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Effect of drying temperatures and slice sizes on organoleptic characters of dried okra

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Abstract

An experiment was conducted to see the effect of drying temperature and slice size on Organoleptic characters of drying okra was conducted at Department of Plant Breeding and Genetics, K.N.K College of Horticulture Mandsaur, RVSKVV Gwalior during March 2008 to last May 2008. The Organoleptic characters under sensory evaluation, maximum score for colour (8.08), aroma (8.04), taste (7.16) and texture (7.06) were observed in drying temperature 60 °C (T₂) x 2 cm slice size (S₂).

Keywords: Colour, aroma, taste, texture, Okra

1. Introduction

Okra (*Abelmoschus esculentus* L.) is an annual herb, belongs to the family Malvaceae. It is a native of tropical and sub-tropical Africa. Okra tender pods are used as vegetable and are eaten boiled or in the forms of sliced and fried pieces. They are also used as snacks and are excellent thickener for gravies and soups because of their high mucilage content. Some time they are sliced and sun dried for off-season use. Dried slice are reported to be produced in Turkey on a large scale (Anon. 1951). It is a good source of vitamins A and B, protein, calcium, potassium and other mineral matters. In post-harvest handling of horticulture produce, drying i.e. partial removal of water to enhance their keeping quality has been practiced since time immemorial Other than sun drying technique. All drying technologies require large amount of energy for removal of water from vegetables and are less energy efficient. Also these vegetables contain large amount of water, which needs to be removed by drying. A need was felt to process the local okra cultivar through low cost drying technology in the form of slices to help reduce the post-harvest losses of okra as well as to increase off-season use.

2. Material and Methods

The present investigation was carried out at Department of Plant Breeding and Genetics, K.N.K., College of Horticulture, Mandsaur, R.V.S.K.V.V. Gwalior during March 2008 to last May 2008. The experimental material is okra *cv.* Mahyco-10 used in this study was collected from a local farmer Mr. Modi Ram Patidar in Mandsaur (M.P.). Fruit of this variety is green, smooth with 5 ridged and about 8-10 cm long at the marketable stage. The experiment laid out into sixteen treatment combinations which consisted four treatments of drying temperature *i.e.* 50, 60, 70, and 80 °C and four slice sizes *i.e.* 1, 2, 3, and 4 cm were replicated two times in a factorial complete randomized design. Tails and butts of the cleaned pods were removed by a stainless steel knife. Okra samples were cut in to different slice sizes of 1 cm, 2 cm, 3 cm and 4 cm by using cut and chop board. For getting desired size of slices markings were made on the cut and chop board and the samples were fixed to the board with the help of wooden sticks. Samples were blanched in NaCl solution (0.5%) at 95 °C for 5 min. The blanched samples were immediately cooled by immersing in cold water. Then blanched samples were spread on a stainless steel sieves to drain excess water (Shivhare *et al.*, 2000) [3]. Drying time was noted down by calculating the total time taken in drying with the help of a digital clock.

Organoleptic analysis was done on the basis of Hedonic scale and 5-trained panel members and 10-semi-trained members. Colour of dried okra were judge by visual method. For this a panel of six judges was chosen who examined the product and marks given by them were arranged. The scoring was done by the pattern is given in table 1.

Table 1: Sensory score for colour of dried okra

Colour	Score
Greenish Yellow	7.5 – 9
Light brown green	5.0 – 7.49
Brownish green	2.5 – 4.99
Dark brown greenish	< 2.50

The taste, aroma and texture of the product were evaluated by panel of six judges by using Hedonic Rating Scale out of 9 point marks (Raganna, 1977) [2]. The marks given by them were arranged. The scoring was done by the patterns as shown in table 2.

Table 2: Sensory score for aroma, taste, and texture

Aroma/Taste/Texture	Score
Like extremely	9
Like very much	8
Like moderately	7
Like slightly	6
Neither like nor dislike	5
Dislike slightly	4
Dislike moderately	3
Dislike very much	2
Dislike extremely	1

3. Results and Discussion

The sensory characteristics of dried okra were recorded and presented in various Tables. The Quality of dried okra depends upon its appearance (colour, taste, aroma and texture etc.).

3.1 Colour

Sensory score for colour of dried okra slices at different slice size and temperature are shown in Table 3. It reveals that the maximum average score for colour 7.39 at 60°C (T₂), which is highly acceptable than drying at other temperatures. The minimum average score (6.65) was noted in 80°C (T₄) drying temperature.

In case of slice size the maximum average score for colour of dried okra was found (7.22) at 2 cm (S₂) slice size, which is most acceptable to other levels of slice size. The minimum average score (6.65) was noted in 1cm (S₁) slice size. For different interaction of drying temperature and slice size, the maximum score for colour of died okra was 8.08 under 60°C and 2 cm slice size (T₂S₂), which is highly acceptable than any other interaction. The minimum score was (6.26) recorded under combination of 70 °C and 3 cm slice size (T₃S₃).

Table 3: Effect of drying temperatures and slice sizes on sensory evaluation for colour of dried okra

Slice size (cm)	Temperature (°C)				Mean
	50 °C (T ₁)	60 °C (T ₂)	70 °C (T ₃)	80 °C (T ₄)	
1cm (S ₁)	7.03	7.26	7.01	6.64	6.65
2cm (S ₂)	7.26	8.08	6.78	6.78	7.22
3cm (S ₃)	7.16	7.2	6.26	6.36	6.74
4cm (S ₄)	6.73	7.04	7.11	6.82	6.92
Mean	7.04	7.39	6.79	6.65	
Treatment		S.Em±		C.D. at 5% level	
T		0.138		0.412	
S		0.138		0.412	
T X S		0.275		NS	

3.2 Aroma

Sensory score for aroma of dried okra slices at different temperature and slice size are shown in Table 4. It reveals that the maximum average score (7.53) for aroma at 60 °C (T₂), which is highly acceptable than drying at other temperatures. The minimum average score 6.54 was noted in 80 °C (T₄) drying temperature. For slice size the maximum average score for aroma of dried okra was found (7.17) at 2 cm (S₂) slice size, which is most acceptable than other levels of slice size. The minimum average score 6.86 was noted in 1 cm (S₁) slice size.

For different combination of drying temperature and slice size, the maximum score for aroma of died okra was 8.04 under 60 °C and 2 cm slice size (T₂S₂), which is highly acceptable than other interaction. The minimum score of 6.12 for aroma was recorded under combination of 80 °C and 1 cm slice size (T₄S₁).

Table 4: Effect of drying temperatures and slice sizes on sensory evaluation for aroma of dried okra

Slice size (cm)	Temperature (°C)				Mean
	50 °C (T ₁)	60 °C (T ₂)	70 °C (T ₃)	80 °C (T ₄)	
1cm (S ₁)	7.03	7.29	7.03	6.12	6.86
2cm (S ₂)	7.23	8.04	7.17	6.26	7.17
3cm (S ₃)	7.21	7.42	7.31	7.09	7.25
4cm (S ₄)	7.26	7.40	7.10	6.71	7.11
Mean	7.18	7.53	7.15	6.54	
Treatment		S.Em±		C.D. at 5% level	
T		0.104		0.312	
S		0.104		NS	
T X S		0.208		NS	

3.3 Taste

Sensory score for taste of dried okra slices at different temperature and slice size are shown in Table 5. It is reveal that the maximum average score for taste (7.04) at 60 °C (T₂), which is highly acceptable than to drying at other temperatures. The minimum average score of 6.30 was noted for 80 °C (T₄) drying temperature. In case of slice size the maximum average score for taste of dried okra was found to be 6.79 at 2 cm (S₂) slice size, which is most acceptable than other levels of slice size. The minimum average score of 6.56 was noted for 3 cm (S₃) slice size.

In case of different combination of drying temperature and slice size, the maximum score for taste of died okra was (7.16) under 60 °C and 2 cm slice size (T₂S₂), which is highly acceptable than any other interaction. The minimum score for taste 6.12 was recorded under combination of 80°C and 4 cm slice size (T₄S₄).

Table 5: Effect of drying temperatures and slice sizes on sensory evaluation for taste of dried okra

Slice size (cm)	Temperature (°C)				Mean
	50°C (T ₁)	60°C (T ₂)	70°C (T ₃)	80°C (T ₄)	
1cm (S ₁)	6.73	7.13	6.5	6.43	6.69
2cm (S ₂)	6.8	7.16	6.63	6.58	6.79
3cm (S ₃)	6.92	7.03	6.23	6.08	6.56
4cm (S ₄)	6.86	6.86	6.63	6.12	6.61
Mean	6.82	7.04	6.49	6.30	
Treatment		S.Em±		C.D. at 5% level	
T		0.133		0.400	
S		0.133		NS	
T X S		0.267		NS	

3.4 Texture

Sensory score of texture of dried okra slices at different temperature and slice size are shown in Table 6. It reveals that the maximum average score for texture 6.71 at 60 °C (T₂) and 70 °C (T₃), which is highly acceptable than to drying at other temperatures. The minimum average score of 6.38 was noted for 50 °C (T₁) drying temperature. In case of slice size the maximum average score for texture of dried okra was found to be 6.76 at 2 cm (S₂) slice size, which is highly acceptable than other levels of slice size. While minimum average score of 6.49 was noted for 4 cm (S₄) slice size.

In case of different interaction of drying temperature and slice size, the maximum score for texture of died okra was 7.06 under 60 °C and 2-3 cm slice size (T₂S₂ and T₂S₃), which is most acceptable than any other interaction. The minimum score of 6.21 for texture was recorded under combination of 50 °C and 4 cm slice size (T₁S₄).

Table 6: Effect of drying temperatures and slice sizes on sensory evaluation for texture of dried okra

Slice size (cm)	Temperature (°C)				Mean
	50 °C (T ₁)	60 °C (T ₂)	70 °C (T ₃)	80 °C (T ₄)	
1cm (S ₁)	6.40	6.53	6.53	6.83	6.57
2cm (S ₂)	6.56	7.06	7.04	6.36	6.76
3cm (S ₃)	6.36	6.80	6.80	6.46	6.60
4cm (S ₄)	6.21	6.46	6.46	6.83	6.49
Mean	6.38	6.71	6.71	6.62	
Treatment		S.Em±		C.D. at 5% level	
T		0.107		0.322	
S		0.107		0.322	
T X S		0.214		0.644	

In sensory evaluation the maximum score for aroma, taste, colour and texture was found significantly higher under temperature 60 °C and slice size 2 cm. This may be due to less reduction of chemical and flavour compounds under low temperature. Similar results have been reported at 55 °C and 2 cm slice size by Shivhare *et al.* (2000) [3].

4. Conclusion

On the basis of present investigation, it can be concluded that the organoleptic characters under sensory evaluation, the maximum score for colour, aroma, taste and texture were also observed in drying temperature 60°C (T₂) x 2 cm slice size (S₂).

5. Reference

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