UNIT 5
TOPIC – 4

Fruit processing involves a series of unit operations to transform fresh fruits into various products such as juices, jams, purees, canned fruits, and more. These unit operations are essential in maintaining product quality, safety, and shelf life. Here are some common unit operations in fruit processing:

1. **Cleaning and Sorting:** The first step is to clean and sort the fruits. This involves removing dirt, debris, and damaged fruits. Sorting is done based on size, color, and ripeness to ensure uniformity in the final product.
2. **Washing:** Fruits are washed to remove residual dirt, pesticides, and microorganisms. This can be done with water or specialized washing solutions.
3. **Peeling and Pitting:** Some fruits may require peeling and pitting to remove the outer skin and seeds. This can be done manually or using machinery depending on the scale of production.
4. **Cutting and Slicing:** Fruits are often cut or sliced into smaller pieces to facilitate further processing. The size and shape depend on the end product. For example, fruits can be cut into wedges for canning or sliced for fruit salads.
5. **Blanching:** Blanching involves briefly immersing the fruits in boiling water or steam to inactivate enzymes and improve color retention. It is common in canning and freezing operations.
6. **Juice Extraction:** For fruit juice production, fruits are typically crushed or pressed to extract the juice. This juice can be further processed or pasteurized for preservation.
7. **Pasteurization:** Pasteurization is used to kill harmful

microorganisms and enzymes in fruit products. It involves heating the product to a specific temperature for a certain time and then cooling it rapidly.

8. **Filling and Packaging:** Processed fruits are filled into containers (such as cans, bottles, or pouches) and sealed to prevent contamination and extend shelf life. Proper labeling and coding are essential for product traceability.
9. **Drying:** Drying removes moisture from fruits to extend shelf life. This can be done through various methods, including sun drying, air drying, freeze-drying, and hot-air drying.
10. **Freezing:** Freezing is used to preserve the freshness of fruits. Fruits are rapidly frozen to very low temperatures to maintain their texture and flavor.
11. **Jam and Jelly Making:** This involves cooking fruit puree or juice with sugar and pectin to make jams and jellies. The mixture is heated to a specific temperature to achieve the desired consistency.
12. **Canning:** Fruits are packed into cans along with syrup or juice, sealed, and then heat-processed to sterilize the contents. This preserves the fruits for an extended period.
13. **Dehydration:** Dehydrated fruits are produced by removing most of the water content, which inhibits microbial growth. This can be done through air drying, sun drying, or using specialized equipment.
14. **Fruit Puree Production:** Fruits are crushed or blended into a smooth puree, which can be used as a base for various products like baby food, yogurt, or fruit sauces.
15. **Concentration:** Concentrating fruit juice involves removing a portion of the water content to increase the sugar content. This is commonly done for making concentrated fruit juices or syrups.

Each of these unit operations plays a crucial role in fruit processing, ensuring that the final product meets quality, safety, and shelf life

standards. The specific operations used will depend on the type of fruit being processed and the desired end product.