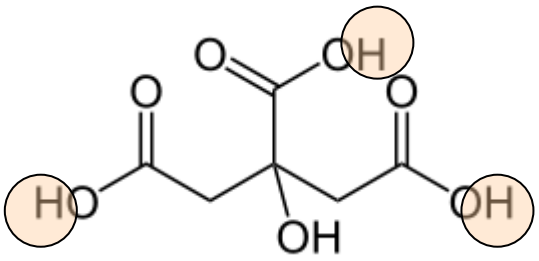
Determination of total acidity in fruit juice

Application

Use

This method is used fort he quantitative determination of total acidity in fruit juice. Here, the citric acid as the main use as a reference.



Molecular weight citric acid M= 192.13 g/mol

Appliances

- Titrator: TL 6000/7000 (TL 6000/7000 M2/20) consists of
- Basic device
- Magnetic stirrer TM 235
- 20 mL Exchange unit WA 20, with nrown glass bottle for titrant complete
- And pH combination electrode A 162 DIN ID

Electrodes

- Electrode: A 162 DIN ID
- Calibration: DIN buffer pH= 4.00 and pH= 7.00

Application

Reagents

- Titrant: sodium hydroxide solution 0.1mol/l
- Soda lime for carbon dioxide uptake of the reagent.
- Titer: potassium hydrogen phthalate (reference material)

Description

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

Buffers used

pH buffer 1:	TEC_4.000	
pH buffer 2:	TEC_7.000	

Measured values

pH buffer 1:	TEC_4.000	165.6 mV / 23.4 °C
pH buffer 2:	TEC_7.000	-11.2 mV / 23.0 °C

Calibration data

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

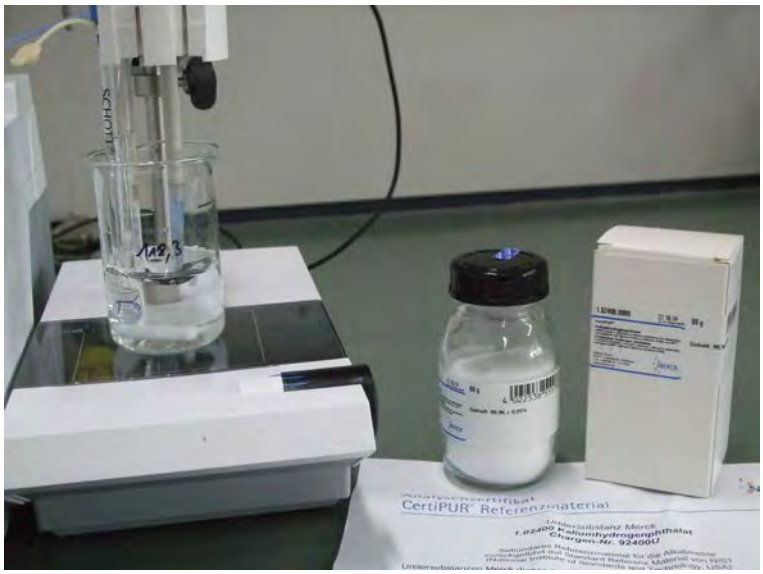
Determination of the exact concentration of the standard solution

By 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 0.3g potassium hydrogen phthalate were weighed accurately and dissolved in 30 mL of dist. water with stirring. It is titrated with 0.1 mol/l sodium hydroxide solution.

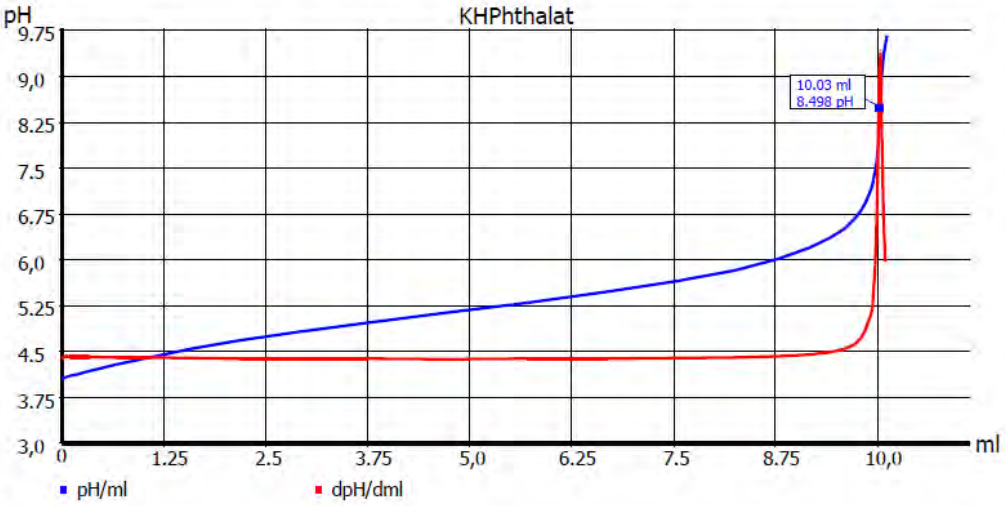
Application



Pic. left: titer

GLP documentation

Titration graph



Method data

Method name:	Titre NaOH	Titration duration:	2 m 15 s
End date:	08.01.13	End time:	15:46:03

Titration data

		Weight:	0.20490 g
Start pH:	pH 4.065	End pH:	pH 9.667
Start temperature:	25.0 °C (m)	End temperature:	25.0 °C (m)
Zero point:	pH 6.85 / -8.9 mV	Slope:	98.7 % / -58.4 mV/pH
EQ:	10.032 ml / pH 8.498	Titre:	0.1000 mol/l
Mean value:	---	RSD:	---

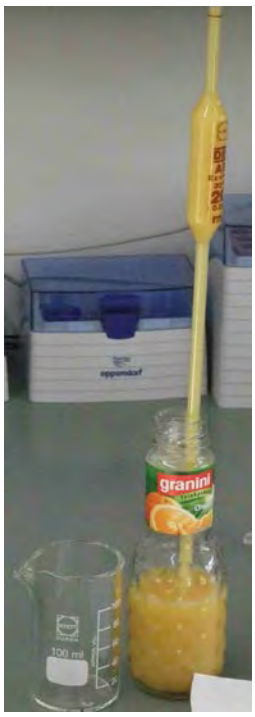
Calculation formula

Titre:	(W*F2)/((EQ1-B)*M*F1) -> WA	Mol (M):	204.22000
Weight (W):	0.2049 g (m)	Factor 2 (F2):	1000.0000
Blank value (B):	0.0000 ml	Factor 1 (F1):	1.0000
Statistics:	3		

The titration parameters are described under „method“.

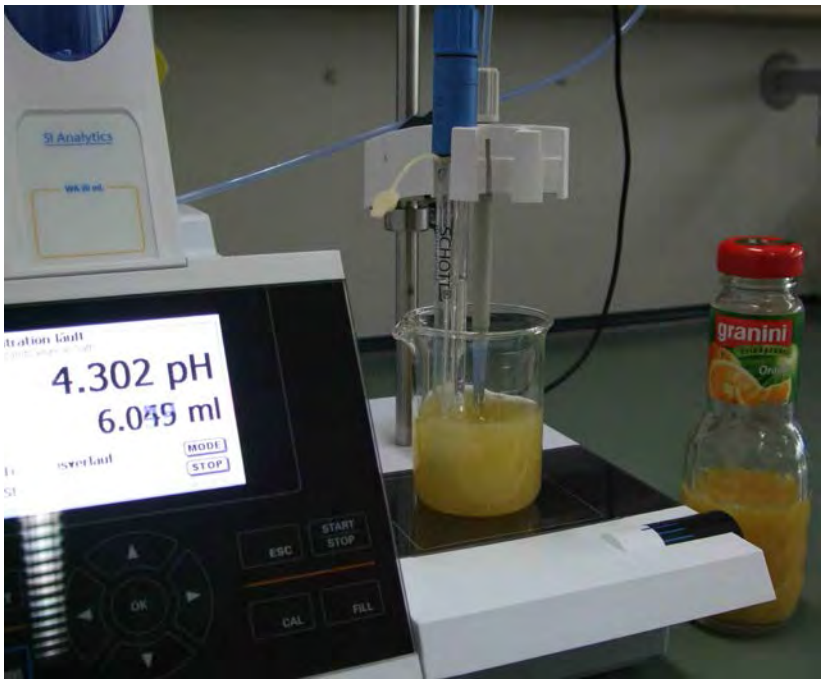
Titration of the sample

Into a 50mL beaker 5 – 25mL fruit juice must be pipetted accurately and mixed with 20mL of dist. Water with stirring. It is titrated with 0.1 mol/l sodium hydroxid solution.



Pic. left: preparation af the sample

Application



Pic. left: titration of the fruit juice

Application

Reaction equation:

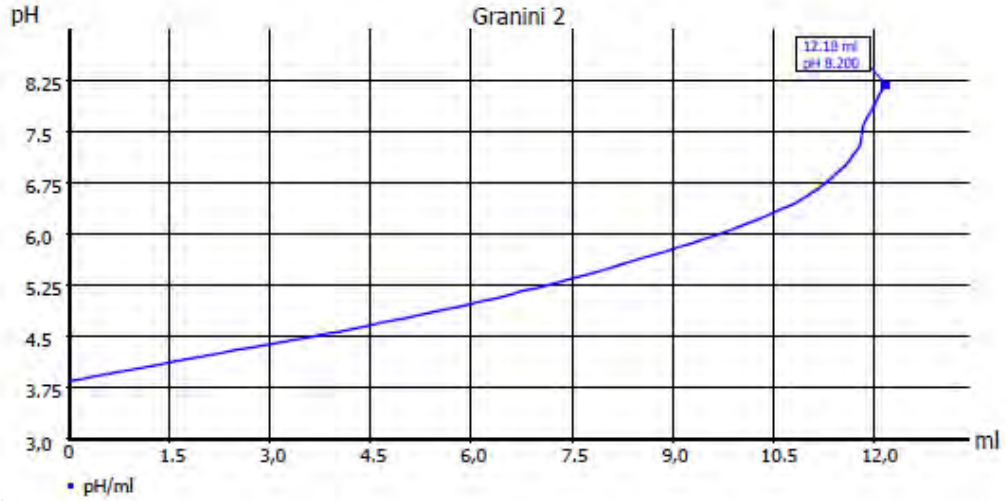
Citric acid is a tribasic acid. There a three moles of sodium hxdroxide required to neutralize one mole of citric acid completely:

$$H_3Citrat + 3\ NaOH \dashrightarrow 3\ H_2O + Na_3Citrat$$

Result example:

GLP documentation

Titration graph



Method data

Method name:	Orange Juice	Titration duration:	1 m 57 s
End date:	08.03.13	End time:	12:19:40

Titration data

Sample ID:	Granini 2	Pattern:	10.000 ml
Start pH:	pH 3.853	End pH:	pH 8.235
Start temperature:	23.3 °C (a)	End temperature:	23.8 °C (a)
Zero point:	pH 6.81 / -11.3 mV	Slope:	99.6 % / -58.9 mV/pH
EP1:	12.179 ml / pH 8.200	Acidity:	7.80 g/l

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

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 delay 1:	5 s
Endpoint 2:	Off		

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

Application

Notes

If you have any questions on the application, you can feel free to contact us..

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