Frequently Asked question

1. What does food chemistry deal with?

Food chemistry is a major component of food science that deals with the chemical composition and properties of foods. Food chemistry deals with the study of chemical processes happening during the handling, processing and storage of foods. The chemical interactions between the biological and non-biological components are the main chemical reactions that happen in a food system.

2. What are the macronutrients present in foods. Give examples.

The macronutrients present in foods are water, carbohydrates, protein and fat. Water is present in almost all foods ranging from <10% in dried foods to >95% in fruits and vegetables. Glucose, starch and dietary fibre are the examples of carbohydrates. Casein, whey, albuminetc are examples of food proteins. Saturated and unsaturated fatty acids, cholesterol etc are the examples of fat in foods.

3. What are the micronutrients present in foods. Give examples.

The micronutrients present in foods are vitamins, minerals and other non - nutritive components. Water soluble vitamins such as thiamine, riboflavin, niacin, cyanocobalamin and fat soluble vitamins such are beta carotene, alpha- tocopheroletc are examples of vitamins present in food. Calcium, magnesium, potassium, selenium etc are the examples of minerals present in foods.

4. Write on the nature of lipids in foods.

Lipids are present in foods mainly as saturated and unsaturated fatty acids, waxes and fatty acid derived compounds such as sphingolipids and phospholipids.Most of these forms of fats are Amphiphilic in nature i.e. they possess both hydrophobic and hydrophilic moieties. Lipids in foods can be found to have aliphatic structure or aromatic/ring structure.

5. What are the possible alterations that can happen in texture and colour during processing and storage?

The potential alterations that can happen during processing and storage in texture are loss of solubility, water holding capacity, toughening and softening whereas the alterations that can happen in colour are darkening, bleaching and browning that can be sometimes desirable in a food.

6. What type of chemical reactions lead to alteration offood quality?

Some of the various types of chemical reactions that can alter the food quality are non-enzymatic browning (baked goods), enzymatic browning (cut fruits), oxidation of lipids (oils), hydrolysis of proteins and fat, protein denaturation (egg), interactions with metals and glycolytic changes (in meat post mortem).

7. Give an example for the series of events leading to alteration in food quality.

An example for events leading to alterations in food quality will be the hydrolysis of fats which is the primary event, the free fatty acids thus derived react with protein in the foods which becomes the secondary event ultimately alterations in the texture, flavour and nutritive value.

8. Briefly write on the applications of food chemistry.

Food chemistry has several applications. The knowledge about the nutritive and nonnutritive components of food can be analyzed which are of importance in practical application of foods such as product development. The outcome of research in food chemistry leads to the formulation of safe and nutritious food products. The research has also lead to the identification and synthesis and use of natural and artificial food additives such as emulsifiers, stabilizers etc.

9. List the names and work of Scientists of importance in the field of Food Chemistry.

The name and works of scientists of importance to the field of Food Chemistry are as follows:

a. Lavoisier: Establishment of fundamental principles of combustion and organic analysis

b. Leibig: Standardization of analytical methods and classification of foods into nitrogenous and non-nitrogenous sources.

c. Louis Pasteur : Pasteurization and Fermentation

d: Scheele: Discovery of chlorine, glycerol and isolation of citric and malic acids from several fruits.

10. Write on the advancements that happened during the Industrial revolution leading to the growth of food chemistry.

The industrial revolution resulted in tremendous expansions in many fields, part of which also had an impact on food quality control. The prevalence of several public health problems in this period due to unhygienic conditions, low quality of foods and adulteration of foods led to the establishment of institutions with an aim to control chemical composition of foods firstly in Europe and later in Northern America. Establishment of agricultural experimental units, laboratories to control food quality, establishment of research institutions and scientific journals dealing with food chemistry took place in this period.

11.List the important areas of application of knowledge from research in Food Chemistry?

The important areas of application of food chemistry are as follows:

a. Use of analytical methods in evaluation of the nutritive and non-nutritive components of foods

b. Application of this knowledge in the development of new food products

c.Development of food additives such as flavours, emulsifiers, thickeners, sweeteners, colors and preservatives.

12. How important is food safety as a part of Food Chemistry.

All foods are made up of chemicals. These chemicals by nature are reactive to other chemicals depending on the conditions it is exposed to. The outcomes of such chemical reactions can be desirable, non-desirable and sometimes hazardous to human

health.Thus knowledge on the components of food that can lead to unsafe food/food product is of importance. Controlling the non-desirable reactions leading to microbial growth or production of toxic by-products is crucial to keep the food safe. Thus, analysis of the relevant chemical components of food is an essential part of food analysis and food chemistry.