Frequently Asked Questions

1. What are the drawbacks in Indian agriculture?
Ans : India wastes more fruit and vegetables than consumed in the whole of the United Kingdom. Low productivity and quality Cumulative waste is worth an estimated Rs. 25,000 to 35,000/- corers equivalent to 25- 35% of the production of fruit and vegetables. Poor road surface leads to fragile produce being easily damaged.Produce is handle. It is piled into large cane baskets or on to truck beds without cushioning or packaging, and transported in open trucks that leave it exposed to the sun in temperatures often exceeding 40°C.

2. Why processing industry is important to India?
Ans : Helpsin reducing fruit and vegetable losses. Diversification of the economy, in order to reduce present dependence on export commodity. Government industrialization policy.Reduction of imports and meeting export demands. It stimulate agricultural production by obtaining marketable products. It generate both rural and urban employment. Improves farmers nutrition by allowing them to consume their own processed fruits and vegetables during the off-season. It also generate new sources of income for farmers

3. Define Value Addition to fruits and vegetables?
Ans : Fruits and vegetables being highly seasonal and perishable commodities, it has been an endeavor world over to evolve methods to prevent losses of these commodities between harvesting and consumption. By allowing these edible crops through processing into shelf stable and value added products, by minimizing the losses and at the same time keeping the vital minerals and nutrients at minimal loss, and good for human consumption is called Value addition to fruits and vegetables.

4. What are the factors that lead to the loss of Post harvesting of crops?
Ans : This post harvesting loss of crops is mainly in Tropical developing countries. This is due to the adverse climatic conditions, inadequate infrastructural facilities and the inherent physiological nature of the corps. Being highly perishable and seasonal in nature, the crops deteriorate in quality and value and ultimately lead to losses. And further to this, the loss also occurs during the processing of fruits and vegetables. During processing, the crops undergo certain common unit operations such as mechanized mass removal of fruit, impact during handling of crops, at the time of washing and peeling and slicing also there is a marginal loss of crops.

5. List out the Major and Minor Fruits that are being commercially processed around the world?
Ans : Major fruits include mango, banana, citrus, pineapple, apple, grapes, sapota, papaya, and litchi
The Minor fruits are Aonla, Passion fruit, Annona, Mangostein, Avocado, Bael, Olive, Jackfruit, Jamun etc.,

6. How could the loss of crops be avoided at the time of processing?
Ans : As the fruits and vegetables are seasonal and perishable, they have to be safeguarded at all times ever since they are sowed. During the post harvest period and the processing period suitable measures have to be taken to conserve their nutrients and to control microbial and insect

infestation. Harvesting at the optimum stage of maturity is very much needed. Adopting appropriate methods and careful handling of the commodities throughout the handling chain till it reach the consumer is a must. Frequent vigilance during the different stages of the processing is very much mandatory to avoid losses.

7. Briefly explain the primary processing operations of fruits and vegetables?

Ans : The quality of the processed product depends largely on the quality of the incoming fruits. Therefore, it is important that fruits and vegetables of right quality suitable for different processed products are produced. Harvesting the fruits at its optimum stage of maturity, optimum colour, size etc. is carried out mechanically or by manual harvesting. These process further lead towards the handling, sorting, washing peeling, cutting of crops.

Bulk handling methods are adopted to reduce cost and to enable increased mechanical harvesting rates.

Sorting is to segregate materials into lots based on fruit characteristics such as maturity, colour, weight, size, defects and firmness. They can be done manually, mechanically or electronically.

Washing is another important phase of many crops. It is done to remove dirt, dust, insect, mosd, spores, and filth that may affect the colour, aroma or flavor of the fruit. Water is the main source for washing. Even detergents are used as supplements.

Peeling and slicing are the other two major aspects of primary processing. These are meant for canning freezing and dehydration fruits. Various peeling methods such as hand peeling, peeling by heat, lye peeling, acid peeling, dry caustic peeling, calcium chloride peeling, and mechanical peeling are followed.

8. Give a note on Thermal Processing?

Ans : For Thermal Processing of fruit and vegetable products in open top sanitary cans is widely practiced. Many vegetables like potato, okra, bitter gourd, beans, cabbage, tinda, parval and fruit products like mango and other fruit pulps, mango and pineapple slices. litchi, guava etc., are canned. For thermal processing, tinplate cans are the predominant packaging material, but glass bottles, are also used to a limited extent. Possibilities of using retort able pouches, aluminum cans, tin free steel plate etc., have been established and these are likely to be used widely in the near future.

Further improvement in quality of thermally processed foods has been achieved by High Temperature Short Time (HTST) processing as in the case of aseptic bulk and unit packaging

9.How is Fruit Juice Extraction being done?

Ans: Fruits and their products being a major component of diet, have gained considerable importance by contributing significantly to the nutrition and economy of many countries in the world. The consumption of fruit juices has been increasing world over because of their richness in essential minerals, vitamins and other nutritive factors. Besides they are delicious and have universal appeal. In the juice recovery process, apart from thermal extractive heat extraction and the enzymatic liquefaction, mainly mechanical pressing systems such as

i)hydraulic press,

ii) pneumatic fruit juice press,

iii) continuous plate press,

iv) continuous screw type press

v) horizontal basket press and
vi) screening centrifuges are employed.
Recently microbiologically produced plyphenoloxidases and adsorber resins have also been used. These fining agents not only eliminate existent browning but also link colourless oxidizable polyphenol and also diminish browning tendency. Recent developments have shown that adsorbent resins in combination with ultrafiltration can be used effectively for debittering of citrus juices and its by- products.

10.How is fruit pulp and concentrates are achieved?
Ans : Clarified fruit pulp/juices enable concentration to high solids concentrates. Concentration is achieved mainly in vacuum evaporators either in single or multiple stages (to reduce energy cost). Different types of evaporators like Calandria, plate, centrifugal, agitated film and scraped surface are used depending on the rheological as well thermal sensitivity of the products.
Aroma loss which is a major drawback in fruit juice concentration has been overcome by aroma recovery and restoration of the lost aroma.
Evaporation being energy intensive and liable for causing thermal damage to certain juices, membrane concentration process (reverse osmosis), has been established.

11.Explain the method of Freezing of commodities?
Ans : Freezing preserves the taste, texture and nutritional value of the food better than any other preservation method. Freezing preservation of fruits depends on inhibition of post- harvest physiological changes along with inhibition of microbial action at low temperature. For prolonged storage the temperature must be well below the freezing point of water. Chilled food markets have experienced enormous recent growth and improvements in the nutritional and sensory qualities of novel heat processed foods which have comparable shelf like to the frozen counterparts have resulted in these preservation processes taking a considerable market share. In order to obtain high quality frozen foods, high quality raw material are necessary and processing distribution and storage must be carefully controlled.

12.Write a note on Combination Freezing Method?
Ans : Combination Freezing is a method sued by combining cryogenic and mechanical techniques. The principle of operation of combination systems is to use a cryogenic freezing unit for initial freezing of the outer surface of the product, followed immediately by mechanical freezing to reduce the temperature of the bulk of the product to the desired frozen temperature.
Combination freezing system has also been developed for freezing of liquid, semi liquid foods such as fruit and vegetable purees. A combination treatment involving freezing in conjunction with irradiation has recently been proposed as means of reducing spoilage prior to or following processing.

13.Which are the only two Chemical preservatives permitted under FPO -1955?
Ans : They are sulphur dioxide (and its sodium and potassium salts) and benzoic acid (and its sodium salt).

14.What is Osmotic Dehydration? Explain.
Ans : The process of immersing fruit or vegetable pieces in a concentrated solution of salt or sugar to

obtain partial dewatering and direct formulation of them is called Osmotic Dehydration. This process is also known as dewatering and impregnation soaking process. This process can be used as a pretreatment before any complementary processing steps such as drying, freezing, pasteurizing, canning and or the addition of preservative.

Fresh fruit pieces are first soaked in sucrose syrup (possibly blended with invert sugar) in batch system at normal pressure and at temperatures in the range of 30-80°C. Products are then air dried which leads to final water content in the range 15-20% (w/w). Osmo dried fruits are mainly prepared from pineapple, papaya, mango, jackfruit, banana, ginger etc.

15.Give a brief note on the present day Indian status of Processing of Fruits and Vegetables in the World Market?

Ans : India has emerged as one of the largest producers of fruits and vegetables in the world producing up to about 150 MMT next only to china. The Post –harvest losses of fruits and vegetables amounts to about 25-30% due to improper storage, transportation and packaging facilities. Even though, we are number two in the world, the processing capacity of the industry is less than 2%. The industry produces a variety of products both for domestic and International market and forms one of the major segments of the food industry and hence the need for development of newer and revised technologies on the regular basis for the economic growth of the countries. Number of processing technologies is being followed either alone or in combination, in order to achieve the required goals. Apart from utilizing the raw material of commercial importance, there is a need to develop products based on underutilized fruits which has a ready International market. The newer technologies combined with the ongoing technologies followed in the fruit and vegetable processing industries pave the way to solve both old and emerging needs. This in turn will bring about more efficiency further along the supply chain to eventually give better value products to the consumers.