FREQUENTLY ASKED QUESTIONS

1. **What are Fats and Oils?**

Ans. Fats and oils are constructed of building blocks called “triglycerides” resulting from the combination of one unit of glycerol and three units of fatty acids. They are insoluble in water but soluble in most organic solvents. They have lower densities than water, and may have consistencies at ambient temperature of solid, semisolid, or clear liquid. When they are solid-appearing at a normal room temperature, they are referred to as fats, and when they are liquid at that temperature, they are called oils.

2. **What is the chemical composition of fats and oils.**

Ans. The main components of edible fats and oils are triglycerides. The major and the minor components include triglycerides and mono- and diglycerides, free fatty acids, phosphatides, sterols, fat soluble vitamins, tocopherols, pigments, waxes, and fatty alcohols respectively.

3. **Write in brief about the classification of fats acids.**

Ans. Fatty acids occurring in edible fats and oils are classified according to their degree of saturation.

a. Saturated Fatty Acids: Those containing only single carbon-to-carbon bonds are termed “saturated” and are the least reactive chemically.

b. Unsaturated Fatty Acids: Fatty acids containing one or more carbon-to-carbon double bonds are termed unsaturated.

c. Polyunsaturated Fatty Acid: Of the polyunsaturated fatty acids, linoleic, linolenic, arachidonic, eicosapentaenoic, and docosahexaenoic acids containing respectively two, three, four, five, and six double bonds are of most interest.

4. **Write about the isomerism in fats and oils.**

Ans. Isomers are two or more substances composed of the same elements combined in the same proportions but differing in molecular structure. The two important types of isomerism among fatty acids are (1) geometric and (2) positional.

Geometric Isomerism. Unsaturated fatty acids can exist in either the *cis* or *trans* form

depending on the configuration of the hydrogen atoms attached to the carbon atoms joined by the double bonds. If the hydrogen atoms are on the same side of the carbon chain, the arrangement is called *cis*. If the hydrogen atoms are on opposite sides of the carbon chain, the arrangement is called *tran.*

Positional Isomerism. In this case, the location of the double bond differs among the isomers.

5. **What is Degumming**

Ans. The process of treating the crude oil with a limited amount of water to hydrate the phosphatides and make them separable by centrifugation.

6. **What is Refining/Neutralization.**

Ans. The process of refining (sometimes referred to as “alkali refining”) generally is performed on vegetable oils to reduce the free fatty acid content and to remove other impurities such as phosphatides, proteinaceous, and mucilaginous substances.

7. **What is Fractionation / Winterization.**

Ans. Fractionation is the removal of solids by controlled crystallization and separation techniques involving the use of solvents or dry processing.

Winterization is a process whereby material is crystallized and removed from the oil by filtration to avoid clouding of the liquid fraction at cooler temperatures.

8. **Define Hydrogenation.**

Ans. Hydrogenation is the process by which hydrogen is added to points of unsaturation in the fatty acids. Hydrogenation was developed as a result of the need to (1) convert liquid oils to the semi-solid form for greater utility in certain food uses and (2) increase the oxidative and thermal stability of the fat or oil. It is an important process to our food supply, because it provides the desired stability and functionality to many edible oil products.

9. **Define Oxidative Rancidity of Fats.**

Ans. Oxidative rancidity is associated with the degradation by oxygen in the air. Via a free radical process, the double bonds of an unsaturated fatty acid can undergo

cleavage, releasing volatile aldehydes and ketones. Oxidation primarily occurs with unsaturated fats.

10.What is meant by the Polymerization of Fats.

Ans. All commonly used fats and particularly those high in polyunsaturated fatty acids tend to form larger molecules (known broadly as polymers) when heated under extreme conditions of temperature and time.

11.Write in brief the importance of fats and oils.

Ans. Fats and oils are recognized as essential nutrients in both human and animal diets. Nutritionally, they are concentrated sources of energy (9 cal/gram); provide essential fatty acids which are the building blocks for the hormones needed to regulate bodily systems; and are a carrier for the oil soluble vitamins A, D, E, and K. They also enhance the foods we eat by providing texture and mouth feel, imparting flavor, and contributing to the feeling of satiety after eating. Fats and oils are also important functionally in the preparation of many food products. They act as tenderizing agents, facilitate aeration, carry flavours and colours, and provide a heating medium for food preparation.