



Acidity of Milk

Introduction

As the acidity has a major influence on the taste of the product, this parameter is used to test the quality of milk.

As the acidity of milk increases with the storage time, this parameter is also a means of checking storage conditions.

Principle

The acidity of milk is determined by end point titration using 0.1 eq/l NaOH. The end point value is generally fixed at pH 8.7 and the result is expressed in dg/l of lactic acid. This result is also called DORNIC acidity.

Electrode and reagents

pHC2401-8 Combined pH Electrode

NaOH 0.1 eq/l solution in distilled water (see Application Note TTEP01-02MIN)

IUPAC Series pH standards
 pH 4.005 (part no. S11M002) or
 pH 7.000 (part no. S11M004) and
 pH 10.012 (part no. S11M007).

End Point titration settings

Burette volume:	10 ml
Stirring speed:	400 rpm
Working mode:	pH
Number of end points:	1
End point:	8.70 pH
Stirring delay:	20 seconds
Minimum speed:	0.2 ml/min
Maximum speed:	6.0 ml/min
Proportional band:	4.00 pH
End point delay:	5 seconds
Sample unit:	ml
Sample amount:	20
pH:	Increasing
Result:	g/l
Equation:	Result * 10

Procedure

A wine sample can be degassed in two ways:

1) Pour the wine into a Buchner flask and connect it to a vacuum system for 3 minutes.

2) Boil the wine for a few seconds then allow the wine to cool to room temperature.

Calibrate the combined pH electrode using the 2 IUPAC

standards above.

Pipette 10 ml of sample.

If necessary, add pH adjusted distilled water.

Dip electrode and delivery tip in the solution.

Start method by pressing the RUN key.

Results

Expressed as decigrams/l of lactic acid (CH₃-CHOH-COOH) and MW=90 g/mol

As in this case 1 molecule of NaOH reacts with 1 molecule of lactic acid

$$R = V(\text{titr}) * C(\text{titr}) * 90 * 10^* / V(\text{smp})$$

-V(titr) = total volume of titrant to reach the end point in ml

-C(titr) = Titrant concentration in eq/l (currently 0.1)

-V(smp) = sample volume in ml

90 = Molecular weight of lactic acid

10 = Factor for result expression in decigram/l

If you enter the correct data for titrant concentration, sample amount, molecular weight, the titration manager's reaction coefficients and equations allow the result to be calculated.

For a result in g/l

Enter

The sample amount in the SAMPLE screen

The titrant concentration in the TITRANT screen 1
 Titrant and 1 Sample in the COEFFICIENTS display
 90 for lactic acid molecular weight

The Titration Manager gives a result according to the formula above.

You can obtain a first result directly in g/l of lactic acid and then use an equation to obtain another result in decigrams/l

For a result in decigrams/l use the equation feature

Equation number: 1
 Equation result: dg/l

Equation formula

R1 * 10

R1 is the titration result calculated in g/l

Results for 10 determinations

Mean (as decigrams/l of lactic acid):	15.17
Standard deviation:	0.106
Relative standard deviation:	0.7%

Working Range

The acidity of fresh milk is around 15 to 17 when expressed, as indicated, in decigrams/l of lactic acid (some articles give a mean value of around 18). According to the calculation formula and for 20 ml of sample, this value corresponds to approximately 4 ml of 0.1 eq/l titrant.

Notes

1) Depending on local applications, it is recommended to use a N/9 (0.1111 eq/l) titrant.

With this titrant concentration and a sample volume equal to 10 ml:

Acidity (in decigrams/l of lactic acid) = $V(\text{titrant}) * 10$

2) According to another definition, acidity of milk can be expressed in Soxlet-Henkel acidity: i.e. the number of ml of 0.25 eq/l titrant needed to titrate 100 ml of milk.

For a 10 ml sample volume

Acidity in °S-H = $V(\text{titrant}) * 10 / 2.5$ Fresh milk corresponds to a Soxlet-Henkel acidity of around 7.2 (generally between 6.5 and 7.5).

3) The end-point value is important for this method. Please refer to local rules or standards.

4) This method frequently uses a coloured indicator. To adapt the pH determination, use the coloured indicator the first time and read the pH of the sample according to the colour change.