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Osmotic Dehydration in Sapota (*Acharus sapota* L.)

Gharate P. S.[1], Khandave Om[1], Babar R. R.[2]
[1]M.Sc. Scholar, Department of Horticulture, V.N.M.K.V, Parbhani, (M.S.)
[2]Senior Research Fellow, ICAR – National Institute of Abiotic Stress Management, Malegaon, Baramati (M.S.)

SUMMARY

Osmotic dehydration has received the wide elucidation, promotion and attraction in the recent years as an improving and processing method for preserving the fruits and vegetables. The dehydration process retains the original fruit characters vizcolor, aroma, texture along with their nutritional values. Now a days, the production of dehydrating products is increasing at robust rate worldwide. Dehydration helps to retain the original taste, aroma of fruit by removing moisture content; which ultimately leads to extending its shelf life of produce. These products can be used in preparation of juices and beverages.

INTRODUCTION

Sapota (*Achras sapota* L.) commonly known as *chiku*. India is the largest producer of sapota with 30 to 40 thousand hectares area. Sapota is one of the most liked fruit of the country. In area of 97.3 ha, the Sapota production is 1175.9 MT in India, Highest area is present in Maharashtra i.e. 15.03 ha with production of 134.78 MT. and the second highest in Karnataka after Maharashtra and others states(Anonymous, 2018).Sapota is sweet, soft flesh, delicious, filled with nutrition and minerals. Mainly Sapota is commercially grown for fresh consumption.The fruit is rich in sugar, dietary fiber, carotene, known for its antioxidant properties and laxative substances, possessing various nutritional properties (Bhagyashri *et. al* 2014). Sapota contains high fiber content (2.60g/100g). Therefore the dried powder also used as a fiber supplement. As it belongs to climacteric group, it majorly faces the problem of shelf life. By implementing different post harvest practices should overcome these problem. To maintain its nutritive value, dehydration technology is being practicing from long time. In this method, moisture from fruit pulp is removed by using mechanical dryers and / or natural dryers. Some advanced methods of dehydration are evolved; in this article, application of osmotic dehydration is discussed briefly.

Osmosis

The movement of solvent from a region of lower concentration of solution to a region of higher concentration of solution through semi-permeable membrane.

What is Osmotic Dehydration?

Osmotic dehydration is a process used for the water removal at low temperature with low energy consumption.

- Water diffusion into the solution
- Solute diffusion into food.
- Leaching out of food's tissue own solute.

Difference between Dehydration and Osmotic Dehydration

Dehydration	Osmotic Dehydration
Huge nutrients loss.	Retention of nutrients.
Chance of physical contamination.	No change of contamination
Rehydration is needed.	Rehydration is not needed.
Loss of flavour.	Retention of fresh fruit flavours.

Advantages over Traditional Drying and Dehydration Methods

- Preservation of fresh products, making them available whole year commercial processing is negligible.
- Conversion of the fresh product into a dry one while maintaining or improving its final quality.

- Reduction of the volume and weight of the product for an easier transportation and storage; and last but not least.
- Sustainable processing as the most popular drying methods use enormous quantities of energy at low efficiency.

Principles of Osmotic Dehydration

- Principle of osmosis is used.
- The cut foods are immersed in concentrated solutions of sugars or salts.
- A flux of water out of the food and other solutes into the foodstuff develops due to the difference in osmotic pressure.
- The product losses some water to the external solution.
- Rate of removal of water enhanced by increasing the concentration of the osmotic solution or temperature.

Process of Osmotic Dehydration of Sapota

1.Selection of ripe Sapota
2.Washing and Peeling
3.Slicing
4.Blanching
5.Osmotic treatment (Describe these treatments in one line)
6.Draining
7.Drying of slices

Different Osmotic Agent and Their Effects in Osmotic Dehydration Process

Osmotic agent	Remark	References
Lactose	It has much lower level of sweetness than sucrose. Low solubility in aqueous solution	Hawkes and Flink, 1978
Fructose	Increase the dry matter content by 50% as compared to sucrose due to higher penetration rate.	Bolin *et. al*, 1983
Starch / corn syrup	Favours similar final water content with minimum solid gain as that obtained with sucrose	Flink,1975

Flow sheet of Sapota powder

- Selection of firm ripe fruit
- Washing, peeling and slicing of fruit
- Osmotic treatment
- Draining
- Drying of slices
- Grinding of dehydrated slices
- Sieving
- Packing in polythene pouches
- Storage at dry place

Advantages of Osmotic Dehydration

- Acid removal and sugar uptake by fruits modifies the composition and improves the taste and acceptability which is called candying effect.
- The process reduces volume of the products.
- The process could prove to be good for production of the ready to eat foods such as raisins etc.

Disadvantages of Osmotic dehydration

- Damage to the cells and development of off-flavour occur.
- The final product characteristics, sugar uptake affects both rehydration and flavour retention.
- The process lack precise control.
- Sugar uptake results in the development of a concentrated solids layer under the surface of the fruit, upsetting the osmotic pressure gradient across the fruit interface and decreasing the driving force for water flow.

CONCLUSION

As osmotic dehydration can be conducted at low or ambient temperature, it is considered as one of the less energy concentrated technique as compared to air or vacuum drying process. The product obtained by osmotic process is more stable during storage due to low water activity imparted by water loss and solute gain.In rural areas without much investment, the growers can adopt this technique and convert the excess production into stable dehydrated form. Osmotic dehydration improves the colour, flavour and texture and is less energy intensive process compared to other drying techniques.Mass transfer during osmotic dehydration process of Sapota was influenced by syrup concentration, temperature and duration of osmosis.

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