

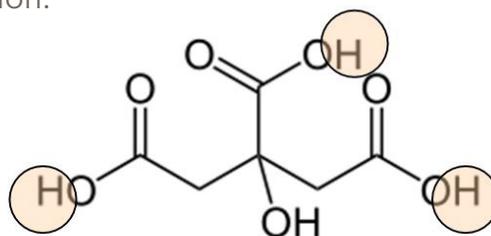
Determination of Total Acidity in Beverages

SI Analytics
a xylem brand

Titration Application
M104

Introduction

This method is used for the quantitative determination of total acidity in fruit juice. Citric acid is the example in this titration application.



Titration applications for determining the acidity in milk and the acidity in wine are also available.

Required Equipment

Apparatus

- TL 5000/TL 7000/TL 7750/TL 7800
- Magnetic stirrer (TM 235 for TL 7000; TM 50 for TL 5000)
- 20 mL exchangeable unit (WA 20) with brown glass bottle for titrant *if using TL 7000/TL 7750/TL 7800*

Electrode and Electrolyte

- pH combination electrode with integrated temperature sensor, such as A 162 2M-DIN-ID (item # 285130275)
- KCl 3 mol/L electrolyte

Solutions

- Titrant:** Sodium hydroxide solution 0.1 mol/L
- Titer:** Potassium hydrogen phthalate (reference material)
- Calibration solutions:** Technical buffer pH=4.00 and pH= 7.00 or in DIN buffer pH= 4.01 and pH= 6.87
- Soda lime for carbon dioxide uptake of the reagent

Procedure

Calibration

The pH combination electrode is calibrated in technical buffer pH=4.00 and pH= 7.00 or in DIN buffer pH= 4.01 and pH= 6.87.

Example of the calibration documentation:

Calibration		
<u>Buffers used</u>		
pH buffer 1:	TEC_4.000	
pH buffer 2:	TEC_7.000	
<u>Measured values</u>		
pH buffer 1:	TEC_4.000	165.6 mV / 23.4 °C
pH buffer 2:	TEC_7.000	-11.2 mV / 23.0 °C
<u>Calibration data</u>		
Slope:	99.4 % / -58.8 mV/pH	
Zero point:	pH 6.81 / -11.2 mV	
Temperature:	23.4 °C (a)	
Date and time:	07.03.13 / 15:04	

Determination of the exact concentration of the titrant

Carbon dioxide absorption from the air occurs in the sodium hydroxide solution of sodium bicarbonate, which changes the pH of the titrant. To prevent this, a drying tube filled with soda lime is placed on the reagent bottle. The exact concentration of the sodium hydroxide solution is determined using the standard potassium hydrogen phthalate. The potassium hydrogen phthalate is dried in the oven before the titer determination for 2 hours at 120 °C and cooled in a desiccator.

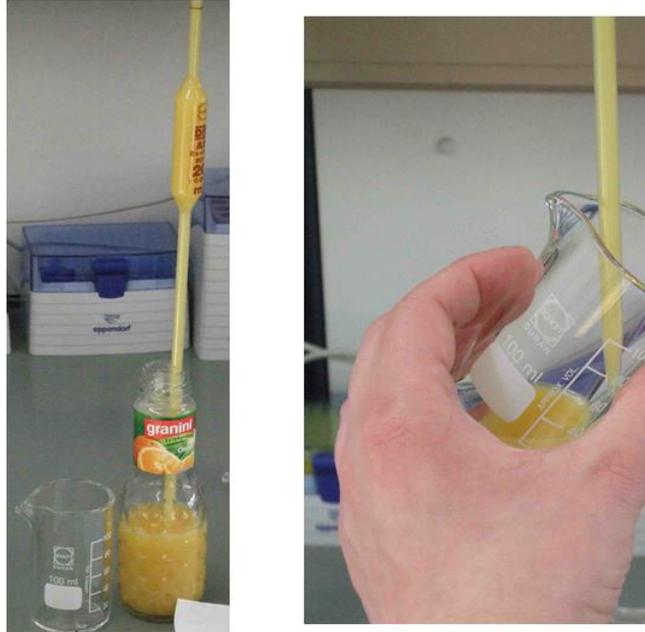
Implementation

In a 50 mL beaker, 0.1 to 0.3 g potassium hydrogen phthalate is weighed accurately and dissolved in 30 mL of dist. water with stirring. It is titrated with 0.1 mol/l sodium hydroxide solution.

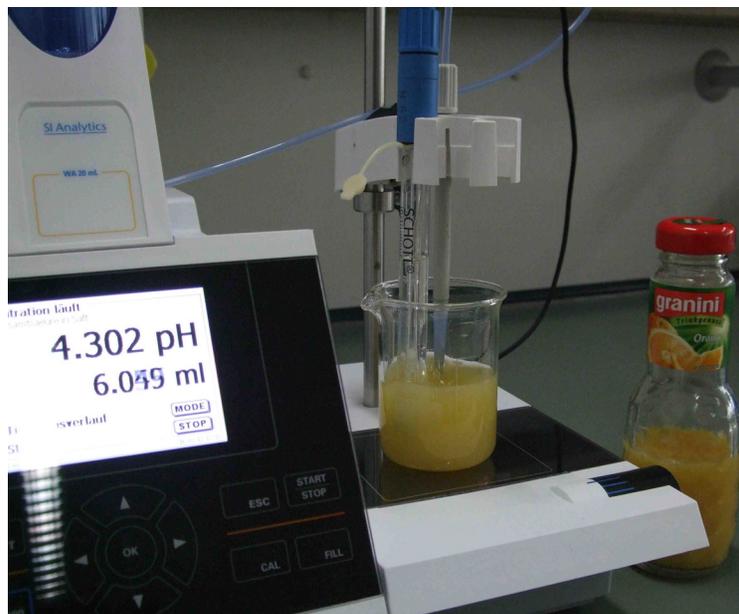
Titration of the sample

Load the default method "Total Acidity". The method is ready to use.

Into a 50 mL beaker, 10 mL fruit juice is pipetted accurately and mixed with 20 mL of dist. water with stirring. Immerse the electrode and burette tip into the sample. This is titrated with 0.1 mol/L sodium hydroxide solution.



Preparation of the sample



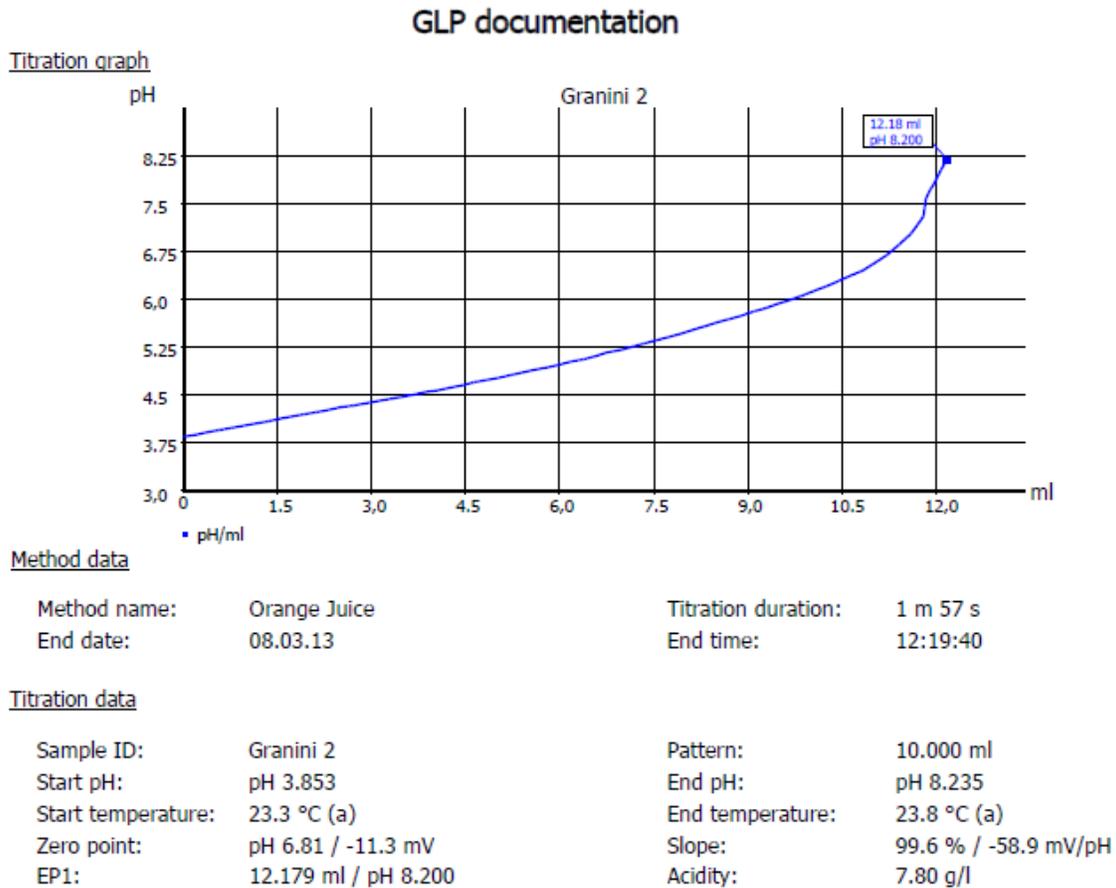
Titration of the sample

Reaction equation:

Citric acid is a tribasic acid. There are three moles of sodium hydroxide required to neutralize one mole of citric acid completely:



Result example:



Calculation formula

Acidity:	(EP1-B)*T*M*F1/(V*F2)	Mol (M):	64.04000
Blank value (B):	0.0000 ml	Titre (T):	0.10000000 (m)
Factor 1 (F1):	1.0000	Pattern (V):	10.000 ml (m)
Factor 2 (F2):	1.0000	Statistics:	Off

Method Information (example)

Method data overall view

Method name:	Orange Juice	Created at:	03/08/13 12:06:41
Method type:	Automatic titration	Last modification:	03/08/13 12:16:39
Measured value:	pH	Damping settings:	None
Titration mode:	End pt.	Documentation:	GLP
Linear steps:	0.040 ml		

Measuring speed / drift:	Normal:	minimum holding time:	02 s
		maximum holding time:	15 s
		Measuring time:	02 s
		Drift:	20 mV/min
Initial waiting time:	0 s		
Titration direction:	Increase		
Pretitration:	Off		

Endpoint 1:	pH 8.200	delta endpoint 1:	pH 1.000
Endpoint 2:	Off	Endpoint delay 1:	5 s

Dosing parameter

Dosing speed:	65.00 %	Filling speed:	30 s
Maximum dosing volume:	50.00 ml		

Unit values

Unit size:	20ml
Unit ID:	10039117
Reagent:	NaOH
Batch ID:	no entry
Concentration [mol/l]:	0.01000
Determined at:	03/08/13 20:03:29
Expire date:	--
Opened/compounded:	--
Test according ISO 8655:	03/19/12
Last modification:	03/08/13 12:03:32

Contact Information

Please contact our titration experts if you have any application or product questions. Thanks!

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