

# Titration of Total Acidity in fruit juice

## Description

Almost all drinks contain acids that are usually already contained in the raw fruit materials. They improve the taste and the durability. Acids are still added to some soft drinks. As drinks often also contain different acids, a titration to an equivalence point is not suitable. It is titrated to an endpoint, mostly pH 8.2, in some cases also 8.1, 8.3 or 8.5.

The acidity in beverages is usually calculated as g/l citric acid, a tri-basic acid. Sometimes, however, another acid such as Malic acid is used for calculation. In this case the calculation in the standard method have to be changed.

## Instruments

Titration	TL 5000, TL 7000, TL 7750, TL 7800
Exchange Unit	WA 20
Electrode	A 162 2M DIN ID, N62, 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
	Magnetic stirrer bar 30 mm

## Reagents

1	Sodium hydroxide solution 0.1 mol/l
2	Suitable pH buffers, e.g. pH 4.00 and pH 7.00
3	Soda lime
4	Electrolyte solution L 3004
5	Distilled water
All reagents should be of analytical grade or better.	

## **Titration procedure**

### **Reagents**

#### **NaOH – solution 0.1 mol/L**

NaOH 0.1 mol/L is available as a ready-to-use solution.

Caustic soda quickly absorbs CO<sub>2</sub> from the air and thus becomes unusable. The solution must therefore be protected from CO<sub>2</sub> with a CO<sub>2</sub> 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.

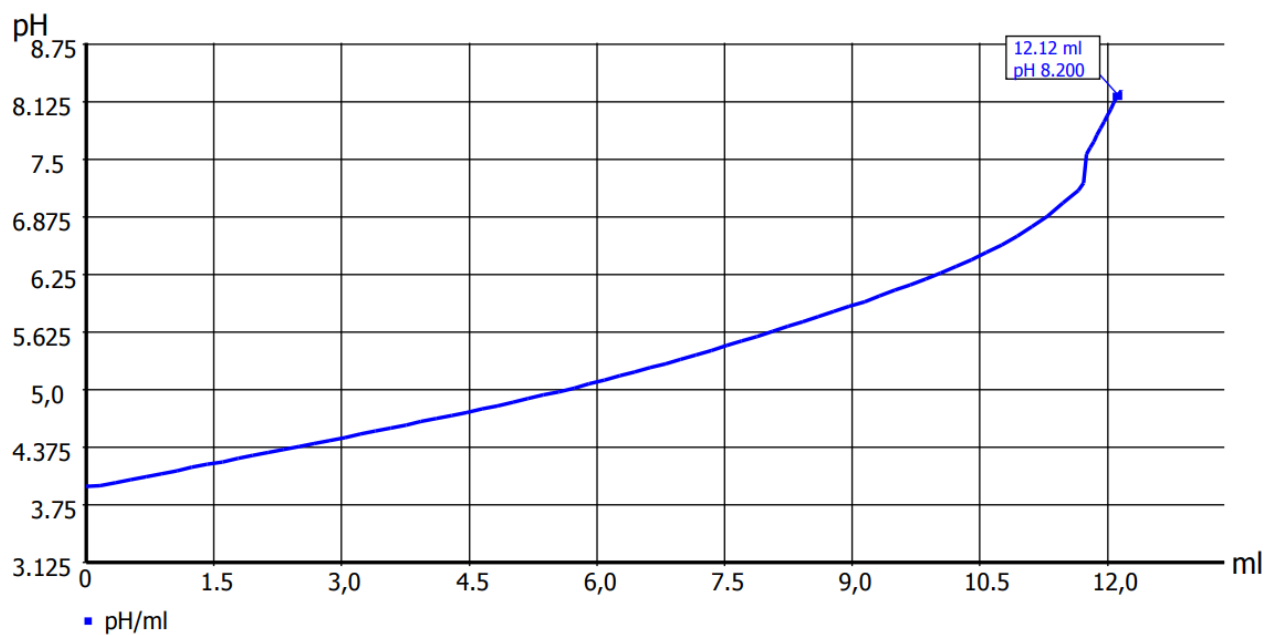
The electrode must be calibrated regularly (weekly), e.g. with the buffers pH 4 and pH 7. Electrodes with a slope <95% must be replaced.

### **Sample preparation**

5-25 ml of the sample, depending on the acidity, are placed in a beaker and made up with a little distilled water so that the electrode and titration tip are immersed in the solution. The sample is then titrated with NaOH 0.1 mol/L to pH 8.2 (or another end point).

## Titration parameter

### Sample titration



Default method	Total acidity (8,2)		
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	0.04 ml		
Dampening	none	Titration direction	increase
Pretitration	Off	Delay time	0 s
Endpoint 1	8.20 pH	Delta Endpoint	1.2 pH
		Endpoint delay	5 s
Endpoint 2	Off		
Max. titration volume	20 ml		
Dosing speed	25 %	Filling speed	30 s

### Calculation:

#### Formula 1

$$\text{Acidity [g/l]} = \frac{(EP1 - B) * T * M * F1}{V * F2}$$

B	0	Blank value
EP1		Consumption of titrant at the end point
T	WA	Exact concentration of the titrant
M	192.13	Molecular weight of Citric acid
V	m	Volume of the sample [mL]
F1	1	Conversion factor
F2	3	Conversion factor (stoichiometric factor, Citric acid is a tri-basic acid)

F2, a stoichiometric factor, depends on the acid used in the calculation. If the acidity is calculated as g/l malic acid (a 2-basic acid), 2 must be used for F2 and the molecular weight of malic acid (134.09 g/mol) must be used for M.

Any questions? Please contact the application team:

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