

Experiment No. 4

Aim of the experiment: To determine saponification value of given oil sample.

Apparatus required: 250ml Round bottom flask, beakers, reflux condenser, Buchner funnel, Bruchner flasks, thermometer, separatory funnel etc.

Chemical required: Oil sample, potassium hydroxide, ethanol (95%), hydrochloric acid, methyl red, phenolphthalein.

Principle: Saponification is the hydrolysis of fats or oils under basic conditions to afford glycerol and the salt of the corresponding fatty acid. The saponification value is the number of milligrams of KOH necessary to neutralize the free acids and to saponify the ester present in 1 gm of the substance.

Saponification value: $28.05(b-c)/w$

Where, W = weight in gm of the substance.

Procedure: Unless otherwise specified in the individual monograph, introduce about 2gm of the substance under examination, accurately weighed into a 200ml flask of borosilicate glass fitted with a reflux condenser. Add 25ml of 0.5 M ethanolic KOH and a little pumice powder and boil under reflux on a water bath for 30 min. Add 1ml of phenolphthalein solution and titrate immediately with 0.5 M HCl. Perform a blank determination omitting the substance under examination. Calculate the saponification value from the expression given above.

Significance of saponification value

1. Petroleum oils do not saponify whereas vegetable and animal oil have a characteristic saponification value.
2. Saponification value indicates presences of vegetable and animal's oil additive in blended lubricating oils.
3. Each blended oil has its own characteristics saponification value hence any deviation indicates changes of adulteration. Fats (triglycerides) upon alkaline hydrolysis (either with KOH or NaOH) yield glycerol and potassium or sodium salts of fatty acids (soap).