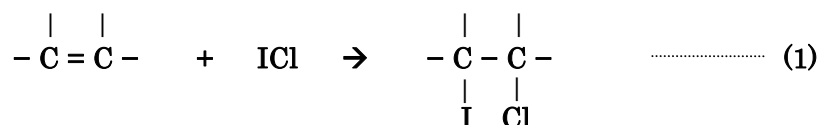


AQUACOUNTER Application Sheet	COM series	DATA No. A8	1st edition
Food and Beverage	Measurement of iodine number in edible oil		

1. Measurement outline

Fats and oils that contain unsaturated fatty acids such as oleic acid and linoleic acid consume iodine, because iodine will react with the double bond in such unsaturated fatty acid. Iodine number is expressed as the “grams of iodine equivalent to halogen quantity added to 100g of the sample,” and it indicates the quantity of double bond (= unsaturated fatty acid) in oils and fats. As the source for halogen, iodine bromide (IBr, Hanus method) or iodine chloride (ICl, Wijs method) is used. This section describes the Wijs method that is relatively popular. An excessive volume of iodine chloride solution is added to the number of double bonds. One halogen molecule is added quantitatively to one double bond in oil/fat. (1).



Residual iodine chloride reacts with iodide to liberate iodine quantitatively. (2)



Iodine is titrated with sodium thiosulfate. (3).



2. Reagents and Electrodes

(1) Reagents	Titrant	0.1mol/L Sodium thiosulfate
	Wijs solution (Iodine chloride)	Commercially available
	Loading buffer	1 mol/L Potassium iodide solution
	Titration solvent	Cyclohexane
(2) Electrodes	Indicator electrode	Platinum reference electrode PR-731B to IE jack (P/N D252341-1)

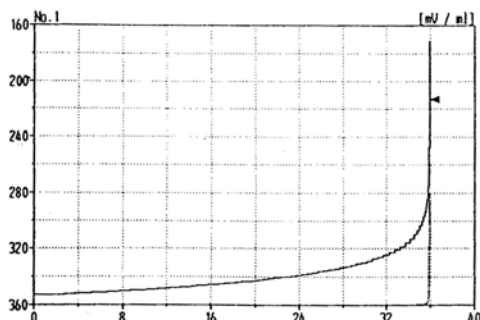
3. Measurement conditions example (for COM-1600S)

Master File No.1	
Condition file: 1	
Parameters for Condition file 1	
Method	AUTO
Buret No.	1
Meas Unit	mV
S-Timer	10 sec
CP,DP Unit	mL
CP	0 mL
DP	0 mL
Direction	N/A
End Sens	200
Over mL	0 mL
Max Vol	20 mL
Mode No.	8 (Pulse = 8, Min Feed = 0.01)
Unit	g/100g
Formula	$(B \cdot D) \times K \times F \times M / (S \times 10)$
Blank	0
Molarity	0.1
Factor	Titre of the titrant
K	126.9

4. Measurement Procedure

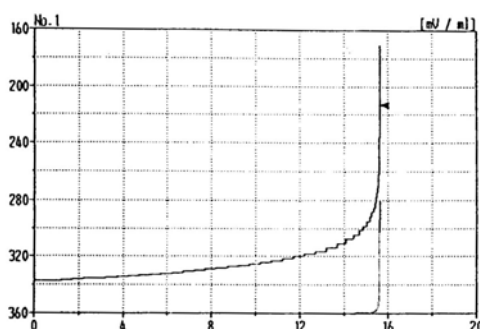
- 1) Weigh the sample accurately into 250mL glass stoppered flask.
- 2) Add 15-20mL of cyclohexanone and dissolve the sample completely.
- 3) Pipette 25mL of Wijs solution into the flask.
- 4) Stopper the flask and swirl to mix.
- 5) Store the flask in dark for 30 minutes.
- 6) Add 20mL of KI solution followed by 100mL of deionized water.
- 7) Titrate with 0.1mol/L Sodium thiosulfate titrant.
- 8) Perform at least two blank determinations.

5. Measurement example



Blank measurement results

Sample No.	Titration value (mL)
1	35.895
2	35.867
3	35.834
4	35.846
Avg.	35.861 mL
Std. Dev.	0.027 mL
C.V.	0.075 %



Measurement results of iodine number in sample

Sample No.	Sample size (g)	Titration value (mL)	Iodine number (g/100g)
1	0.2000	16.156	125.0
2	0.2024	15.861	125.4
3	0.2023	15.698	126.5
4	0.2021	15.756	126.2
Avg.			125.8 g/100g
Std. Dev.			0.70 g/100g
C.V.			0.55 %

6. Note

- (1) Wijs solution shall be added so that it is excessive by 50 – 60% of the required volume. If Wijs solution is absorbed more than this level, the sample volume must be reduced.
- (2) Since Wijs solution tends to be modified easily, blank measurement shall be implemented as necessary.
- (3) Since iodine may evaporate during the period of reaction between the sample and Wijs solution, Erlenmeyer flask with a stopper shall be used.
- (4) The reaction period may be reduced depending on the sample. The table on the right shows the relationship between the reaction period and measurement result for iodine number measurement on edible oil for reference.
- (5) Japanese Pharmacopoeia uses iodine trichloride instead of iodine monochloride in Wijs solution.
- (6) This method is said to have tendency to have higher values compared to the Hanus method .
- (7) The electrode assembly to be used in this measurement is shown in Figure 1.

Reaction period (min.)	Iodine number (g/100g)
10	125.8
20	126.4
30	125.8

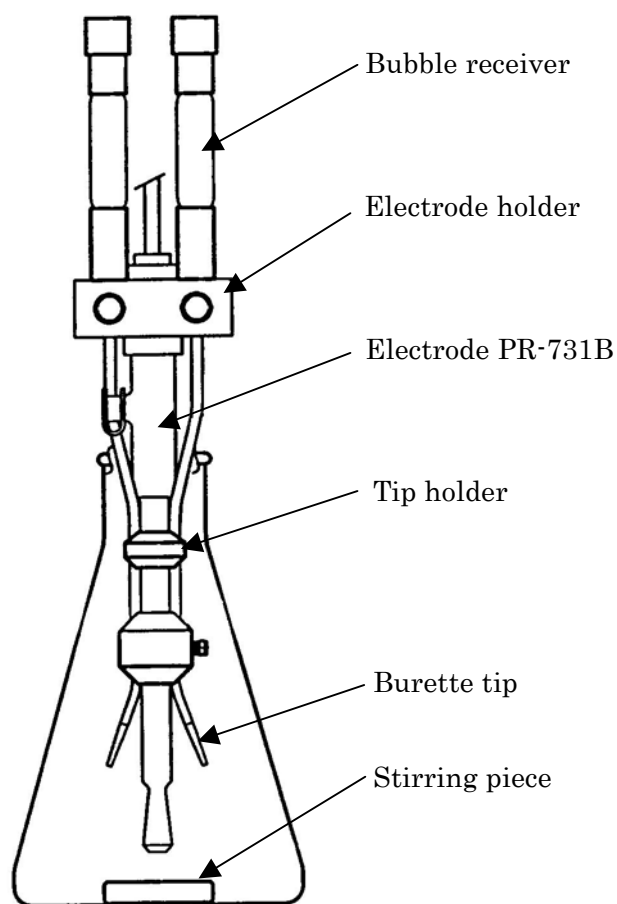


Figure 1. Example of electrode assembly used in titration

Key words

Iodine number, Hanus method, Wijs method

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