

Food

Total Acid and Amino Acid of Sake

Acid-base titration by
Automatic Potentiometric Titrator

Standard

Test method by
National Tax
Administration

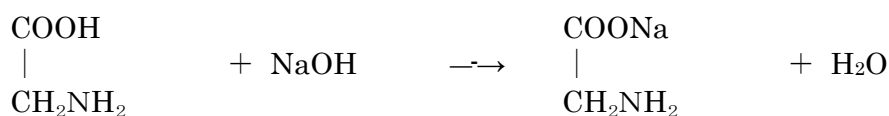
1. Abstract

To quantify total acids and amino acids, here we demonstrate Formol titration based on Test method for Total acid, Amino acid of Sake and Synthetic wine prescribed by National Tax Administration Agency.

Formol titration starts 1st method with 0.1mol/L Sodium hydroxide until reaching pH 7.2. Then, continue to 2nd method by adding neutral formalin. Again titration goes with 0.1mol/L sodium hydroxide to pH 7.2.

Titration volume after neutral formalin added is converted to Glycin in order to obtain amino acids.

Refer to No.TIF-99306 for parameters of 1st method.



2. Reference

- 1) Test method for Total acid, Amino acid of Sake and Synthetic wine prescribed by National Tax Administration Agency (Instruction No. 6 revised in 2007)

3. Cautions in measurement

- 1) Use a combination glass electrode for micro titration since 10mL sample is titrated without dilution.
- 2) It is recommended to use not only electrode but titration cell unit for micro titration in order to avoid the effect of carbon dioxide gas in the air.
- 3) Adjust pH of neutral formalin each time used in titration.
- 4) Obtain factor of titrant 0.1mol/L sodium hydroxide using sulfuric amide according to JIS K8001 General Rule of Test Method and ISO 6531-1.
- 5) Store titrant 0.1mol/L sodium hydroxide in zeolite to prevent ambient carbon dioxide from permeation.
- 6) Pure water used for dilution must be degassed of carbon dioxide.
- 7) Filter the sample to remove fruits particles in order to obtain good repeatability.

4. Post-measurement care

After the electrode is rinsed with pure water, keep its tip dipped in a beaker filled with pure water in order to avoid it from drying up.

5. Test equipment

Main unit : Automatic potentiometric titrator (Standard preamplifier: STD—)
Electrode : Option Combination glass electrode (for micro titration)
 Standard Temperature compensation electrode
Option : Micro titration cell unit

6. Reagent

Titrant : 0.1mol/L Sodium hydroxide (f=1.000)
Additive : Neutral formalin
After 50mL formalin is adjusted with 0.1mol/L Sodium hydroxide to pH8.2, add pure water to make it 100mL in total.

7. Measurement procedure

—Measurement—

• 1st method

- 1) Sample 10mL in micro titration cell.
- 2) Titrate with 0.1mol/L sodium hydroxide to pH7.2.

• 2nd method

- 3) Add 5mL of neutral formalin.
- 4) Again titrate with 0.1mol/L sodium hydroxide up to pH7.2 to obtain amino acid.

8. Formula

The 1st method formula is applied in this application.

Refer to No.TIF-99306.

9. Example of measurement

— Ambient condition —

Room temperature : 23.0 °C	Humidity : 47 %	Weather : Cloudy
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-Titration parameter-

Model : AT-510 Method No. : 51	
[2nd Combine] Method No. : 33 <Auto Intermit>	
<Dose> Form : Volume Stop APB No. : 10 Unit No. : 2 Volume : 5.0mL Cut-off Time : 0s Dispense Speed : 5s/mL Wait Time : 0s	<Control> End Point No. : 1 1st Level : 7.2pH Over Titr.Vol. : 0mL Gain : 1 Data samp.Pot. : 4.0mV Data samp.Vol. : 0.5mL Stability : 0.5mV/s Delay Time : 1s Limit Time : 30s
<Titration> Form : Level Stop APB No. : 1 Unit No. : 1 Detector No. : 1 Unit : pH Max.Volume : 20.0mL Wait Time : 30s Direction : Positive	

-Titration curve-

*** Result ***	
Sample No. : 69-01 Date : 1999/08/16 16:37 Sample ID :	
Titr. Time : 00:02:30	
Size : <u>10.0mL</u>	
Conc-1 : <u>0.0681 g/100mL</u> Conc-2 : <u>0.0448 g/100mL</u>	
End point-1 Volume : <u>1.1550mL</u> Potential : 7.20pH	
End point-2 Volume : <u>1.7527mL</u> Potential : 7.20pH	

(The above parameters and titration curve are printed out by AT-510)

«Dose parameter»

Form: of titration / APB No. the burette used in titration / Unit No.: [APB Unit File number used in titration](#)
Volume: of reagent/ Cut-off Time: [intermittent](#)/ Dispense Speed: of dispenser/ Wait Time: before titration starts
Direction.: of titration

«Titration parameter»

Form: of titration / APB No. the burette used in titration / Unit No.: [APB Unit File number used in titration](#)
Detector No.: the detector used in titration / Max Volume. of titration / Wait Time: before titration starts
Direction.: of titration

«Control parameter»

End Point No. number of EPs detected / 1st Level: potential of the first EP / Over Titr.Vol. over-titration volume
Gain: sensitivity of detection signal / Data samp.Pot.: potential changes of sampling signal / Data samp.Vol.: titration volume of sampling signal / Stability: EP sense/ Delay Time: before stability check / Limit Time: of stability check

-Measurement results-

n	Sample (mL)	Titration (mL)		Total acid (g/100mL)	Amino acid (g/100mL)
		EP-1	EP-2		
1	10.0	1.1550	1.7527	0.0681	0.0448
2	10.0	1.2088	1.7977	0.0713	0.0442
3	10.0	1.1865	1.7707	0.0700	0.0438
			Mean	0.0698	0.0443
			SD	0.0016	0.0005
			RSD	2.2841 %	0.8493 %

* The above results were obtained by 3 tests of the same sample.

* Red underline shows the data from page 3/4.

10. Summary

Sake is a Japanese traditional alcoholic beverage made from fermented rice.

Amino acid is in term of chemistry a generic name of organic compound having both functional group of amino and carboxyl.

Quality control and evaluation of Sake by Amino acid is important.

The sample measurement shows a good repeatability with less than 0.9% relative standard deviation. Precise and reliable measurement is assured by the automated potentiometry.

The analysis of alcoholic beverage like sake can be perfectly made by any of the following titration systems manufactured by Kyoto Electronics (KEM).

【AT-610】



Awarded Product of Supreme Technology from Kyoto City

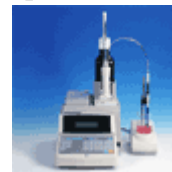
- Easy key entry by touch panel of large color LCD (8-inch wide)
- Simultaneous titration in parallel
- Both potentiometric and Karl Fischer moisture titration (coulometric + volumetric) can be performed at a time.

【AT-510】



- Compact and cost performance model
- PC card expands data memory for convenience and versatility.

【AT-500N-1】



- Low cost and high performance
- Easy view with back light LCD
- GLP/GMP conformed model

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