

Titration of Acidity in milk

Description

This method is used for the determination of acidity (acid degree) in milk and milk products. The acidity is calculated either as SH-, Dornic- or Therner degree. Different NaOH concentrations are used for the different units. The degrees describe the consumption of a defined NaOH solution per 100 ml of milk.

$^{\circ}\text{SH} = \text{ml}_{\text{NaOH } 0,25 \text{ mol/l}} / 100 \text{ ml milk}$

$^{\circ}\text{D} = \text{ml}_{\text{NaOH } 0,111 \text{ mol/l}} / 100 \text{ ml milk}$

$^{\circ}\text{Th} = \text{ml}_{\text{NaOH } 0,1 \text{ mol/l}} / 100 \text{ ml milk}$

Instruments

Titration	TL 5000 or higher
Electrode	N 62 or A 7780 1M-DIN-ID or similar
Cable	L1A (only for electrodes with plug head)
Stirrer	Magnetic stirrer TM 235 or similar
Lab accessory	Glass beaker 50 ml
	Magnetic stirrer bar 30 mm

Reagents

1	Sodium hydroxide solution 0.25 (SH), 0.111 (Dornic) or 0.1 mol/l (Therner)
2	DIN/NIST buffer pH 4.01 or technical buffer 4.00
3	DIN/NIST buffer pH 6.87 or technical buffer 7.00
4	KCl solution 3 mol/l
5	Soda lime
All reagents should be of analytical grade or better.	

Titration procedure

Reagents

NaOH 0.1 or 0.111 or 0.25mol/L

NaOH is available as a ready-to-use solution.

Caustic soda quickly absorbs CO₂ from the air and thus becomes unusable. The solution must therefore be protected from CO₂ with a CO₂ absorbent such as soda lime. For this purpose, a dry tube filled with soda lime is placed on the storage bottle.

The titer is determined as described in the application "Titer NaOH".

Cleaning and storage of the electrode

The electrode is cleaned with distilled water. The L300 electrolyte solution is suitable for storing the electrode.

The electrode must be calibrated regularly (weekly), e.g. with the buffers pH 4 and pH 7. Electrodes with a slope <95% must be replaced.

Sample preparation

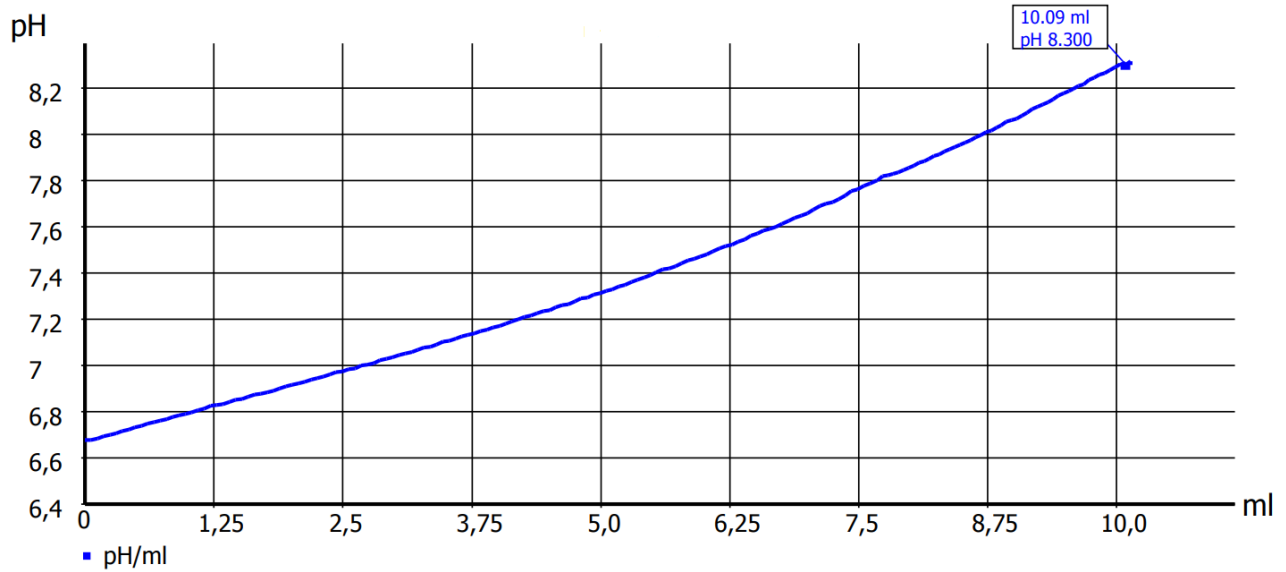
10 - 100 ml (depending on the acidity, for fresh milk 25 – 50 ml are well suited) of the sample are pipetted in a beaker. For °D and °Th twice the amount distilled, CO₂ – free water is added. The titration is done with Sodium hydroxide to the endpoint pH 8.3 (or another endpoint, depending on the norm). The Sample amount and concentration of the NaOH depends on the norm:

Unit	C _{NaOH} [mol/l]	Dilution with water Sample : water
°SH	0.25	-
°Dornic	0.11	1 : 2
°Therner	0.1	1 : 2

It is also possible to titrate °SH or °Dornic with 0.1 mol/l NaOH, but the concentration of the NaOH must be taken in consideration in the calculation. The calculation in this application note considers the concentration of NaOH.

Titration parameter

Sample titration



Default method	---		
Method type	Automatic titration		
Modus	Endpoint		
Measured value	pH		
Measuring speed / drift	normal	Minimum holding time	2 s
		Maximum holding time	15 s
		Measuring time	2 s
		Drift	20 mV/min
Initial waiting time	0 s		
Step size	0.05 ml		
Dampening	none	Titration direction	increase
Pretitration	Off	Delay time	0 s
Endpoint 1	8.30 pH	Delta Endpoint	1.0 pH
		Endpoint delay	10 s
Endpoint 2	Off		
Max. titration volume	20 ml		
Dosing speed	20%	Filling speed	30 s

Calculation:

The result is calculated as degree SH:

$$^{\circ}SH = \frac{(EP1 - B) * T * M * F1}{V * F2}$$

EP1		Consumption of titrant at the end point
B	0	Blank value
T	WA	Actual concentration of the titrant
M	1	Molecular weight
V	m	Volume of the sample
F1	100	Conversion factor
F2	0,25	Conversion factor

For calculation as degree Dornic (°D) set F2 = 0.111

For calculation as degree Thoenen (°Th) set F2 = 0.1

Any questions? Please contact the application team:

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