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Studies on Effect Packaging Material on Ascorbic Acid Retention During Storage of Kothimbda Powder (Cucumis Callosus)

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Abstract

Cucumis callosus (Rottl.) Cogn (Cucurbitaceae) is very common throughout the India and commonly known as "Kothimbda" in Gujarat. The Kothimbda slice was dried in Industrial tray dryer with constant air velocity at 1.5 m/sec and in solar cabinet dryer. The dried Kothimbda slice was converted in to powder of 16 mesh and stored at room temperature for 90 days in Glass bottles, Polyethylene pouches of 300 µ thickness and Aluminum coated P.P. bags. During storage observations in terms of ascorbic acid were recorded at 15 days interval. The ascorbic acid content of the stored dried Kothimbda powder was decreasing with the increase in storage period under room temperature storage. The loss in ascorbic acid during storage was minimum in the powder packed in Glass bottle followed by HDPE bag and Aluminum Coated P.P. bag. Considering the analysis of observation, it was concluded that, to minimize the loss in ascorbic acid content of Kothimbda powder (16 mesh) during storage for 90 days at room temperature, it should be packed in Glass bottle

Keywords: Kothimbda, Packaging Material, Ascorbic Acid, etc

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Introduction:

Cucumis callosus (Rottl.) Cogn (Cucurbitaceae) is very common throughout the India and commonly known as "Kothimbda" in Gujarat. It is one of minor vegetables of family cucurbltaceae which comprises of 120 genera and 825 species. Leaves are cordate, sub orbicular, deeply palmately of 5-7 lobed. Flowers are yellow. Fruits are smooth, Obovoid or Ellipsoid, Green variegated stripes generally fruiting in August-November. Kothimbda is a highly cross pollinated crop and usually monoicous in nature preferring warm weather and bright light for its better growth and development. However it can be grown in both summer and rainy season, but can't tolerate cold injury (Rastogi, 1998).

The mature fruits of Cucumis callosus (rottl.) Cogn (Kothimbda), a drought tolerant cucurbitaceous vegetable found growing abundantly during rainy season in the arid and semiarid regions of North-Western India, particularly in Gujarat and Rajasthan, are usually cooked with various vegetable preparations. It is an ideal summer vegetable crop chiefly grown for its edible tender fruits, preferred as salad ingredient, pickles, Desert fruit and as a cooked vegetable. The ripe fruits are eaten as such, while unripe fruits used as vegetable. Fruits are known to contain vitamin C (Singh and Joshi, 2010).

Kothimbda powder obtained after drying the fruits is used as souring agent in combination with other spices to make spice premix and mouth fresheners. Powder of Kothimbda with other spices is commonly used for various therapeutic purposes to cure stomach pain, nausea, vomiting and constipation. The dehydrated Kothimbda is coughicide, vermicide, cooling, diuretic and gastric stimulant. Amongst all nutrients Ascorbic acid (Vitamin c) is most important from the processing point of view (Goyal and sharma, 2009).

The post-harvest loss of Kothimbda varies from 30 to 40 per cent due to its perishable nature and glut during harvesting time, which also reduces the market value of the fruit. Hence, dehydration is the only solution to overcome the problem of post-harvest losses as well as to provide high returns to the growers along with the availability of the fruit during off season. The farmers producing Kothimbda of our country are still using the traditional drying techniques for drying of Kothimbda and so far very little scientific research work has been undertaken on standardization of drying and dehydration technology especially for Kothimbda.

Packaging also ensures that product arrives at the point of distribution in its optimum conditions. It increases their potential shelf life and makes product more attractive to buyers. The effectiveness of different packaging materials will not be the same. Each material will show various impacts on the quality and shelf life. So the changes

in Ascorbic acid in Kothimbda with the use of different available packaging materials should be studied. The present study has been taken with the objectives to study effect packaging material on ascorbic acid retention during storage of kothimbda powder (cucumis callosus)

Materials and methods:

For this experimentation mature, the sound and uniformly matured fruits without any damage were selected for the experiment and washed in tap water. The washed and shade dried Kothimbda fruits were sliced into 3 mm, 5 mm and 7 mm thickness by using stainless steel knife. To prevent bacterial/mold infection, knifes were frequently dipped into potassium permanganate solution (5%) for 2 minutes before reusing for slicing. The slices of Kothimbda Slices were uniformly spread in single layer in tray for dehydration. The dried Kothimbda slices were grinded into the desired particles sizes by the Bajaj make grinder of 600W and 1800 rpm. The powder of dried Kothimbda slices obtained under different was sieved with the help of IS Sieves, having openings of size (16 mesh) to obtained the of uniform desired particle size of 16 mesh.

The packaging of Kothimbda powder of each treatment under study was done in glass bottles, Polyethylene pouches of 300 µ thickness and in Aluminum coated P.P. bags. All the containers were stored for a period of 3 months at room temperature. Temperature and relative humidity during the storage period was varying between 7.4 to 36.5 0C and 13 to 95 % respectively. The observations in terms of Ascorbic Acid content were recorded at an interval of 15 days besides initially during storage. To estimate ascorbic acid content, the following procedure as reported by Sadasivam and Manikam (1992) will be followed.

Results and disscusion:

Treatment	Ascorbic Acid (mg/100g)						
	Storage Period in Days						
	Initial	15	30	45	60	75	90
Slice Thickness (v)							
Packaging Material (p)							
p_1	39.30	35.00	33.05	28.61	25.69	24.16	22.50
p_2	39.30	35.00	30.27	29.44	26.39	23.47	20.14
p_3	39.30	32.21	29.16	26.66	24.72	22.36	19.30
S. Em. ±	0.54	0.66	0.86	0.75	0.71	0.60	0.65
CD (0.05)	NS	1.897**	2.4789**	2.159*	NS	NS	1.86**

Table: Effect of different Packaging Materials on Ascorbic acid content (mg/100g) of Kothimbda fruit powder during storage.

The dried Kothimbda fresh powder was biochemically analysed in terms of ascorbic acid content and observations are presented in Table. The powder was packed in three types of container i.e. Glass bottle, HDPE bag and Aluminum Coated P.P. bag and stored at room temperature for 90 days. The powder of each container was assessed for ascorbic acid content at 15 days interval. The results obtained are presented in Table. From results it was observed that the ascorbic acid content of the stored Kothimbda fruit powder was decreasing with the increase in storage period when stored at room temperature. The ascorbic acid content of the sample packed in Glass bottle, HDPE bag and Aluminum Coated P.P. bag was varying from 39.30 to 22.50, 39.30 to 20.14 and 39.30 to 19.30 mg/100g during 90 days of storage period at room temperature respectively. From these observations it was asserted that the loss in ascorbic acid during storage was minimum in the powder packed in Glass bottle followed by HDPE bag and Aluminum Coated P.P. bag (Table).

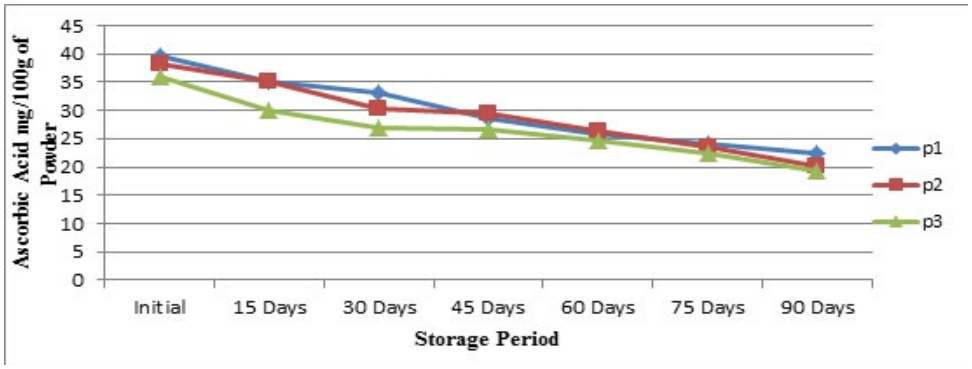

Fig. Effect of Packaging Materials on Ascorbic acid content of Kothimbda slice powder.

The statistical analysed data revealed that the Slice Thickness was giving highly significant results for the ascorbic acid content

The Kothimbda powder packed in Glass bottle (p1) showing highest value of ascorbic acid content retention after 90 days of storage followed by powder packed in HDPE bag (p2) and powder packed in Aluminum Coated P.P. bag (p3). Packaging Materials (p1) was giving highly significant results for the ascorbic acid content retention in mg/100g during 15 days, 30 days and 90days. It also gave significant result for 45 days of storage, while for the other stages of storage period found non-significant. The Glass bottles provide high barrier that preserved most of the antioxidants and functional properties of the powder as compared to HDPE bag and Aluminum Coated P.P. bag resulted in to less loss in Ascorbic acid during storage.

Similar results were reported by Burdurlu et al. (2006) in storage of citrus juice concentrates, Babarinde and Fabunmi (2009) for effective packaging materials to retain quality parameters and Seevaratnam et el. (2012).

Conclusion:

Keeping in view all the studied parameters under room temperature storage it was concluded that, To minimize the loss in ascorbic acid content of Kothimbda powder (16 Mesh) during storage for 90 days at room temperature, it should be packed in Glass bottle.

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