FREQUENTLY ASKED QUESTIONS

1. **Define fruit Jam?**

Ans. Fruit jam is the product made by cooking to suitable consistency, properly prepared fresh fruit, cold stored fruits, canned fruits or a mixture of two or all of those with sugar or with sugar and dextrose with or without water. In its preparation, not less than 45 lb of fruits be used for each 55 lb of sugar and dextrose.

2. **Enlist different unit operations for fruit jam preparation?**

Ans. The preparation of jam requires several unit operations viz., selection of fruit, preparation of fruit, addition of sugar, addition of acid, mixing, cooking, filling, closing, cooling and storage.

3. **Name different forms and quantity of sulphur dioxide used for fruit pulp preservation?**

Ans. For preserving fruit pulps in bulk during peak production season, sulphur dioxide is used universally in the form of potassium metabisulphite, sodium sulphite, or calcium sulphite. Most of the pulps are preserved by 1000-1500 ppm SO_2.

4. **What is the concentration of sugar used for jam making?**

Ans. Generally, cane sugar (sucrose) of good quality is used in the preparation of jams. The proportion of sugar to fruit varies with type and variety of fruit, its stage of ripeness and acidity. Sweet fruits require less sugar than tart fruits, although fruit pulp and sugar ratio of 1:1 is generally acceptable. This is usually a suitable ratio for berries, currants, plums, apricots, pineapple and other tart fruits. To make jam 24.9 kg of sugar for every 20.4 kg of fruit taken for ensuring 68.5% sugars in jam is recommended.

5. **What are the advantages of vacuum Concentration in jam processing?**

Ans. The vacuum boiling has advantage of minimizing the undesirable changes in flavour, colour and nutrients. Further volatile esters are collected by process of recovery and put-back in the jam.

6. **Discuss briefly the plate evaporation process for jam preparation?**

Ans. In a typical plate evaporation process, first stage is the mixing together of ingredients which would normally include fruit pulp, sugar, pectin and possibly corn syrup. The ingredients may be weighed into the batch premix vessels. The premix then goes through a paraflow plate heat exchanger where it is heated by condensate and steam. If sulphited fruit pulp is used, the hot mix enters a de-sulphiting column.

The hot mix is fed to the APV plate evaporator, held under vacuum. This is a rising and falling film type evaporator. Typically the temperature of evaporation is 60-65 °C. The concentrated jam and vapours are discharged through a large rectangular part to a snail separator where jam is separated from the vapour. The jam is extracted by a rotary pump. In line pH metering allows control of citric acid solution, added for acidity reduction. Jam for the rotary pump also passes through online refractometer to control TSS. Post process addition of any flavourings compensated volatile loss during evaporation. The product then passes through scrapped surface cooler before passing to bottle storage and to filling.

7. **What is drop test?**

Ans. This test is the simplest way to determine the finishing point of jam. In this method, a little quantity of jam is taken from the boiling pan in a tea spoon and allowed to air cool before putting a drop of it in a glass filled with water. If the drop of jam touches the bottom of glass without disintegrating in the water, jam is considered to be ready. The only drawback of this method is that jam sometimes gets overcooked while it is being cooled for testing.

8. **What is the advantage of hot filling?**

Ans. The advantage of hot filling is that when cans or jars are filled hot at a temperature of not less than 85 °C, there is no need for pasteurization to prevent mold growth. After filling, the cans or jars should be inverted for a couple of min to sterilize the lids or caps and then returned to the upright position.

9. **Name different ingredients used for preparation of apple jam?**

Ans. To prepare apple jam, 40 kg of apple pulp requires sugar 44 kg, pectin 150 grade 400 g, citric acid 500 g, and apple essence 60 ml.

10. **Give is the recipe for preparation of mixed fruit jam?**

Ans. To prepare mixed fruit jam, blends of mango, pineapple, orange, apricots, papaya, guava, etc., and equal weight of sugar to that of blended pulp taken, and citric acid to the extent of about 0.75–1.0% by weight of blended pulp containing pectin to the extent of 0.5–1.0% by weight of blended pulp are required depending upon the fruits used. A blend of predominantly red food grade colors may be added along with an

appropriate essence to the desired extent.

11. **Name different methods used for determination of soluble solids in jam?**

Ans. Soluble solids can be determined easily with a refractometer or by means of a specific gravity hydrometer, or even by a thermometer, as the boiling point of the product depends upon the soluble solids in the product.

12. **Enlist different analytical quality control measures in the manufacture of jams?**

Ans. The various analytical quality control measures in the manufacture of jams are determination of soluble solids, total soluble solids, invert sugar, sulphur dioxide content, acidity, regulating pH of the material, estimation of pectin, etc.

13. **Describe the modern processing Technique for jam making?**

Ans. Microwave oven cooking is the latest method for processing of jams and jellies for home makers. An oversized container must be used for this purpose to avoid boiling over. Fruit, sugar and some butter are mixed and allowed to stand for 30 min. Butter will avoid frothiness development. The mixture is microwaved until it boils, with frequent stirring with further cooking for 10 min more. Jams produced from this mixture keep well in the refrigerator for several months or can be canned.

14. **How the pH of jam can be regulated?**

Ans. As the pH is the controlling factor in the setting of jams, it is sometimes necessary to adjust it to the optimum. This is done generally by adding salts of citric or tartaric acids or alkalies like sodium bicarbonate or calcium carbonate. The addition of about 28 grams of the buffer salt to 45.3 kg of the jam will generally change the pH by about 0.1 unit.