

Fat and Oil

POV of Animal Fat

Redox titration by
Automatic Potentiometric Titrator

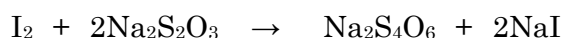
Standard

Standard Test Method
for Fat and Oil
ISO 3960

1. Abstract

Peroxide value of animal fat is determined according to JOCS (see below) for a sample dissolved in mixed solvent of Chloroform and Acetic acid (2:3) from which the dissolved oxygen is removed by nitrogen gas flowing through the sample while Potassium iodide is being added. Then, perform titration of free iodine with 0.01mol/L Sodium thiosulfate up to the endpoint, which is the maximum inflexion on titration curve.

POV is calculated from titration volume of Sodium thiosulfate.



2. Reference

- 1) Standard Test Method for Fat and Oil set by Japan Oil Chemists' Society [JOCS] Reference 2.4-1996 POV (Chloroform Method)
- 2) ISO 3960 : 2007 Animal and vegetable fats and oils – Determination of peroxide value

3. Cautions in measurement

- 1) To prepare saturated potassium iodide solution, do not use pure water containing carbon dioxide.
- 2) To confirm saturation, add excessive potassium iodide to the saturated potassium iodide solution, and leave crystal in the solution.
- 3) Prepare fresh saturated potassium iodide each time.
- 4) If the sample does not change in color to yellow due to free iodine when saturated potassium iodide is added, add more saturated potassium iodide except when blank test is performed or if peroxide value is very small in number.
- 5) It is necessary to remove dissolved oxygen in sample completely by flowing nitrogen gas before Potassium iodide is added.

4. Post-measurement care

Rinse the electrode with pure water, and keep it dipped in water to avoid drying up.

5. Test equipment

Main unit : Automatic potentiometric titrator (Standard preamplifier: STD-)

Electrode : Option combination Pt. electrode

6. Reagent

Solvent : Chloroform + Acetic acid (2+3), Pure water

Additive : Saturated potassium iodide

Titrant : 0.01mol/L Sodium thiosulfate (f=1.002)

Inactive gas : Nitrogen gas

7. Measurement procedure

—Pretreatment—

- 1) Add 300mL Acetic acid to 200mL Chloroform to prepare solvent.
- 2) Add Potassium iodide to pure water until saturated.

—Measurement—

- 1) Sample 5g precisely weighed into a 100mL conical flask with ground-in stopper.
- 2) Add 30mL solvent, and gently shake to dissolve sample completely.
- 3) Gently flow nitrogen gas into the flask to replace dissolved oxygen.
- 4) Continue to flow nitrogen gas and add 0.5mL Potassium iodide, and immediately seal the flask to stir in an ultrasonic cleaner for 30 seconds.
- 5) Leave it in a dark place for 5 minutes.
- 6) Add 30mL water and plug. Stir for further 30 seconds in the ultrasonic cleaner.
- 7) Titrate with 0.01mol/L Sodium thiosulfate to obtain POV.
※Likewise, obtain blank level in advance by a blank test.

8. Formula

Peroxide value (meq / kg) = (EP1 - BL1) × TF × R / SIZE

EP1 : Titration volume (mL)
BL1 : Blank level (0.00mL)
TF : Factor of reagent (1.002)
R : Constant (10)
SIZE : Sample size (g)

9.Example of measurement

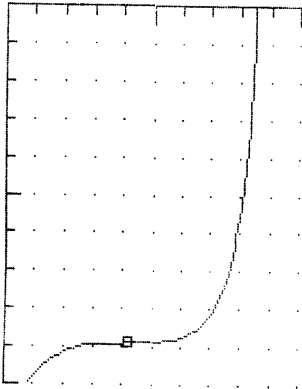
— Ambient condition —

Rom temperature : 23 °C	Humidity : 20 %	Weather : Fair
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- Titration parameter -

Model : AT-510 Method No. : 19 Titr.mode : Blank Titr.form : EP Stop	
[Titration parameter]	[Result parameter]
Form : EP Stop APB No. : 1 Unit No. : 1 Detector No. : 1 Unit : mV Max. Volume : 10.0mL Wait Time : 0s Direction : Auto	<Calculation> Calc. Type : Sample Conc.1 : Set CO1=(EP1-BL1)*TF*C1/SI ZE Unit : meq/kg EP No. : 1 Temp.Comp. : Off
[Control parameter]	<Constant> C1 : 10
End Point No. : 1 End sense : Auto End Point Area : Off Separation : Off Over Titr.Vol. : 0mL Gain : 1 Data samp.Pot. : 4.0mV Data samp.Vol. : 0.1mL Stability : 0.5mV/s Delay Time : 1s Limit Time : 30s	<Titr. Constant> Factor : 1.002 <Blank> Blank1 : 0.00

- Titration curve -

*** R e s u l t *** Sample No. : 07-01 Date : 2000/02/25 11:51 Method No. : 19 <Blank Titration> Method Name: Blank Titration <Constant> C1(mg/mL) : 10 Titr.Time : 00:36:04 Size : 5.0909g Conc-1 : 3.5016meq/kg End Point-1 Volume : 1.7791mL Potential : 184.3mV 100 [mV] 300 0.000  2.000 [mL]

(The above printout data were obtained from titration by AT-510 unit)

«Titration parameter»

Form: of titration / APB No. the burette used in titration / Unit No.: [APB Unit File number](#)
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 / End sense: direction of EP / End Point Area: detection area
Separation: of potential / 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: of titration / Delay Time: before stability check / Limit Time: for stability check

«Result parameter»

Calc.Type: of formula / Conc.1 formula 1 / Unit of result
EP No. for calculation / Temp.Comp. temperature compensation of titration liquid / R: constant
Factor: of reagent / Blank1: blank level 1

—Measurement results—

n	Sample (g)	Titration (mL)	POV (meq/kg)	Mean POV (meq/kg)
1	5.0909	<u>1.7791</u>	3.5016	3.5017
2	5.1416	1.7968	3.5017	

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

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

10. Summary

The animal fat means from meat like beef, pork, etc.

POV is a good measure to determine deterioration of meat products.

The measurement results show a favorable repeatability. Precise and reliable measurement is assured by the automated potentiometry.

POV of animal fat can be perfectly measured by any of the following titration systems manufactured by Kyoto Electronics (KEM).

【AT-610】



Awarded Product of Supreme Technology from Kyoto City

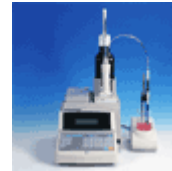
- Easy key entry by touch panel of large color LCD (8-inch wide)
- Simultaneous titration in parallel
- Both potentiometric and Karl Fischer moisture titration (coulometric·volumetric) can be performed at a time.

【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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