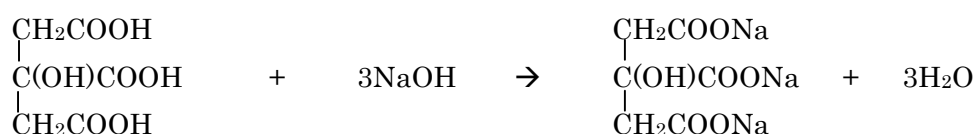


AQUACOUNTER Application Sheet	COM series	DATA No. A5	1st edition
Food and Beverage	Successive measurement of citric acid and vitamin C in refreshing drinks		

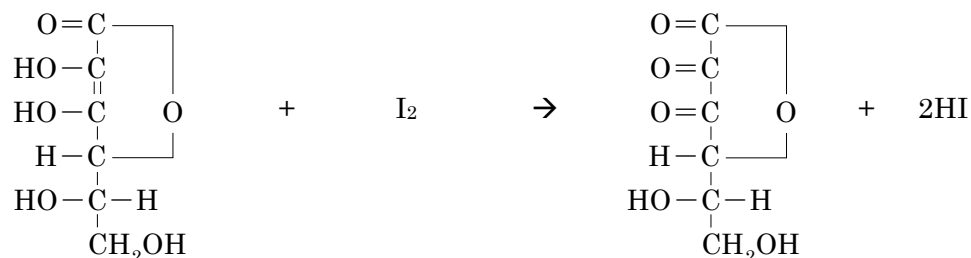
1. Measurement outline

Acidity and vitamin C in refreshing drinks are titrated successively to quantify each component.

- (1) First, citric acid in the sample is titrated with sodium hydroxide using glass/reference combination electrode.



- (2) When titration of citric acid is completed, acetic acid is added to acidify the sample. The indicator electrode is switched to platinum electrode automatically and vitamin C is titrated with iodine.



2. Reagents and Electrodes

(1) Reagents	Titrant	0.1mol/L Sodium hydroxide (For Citric acid) 0.1mol/L Iodine (I ₂) (For Vitamin C)
	Loading buffer	10% Acetic acid
(2) Electrodes	Glass reference electrode GR-501B (P/N D252331-1) to IE-1 jack. Platinum electrode PT-301 (P/N D231244-A) to IE-2 jack.	

Use the combination of GR-501B and PT-301. The reference electrode of GR-501B also works with PT-301.

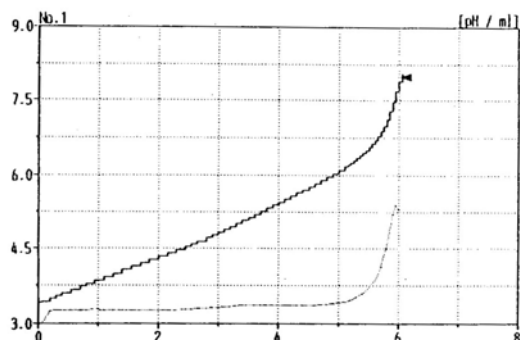
3. Measurement conditions example (for COM-1600S + Buret B-2000-20 × 2 units)

Master File No.1					
Condition file : 1 + 2 + 3					
Parameters for Condition file 1 (For 1 st EP = Citric acid)		Parameters for Condition file 2 (For addition of Acetic acid)		Parameters for Condition file 3 (For 2 nd EP = Vitamin C)	
Method	AUTO	Method	DISP	Method	AUTO
Amp No.	1	Amp No.	1	Amp No.	2
Buret No.	1	Buret No.	2	Buret No.	3
Meas Unit	pH	S-Timer	0 sec.	Meas Unit	mV
S-Timer	5 sec.	Disp. Vol.	5 mL	S-Timer	5 sec.
CP	0 mL			CP	0 mL
DP	0 mL			DP	0 mL
End Sens	300			End Sens	200
Over mL	0 mL			Over mL	0 mL
Max. Vol.	20			Max. Vol.	10
Mode No.	3			Mode No.	3 (Pulse = 10)
Unit	%			Unit	%
Formula	(D·B)×K×F×M/(S×10)			Formula	(D·B)×K×F×M/(S×10)
Blank	0			Blank	0
Molarity	0.1			Molarity	0.1
Factor	Titre of the titrant			Factor	Titre of the titrant
K	64 (As Citric acid)			K	88.06 (As Ascorbic acid)

4. Measurement Procedure

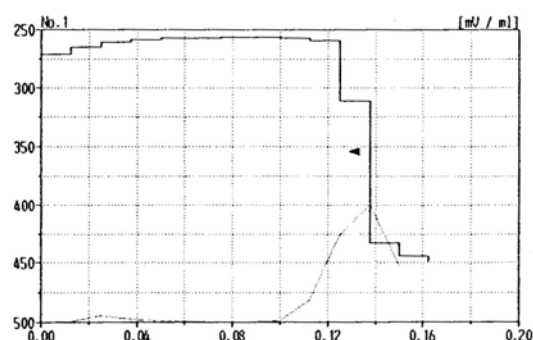
Using a pipette, take 5.00mL of sample. Add 50mL of deionized water and titrate the sample with 0.1mol/L sodium hydroxide titrant for citric acid first. On completion of the titration for acidity, 5mL of 10% acetic acid is added to the solution, and titrated with 0.1mol/L iodine titrant for vitamin C. Rinse the electrode with deionized water after the titration is completed.

5. Measurement example



Citric acid measurement results

Sample No.	Sample size (mL)	Titration value (mL)	Concentration (%)
1	5.00	6.046	0.764
2	5.00	6.031	0.762
3	5.00	6.026	0.761
Avg.			0.762 %
Std. Dev.			0.002 %
C.V.			0.200 %



Vitamin C measurement results

Sample No.	Sample size (mL)	Titration value (mL)	Concentration (%)
1	5.00	0.129	1.85
2	5.00	0.129	1.85
3	5.00	0.129	1.85
Avg.			1.85 %
Std. Dev.			0.00 %
C.V.			0.00 %

6. Notes

In this method, two different components are analyzed successively using two types of indicator electrodes and two types of titrants, and it is valid for labor-saving as well as efficiency in analysis. While this method used iodine titration method as the analysis method for vitamin C, an alternative method is the indophenol method (see Data No.A4). It must be noted that indophenol method may be specified depending on the type of sample.

Key words

Food product, refreshing drinks, citric acid, vitamin C,

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