Aim 26

To Estimate the Acid Value of Fats and Oils

Introduction

Amount of KOH in mg required to neutralize the fatty acids present in 1g of fat/oil is defined as the acid value of fats and oil. Titration of sample with KOH is used to determine the amount of free fatty acids. The degree of deterioration of fats and oils is indicated by acid value due to hydrolysis of fats into fatty acids and glycerol.

Requirements

1. Burette
2. Conical flask
3. Test samples (olive oil, butter, refined oil etc)
4. KOH – 0.1 N
5. 95% ethanol-ether mixture(1:1)
6. Phenolphthalein – 1%
7. Oxalic acid – 0.1 N

Procedure

1. 1 g of fat sample and 10 ml of ethanol-ether mixture is taken in a flask and mixed well.
2. 2-3 drops of phenolphthalein solution is added and mixed properly.
3. Fresh solution of 0.1 N KOH is taken. Using phenolphthalein as an indicator, solution is standardized by titrating with a known volume (20 ml) of 0.1 N oxalic acid. Fill burette with KOH solution and take oxalic acid in flask. Add KOH solution into the

oxalic acid in drop wise manner till pink colour is appeared.

4. Calculate the actual normality of the KOH solution.

   $N_1V_1 = N_2V_2$

   Oxalic acid = KOH

   0.1 X 20 = N_2 x suppose y volume of KOH solution used

   N_2 = (0.1/ Y) X 20 = 2/Y

5. Titration of the fat sample with 0.1 ml KOH is done until the pink colour appears for 20 – 30 sec.
6. Write down the volume of KOH used.
7. The titration is repeated for other samples in the same way.
8. Also repeat the titration step with ethanol – ether mixture (blank).

Calculations

Volume of 0.1 N KOH solution used for blank = x ml

Volume of 0.1 N KOH solution used for test sample (fat/oil) = y ml

Titrate value for sample = (y - x) ml

Acid value (mg KOH/g fat) =

$$\frac{\text{Titre value x normality of KOH x 56.1}}{\text{Weight of sample (g)}}$$

$$\frac{(y-x) \times 0.1 \times 56.1}{1}$$

(1 ml of 1 N KOH contains 56.1 mg of KOH)

Molecular weight of KOH = 56.1

56.1 g/1000 ml = 1N

Or 56.1 mg/ml = 1 N

(So, to obtain the weight of KOH from the volume of 0.1 N KOH solution used, 56.1 is used).