Nittoseiko Analytech

Application Sheet

Sheet No.

GT200-OF030E Oil

Determination of acid number of palm oil —— 1/4

Method	: Non-aqueous acid-base titration
Apparatus	: Automatic Titrator model GT-200 (GT0EF)
	Electrodes: Reference electrode, sleeve type (GTRS10B) *
	Inner solution: 3.3mol/l Potassium chloride
	Glass electrode (GTPH1B)
Titration mode	: INF, Detection: pH and mV
Related standard	: 1) Japan Agricultural Standards "Japanese Agricultural Standards for Edible Vegetable Oils and Fats," "Acid Numbers"
	2) Japan Oil Chemists' Society. "JOCS Standard Methods for the Analysis of Fats, Oils and Related Materials," "Acid Numbers"

*This application sheet is provided as reference, and does not assure the measurement results. Please consider analysis environment, external factors and sample nature for optimal conditions before the measurement.

Outline

Palm oil is a vegetable oil obtained from the fruit of an oil palm. In addition to the use as cooking oil, it is used as raw materials for soap, detergent and biodiesel.

Reagents

[Titrant]
■0.1mol/L-potassium hydroxide solution in ethanol (Volumetric analysis grade)
[Adjustment reagents]
■Titration solvent … Diethyl ether: Ethanol (1:1)

Analytical Procedure

[Pretreatment]
As palm oil is solid at room temperature, melt it down in a water bath before the determination.
(1) Add a sample in a quantity determined according to the acid number of the sample (10g±0.05g for this sample) into a 100ml beaker.
(2) Collect 50ml titration solvent using a measuring cylinder and add it into the above-mentioned beaker.
(3) Titrate with 0.1mol/L-potassium hydroxide solution in ethanol.

[Calculation]
Acid number (mg KOH/g) = 5.611 x A1 x f/S

5.611: Content of potassium hydroxide in 1ml of 0.1mol/L-potassium hydroxide solution in ethanol (mg)
A1   : Titration volume of 0.1mol/L-potassium hydroxide solution in ethanol at sample titration (ml)
f   : Factor of 0.1mol/L-potassium hydroxide solution in ethanol
S   : Sample volume (g)

Other Requirements

■Make sure to confirm labels and safety data sheets of reagents and gases used for the measurement and handle them with enough care.

■Wear protective equipment (eye protector, gloves and others) when handling reagents.

Measurement Results

Acid number of palm oil

Detection : pH

	Sample size (g)	Titration volume (ml)	Results (mgKOH/g)
1	10.0438	10.2123	5.71
2	10.0044	10.1636	5.70
3	10.0101	10.0782	5.65

Nos. of data   (n)   3
Average   5.7
Standard deviation   (SD)   0.03
Relative standard deviation (RSD%)   0.22

Acid number of palm oil

Detection : mV

	Sample size (g)	Titration volume (ml)	Results (mgKOH/g)
1	10.0198	10.1053	5.66
2	10.0194	10.0750	5.64
3	10.0248	10.1235	5.66

Nos. of data   (n)   3
Average   5.7
Standard deviation   (SD)   0.01
Relative standard deviation (RSD%)   0.22

Acid numbers of palm oil were measured using GT-200. The average of three measurements was 5.7 mg KOH/g. GT-200 can measure acid numbers with good repeatability in both pH detection and mV detection.

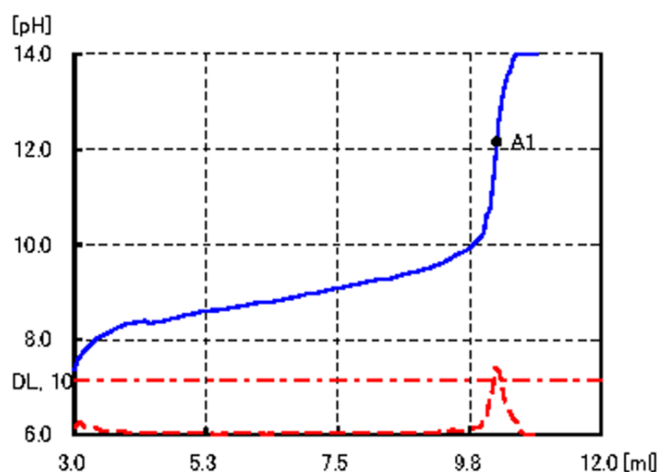ID No. : 4 GT No.1   User : GT-200

Measurement   : 2014/12/16 12:19   Type   : Sample Titr
Sample name   : Palm oil   Sample size(S)   : 10.0438 [g]

C1 : 5.705 [mgKOH/g]

A1 : 10.2123 [ml]   12.155 [pH]

Initial potential (Pi) : 6.318 [pH]
Start   : 3   [ml]   7.374   [pH]
End   : 10.892   [ml]   14   [pH]   Time : 10'51"

Run file No. : 20 Acid number of Palm oil
Titration file No.: 55 Acid number of Palm oil
*Run file and Titration file parameters are set for each analysis item
Mode   : INF   End1, End1 Width : 11 [pH] ± 2 [pH]
Detect   : pH
BRT No.   : 1   Preset 1   Mode : V   BRT : 1
Reagent   : 18   Volume   : 3 [ml]
WTint   : 30   [sec]   Position   : Titration
Vup   : 100   [µl]
Vlow   : 50   [µl]
dE   : 0.1   [pH]
dT   : 5   [sec]
DL   : 10   [pH/ml]
DetCnt   : 10
Vmax   : 20   [ml]   C1 : 5.611*A1*f/S
Vover   : 0.2   [ml]   [mgKOH/g]

Reagent name (Reag) : KOH/EtOH   Equivalent (E) : 1   Molarity(M) : 0.1 [Mol/l]
Factor (f)   : 1

Buret Injection Speed : 500 [ul/sec]

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ID No. : 7 GT No.1   **User : GT-200**

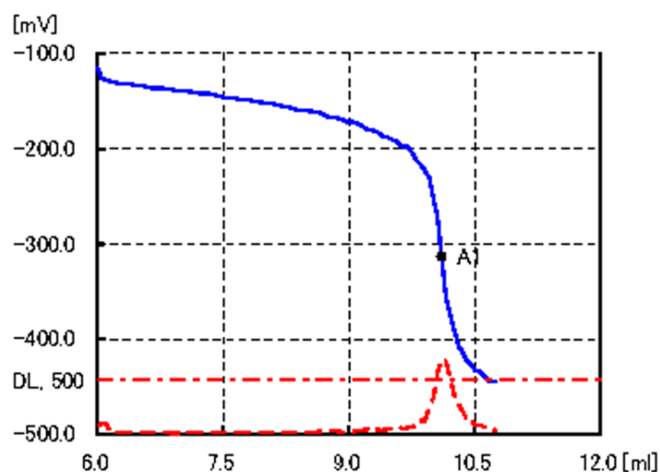Measurement   : 2014/12/16 14:20   Type   : Sample Titr
Sample name   : Palm oil   Sample size   : 10.0198 [g]

C1 : 5.659 [mgKOH/g]

A1 : 10.1053 [ml]   -313 [mV]

Initial potential (Pi) : 14 [mV]
Start   : 6   [ml]   -115   [mV]
End   : 10.756   [ml]   -445   [mV]   Time : 16'48"

Run file No.   : 20 Acid number of Palm oil
Titration file No. : 56 Acid number of Palm Oil mV
*Run file and Titration file parameters are set for each analysis item

Mode	: INF		End1, End1 Width): 500 [mV] ± 1500 [mV]
Detect	: mV1		
BRT No.	: 1		Preset1 Mode : V BRT : 1
Reagent	: 18		Volume : 6 [ml]
WTint	: 30	[sec]	Position : Titration
Vup	: 100	[μl]	
Vlow	: 50	[μl]	
dE	: 0.1	[mV]	
dT	: 3	[sec]	
DL	: 500	[mV/ml]	
DetCnt	: 10		
Vmax	: 20	[ml]	C1 : 5.611*A1*f/S
Vover	: 0.2	[ml]	[mgKOH/g]

Reagent name (Reag) : KOH/EtOH   Equivalent (E) : 1   Molarity (M) : 0.1 [Mol/l]
Factor (f) : 1

Buret Injection Speed : 500 [ul/sec]