2.2. Calibration of the pH meter

The pH meter must be calibrated at 20°C using standard buffer solutions traceable to the SI. The pH values selected must encompass the range of values that may be encountered in musts. If the pH meter used is not compatible with calibration at sufficiently low values, a verification using a standard buffer solution linked to the SI and which has a pH value close to the values encountered in the musts may be used.

5.2.3. Method of measurement

Into a conical flask (4.4), introduce a 50 ml of the sample, prepared as described in 5.1.

Add about 10 ml of distilled water and then add the 0.1 M sodium hydroxide solution (3.2) from the 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 0.1 M NaOH added.

5.3. Titration with indicator (bromothymol blue)

5.3.1. Preliminary test: end-point colour determination.

Into a conical flask (4.4) place 25 ml of boiled distilled water, 1 ml of bromothymol blue solution (3.3) and 50 ml of the sample prepared as in (5.1).

Add the 0.1 M sodium hydroxide solution (3.2) until the colour changes to blue-green.

Then add 5 ml of the pH 7 buffer solution (3.1)

5.3.2. Measurement

Into a conical flask (4.4) place 30 ml of boiled distilled water, 1 ml of bromothymol blue solution (3.3) and 50 ml of the sample, prepared as described in 5.1.

Add 0.1 M sodium hydroxide solution (3.2) until the same colour is obtained as in the preliminary test above (5.3.1).

Let n ml be the volume of 0.1 M sodium hydroxide added.

6. Expression of results

6.1. Method of calculation

The total acidity expressed in milliequivalents per kilogram of rectified concentrated must is given by:

$$A = 5 \times n$$

The total acidity expressed in milliequivalents per kilogram of total sugars is given by:

$$A = (500 \times n)/P$$

P = % concentration (m/m) of total sugars.

It is recorded to one decimal place.

7. Characteristics of the method

Repeatability (r)

- r = *0.4 meq /kg total sugars*

Reproducibility (R)

- R = *2.4 meq /kg total sugars*