# Determination of Peroxide value (POV) in fats and oils

Description

The Peroxide number (POV) is indicator for the state of unsaturated oils and fats. Unsaturated oils and fats become rancid by oxidation, forming peroxides.

The determination of the POZ is done by titration with sodium thiosulfate after reaction of the sample with potassium iodide, wherein the iodide is oxidized by the peroxides to iodine.

$$R\text{-}OOH + 2I^- \rightarrow R\text{-}OH + I_2$$

$$I_2 + 2\ S_2O_3^{2-} \rightarrow 2\ I^- + S_4O_6^{2-}$$
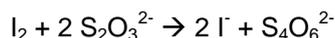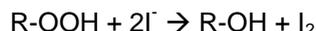
The solvent used for the sample is a mixture of glacial acetic acid and chloroform. Depending on the sample, it is also possible to use decanol or hexanol instead of chloroform.

The POV is calculated as $mmol_{peroxide}/kg$.

Instruments

Titrator	TL 7000 or higher
Exchange unit	WA 10
Electrode	Pt 62 oder Pt 61
Cable	L1A
Stirrer	Magnetic stirrer TM 235 or similar
Lab accessory	Erlenmeyer flask 100 ml with stopper
	Magnetic stirrer bar 30 mm

Reagents

1	Sodium thiosulfate 0.01 mol/l (for very low POV 0.001 mol/l)
2	Potassium Iodide
3	Glacial acetic acid
4	Chloroform (depending on the sample Decanol or Hexanol are also possible)
All reagents should be of analytical grade or better.	

Titration procedure

Reagents

The titer determination of the $Na_2S_2O_3$ - solution is carried out as described in the application report "Titer determination of $Na_2S_2O_3$".

Solvent mixture
600 ml glacial acetic acid are mixed with 400 ml chloroform.

Potassium iodide solution
10g of Potassium iodide are dissolved in 13g distilled water. The KI solution should be prepared fresh each day.

Cleaning of the electrode

The electrode is rinsed with distilled water and, if necessary, with solvent. The electrolyte solution L300 is suitable for storage.

Blank value
To determine the blank value, 30 ml of solvent mixture are placed in a 100 ml Erlenmeyer flask and 0.5 ml of KI solution are added. The flask is closed and the mixture is stirred for 60 sec. Subsequently, 30 ml of dist. Water are added and titrated with sodium thiosulfate.

Sample preparation

Approximately 1 g of sample is weighed into a 100 ml Erlenmeyer flask and dissolved in 30 ml of solvent mixture. 0.5 ml of KI solution are added. The flask is closed and the mixture is stirred for 60 sec. Subsequently, 30 ml of dist. Water are added and titrated with sodium thiosulfate to an equivalence point.
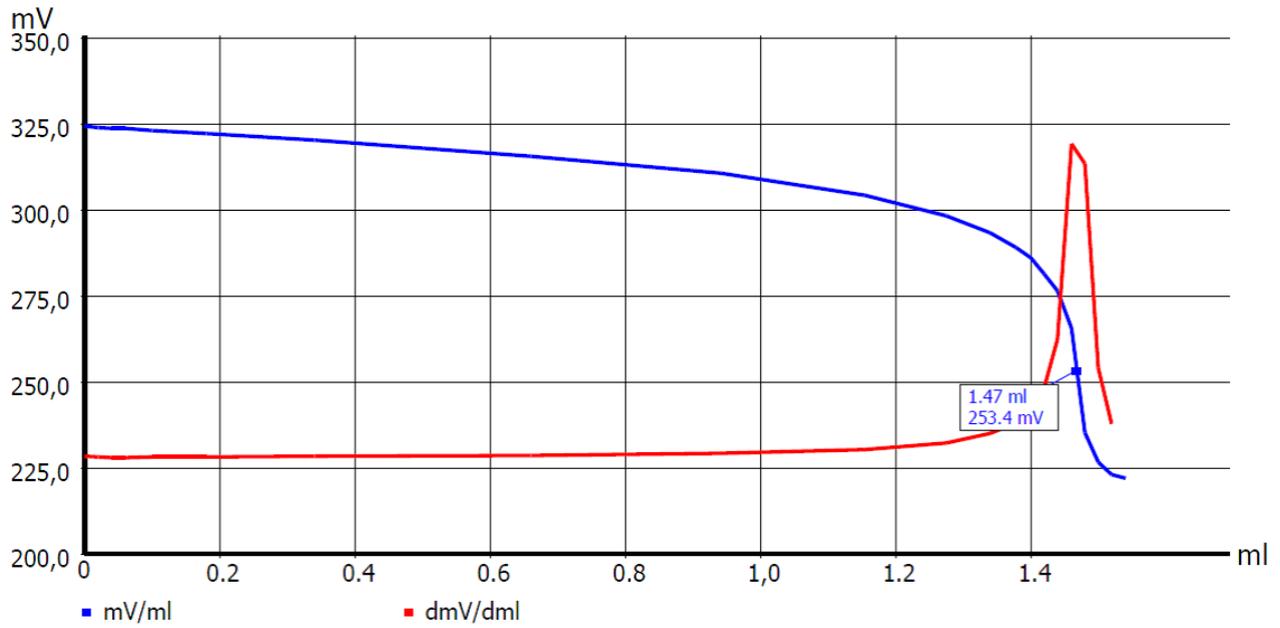
Titration parameter

Blank titration
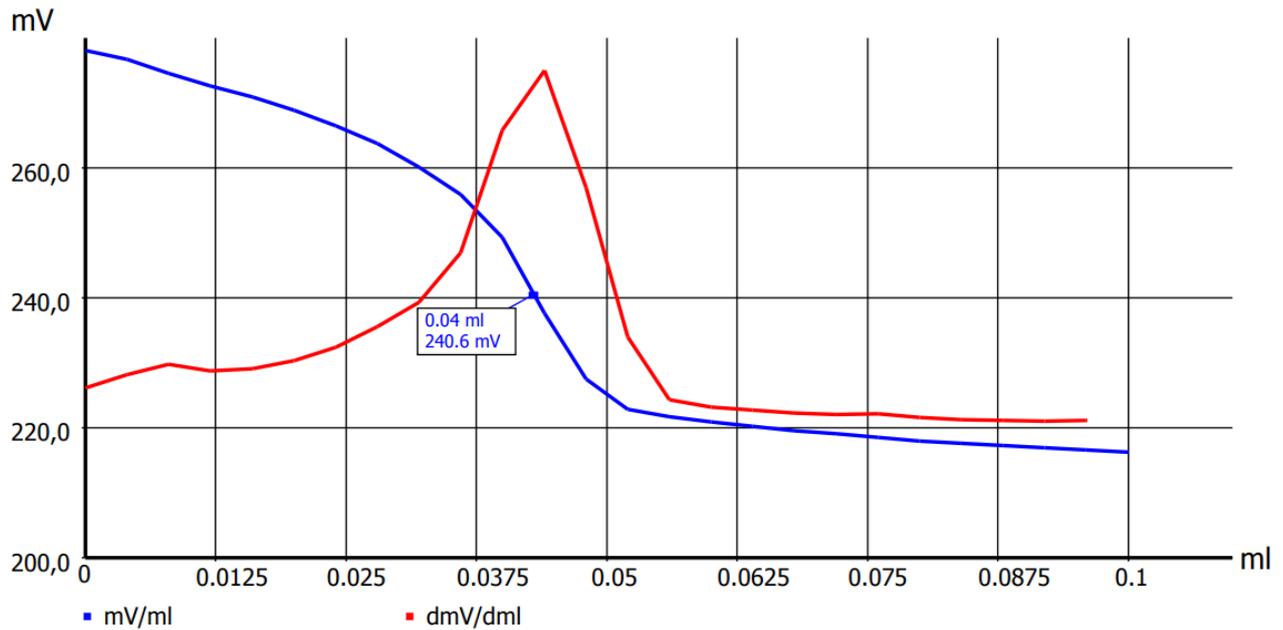
Default method	-		
Method type	Automatic titration		
Modus	linear		
Measured value	mV		
Measuring speed / drift	individual	Minimum holding time	4 s
		Maximum holding time	15 s
		Measuring time	3 s
		Drift	10 mV/min
Initial waiting time	5 s		
Linear steps	0.004 ml		
Damping	none	Titration direction	decrease
Pretitration	off	Delay time	0 s
End value	off		
EQ	On (1)	Slope value	120
Max. titration volume	0.2 ml		
Dosing speed	100%	Filling speed	30 s

Calculation:

$$ml = EQ1$$

The result is saved in a global memory, e.g. M01. We recommend to use statistics = 3.

Sample titration

Default method	-		
Method type	Automatic titration		
Modus	Dynamic		
Measured value	mV		
Measuring speed / drift	Individual	Minimum holding time	4 s
		Maximum holding time	15 s
		Measuring time	3 s
		Drift	10 mV/min
Initial waiting time	5 s		
Dynamic	average	Max step size	1.0 ml
		Slope max ml	10
		Min. step size	0.02 ml
		Slope min. ml	120
Damping	none	Titration direction	decrease
Pretitration	off	Delay time	0 s
End value	off		
EQ	On (1)	Slope value	120
Max. titration volume	5 ml		
Dosing speed	100%	Filling speed	30 s

Calculation:

$$POV = \frac{(EQ1 - B) * T * M * F1}{W * F2}$$

B	M01	Blank value from global Memory M01
EQ1		Consumption of titrant at first Equivalence point
T	WA	Actual concentration of the titrant
M	1	Molecular weight
W	man	sample weight in g
F1	1000	Conversion factor
F2	1	Conversion factor

Any questions? Please contact the application team:

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