DENVER INSTRUMENT



Acidity of Mustard and Associated Products

Introduction

The total acidity of mustard and many associated products such as mayonnaise refers to the sum of titratable acids using a strongly alkaline titrant like NaOH. An end point titration can easily be used with pH 7.50 as end point. Depending on the sample and local regulations, results are expressed as acetic acid content in g/l or mg/g or even as a %.This method is not suitable for edible oils, because they are not miscible with water.

Principle

The end point titration is very easy to run. The titrant is normally NaOH 0.1 eq/l. As the result is expressed as acetic acid content, the MW of CH_3COOH is 60 g/mol.

Electrode and reagents

pHC2401-8 Combined pH Electrode

NaOH 0.1 eq/l solution in distilled water

Distilled water

IUPAC Series pH standard solutions pH 4.005 (part no. S11M002) and pH 7.000 (part no. S11M004)

End Point titration settings

Burette volume:	25 ml
Stirring speed:	400 rpm
Working mode:	pH
Number of end points:	1
End point:	7.50 pH
Stirring delay:	30 seconds
Minimum speed:	0.2 ml/min
Maximum speed:	8.0 ml/min
Proportional band:	3.50 pH
End point delay:	5 seconds
Sample unit:	g
(depending to the sample can be also ml)	
Sample amount:	(see below)
Titration:	Increasing pH
Result:	%

Procedure

Dilute the sample in 50 or 100 ml of freshly distilled water. For some samples an efficient stirring procedure may be necessary.

Calibrate the combined pH electrode using pH 4.005 and pH 7.000 IUPAC standards.

Dip electrode and delivery tip the sample.

Start method by pressing the RUN key.

Results

As in this case 1 molecule of titrant reacts with 1 molecule of CH_3COOH

Expressed as g/l acetic acid
R = V(titr) * C(titr) * 60.0 / V(smp)

Expressed as mg/g acetic acid (or g/kg)
R = V(titr) * C(titr) * 60.0 *FDIL / W(smp)

Expressed as % acetic acid
R = V(titr) * C(titr) * 60.0 *FDIL / 10 * W(smp)

-V(titr) = total volume of titrant to reach the end point in ml

-C(titr) = Titrant concentration in eq/l (currently 0.1)

-W(smp) = sample amount in g

-V(smp) = Sample volume in ml

-FDIL = Dilution factor between the total volume used to dilute the sample and the aliquot used for titration.

For a result as a %
Enter

The actual sample amount in the SAMPLE screen

The titrant concentration in the TITRANT screen

1 Titrant and 1 Sample in the COEFFICIENTS display

60 as molecular weight

The Titration Manager gives the result according the above formula.
As the above-mentioned dilution factor FDIL is directly calculated by the titration manager, if necessary enter the following in the SAMPLE screen.

DILUTION: YES

The total sample amount
The final dilution volume
The aliquot volume

5 determinations on mustard
Mean: 1.8%
Standard deviation: 0.009
Rel. standard deviation: 0.5%

Working Range

Using application note conditions (0.1 for titrant concentration and 25 ml burette cylinder and 10 ml for sample volume), the working range is between 5.25 g/l (for 35% capacity of the burette) and 15 g/l (for the burette capacity) for the best reproducibility.
For 10 g of sample and FDIL=1 the experimental working range is between 5.25 g/kg and 15 g/kg or between 0.52% and 1.5%.

Notes

1) With some non-homogeneous products, it is necessary to ensure efficient stirring during titration. In this case, you can also use lower addition speeds and a longer end point delay (15 seconds for example)

2) According to different regulations or standards, the pH of the end point can be changed but other settings stay identical.