

## Drying effect on storage and organoleptic qualities of okra [*Abelmoschus esculentus* (L.) Moench.]

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### ● ABSTRACT ●

Okra is an important commercial crop grown in India. As it is seasonal in nature its availability is limited only to some part of the year. Okra is harvested at green, tender stage. Hence, the produce cannot be stored for longer period. Drying is one of the most widely used and a primary method of preservation. In this connection investigations were carried out to study the effect of drying on storage and organoleptic qualities of okra slices to make it available in off season. Okra slices were made and dried under three conditions viz., sun drying, ambient temperature drying and convectional drying at selected levels of temperature. Results indicated that okra slices dried at 40°C under conventional drying recorded better results in maintaining good organoleptic qualities than those dried in sun drying and ambient drying methods.

**KEY WORDS :** Organoleptic qualities, Sun drying, Ambient temperature drying, Convectional drying

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### ● INTRODUCTION ●

Vegetables and fruits are indispensable part of human diet and can be regarded as the fuel for physiological processes. 25-30% of total produce is being wasted during handling from point of production to consumer's plates. This wastage can be effectively reduced by applying appropriate method of processing and preservation. In this regard some of the vegetables have been traditionally processed by drying to extend their storage life well beyond few weeks and make them available in off season.

Okra [*Abelmoschus esculentus* (L.) Moench.] is one of the fruit vegetable, normally consumed as a vegetable in large scale throughout India and other parts of the

world. The immature, fresh and tender fruits which are generally cooked as vegetable for culinary and soup purposes. The fruits also have some medicinal value and provides moderate amount of vitamins, dietary fiber, energy and minerals. They may also be dried and ground into the powder and added for flavoring in various dishes. In India okra is traditionally preserved by slicing and sun drying on the ground, concrete floors, racks, trays and other drying surfaces up to 5-6 days till it becomes brittle. (Kalra and Bharadwaj 1981). The present investigation was carried to find out the most effective drying method for storage and organoleptic qualities of okra.

### ● MATERIALS AND METHODS ●

The experiment was conducted on effect of drying on storage and organoleptic qualities of okra in the Department of Horticulture, UAS, Dharwad, Karnataka state, India. The fresh okra fruits were collected from Dharwad local market during Jan- March, 2008. The average dimensions of fruit were 60-80 mm long and 15-20 mm diameter. Dark green coloured fruits were selected for the study. The fruits were thoroughly washed and sliced into 5 mm thickness using sharp sterilized knife. The slices were then weighed exactly 50 grams for each treatment.

These were kept for drying in three replications. The convection drying was carried by drying the samples at

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40°C, 100°C and 140°C. For sun drying the weighed okra slices were taken in paper plates and kept on the open floor on the top of terrace of lab. For ambient drying the weighed okra slices were taken in paper plates and kept inside the well ventilated room. The conventional drying was carried out by keeping the weighed slices in glass bowl to avoid the burning of paper plates. Observations on physiological loss in weight and colour change in each sample were recorded at the interval of one hour in sun drying, 2 hour in ambient drying and 5 minutes for convective drying. The change in color of slices was recorded and presented in the graph using the following score card.

The texture of end produce was also tested by observing breakage of the dried slices and the produce was categorized into different grades. Temperature and relative humidity in the ambient drying and sun drying was recorded throughout the drying period using hygrometer.

Table 1 : Score card for colour of the end produce	
Score	Colour
5	Green
4	Light green
3	Light brown
2	Brown
1	Dark brown

## ● RESULTS AND DISCUSSION ●

The effect of different drying methods on drying time, color and texture of the okra slices were determined. The result shown that there was a general decline in weight of the sample from 50 g to 6 g in all methods of drying. Time required for ambient drying of okra was 40 hours and sun drying took 15 hours, whereas convective drying was found to be quicker drying method. It took lesser time of about 540 minutes at 40°C air temperature, 110 minutes at 100°C air temperature and 90 minutes at 140°C air temperature to attain final constant weight.

The results pertaining to drying of okra as recorded in three different methods viz., ambient drying, sun drying and convective drying are shown in Fig. 1 and 2. The data indicated that the less of moisture was at its highest magnitude in the first hour of drying, however, the moisture loss was slowed down in the subsequent drying period. The reduction in moisture content of okra during first hour in convective drying and sun drying was at higher rate than the samples dried in ambient condition. Similar trend was also observed by Bhosale and Arya (2004), in cabbage, cluster bean, fenugreek, spinach and okra.

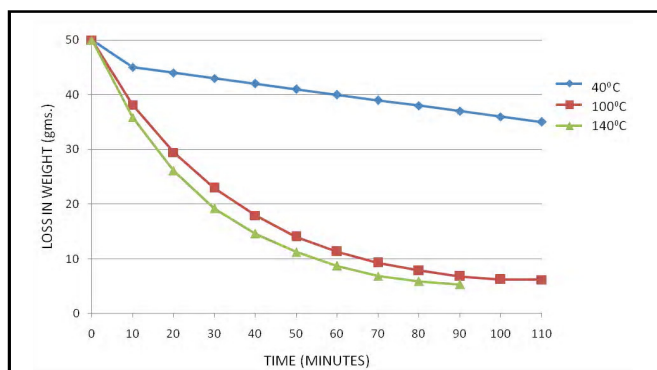


Fig. 1: Effect of convective air temperature on final weight of dried okra slices

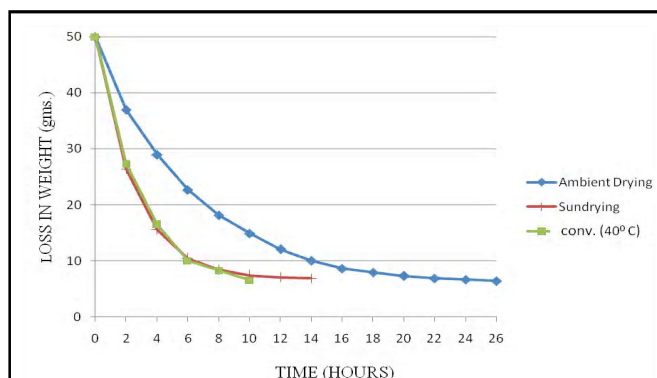
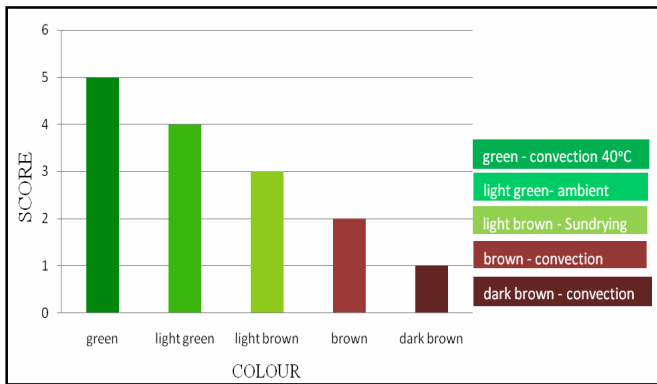


Fig. 2 : Effect of different drying methods on final weight of dried okra slices

Among the drying methods, the removal of moisture from okra slices was found to be at faster rate in convective drier followed by sun drying and ambient conditions. This was attributed to the level of temperature and rate of air flow in the oven which might be responsible for higher difference in less of moisture. Differences in final weight were observed with the samples dried under different methods of drying. The final weight achieved were, 6.14 g under sun drying, 6.91 g in ambient drying. Similarly final weight recorded with different levels of air temperature under convection drying were 6.65g, 6.25 g and 5.35g at the air temperature of 40°C, 100°C and 140°C, respectively. Further the observations were also recorded on change in colour of the dried okra slices. The colour of slices under ambient temperature was found light green. The change of colour from green to light brown was observed with sun drying. The change of colour in convection drier at 100°C and 140°C air temperature were brownish and dark brown, respectively, whereas the colour was found to be better (green) at 40°C air temperature (Fig.3). Similar results were obtained by Adorn *et al.* (1991) and they opined that the shift in colour from green to brownish was due to temperature dependent



**Fig. 3 : Effect of different drying conditions and air temperature on colour of dried okra slices**

degradation of chlorophyll.

Further the textures of final dried sample were also recorded. Result indicated that the slices dried under convection drier at 40°C air temperature remained their texture well. The slices dried at 140°C had very poor textural quality and were shriveled and giving burnt appearance. The sundried slices were also appeared shriveled with broken pieces. Similar results were also observed by Jayaraman *et al.* (1991).

**Conclusion:**

The commonly consumed okra was dried under convectional drying, sun drying and under ambient drying. The drying characteristic and time required for drying of

okra was studied and final dry weight of the okra slices were estimated. It was found that okra samples, dried by convective drying were reported to take minimum time for drying with, maximum removal of moisture as compared to sun drying and ambient drying. The initial first hour of convection drying and sun drying and initial 6 hours under ambient drying resulted in maximum removal of moisture from okra. The okra slices dried in convective drier at 40°C gave better results in maintaining better appearance, colour and texture.

● **LITERATURE CITED** ●

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