Preservation of cashew apple and juice

- ***Low temperature and modified atmosphere storage***

Cashew apples can be stored up to a maximum of only one day at ambient conditions. Low temperature (1 to 5°C temperature and 85 to 90% relative humidity) relatively extend the shelf life of cashew apples up to 25 days without spoilage and minimum physiological loss in weight (22%). Cashew apples sealed with plastic film flushed with carbon dioxide in combination with low temperature storage (5°C) can extend the shelf life up to 15 days.

- ***Chemical preservatives***

The colour, flavour, appearance, texture of cashew apple and nutritive quality can be well preserved without microbial spoilage by using chemical preservatives. Sodium benzoate, sodium metabisulphite, potassium metabisulphite, citric acid, sorbates and benzoic acids have been used as preservatives for improving the shelf life of the cashew apple juice. The benzoates and sorbates inhibit the yeast and mould growth whereas the sodium and potassium metabisulphite reduce the enzymatic browning and use of citric acid decreases polyphenol oxidase activity. Any one of the following chemical combinations *viz.,* sodium benzoate and sodium metabisulphite at 0.01% each or sodium benzoate and citric acid at 0.01% each or sodium metabisulphite and potassium metabisulphite at 0.05% each can extend the shelf life of juice up to 20 days under ambient condition. Coating fresh cashew apple with vegetable oils such as mustard or neem oil is the best preservative for shelf life extension of the cashew apple up to 12 days.

- ***Use of osmolytes***

Osmolytes such as sugar and salt can significantly reduce the moisture content from cashew apple (48 to 70%). The subsequent drying time at the final step of processing can be reduced due to osmolyte intake in this pre-drying process. The cashew apple cubes of 1cm3 immersed in sugar solution of 40 to 60°Brix under 30 to 50°C for 2-4 hrs followed by air drying was found suitable for developing dehydrated cashew apple products. After pre-drying with the osmolytes, further preservation can be done using air or vacuum drying.

Advantages

- Prevents enzymatic browning and microbial growth
- A suitable method at industrial and homestead level
- Reduces the astringency of cashew apple juice.

Disadvantages

- Leaching of nutrients especially vitamin C and biochemical characters

- ***Thermal processing***

This method is common for the preservation of juice and pulp of any fruit. The liquid or semi-solid substance are homogenized, de-aerated and exposed to heat (90°C) for one hour followed by immediate bottling (hot filling) or heated – cooled– filled in aseptic filling in glass or tetra pack pouches (polythene-aluminum-foil layered). Both these processes are found to be effective in maintaining the physicochemical characteristics of the treated juice for up to 12 months. The combined approach of chemical preservatives and pasteurization (high temperature short time or low temperature long time) enhances the shelf life of cashew juice.

Advantages

- Prevent microbial growth and ensures safe consumption
- Reduces the astringency of cashew apple juice

Disadvantages

- Degrades vitamins especially vitamin C (vitamin C is sensitive to high temperature) and other nutrients
- Inactivates enzyme activity
- Non-enzymatic browning
- The loss in sensory qualities

- ***High-pressure processing technique***

Pressure and temperature are the main components of this method. The pressure and temperature applied over the surface of solid or semi-solid or liquid phase are uniformly transmitted to the inner part to achieve desirable effect of texture, colour, flavour, microbiologically safe and stable food products. The exposure time for pressure and temperature application depends on the product and the target microorganisms. Cashew apple juice can be well preserved under 350 MPa pressure for 7 min or 400 MPa for 3 min at room temperature (28±3°C) for a maximum of 8 weeks under refrigerated conditions. The nutritional quality, vitamin C, total soluble solids and acidity of the cashew apple juice are maintained in this method.

- ***Irradiation technique***

Electromagnetic waves of different wavelength especially gamma rays and X-rays are mainly used in the field of food preservation. Irradiation using gamma rays with doses of 0.5 and1.0 k Gy can be used for an extended shelf life of cashew apple juice.