



# GOVERNMENT OF ANDHRA PRADESH COMMISSIONERATE OF COLLEGIATE EDUCATION



## Modified oil

## Chemistry



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# Introduction

As natural products, fats and oils do not always have the properties required for specialized purposes. On the other hand, there might be raw materials that do have the ideal properties required, but are too expensive or exist in limited quantity. Modification of oils and fats offers an adequate solution. The techniques used to modify fats and oils change mainly their physical properties to meet the needs of the specified purpose. Modification offers the possibility of changing the properties of oils and fats within wide ranges, thus making them suitable for many uses or for making oils and fats with desirable properties available in sufficient quantities. The benefits of applying the processes include the possibility of stabilizing highly unsaturated oils that can degrade easily as a result of oxidation.

# oil

An oil is any nonpolar chemical substance that is composed primarily of hydrocarbons and is both hydrophobic (does not mix with water, literally "water fearing") and lipophilic (mixes with other oils, literally "fat loving"). Oils are usually flammable and surface active

## **oil modification:**

All oil modification processes involve a **substantial change of the physical behaviors and structural properties of an oil**. There are three main modification technologies available in the edible oils industry at present: hydrogenation, interesterification and fractionation



# Hydrogenation

Hydrogenation is **the process by which hydrogen is added directly to points of unsaturation in the fatty acids**. The purpose of hydrogenation is to obtain oils and fats with specific melting profiles or oxidative stability by reducing unsaturated double bonds in the oil system.



## Fractionation oil

Fractionation is a well-established process adopted in the fats and oils industries. It **involves the separation of low and high melting triacylglycerol under controlled cooling conditions into olein and stearin fractions with distinct chemical and physical properties**

## **Difference between hydrogenation and interesterification**

Hydrogenation is used to improve the oxidative stability of oil and to modify the physical characteristics by reducing the double bonds ( 2). Interesterification changes the distribution and positions of fatty acids within and among triglycerides to change the physical properties and behaviors of oil



# Questions

1. What is modified oil?
2. What is interesterification process?
3. What is fractionation oil?
4. What is the difference between hydrogenation and interesterification?

## Interesterification

Interesterification involves a rearrangement or reshuffling of the fatty acids on the glycerol backbone of the triglyceride molecule. Interesterification is catalyzed by an alkaline catalyst or by a lipase enzyme. The most commonly used alkaline catalysts are sodium methanolate and sodium ethanolate.