

# Titration of Acidity in Milk

FOOD & BEVERAGE SERIES



## Introduction

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.

$$\begin{aligned} \text{°SH} &= \text{ml}_{\text{NaOH}} \cdot 0,25 \text{ mol/l} / 100 \text{ ml milk} \\ \text{°D} &= \text{ml}_{\text{NaOH}} \cdot 0,111 \text{ mol/l} / 100 \text{ ml milk} \\ \text{°Th} &= \text{ml}_{\text{NaOH}} \cdot 0,1 \text{ mol/l} / 100 \text{ ml milk} \end{aligned}$$



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Instrument	
Titrator	TL 5000 or higher
Stirrer	Magnetic stirrer TM 235 or similar
Electrode, Cable, and Electrolyte	
Electrode	N 62 or A 7780 1M-DIN-ID or similar
Cable	L1A (only for electrodes with plug head)
Lab Accessories	
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 in analytical grade or better.	

## Titration Procedure

### Reagents

The titer determination of the NaOH is carried out as described in the application report "Titer determination of strong bases". The sodium hydroxide must be protected with a CO<sub>2</sub> absorption tube filled with Soda lime.

### Cleaning of the electrode

The electrode is cleaned with distilled water. Suitable for storage is KCl solution 3 mol/l or electrolyte solution L 911. Because this titration is done as an endpoint titration, the electrode must be calibrated periodically (at least weekly). We recommend a 2-point calibration with the DIN buffers pH 4.01/ 6.87 or 4.00/7.00.

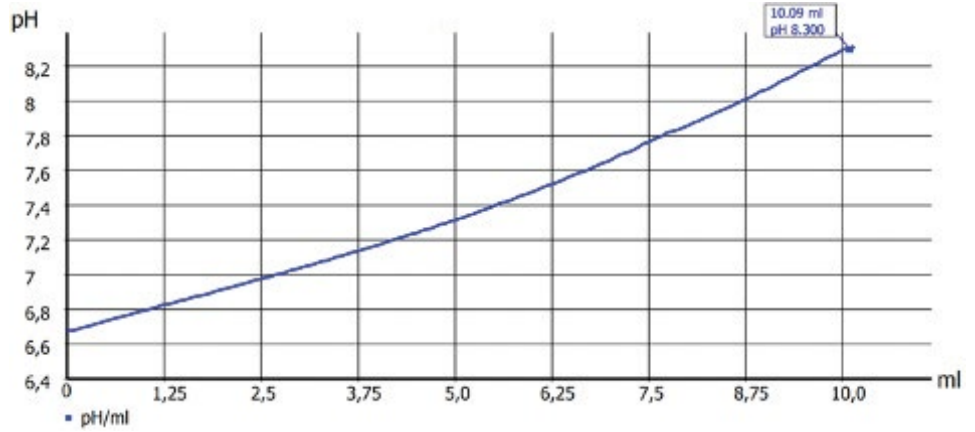
### Sample preparation

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, CO<sub>2</sub> - 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 <sub>NaOH</sub>	Dilution with water Sample : water
°SH	0.25	-
°Dornic	0.11	1 : 2
°Thoerner	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.

Titration parameter - Sample Titration



APPLICATION NOTE XA00122

Default Method ---			
Method type	Automatic Titration		
Mode	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		
Damping	None	Titration Detection	Decrease
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 ( $^{\circ}D$ ) set F2 = 0.111

For calculation as degree Thoenen ( $^{\circ}Th$ ) set F2 = 0.1

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