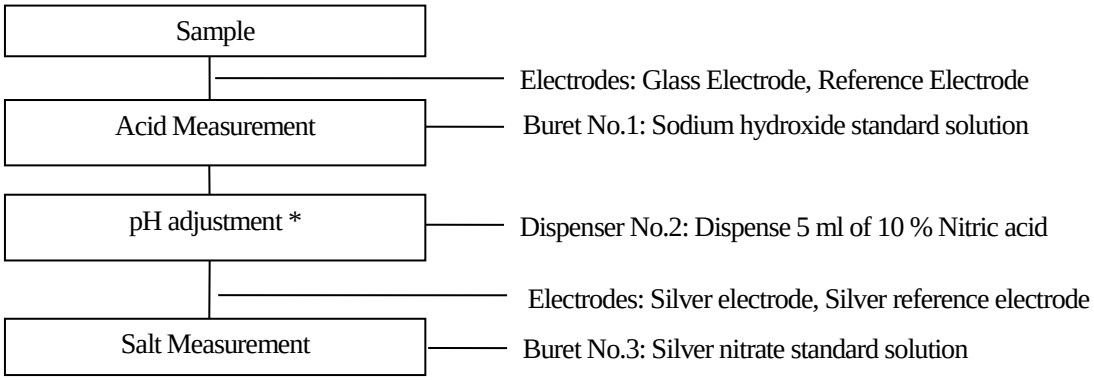
HIRANUMA APPLICATION DATA	Automatic Titrator	Data No.	A2	Sep. 12, 2018
FOOD	**Successive measurement of acid and salt in dressing**			

1. Abstract

An example of successive determination of concentration of acid and salt chloride in dressing is introduced here. Acid and salt are determined as acetic acid and sodium chloride.



At first, titration of acetic acid with sodium hydroxide titrant is performed (Formula (1)). Next, the sample solution is acidified by adding nitric acid, then titration of sodium chloride is performed with silver nitrate titrant (Formula (2)).

$$CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O \quad \cdots (1)$$

$$NaCl + AgNO_3 \rightarrow AgCl + NaNO_3 \quad \cdots (2)$$

* The titration for sodium chloride with silver nitrate has to be performed under acidic condition using nitric acid.

2. Configuration of instruments and Reagents

(1) Instruments

Main unit	:	Hiranuma Automatic Titrator COM series (w/ one buret)
Option	:	Buret 1 set, Dispenser (Peristaltic pump type) 1 set
Electrodes	:	Glass electrode GE-101B, Connect to IE-1.
		Silver reference combination electrode AGR-811Z (Double junction type)
		Connect to IE-2 and RE-2.

(2) Reagents

Titrant	:	0.1 mol/L Sodium hydroxide standard solution (Measurement of acid)
		0.1 mol/L Silver nitrate standard solution (Measurement of salt)
Additive solution	:	10 % Nitric acid solution

3. Measurement procedure

(1) Take 1 g of sample into 100 ml beaker and weigh it exactly.

(2) Add 50 ml of DI water.

(3) Immerse the electrodes and start titration. The following successive titration processes are performed. [(i) titration of acid, (ii) dispense nitric acid, (iii) titration of salt]

4. Measurement conditions and results

Examples of titration conditions

(1) Titration of acid with sodium hydroxide standard solution

Condition No. 1								
Method	Auto		Constant No.	1		Mode No.	4	
Buret No.	1		Size	1.0739	g	Pre Int	0	sec
Amp No.	1		Blank	0	mL	Del K	9	
D.Unit	pH		Molality	0.1	mol/L	Del Sens	0	mV
S-Timer	5	sec	Factor	1.005		Int time	3	sec
CP mL	0	mL	K	60.05		Int Sens	3	mV
T Timer	0	sec	L	0		Buret Speed	2	
D.P. mL	0	mL	Unit	%		Pulse	40	
End Sens	200		Formula	(D-B)*K*F*M/(S*10)			0.05	mL
Over mL	0	mL						
Max. Vol.	20	mL	Digits	3				
			Auto input Parameter		None			

(2) Dispense 10 % nitric acid.

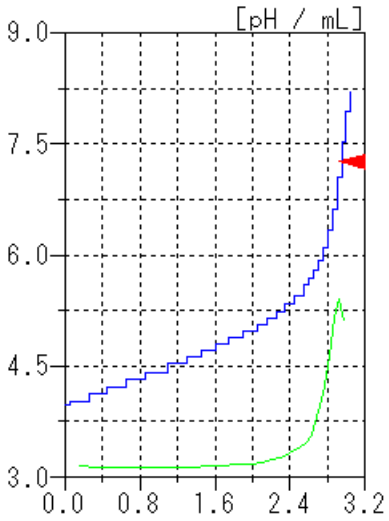
Condition No. 2		
Method	Disp	
Buret No.	2	
S-Timer	0	sec
Disp. Vol.	5	mL

(3) Titration of salt with silver nitrate standard solution

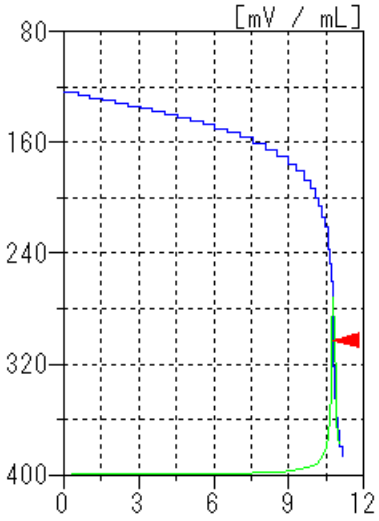
Condition No.3								
Method	Auto		Constant No.	3		Mode No.	4	sec
Buret No.	3		Size	1.0739	g	Pre Int	0	
Amp No.	2		Blank	0	mL	Del K	9	mV
D.Unit	mV		Molality	0.1	mol/L	Del Sens	0	sec
S-Timer	5	sec	Factor	1.004		Int time	3	mV
CP mL	0	mL	K	58.44		Int Sens	3	
T Timer	0	sec	L	0		Buret Speed	2	
DP mL	0	mL	Unit	%		Pulse	40	
End Sens	200		Formula	(D-B)*K*F*M/(S*10)			0.05	mL
Over mL	0.3	mL						
Max. Vol.	20	mL	Digits	3				
			Auto input Parameter		None			

Measurement results

Measurement No.	Size (g)	Titrant volume (mL)	Acid (%)	Titrant volume (mL)	Salt (%)
1	1.0854	2.944	1.637	10.905	5.895
2	1.0786	2.934	1.642	10.831	5.892
3	1.0739	2.923	1.643	10.776	5.888
Statistical result		Avg.	1.64 %		5.89 %
		SD	0.0032 %		0.0035 %
		RSD	0.20 %		0.06 %



Measurement of acid



Measurement of salt

Examples of titration curves

5. Note

(1) Homogeneity of samples

The unevenness of sample, because the dressing often containing solid and oil components, may effect to the measurement accuracy. Stir the sample adequately with mixer or homogenizer to uniform the sample before measurement.

(2) Electrodes

Electrodes GE-101B and AGR-811Z are used for successive measurement of acid and salt in this report. AGR-811Z is a combination electrode. Reference compartment of AGR-811Z is made of Ag/AgCl inner electrode with double junction system. Ag/AgCl inner electrode immersed in KCl inner solution is required for electrode to perform pH calibration. On the other hand, KCl inner solution is a contaminant source for salt measurement. That is the reason why AGR-811Z equipped double junction system must be used for this titration.

Keywords：Dressing, Acid, Salt

*Some measurement would not be possible depending on optional configuration of system.