AQUACOUNTER Application Sheet	COM series	DATA No. A2	1st edition

Food and Beverage — Successive titration of acid and salt in dressings

1. Measurement outline

Acidity (Acetic acid) and salt (Sodium chloride) in a dressing are titrated successively.

(1) First, acetic acid is titrated with sodium hydroxide. The glass electrode is used to detect the end point of the titration.

$$CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$$

(2) When the titration of acidity is completed, nitric acid is added to acidify the sample. Chloride is titrated with silver nitrate. The glass electrode is switched to the silver electrode automatically to detect the end point of the titration.

$$NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$$

2. Reagents and Electrodes

(1) Reagents	Titrant	1. 0.1mol/L Sodium Hydroxide (Acidity) 2. 0.1mol/L Silver Nitrate (Salt)
	Loading buffer	10% nitric acid
(2) Electrodes	Indicator electrode	*Glass electrode GE-101B to IE-1 jack *standard accessory
	Reference electrode	Silver combination electrode AGR-811 to IE-2 and RE jack (P/N D230091-A)
	Glass electrode GE-101B and silver combination electrode AGR-811 must be used for a successive titration of acid/base and precipitation titration. Incorrect pH reading or poor accuracy may result with the other type of the electrodes.	

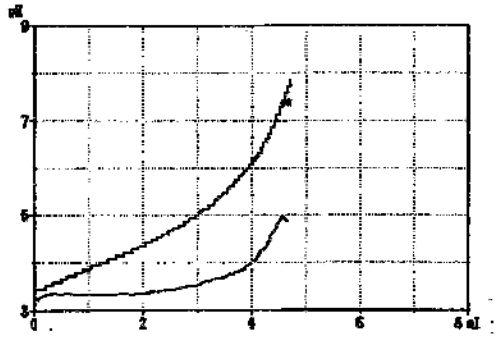
3. Measurement conditions example (for COM-1600S + Buret B-2000 × 2 units)

Master File No.1 **Condition file : 1 + 2 + 3**					
Parameters for Condition file 1 **(For 1st EP = Acidity)**		**Parameters for Condition file 2** **(For addition of Nitric acid)**		**Parameters for Condition file 3** **(For 2nd EP = Salt)**	
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.	1 mL	S-Timer	5 sec.
CP	0 mL			CP	0 mL
DP	0 mL			DP	0 mL
End Sens	300			End Sens	300
Over mL	0 mL			Over mL	0 mL
Max. Vol.	20			Max. Vol.	20
Mode No.	3			Mode No.	3
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	60.05 (As Acetic acid)			K	58.44 (As NaCl)

4. Measurement Procedure

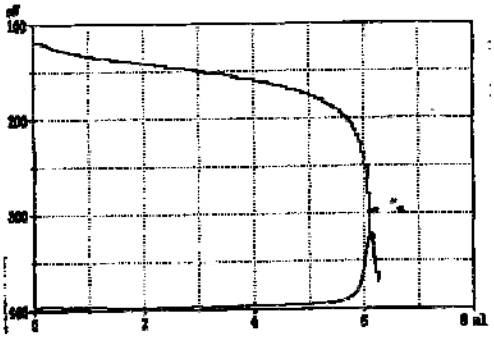
Take ca. 1g of sample. Weigh accurately. Add 50mL of deionized water and titrate the sample with 0.1mol/L sodium hydroxide titrant for acidity first. On completion of the titration for acidity, 1mL of 10% nitric acid is added to the solution, then the solution is titrated with 0.1mol/L silver nitrate titrant for salt. Rinse the electrode with deionized water after the titration is completed.

5. Measurement example



Result of Acidity Measurement

Sample No.	Sample size (g)	Titration value (mL)	Concentration (%)
1	1.1550	5.100	2.652
2	1.2491	5.519	2.653
3	1.0045	4.529	2.604
	Avg.		2.636 %
	Std. Dev.		0.028 %
	C.V.		1.062 %



Result of Salt Measurement

Sample No.	Sample size (g)	Titration value (mL)	Concentration (%)
1	1.1550	6.733	6.893
2	1.2491	7.249	6.863
3	1.0045	6.073	6.676
	Avg.		6.811 %
	Std. Dev.		0.118 %
	C.V.		1.727 %

6. Notes

This method is valid as a labor saving and efficient analysis method in which two types of indicator electrodes and two types of titrants are used to analyze two different components.

Key words

Food product, dressing, acetic acid, chlorine ion, neutralization titration, precipitation titration, double-junction

Hitachi High-Technologies Corporation
Head Office 1-24-14, Nishishinbashi,Minato-Ku,Tokyo 105-8717, Japan
Tel : 81-3-3504-7239 Fax : 81-3-3835-7302
http://www.hitachi-hitech.com

Hiranuma Sangyo Co., Ltd.
1739, Motoyoshidacho, Mito-City, Ibaraki 310-0836, Japan
Tel : 81-29-247-6411 Fax : 81-29-247-6942
http://www.hiranuma.com

Category	*Volumetric Karl Fischer Titrator AQV series*
Food & Beverage	**Water content in Sugar-main paste** by Volumetric Karl Fischer Titration *Direct method*
Referenced methods	Hydranal®Manual

Key words; sugar, confectionery, volumetric Karl Fischer titration,

Outline

High sugar content foodstuff is generally poorly soluble in methanol base solvent.
Adding Formamide to the titration solvent helps to increase the solubility of the samples to extract water speedily. Volumetric Karl Fischer method using AQUACOUNTER® AQV-2100 or AQV-300 can easily measure water in sugar paste for confectionery with high accuracy and repeatability.

Reagents

Karl Fischer reagent	:	Hydranal® Composite 5
Titration solvent	:	Hydranal® Formamide dry

Instruments

High-end Volumetric Karl Fischer Titrator **AQV-2100S**
Simple & low cost Volumetric Karl Fischer Titrator **AQV-300**
*Optional Thermal Printer **PR-2000T2** or Dot impact printer **PR-302A**

AQV-2100ST
(inc. optional thermal printer PR-2000T2)

Or

AQV-300

Procedure

① Collect the sample into the container to keep away from absorbing moisture.
② Press SAMPLE key and immediately drop approximately 0.5g sample into the cell with tweezers once the background stabilized.
③ Press TITRATION key to start titration.
④ Weigh the container accurately after sample inject and press S.SIZE/No. key to input the sample quantity.
⑤ End point is determined according to the Interval Time set to 30 seconds.

Condition parameters

C. File No.	1
Cal Mode	0
Interval Time	30 sec
S-Timer	0 min
T-Timer	0 min
Buret Speed (OUT)	10mL/min
Buret Speed (IN)	24mL/min
Blank Value	0 mL
Cal Factor	1
Buret 1 Factor	Titer of KF reagent
Date	Date of standardization of KF reagent

Unit Mode	AUTO
Back Ground	OFF
Min. Feed Vol.	0.01 mL
Max Volume	40 mL
CP Level	250 mV
End Mode	6
Auto Interval	0 g

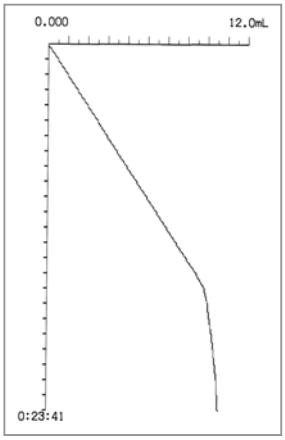
Points

Formamide

… This solvent tends to indicate a high background value. When using such a solvent, it is necessary to take sufficient time for the blank titration before measurements.

Sample

… A small piece of sample is introduced into the cell at a time, not a large piece.



For more information, please feel free to contact:

Hiranuma Sangyo Co., Ltd.

1739 Motoyoshida-cho, Mito, Ibaraki 310-0836 JAPAN

Phone: +81-29-247-7343 / Fax: +81-29-247-0381

URL http://www.hiranuma.com E-mail info@hiranuma.com