EXPERIMENT 6 - LIPID ANALYSIS - TRIACYLGLYCEROLS

CALCULATION OF SAPONIFICATION NUMBER AND AVERAGE MOLECULAR WEIGHT OF TRIACYLGLYCEROLS

The simplest lipids constructed from fatty acids are the triacylglycerols, also referred to as triglycerides, fats, or neutral fats. Triacylglycerols are composed of three fatty acids each in ester linkage with a single glycerol.

Triacylglycerols are major components of the natural lipid in biological tissue. Depending on the nature of the constituent fatty acids, they may be either oils or low melting point solids. Plant triacylglycerols generally tend to be oils, reflecting a relatively high content of saturated fatty acids, whereas animal triacylglycerols are usually solid.

Information about the structure of triacylglycerols can be obtained by two parameters:

- Saponification Number
- Iodine Number

The saponification number gives an indication of the average molecular weight of the triacylglycerols, while the iodine number gives a relative measure of the degree of unsaturation.

Analysis of acylglycerols can be achieved by hydrolysis followed by isolation and characterization of products. Hydrolysis of acylglycerols is most easily accomplished in hot alkali (saponification) but as lipids.

The aim of this experiment is to calculate the saponification number of the oil sample and the average molecular weight of triacylglycerols.

**Procedure:**

- Get a round bottom flask (RBF). Clean your RBF, rinse it with distilled water, then with acetone and allow to dry in the oven.
- After RBF cool down, weight it and record the weight value.
- Measure 2 mL of oil with a graduated cylinder.
- Place the oil into RBF, weigh your RBF once again and record the difference as the weight of your oil sample.
- Set up a reflux apparatus (RBF+condenser). **DO NOT forget to add boiling chips.**
- Add 20 mL of 0.5M ethanolic NaOH into the RBF.
- Reflux for 30 min. **DO NOT forget to flow water through the condenser.**
- After reflux, transfer your solution into an erlenmeyer flask and add 1-2 drops of phenolphthalein as an indicator.
- Titrate the solution with 0.5M HCl.
- Record your end-point.

Questions:

✓ Write the reaction involved during the reflux process.
✓ Define the saponification number.
✓ Calculate the saponification number of your oil sample.
✓ Calculate the average molecular weight of triglycerides of your oil sample.
✓ Compare your saponification number with known values of different types of oils.