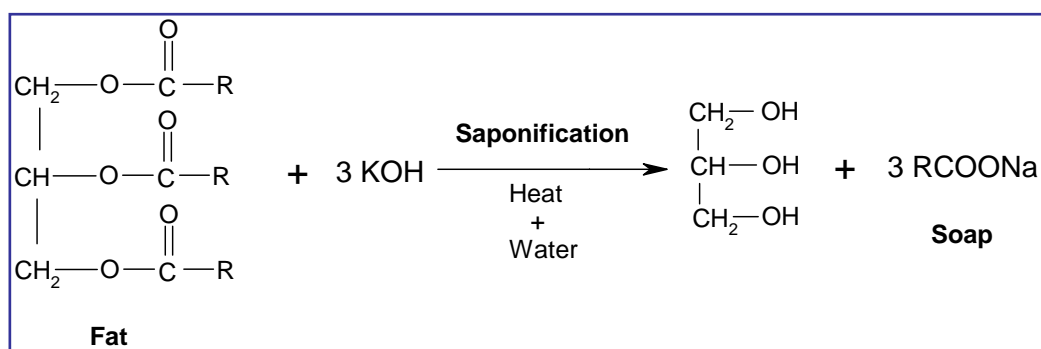




Determination of Saponification Number.

Principle:

On refluxing with alkali, triacylglycerols (fatty acid esters) are hydrolyzed to give glycerol and potassium salts of fatty acids (soap). Such process is known as, *Saponification*. The saponification equation is shown below:



The saponification value is the number of milligrams of KOH required to neutralize the fatty acids resulting from the complete hydrolysis of 1g of fat.

The saponification value gives an indication of the nature of the fatty acids constituent of fat and thus, depends on the the average molecular weight of the fatty acids constituent of fat. The greater the molecular weight (the longer the carbon chain), the smaller the number of fatty acids is liberated per gram of fat hydrolyzed and therefore, the smaller the saponification number and vice versa.

Materials:

- 1- Fats and oils (olive oil, coconut oil, sesame oil, and butter)
- 2- Fat solvent (equal volumes of 95% ethanol and ether)
- 3- Alcoholic KOH (0.5 mol/liter)

- 4-Reflux condenser.
- 5-Boiling water bath.
- 6-Phenolphthalein.
- 7-Hydrochloric acid (0.5 mol/liter)
- 8-Burettes (10 ml and 25 ml)
- 9-Conical flasks (250ml)

Procedure:

- 1- Accurately weight 1g of fat in a small beaker and dissolve it in about 3ml of the fat solvent.
- 2- Quantitatively transfer the contents of the beaker to a 250 ml conical flask by rinsing the beaker three times with a further milliliters of solvent.
- 3- add 25ml of alcoholic KOH and attach to a reflux condenser .
- 4- Set another reflux condenser as blank with everything present except the fat.
- 5- Heat both flasks on a boiling water bath for 30 min.
- 6- Leave to cool to room temperature and titrate with 0.5 mol/liter HCl and use phenolphthalein as indicator. Until the pink color disappears.
- 7- Record your readings as T ml for test and B ml for blank.

Calculations:

The difference between the blank and the test reading gives the number of milliliters of KOH required to saponify 1g fat.

You can use this formula to calculate the saponification value:

$$1\text{ml (0.5 N HCl)} = 28.05 \text{ mg KOH}$$

$$(B-T) = S$$

$$\text{saponification value (S)} = \frac{(B-T) \times 28.05}{\text{Wt. of fat (1g)}} = \text{mg KOH/1g}$$

Name:

No.

Experiment 10:



Results Sheet

- 1- Calculate the Saponification value -for your test oil.
- 2- Record the results your friends have obtained for other oils.

1- your results: