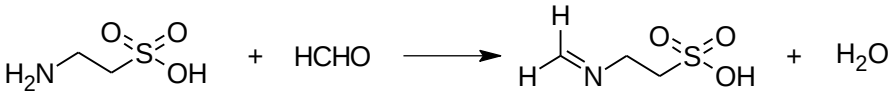
Application Note

Determination of taurine

Industry	Pharmaceutical
Instrument	Automatic potentiometric titrator
Measurement method	Potentiometric titration / Neutralization titration
Standards	Japanese Pharmacopoeia

1. Scope

This Application Note describes an example of quantifying taurine (2-aminoethanesulfonic acid) using the method prescribed in the Japanese Pharmacopoeia.
Taurine is a zwitterionic compound with an amino group ($-NH_2$) and a sulfo group ($-SO_3H$) in the molecule. The charge of a zwitterion changes with the pH, so it cannot be titrated as is. However, if formaldehyde is added, it acts on the amino group as shown below, and only the sulfo group remains.



Accordingly, a solution formed by dissociation of the sulfo group will acidulate and can then be titrated with a base.

2. Precautions

Formaldehyde reagents have an irritating odor and are extremely toxic to humans, so when performing the actual measurement, place the measuring instrument in a local exhaust system.

3. Post-measurement procedure

When storing the electrode, seal the electrolyte filling port in the comparison electrode with a rubber stopper.
The performance of the glass electrodes quickly deteriorates if they are stored while dry. The following storage methods are recommended.

- Short-term storage (less than one month): Store in pure water.
- Long-term storage (one month or longer): Store in a mixture of equal amounts (by volume ratio) of a pH 4 standard solution and a 3.3 mol/L aqueous potassium chloride solution.

4. Apparatus

Main unit	Automatic potentiometric titrator (preamplifier STD)
Electrode	Combined glass electrode (Internal solution 3.3 mol/L potassium chloride solution)

5. Reagents

Titrant	0.1 mol/L sodium hydroxide solution
Additional reagents	36 to 38 % formaldehyde solution (a special class of reagent in accordance with JIS K 8872)

6. Procedure

1) Introduce approximately 0.2 g of the sample into a beaker, and weigh it.
2) Add 50 mL of pure water, and dissolve the sample.
3) Add 5 mL of a formaldehyde solution.
4) Titrate with a 0.1 mol/L aqueous sodium hydroxide solution.
   Note: In addition, perform a blank test under the same conditions, and correct the titration volume during sample measurement.

7. Calculation

Purity of taurine (%) = (EP1 - BL1) × TF × C1 × K1 / S

EP1	Titration volume (mL)
BL1	Titration volume (mL) for a blank test = 0.0389
TF	Titrant factor = 0.9857
C1	Concentration conversion coefficient = 12.52 mg/mL
K1	Unit conversion coefficient = 0.1
S	Weight of sample introduced (g)

8. Example

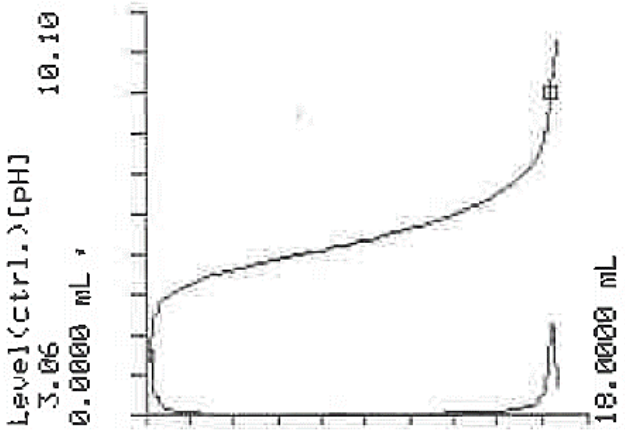
— Parameter —

<Titr. Mode>	Auto control
<Titr. Form>	EP Stop
<Titr. Para.>	
Max Volume	20 (mL)
Channel/Unit (Ctrl.)	Ch1, mV
Wait Time	0 (s)
Dose Mode	None

<Ctrl. Para.>	
End Point No.	1
End Sense (dE/dmL)	Auto
Gain	1
Data Sampling	Slow
Data Sampling	Slow
Other Control	Standard
Stirrer Speed	4
Auto Int. Mode	Standard

（The above condition is an example. The setting condition depends on the model.）

— Example of titration curve —



— Measurement results —

	Sample (g)	Titration (mL)	Taurine (%)
1	0.2021	16.4497	100.17
2	0.2031	16.5036	100.01
3	0.2062	16.7675	100.08
Average	-	-	100.09
SD	-	-	0.08
RSD (%)	-	-	0.08