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SHORT COMMUNICATION

Effect of peeling and thickness of slices on shelf-life of dehydrated kachari (*Cucumis callosus* L.)

M. L. Meena* and G. Lal**
Department of Horticulture, SKN College of Agriculture, Jobner (Rajasthan), India

Kachari (*Cucumis callosus* L.) is one of the minor vegetables of family cucurbitaceae. The post-harvest losses in Kachari vary from 30-40 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 alongwith the availability of the fruit during off-season. Appropriate size of slices and peeling of fruits are good for drying and dehydration and improve the appearance, colour, quality of dehydrated product. Sulphuring treatment also improve the quality of the product. Sanitation was maintained in solar dryer as the dehydrated produce should be free from dust, flies, bees, etc. The solar dryers are simple to fabricate and well suited to rural conditions and small scale food processing industries. Keeping these points in view the present investigation has been carried out to study the effect of peeling, thickness of slice, sulphuring treatments and drying and dehydration techniques on the physico-chemical quality of the product.

Fully matured unripened uniform sized fruits with no injury on skin were procured from the Kachari growing area of Jaipur district of Rajasthan. Fruits were washed in the laboratory with running tape water followed by distilled water to remove dirt, dust particles, pesticide residues, etc and air dried. The fruits were subjected to three drying methods viz. sun drying (D_1), solar drying (D_2) and oven drying (D_3). Fruits were sliced in two thickness viz., 0.3 cm thick slices (T_1) and 0.6 cm thick slices (T_2). There were two treatments of peeling viz., with peeling (P_1) and without peeling (P_2). The slices prepared were subjected to two sulphuring treatments viz., with sulphuring (S_1) and without sulphuring (S_2). In all there were 24 treatment combinations. Required quantity of Kachari fruits were taken and removed the peels by peeling knife. Slices of 0.3 cm and 0.6 cm thickness were prepared from both peeled and unpeeled fruits with the help of peeling knife. Slices were exposed to sulphur fumes in a sulphuring cell. The tray load was 500 g fruits per square ft area. Burning sulphur dust on the charcoal fire produced fumes. The slices were confined to the fumes for 30 minutes. The quantity of sulphur burnt was 2 g per charge. After application of treatments the slices were subjected to drying. For sun drying, the slices were spreaded in open sun light until completely dried. The average maximum and minimum, temperature was 35.1° and 11.6°C, respectively. The slices were completely dries in 8 days. The slices were loaded uniformly in a multitray cabinet solar dryer which was placed in open sun for solar drying. The top of the solar dryer was covered with a transparent glass and the sides were coated with black colour. The trays were changed in rotation from lower shelf to the upper one in order to ensure uniform drying of the entire mass. The temperature of the solar dryer was 5-7°C higher than sun drying. The slices were completely dried in 6 days. For dehydration in oven, the slices were spreaded on trays with a load of 500 g per sq. ft area. The temperature of the oven was ranged from 50-55°C. The slices were completely dried in 10-12 hrs. The drying ratio was calculated after weighing the fresh and dried slices. 10g of dried slices from lot were taken and subjected to boiling water for 15 minutes and then weighed after cooling and rehydration ratio was calculated (Ranganna,1991). The ascorbic acid, carbohydrates and protein content of slices were analyzed with the help of methods suggested by (AOAC,1990). The colour and organoleptic evaluation was done by a panel of 5 judges, as per the Hedonic Rating Test Amerine et al.(1965). To test the significance of variation in the date obtained, the analysis of variance technique was adopted as suggested by Fisher (1950) for completely randomized design. Significance of the difference in the treatment effect was tested through 'F' test.

Aurhot's present address:
* Present Address: Lecturer, Department of Applied Plant Science (Hort.), Babasaheb Bhimrao AmbedkarUniversity, Vidya Vihar, Rae Bareli Road, Lucknow-226025.
**Sr. Scientist (Hort.), CAZRI, ARS, Pali-Marwar (Rajasthan)

It is obvious from the results that the drying and rehydration ratio was significantly affected by different treatments (Table 1). The maximum (10.10) drying ratio was obtained in 0.3 cm thick peeled sulphured slices dried in solar dryer ($D_2T_1P_1S_1$ treatment combination). The slices dried under sun resulted in **maximum moisture loss as** compared to other methods. It was observed that 0.3 cm thick unpeeled sulphured slices of Kachari dried in solar dryer ($D_2T_1P_2S_1$ treatment combination) absorbed more water and resulted highest rehydration ratio (4.0) as compared to 0.6 cm thick peeled non-sulphured slices dried in sun or oven. It might be due to uniform drying in solar dryer as compared to sun and oven drying, favourable effect of sulphuring treatment, presence of more pulp and seeds in peeled slices increased the drying ratio while the presence of peels on the slices favoured the absorption of water and consequently increased the rehydration ratio. Roy and Singh (1979) in bael have also reported similar findings.

The results revealed (Table 1) that the solar dried slices of 0.6 cm thickness with peeling and sulphuring treatment retained greater amount of ascorbic acid as compared to sun and oven drying of 0.3 cm thick unpeeled slices without sulphuring treatment. Sulphur treatment reduced the destruction of carotene and ascorbic acid, which are important nutrients for fruits Raghupathy and Thangavel (2003).

The carbohydrates and protein content of the slices affected significantly with the application of different treatments. The solar dried peeled sulphured slices of 0.3 cm thickness retained maximum carbohydrates and protein as compared to all other treatment combinations. More availability of pulp in peeled slices and favourable effect of sulphuring treatment retained more carbohydrates. Khurdia and Roy (1986) found that fruits dried in solar dryer retained high SO_2 content with fewer changes in reducing and total sugars as compared to those dried in

Table 1. Effect of different treatments on the physico-chemical characteristics of dried Kachari slices.

Treatments	Drying ratio	Rehy-dration ratio	Ascorbic acid (mg/ 100g pulp)	Carbo hydrates (%)	Protein (%)	Colour score (Out of 10 marks)	Organo leptic rating (out of 10 marks)
$D_1T_1P_1S_1$	10.05	2.28	19.35	49.39	9.97	6.70	6.41
$D_1T_1P_1S_2$	10.01	2.20	18.50	49.15	9.46	6.52	6.00
$D_1T_2P_1S_1$	10.05	2.25	19.45	49.24	9.85	6.62	6.38
$D_1T_2P_1S_2$	10.03	2.18	18.61	48.99	9.40	6.43	5.90
$D_1T_1P_2S_1$	9.85	3.28	17.50	42.76	6.95	5.55	6.40
$D_1T_1P_2S_2$	9.80	3.20	16.70	42.10	6.25	5.30	5.97
$D_1T_2P_2S_1$	9.82	3.26	17.40	42.61	6.90	5.47	6.35
$D_1T_2P_2S_2$	9.78	3.19	16.65	42.20	6.39	5.25	5.87
$D2T_1P_1S_1$	10.10	2.90	23.29	42.39	12.20	8.20	8.51
$D2T_1P_1S_2$	10.06	2.70	22.89	52.00	11.90	8.00	7.90
$D_2T_2P_1S_1$	10.09	2.89	23.40	52.23	12.10	8.15	8.45
$D_2T_2P_1S_2$	10.05	2.65	22.75	51.89	11.70	7.90	7.70
$D_2T_1P_2S_1$	9.95	4.00	17.90	46.50	7.69	7.50	8.25
$D_2T_1P_2S_2$	9.90	3.50	16.85	46.20	7.20	7.31	7.65
$D_2T_2P_2S_1$	9.94	3.95	17.95	46.37	7.67	7.40	8.18
$D_2T_2P_2S_2$	9.90	3.45	16.90	46.15	7.19	7.20	7.60
$D_2T_2P_1S_1$	10.07	2.83	21.09	50.62	10.92	7.93	7.37
$D_3T_1P_1S_2$	10.00	2.61	20.65	49.84	10.49	7.70	7.13
$D_3T_2P_1S_1$	10.04	2.80	21.00	50.48	10.75	7.89	7.35
$D_3T_2P_1S_2$	10.00	2.56	20.52	49.75	10.45	7.60	7.10
$D_3T_1P_2S_1$	9.89	3.80	17.69	44.79	7.56	7.32	7.00
$D_3T_1P_2S_2$	9.84	3.40	16.95	44.25	7.30	7.14	6.69
$D_3T_2P_2S_1$	9.87	3.75	17.74	44.67	7.45	7.10	6.95
$D_3T_2P_2S_2$	9.83	3.39	16.90	44.11	7.35	6.90	6.67
SEm -+	0.01	0.02	0.051	0.060	0.075	0.058	0.075
CD (P=0.05)	0.03	0.06	0.15	0.18	0.22	0.17	0.22

D_1 - Sundrying
D_2-Solar drying

T_1 – 0.3 cm thick slice
T_2 – 0.6cm thick slice

P_1-With peeling
P_2- Without peeling

S_1-Sulphuring
S_2- Non-sulphuring

open sun. Similar results were also reported by Tripathi *et al.* (1988) in aonla.

Slices dried under solar dryer resulted in minimum loss of colour as compared to slices dried under sun and oven. Sun dried slices had maximum loss of colour due to the effect of direct sunlight. Lee *et al.*, (1994) also obtained desirable colour when persimmon fruits were either dried with hot air + sun or artificial ventilation. The desirable bright attractive white yellowish colour with maximum score was observed by colour judging panel peeled slices of 0.3 cm thickness as compared to unpeeled and 0.6 cm thick unsulphured slices. It might due to the fact that colour of smaller peeled slices was attractive and desirable and sulphur fumes prevent oxidative browning. These results are close agreement with those of Cai and Corke (2001). The peeled slices of 0.3 cm thickness dried in solar dryer were highly acceptable with maximum organoleptic score over unpeeled slices of 0.6 cm thickness dried in sun or oven. The maximum benefit cost ratio of 1.21 was obtained with 0.3 cm peeled and sulphured slices dried under solar dryer.

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