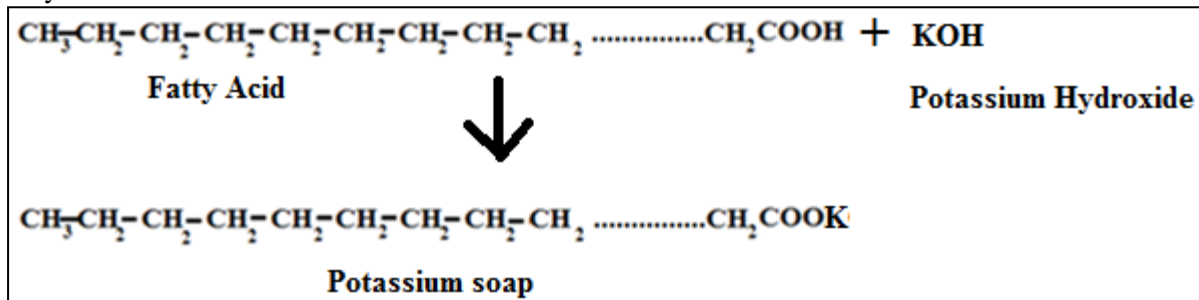


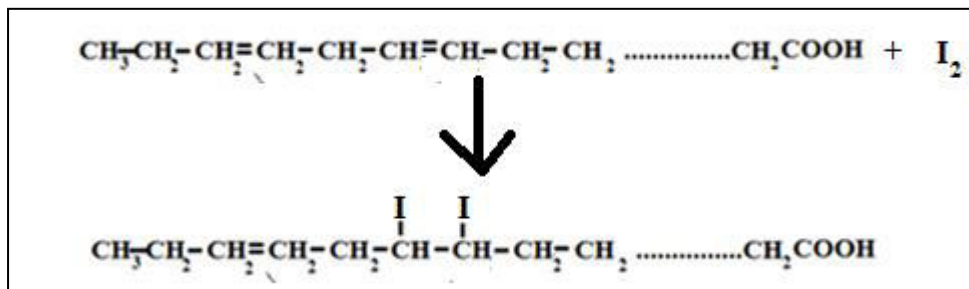
CHARACTERIZATION OF LIPIDS

The characterization of lipids includes the determination of physical and chemical characteristics of lipids. The following are the different techniques of characterization of lipids:

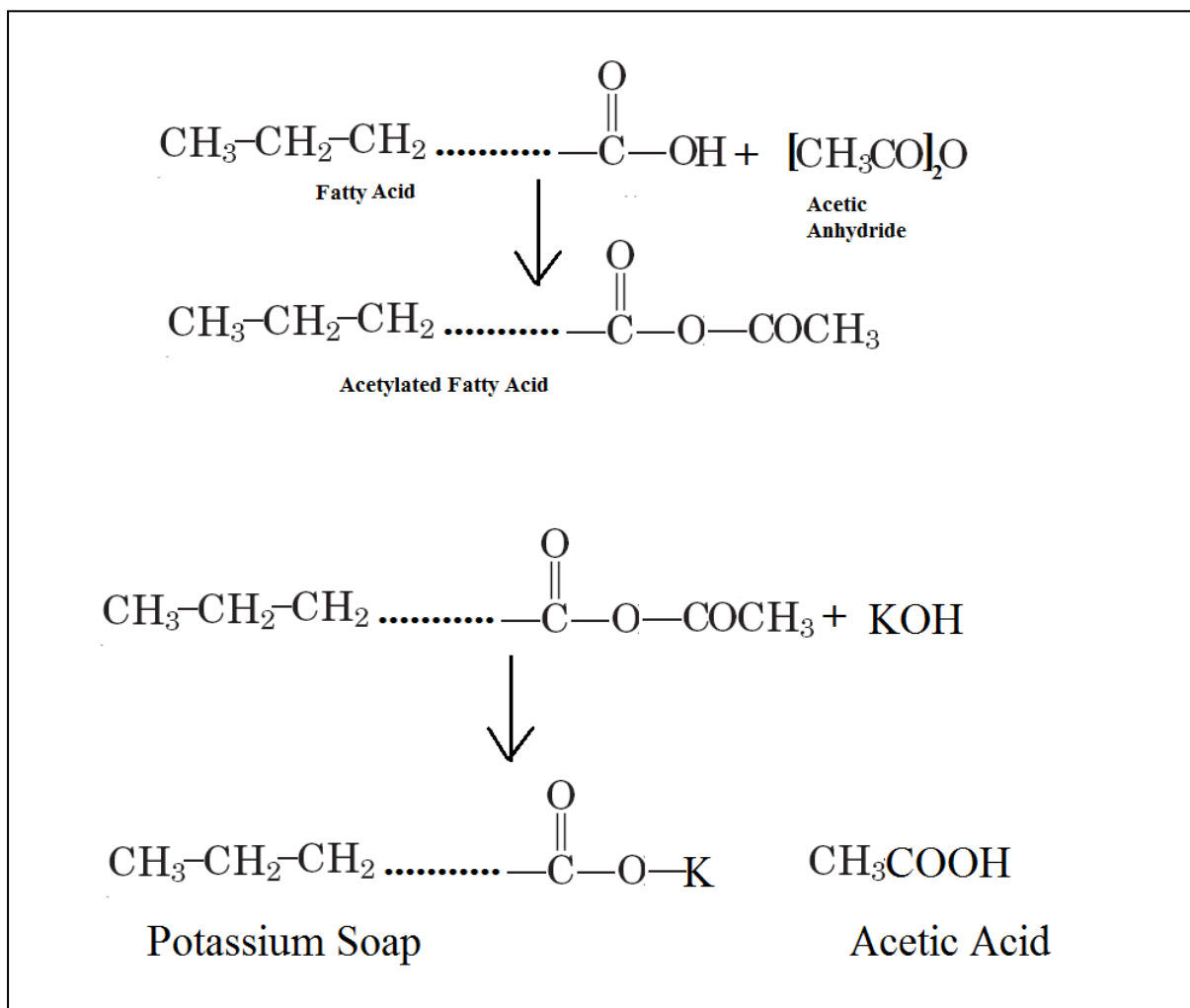
1. Saponification number: it includes the hydrolysis of fats in excess of an alkali such as potassium hydroxide. *It refers to the number of milligrams of potassium hydroxide required to saponify 1g of fat under the conditions specified.* The potassium ions released from KOH replaces the Hydrogen atom present on the COOH group of fatty acids. The long chain fatty acids found in fats have a low saponification value because they have a relatively fewer number of carboxylic functional groups per unit mass of the fat as compared to short chain fatty acids.



2. Acid Number: The number of milligrams of potassium hydroxide required to neutralize 1g of fatty acids. This is determined by titration, where the known weight of fats are dissolved in alcohol are taken in conical flask along with phenolphthalein as an indicator and keeping the Known strength of KOH on the burette. The acid value represents the degree of rancidity in fats.
3. Iodine number: When the iodine is added to unsaturated fatty acids, it is taken up by fatty acids. The double in CH=CH is broken and it forms the bond with the free iodine. The amount of iodine taken up by the fatty acids indicates the degree of unsaturation.



4. Acetyl number: the acetyl number is defined as the milligrams of KOH required to neutralize the acetic acid obtained by saponification of 1 g of acetylated fat. It is an indication of number of OH groups present in a fat or oil. The butter has an acetyl number of about 1.9 to 8.6.



5. Polenske Number: indicates the number of milliliters of 0.1N KOH required to neutralize the insoluble fatty acids from 5g of fat.
6. Reichert Meissi Number or Volatile fatty acid number: this is the number of ml of 0.1 N KOH required to neutralize the distillation from 5 g of fat which has been saponified and acidified.
7. Rancidity of fats: this indicates the oxidation of fats into corresponding aldehydes, dicarboxylic acids and ketones. There are two types of rancidity:
 - a) Hydrolytic rancidity: this indicates the hydrolysis of fatty acids attached to tri-acyl-glycerol into free fatty acids.
 - b) Oxidative rancidity: associated with the degradation by oxygen in the air. This involves the breakage of double bonds by oxygen forming various aldehydes and dicarboxylic acids. It is seen mainly in unsaturated fatty acids. The process can be suppressed by the exclusion of oxygen or by the addition of antioxidants.

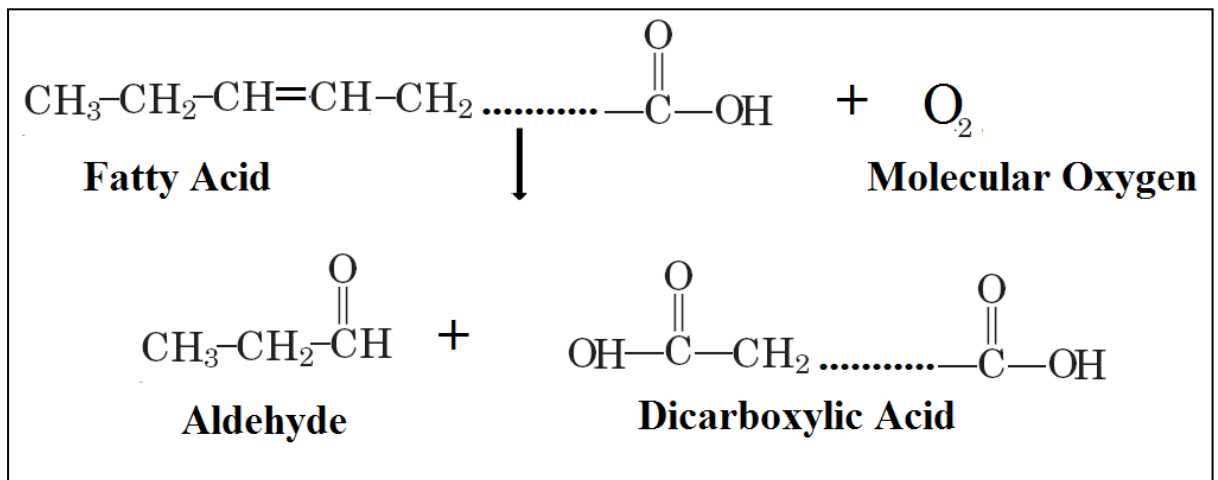


Fig. Oxidative rancidity.