

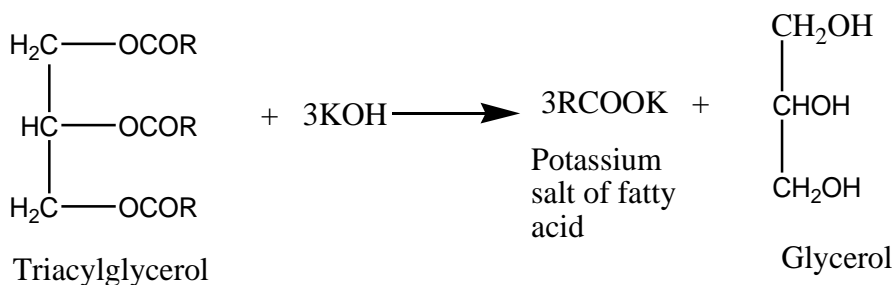
# Aim 27

## To Determine the Saponification Value of Fats and Oils

### Introduction

The hydrolysis of fat with an alkali and glycerol is termed as saponification, Na or K salts of fatty acids (soaps) are formed.

### Reaction



The mg of KOH required to saponify 1 g of the given fat is termed as saponification value. The saponification value of fat sample can be calculated from the amount of KOH utilized during hydrolysis.

Refluxing process can be used to determine the saponification value here refluxation of the known amount of fat with fixed but excess of alcoholic KOH is done. The back titration can be used to find out amount of KOH remaining after hydrolysis with 0.5 N HCl (standardized) and the amount of KOH utilized for saponification can be calculated after subtracting the KOH remaining after hydrolysis from the total amount of KOH added.

### Requiriments

1. Burette
2. Reflux condenser
3. Boiling water bath
4. Phenolphthalein solution – 1 %
5. *0.5 N alcoholic KOH* - Add 28.05 g of KOH in 30 ml water for the preparation of solution and add 95 % ethanol to make the final volume to 1.0 liter.
6. Fat/oil sample (coconut oil, corn oil, butter, mustard etc)
7. *Solvent* – ethanol (95 %) and ether (1:1)
8. HCl – 0.5 N

### Procedure

1. Take 1 g of fat sample in flask and dissolve it in 5 ml of the solvent.
2. 25 ml of alcoholic KOH is added and the contents are refluxed on boiling water bath for 30 min.
3. Let the solution cool and add two drops phenolphthalein solutions.
4. Take 0.5 N HCl in the burette.
5. The contents of the flask are titrated with HCl and note down the volume after complete disappearance of pink colour.
6. Repeat the same for the other samples.
7. Add a blank also (minus fat) and follow the same procedure as given above expect the addition of fat sample.

### Calculations

Volume of HCl used for blank = x ml

Volume of HCl used for test sample = y ml

Titre value for sample = (x - y) ml

That means (x - y) ml of KOH is utilized.

$$\text{Saponification value} = \frac{\text{Titer value} \times 28.5}{\text{Weight of sample (g)}}$$

(1 ml of 0.5 N KOH contains 28.05 mg of KOH)

### **Precautions**

1. Use water bath for refluxing, as alcohol is highly inflammable.
2. Use air tight apparatus for refluxing otherwise alcohol will get evaporated.
3. Condenser should be cooled during refluxing.