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|-------------------------------|---|-------------|-------------|
| AQUACOUNTER Application Sheet | COM series | DATA No. C9 | 1st edition |
| Cosmetics | Measurement of saponification value in odorants | | |

1. Measurement outline

The saponification value of essential oil, raw material for odorant, is measured according to JIS K0070-1992 (saponification value test for oil and fat products and chemical products).

In general, glyceride is saponified and decomposed and forms potassium salt of fatty acid and glycerol when ethanol solution of potassium hydroxide is added to oil/fat and heated (Formula 1). It also reacts with organic acids (Formula 2) and forms potassium salt of fatty acid. "Saponification value" is the number of milligrams of KOH that is consumed by 1 g of oil/fat, which contain such as glyceride and free fatty acids to be neutralized. This measurement method is stipulated in JIS, JAS and Standard Methods of Analysis for Hygienic Chemists.



Excessive KOH is titrated with 0.5mol/L HCl after addition of 100mL of deionized water.



2. Reagents and Electrodes

| | | |
|----------------|--|---|
| (1) Reagents | Titrant | 0.5mol/L Hydrochloric acid |
| | Reaction liquid | 0.5mol/L Potassium hydroxide-ethanol solution |
| (2) Electrodes | Glass reference combination electrode GR-522B to IE jack.(P/N D252334-1) | |

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

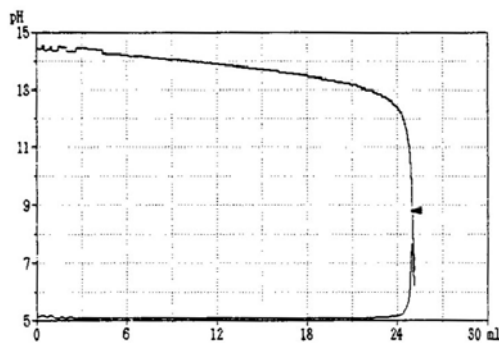
| | |
|---------------------------------|---------------------------------|
| Master File No.1 | |
| Condition file: 1 | |
| Parameters for Condition file 1 | |
| Method | AUTO |
| Amp No. | 1 |
| Buret No. | 1 |
| Meas Unit | pH |
| S Timer | 0 sec |
| CP | 0.00 mL |
| DP | 0.00 mL |
| End Sens | 1000 |
| Over mL | 0.00 mL |
| Max Vol | 40 mL |
| Mode No. | 2 |
| Unit | mg/g |
| Formula | $(D-B) \times F \times 28.05/S$ |
| Blank | *BLNAK result value |
| Molarity | 0.5 |
| Factor | Titer of the titrant |
| K | 56.1 (as KOH) |

| | |
|-----------|-------|
| Mode No.2 | |
| Pre Int | 0 sec |
| Del K | 5 |
| Del Sens | 0 mV |
| Int Time | 1 sec |
| Int Sens | 3 mV |
| Brt Speed | 2 |
| Pulse | 40 |

4. Procedure

1 – 2g of sample is collected and 25mL of 0.5mol/L KOH-ethanol solution is added precisely for heating in water bath for 30 minutes with a reflux condenser.

5. Measurement example



Results of blank test measurement

| Sample No. | Titration value (mL) |
|-------------|----------------------|
| 1 | 26.211 |
| 2 | 26.358 |
| Avg. | 26.285 mL |

Results of measurement on saponification value for the sample

| Sample No. | Sample quantity (g) | Measurement value (mL) | Saponification Value (mg/g) |
|-------------|---------------------|------------------------|-----------------------------|
| 1 | 1.5231 | 24.951 | 24.713 |
| 2 | 1.2845 | 25.195 | 23.942 |
| Avg. | | | 24.327 mg/g |

6. Note

- 1) Since this method requires preprocessing on the sample, the quality of preprocessing has great effect on measurement results.
- 2) A 200mL- Erlenmeyer flask is used for preprocessing. Add a sufficient quantity of deionized water to immerse the electrode immediately after preprocessing. And then insert glass reference combination electrode GR-522B into the Erlenmeyer flask to start titration. Figure 1 shows the electrode assembly for this measurement.

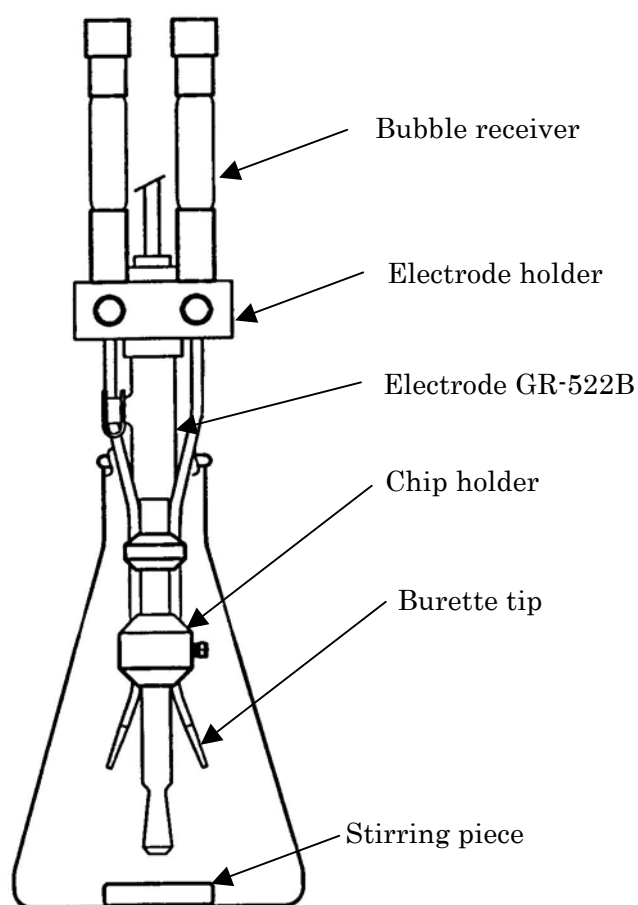


Figure 1. Example of electrode assembly used in titration

3) Relationship among acid value, saponification value and ester value

- Saponification value is the value for calculating the ester value.

Ester value = saponification value – acid value

- In general, acid value for oil/fat is much smaller than the saponification value.

Acid value << saponification value

- Saponification value and ester value do not differ much.

Saponification value is adopted as the index value for oil/fat for assuming the size of fatty acid (JAS).

Key words

Cosmetic product, saponification value, odorant

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>