FREQUENTLY ASKED QUESTIONS

1. Define unit operations in food processing?

Ans. Unit operations are the processes involved in converting a raw product to the final product that is consumed by the end users. Therefore, the study of process engineering is an attempt to combine all forms of physical processing into a small number of basic operations, which are called unit operations.

2. Enlist different unit operations in food processing?

Ans. Important unit operations in the food industry are heat transfer, drying, evaporation, contact equilibrium processes (which include distillation, extraction, gas absorption, crystallization, and membrane processes), mechanical separations (which include filtration, centrifugation, sedimentation and sieving), size reduction and mixing.

3. What is the principle of aspiration cleaning method?

Ans. The principle of aspiration is to feed the raw material into a carefully controlled upward air stream. Denser material will fall, while lighter material will be blown away depending on the terminal velocity. Aspiration exploits the differences in aerodynamic properties of the food and the contaminants. It is widely used in the cleaning of cereals, but is also incorporated into equipment for cleaning peas and beans.

– Steam is particularly suited to root crops. The units are exposed to high pressure steam for a fixed time and then the pressure is released causing steam to form under the surface of the skin,

hence loosening it such that it can be removed with a water spray.

4. What are different methods of peeling?

Ans. The different methods of peeling used are as under

a. Lye peeling– Lye (1–2% alkali) solution can be used to soften the skin which can again be removed by water sprays.

b. Mechanical peeling– Abrasion peeling employs carborundum rollers or rotating the product in a carborundum-lined bowl, followed by washing away the loosened skin.

– Mechanical knives are also suitable for peeling citrus fruits.

c. Flame peeling – Flame peeling is useful for onions, in which the outer layers are burnt off and charred skin is removed by high pressure hot water.

5. What are the different methods of size reduction?

Ans. Different methods of size reduction are classified according to the size range of particles produced:

1. Chopping, cutting, slicing and dicing:

(a) Large to medium (stewing steak, cheese and sliced fruit for canning)

(b) Medium to small (bacon, sliced green beans and diced carrot)

(c) Small to granular (minced or shredded meat, flaked fish or nuts and shredded vegetables).

2. Milling to powders or pastes of increasing fineness (grated products > spices > flours > fruit nectars > powdered sugar > starches > smooth pastes)

3. Emulsification and homogenisation (mayonnaise, milk, essential oils, butter, ice cream and margarine).

6. Enlist different equipments used for size reduction of liquid foods?

Ans. The five main types of equipments used for size reduction of liquid foods are:

1. High-speed mixers

2. Pressure homogenisers

3. Colloid mills

4. Ultrasonic homogenisers

5. Hydroshear homogenisers and microfluidisers.

7. Name two commonly used pressure filters.

Ans. Two commonly used pressure filters are the batch plate-and-frame filter press and the shell-and-leaf pressure filter.

8. Define forming and its uses in food processing?

Ans. Forming is a size enlargement operation in which foods that have a high viscosity or a dough-like texture are moulded into a variety of shapes and sizes, often immediately after a mixing operation. It is used as a processing aid to increase the variety and convenience of baked goods, confectionery and snackfoods.

9. Define pasteurization?

Ans. Pasteurisation is a relatively mild heat treatment, in which food is heated to below 100ºC. In low acid foods (pH > 4.5, for example milk) it is used to minimise possible health hazards from

pathogenic micro-organisms and to extend the shelf life of foods for several days. In acidic foods (pH < 4.5, for example bottled fruit) it is used to extend the shelf life for several months by destruction of spoilage micro-organisms (yeasts or moulds) and/or enzyme inactivation.

10. What are the uses of evaporation?

Ans. Evaporation increases the solids content of a food and hence preserves it by a reduction in water activity. Evaporation is used to pre-concentrate foods (for example fruit juice, milk and coffee) prior to drying, freezing or sterilization and hence to reduce their weight and volume. This saves energy in subsequent operations and reduces storage, transport and distribution costs.

11. What is the principle of dehydration in preservation of foods?

Ans. During dehydration preservation is achieved by reducing the available moisture, or water activity to a level which inhibits the growth and development of spoilage and pathogenic microorganisms, reducing the activity of enzymes and the rate at which undesirable chemical changes occur.

12. What is the principle of preservation by freezing?

Ans. During freezing the temperature of a food is reduced below its freezing point and a proportion of the water undergoes a change in state to form ice crystals. The immobilisation of water to ice and the resulting concentration of dissolved solutes in unfrozen water lower the water activity (aw) of the food. Preservation is achieved by a combination of low temperatures, reduced water activity and, in some foods, pre-treatment by blanching.

13. What are the different categories of chilled foods?

Ans. Chilled foods are grouped into three categories according to their storage temperature range as follows:

1. -1ºC to +1ºC (fresh fish, meats, sausages and ground meats, smoked meats and breaded fish).

2. 0ºC to +5ºC (pasteurized canned meat, milk, cream, yoghurt, prepared salads, sandwiches, baked goods, fresh pasta, fresh soups and sauces, pizzas, pastries and unbaked dough).

3. 0ºC to +8ºC (fully cooked meats and fish pies, cooked or uncooked cured meats, butter, margarine, hard cheese, cooked rice, fruit juices and soft fruits).

14. What are the different methods of coatings foods?

Ans. There are three main methods of coating foods. The selection of an appropriate method depends on the type of coating material to be used and the intended effect of coating. The main methods are:

1. Enrobing with chocolate, compound coatings, glazes or batters

2. Dusting with spices, breadcrumbs, flour, sugar, flavourings, colourings, salt, etc.

3. Pan coating with sugar or sugarless coatings.

15. Enlist different functions of packaging?

Ans. The functions of packaging are containment, protection, communication, machinability and convenience.