

Aim - Determination of Saponification Value of Fat or Oil

Saponification is the process by which the fatty acids in the glycerides of the oil are hydrolyzed by an alkali. The resultant salts of fatty acids are called soaps. Saponification value is the amount (mg) of alkali required to saponify a definite quantity (1g) of an oil or fat. This value is useful for a comparative study of the fatty acid chain length in oils. Each molecules of triglyceride uses 3 molecules of KOH for saponification. It is evident that each g of a triacylglycerol with shorter chain fatty acids will contain large number of molecules of the triacylglycerol and will thus require much more KOH. Whereas, longer the carbon chain the less acid is liberated per gram of fat hydrolysed.

Principle: A known amount of fat or oil is refluxed with an excess amount of alcoholic KOH. *After saponification*, the amount of KOH is estimated by titrating against standard acid. This will give the amount of KOH utilized for saponification.

Materials:

- 0.5N HCl
- Reflux condenser
- 0.5N alcoholic KOH solution: 28.05 g of KOH pellets dissolved in 20ml of distilled water and the volume is made upto 1000ml with 95% ethanol. The solution should remain clear.
- 1% phenolphthalein indicator

Method:

- Melt the sample if it is not already liquid and filter through paper to remove any impurities and traces of moisture. The sample must be completely moisture-free.
- Accurately weigh 2-5g of oil in 250ml conical flask.
- Add 25-50ml of alcoholic KOH from burette to dissolve the fat completely.
- Prepare a blank also by taking only alcoholic KOH same quantity used in the sample and allowing it to drain at the same duration of time.
- Attach the reflux condenser with the flask.
- Reflux the content by gentle boiling in a water bath for 1 hour.

- Cool the flask to room temperature.
- Add few drops of phenolphthalein indicator.
- Titrate the content with 0.5N HCl.

Calculation:

1ml of 0.5N HCl = 28.06 mg KOH

Saponification value =