



Organoleptic Evaluation and Shelf Life Studies of the Developed Products

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ABSTRACT

Sweet potato (Ipomea batatas L.) is a dicotyledonous plant that belongs to the family convolvulacea. It is a short seasonal crop which reliably provides food on marginal and degraded land with little labor and few or no input outside the farm. The present study revealed that, sweet potato products are good sources of nutrients. Sweet potato chips, flakes and biscuits were prepared by using standard methods. Organoleptic evaluation was conducted. Results revealed that, SC-3 (sweet potato chips), SPF-3 (value added sweet potato flakes) and SB-2 (sweet potato biscuits) scored higher in all the sensory attributes. The nutrient composition of the products contained a good amount of protein, fat, energy, carbohydrate, ash, crude fibre, β -carotene and vitamin-C and also it contains better amount of minerals (potassium, magnesium, zinc, iron, copper, manganese and sodium). Shelf life study was carried out and the products were packed in an aluminium foil bags and kept for initial, 10th, 20th and 30th days of the interval. Results revealed that, the sensory scores for stored products were found to be significantly decreased, and found that, increased the microbial population in all the products, as the number of days increased. Consumer acceptance was conducted for 50 under graduate students of the University which were randomly selected. Results revealed that, the chips, flakes and biscuits were accepted by the consumers respectively. It can be concluded that, the sweet potato products contain appreciable amount of nutrients which can be developed into different products.

Keywords: Sweet potato, Consumer, Chips, Flakes.

INTRODUCTION

The nutritional value of sweet potato with high levels of vitamin A (709 μ g) offers an added benefit to processed products. Sweet potato plays an important role in food security, for example, the dried chips can be stored for consumption during the hungry period when some vital crops are in short supply or not

available. The bulkiness and perishability of sweet potato storage is a major barrier to the wider utilization of the crop. A possible means of approach to this problem is to diversify the use of sweet potato. Sweet potato roots are being utilized for various products but there is need to further diversify the processing of the roots into more products.

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Some of the products produced from the processing of sweet potato include fermented sweet potato drink and sweet potato cocktail (Nirvana, 2011). Further diversification of the products of sweet potato is a scientific approach for the supplementation of nutrients for general population.

Various international efforts are being made since long back for alleviating vitamin A deficiency and thereby combating night blindness. From different approaches, mainly supplementation programme, distribution of vitamin capsules; fortification of common foods with micronutrients and the improvement of dietary quality through diversification of foods, and food based approach in achieving and maintaining adequate intake of micronutrient-rich foods. (WHO,1996).

MATERIALS AND METHODS

Name of judge:.....Date:..... Product:

Taste these samples and check how much you like or dislike each one. Use the appropriate scale to show your attitude by checking at the point that best describes your feelings about the sample. Please give

Organoleptic evaluation of sweet potato products:

Sweet potato samples were analyzed for sensory characteristics. Sensory quality characteristics were evaluated by a lab panel of 20 semi- trained members using 9-point Hedonic scale. The samples were evaluated for their appearance, texture, color, aroma/flavor, taste and overall acceptability (ANNEXURE 1).

Shelf life study of the sweet potato products

Shelf life study was conducted for 30 days using aluminium foil bags which were kept at ambient temperature. The products were observed at the interval of initial, 10, 20 and 30th days for sensory attributes and microbial load using Nutrient agar (NA) for total bacterial count. The results were recorded.

SENSORY EVALUATION SHEET

Score sheet for sensory evaluation of sweet potato chips.

a reason for this attitude. Remember you are the only one who can tell what you like. An honest expression of your personal feeling will help me.

Nine point hedonic rating scale

Attributes	SC1	SC2	SC3
Appearance			
Texture			
Color			
Aroma/flavor			
Taste			
Overall acceptability			

Remarks:

Signature

SENSORY EVALUATION SHEET

Score sheet for sensory evaluation of value added sweet potato flakes.

Name of judge:Date: Product:

Taste these samples and check how much you like or dislike each one. Use the appropriate scale to show your attitude by checking at the point that best describes your feelings about

the sample. Please give a reason for this attitude. Remember you are the only one who can tell what you like. An honest expression of your personal feeling will help me.

Nine point hedonic rating scale

Attributes	SPF1	SPF2	SPF3
Appearance			
Texture			
Color			
Aroma/Flavor			
Taste			
Overall acceptability			

Remarks:

Signature

SENSORY EVALUATION SHEET**Score sheet for sensory evaluation of sweet potato biscuits**

Name of judge:Date: Product:

Taste these samples and check how much you like or dislike each one. Use the appropriate scale to show your attitude by checking at the point that best describes your feelings about

the sample. Please give a reason for this attitude. Remember you are the only one who can tell what you like. An honest expression of your personal feeling will help me.

Nine point hedonic rating scale

Attributes	SB1	SB2	SB3
Appearance			
Texture			
Color			
Aroma/Flavor			
Taste			
Overall acceptability			

EXPERIMENTAL RESULTS**Organoleptic evaluation of the sweet potato products**

Sweet potato products were kept for sensory evaluation and they were evaluated by semi-trained lab panel members using a 9 point Hedonic scale. Mean sensory scores of products were presented in the Table 9, Table 10 and Table 11.

Sensory scores of sweet potato chips

The sweet potato chips were subjected for sensory evaluation and the results were presented in Table-9. The SC3 score is higher in

appearance 8.01 and SC1 scored lowest 7.56. SC3 scored higher in color 8.19 whereas, SC2 scored lowest 7.59. The attribute of the texture scored higher in SC3 8.28 and SC1 scored lowest in texture 7.68. In case of aroma SC3 scored higher 8.14 and lowest 7.69 in SC1. Taste of SC3 scored higher 8.23 and lowest score 7.68 in SC1. However SC3 had higher score in overall acceptability, 8.28 and lowest was SC1 7.86. Among these variations SC3 was selected for shelf life study.

Sensory scores of value added sweet potato flakes

The sensory evaluation of the value added sweet potato flakes were presented in the Table-

10. The results revealed that, SPF3 had scored high of 8.25, 8.10, 8.30, 8.70, 8.45 and 8.25 for

Sensory scores of sweet potato chips

appearance, texture, color, flavor, taste and overall acceptability respectively. SPF1 scored lowest 7.95, 7.90 and 8.15 for appearance, texture and color respectively. SPF2 score lowest in aroma/flavor 7.70 and also scored lowest in taste

Products	Appearance	Texture	Color	Aroma	Taste	Overall acceptability
SC1	7.56	7.61	7.89	7.69	7.68	7.86
SC2	7.67	7.59	7.80	7.76	7.85	7.95
SC3	8.01	8.19	8.28	8.14	8.23	8.28
F Values	*	*	NS	*	*	*
SEm±	0.30	0.39	0.36	0.38	0.35	0.52
CD at 5 %	0.94	0.95	-	0.97	0.96	0.96

*Significant at 5 % level, NS-Non-Significant, SC1-Sweet potato chips 1, SC2- Sweet potato chips 2, SC3-Sweet potato chips 3

SC3 scored higher in appearance 8.01 and SC1 scored lowest 7.56. SC3 scored higher in color 8.19 whereas, SC2 scored lowest 7.59. The attribute of the texture scored higher in SC3 8.28 and SC1 scored lowest in texture 7.68. In case of aroma SC3 scored higher 8.14 and lowest 7.69 in SC1. Taste of SC3 scored higher 8.23 and lowest score

7.68 in SC1. However SC3 had higher score in overall acceptability 8.28 and lowest was SC1 7.86. Ojinnaka and Onwuka (2011), reported that, sensory evaluation revealed that, there was significant difference ($p < 0.05$) in the sweet potato chips in terms of texture.

Sensory scores of value added sweet potato flakes

Products	Appearance	Texture	Color	Flavor	Taste	Overall acceptability
SPF1	7.95	7.90	8.15	7.85	7.90	7.80
SPF2	8.15	7.95	8.2	7.75	7.80	7.75
SPF3	8.25	8.10	8.3	8.70	8.45	8.25
F Values	NS	NS	NS	*	*	*
SEm±	0.01	0.07	0.05	0.21	0.12	0.11
CD at 5 %	-	-	-	0.45	0.44	0.39

*Significant at 5 % level, NS-Non-Significant, SPF1-Value sweet potato flakes 1, SPF2-Value added sweet potato flakes 2, SPF3-Value added sweet potato flakes 3

The result of the value added sweet potato flakes were revealed that, SPF3 scored higher scores 8.25, 8.10, 8.3, 8.70, 8.45 and 8.25 for appearance, texture, color, flavor, taste and overall acceptability respectively. SPF1 scored lowest 7.95, 7.90 and 8.15 for appearance, texture and color respectively. SPF2 scored lowest in aroma/flavor 7.70 and also scored lowest in taste 7.80. SPF2 scored lowest in overall acceptability 7.75.

Sensory scores of sweet potato biscuits

Table-11 depicts the sensory evaluation of sweet potato biscuits. Results revealed that, higher score in SB2 8.00, 8.40, 8.00, 8.00, 8.15 and 8.10 for appearance, texture, color, flavor, taste and overall acceptability respectively. SB1 scored lowest 7.75, 7.30, 7.40, 7.50, 7.55 and 7.40 for appearance, texture, color, aroma/flavor, taste and overall acceptability respectively. Among these variations SB2 was selected for best accepted product and shelf life study.

It was observed that, higher score in SB2 8.00, 8.40, 8.00, 8.00, 8.15 and 8.10 for appearance, texture, color, flavor, taste and overall acceptability respectively. SB1 scored lowest 7.75, 7.30, 7.40, 7.50, 7.55 and 7.40 for appearance, texture, color, aroma/flavor, taste and overall acceptability respectively. Srivastava et al. (2012) reported that, biscuits containing 50 per cent of sweet potato flour was acceptable as it contain higher fibre content and scored high score for overall acceptability.

Singh et al. (2008) reported that, sensory properties of cookies supplementing various proportion of sweet potato flour (0-100 %) to the wheat flour. Sensory evaluation revealed that, increasing levels of sweet potato flour (60 %) lowered the overall acceptability (2.7) because of taste and distinct flavor developed during baking.

Shelf life study of the products

The developed products were packed on Aluminium foil bags and products were kept in ambient temperature. Sensory attributes and microbial load were observed for products at the interval of initial, 10th, 20th and 30th day. Results were revealed as follows.

Shelf life study of the sweet potato chips

Sensory scores of shelf life of the sweet potato chips presented in the Table-12. As the number of the days increased, the scores for the sensory characteristic decreased in the products. The result found that from initial day to till the 30th day. The scores of appearance decreased from 8.45 to 6.20, texture 8.40 to 6.15, color 8.40 to 5.57, aroma 8.05 to 5.75, taste 8.00 to 5.90 and overall acceptability 8.05 to 5.90. There was significant difference was found in all the sensory attributes at 5 per cent.

As the number of the days increased, the scores for the sensory characteristic decreased in the products. The result found that from initial day till the 30th day. The scores of appearance decreased from 8.45 to 6.20, texture 8.40 to 6.15, color 8.40 to 5.57, aroma 8.05 to 5.75, taste 8.0 to 5.90 and overall acceptability 8.05 to 5.90. Schwartz *et al.*, 2006, reported that, sweet potato French-fry type products were observed in the sensory scores for color, flavor and texture thus indicating that the products has good stability in storage.

Shelf life study of the value added sweet potato flakes

Sensory scores of shelf life of the value added sweet potato flakes presented in the Table-13. The sensory scores observed from the initial day up to 30th day. The sensory characteristics are reduced from 8.40 to 7.01 appearance, 8.50 to 6.25 texture, 8.60 to 7.09 color, 8.35 to 7.01 flavor, 8.01 to 6.89 taste and 7.90 to 6.85 overall acceptability. There was significant difference in all the sensory characteristic at 5 per cent.

The sensory characteristics are reduced from 8.40 to 7.01 for appearance, 8.50 to 6.25 texture, 8.60 to 7.09 color, 8.35 to 7.01 flavor, 8.01 to 6.89 taste and 7.90 to 6.85 overall acceptability. Walter et al. (2006), reported that, sweet potato flakes supplemented with soy flour, soy flour plus DL-methionine, cottonseed flour and wheat gluten flour were prepared. Each formulation was stored at 23^oC and 40^oC under nitrogen for 8.25 months. Flakes stored at 40^oC

appeared to develop off-flavor and to lose water-binding capacity.

Shelf life study of the sweet potato biscuits

Sensory scores of shelf life study of the sweet potato biscuits presented in the Table-14. The sensory attributes are reduced from initial to 30th day. The sensory scores of the appearance decreased from 8.45 to 6.90, texture 8.08 to 6.01, color 8.50 to 7.89, flavor 8.29 to 6.98, taste 8.09 to 6.78 and overall acceptability 8.01 to 6.54. There was significant difference in all the sensory characteristic except color which was non-significant at 5 per cent. The sensory attributes are reduced from initial to 30th day. The sensory score of the appearance decreased from 8.45 to 6.90, texture 8.08 to

6.01, color 8.50 to 7.89, flavor 8.29 to 6.98, taste 8.09 to 6.78 and overall acceptability 8.01 to 6.54. It was observed that, after the 30th day biscuits lost hardness. This may be due to the absorption of moisture although it was packed in an aluminium foil bags. Taneya et al. (2014) reported that, there were no changes in texture and flavor on storage of 90 days

Microbial study of sweet potato chips

Total bacterial population in sweet potato chips product of (SC3) at initial, 10th, 20th and 30th days of storage are presented in Table-15. Bacterial population of SC3 at initial, 10th, 20th and 30th day was found to be 0.00, 3.20, 4.80 and 6.90X10⁴ respectively.

Sensory scores of sweet potato biscuits

Products	Appearance	Texture	Color	Flavor	Taste	Overall acceptability
SB1	7.75	7.30	7.40	7.50	7.55	7.40
SB2	8.00	8.40	8.00	8.00	8.15	8.10
SB3	7.90	8.20	7.95	7.80	7.85	7.85
F Values	NS	*	*	NS	*	*
SEm±	0.01	0.34	0.11	0.05	0.09	0.12
CD at 5 %	-	0.51	0.47	-	0.46	0.48

*Significant at 5 % level, NS-Non-Significant, SB1- Sweet potato biscuit 1, SB2-Sweet potato biscuit 2, SB3-Sweet potato biscuit 3

Shelf life study of the sweet potato chips

Product	Duration	Appearance	Texture	Color	Aroma	Taste	Overall acceptability
SC3	Initial	8.45	8.40	8.40	8.05	8.00	8.05
	10 th day	7.60	7.30	7.35	6.95	7.05	6.85
	20 th day	7.15	6.65	6.65	6.65	6.60	6.60
	30 th day	6.20	6.15	5.57	5.75	5.90	5.90
F value		*	*	*	*	*	*
SEm±		0.26	0.42	0.54	0.20	0.27	0.30
CD at 5 %		0.87	0.96	1.54	0.52	0.74	0.80

* Significant at 5 % level, SC3-Sweet potato chips 3

Shelf life study of the value added sweet potato flakes

Product	Duration	Appearance	Texture	Color	Flavor	Taste	Overall acceptability
SPF3	Initial	8.40	8.50	8.60	8.35	8.01	7.90
	10 th day	7.90	7.02	8.10	7.85	7.70	7.25
	20 th day	7.55	6.75	7.70	7.40	7.01	7.30
	30 th day	7.01	6.25	7.09	7.01	6.89	6.85
F value		*	*	*	*	*	*
SEm±		0.15	0.11	0.11	0.14	0.33	0.30
CD at 5 %		0.46	0.49	0.24	0.42	0.76	0.70

*Significant at 5 % level, SPF3-Value added sweet potato flakes 3

Shelf life study of the sweet potato biscuits

Product	Duration	Appearance	Texture	Color	Flavor	Taste	Overall acceptability
SB2	Initial	8.45	8.08	8.50	8.29	8.09	8.01
	10 th day	8.20	7.89	8.10	7.72	7.47	7.56
	20 th day	7.56	6.75	7.90	7.20	7.31	7.32
	30 th day	6.90	6.01	7.89	6.98	6.78	6.54
F value		*	*	NS	*	*	*
SEm±		0.14	0.12	0.18	0.13	0.39	0.13
CD at 5 %		0.46	0.49	-	0.62	0.76	0.30

*Significant at 5 % level, NS-Non-Significant, SB2-Sweet potato biscuits 2

Microbial study of sweet potato chips

Product	Duration	TBC/gm
SC3	Initial	0.00
	10 th day	3.20
	20 th day	4.80
	30 th day	6.90
	F value	*
	SEm±	0.17
	CD at 5 %	0.59

*Significant at 5 % level, SC3-Sweet potato chips 3

It was found that, as the storage period increased microbial population was also found to increase. Total bacterial population in sweet potato chips 3 at initial, 10th, 20th and 30th days of storage are presented in Table-15. Bacterial population of SC3 at initial, 10th, 20th and 30th day was found to be 0.00, 3.20, 4.80 and 6.90X10⁴ respectively.

Microbial study of value added sweet potato flakes

Table-16 depicts the population of total bacteria in value added sweet potato flakes 3. Bacterial population of SPF3 at initial, 10th, 20th and 30th days was found to be 0.00, 2.90, 4.30 and 5.90 × 10⁴ respectively.

Table-16 depicts the population of total bacteria in value added sweet potato flakes 3. Bacterial population of SPF3 at initial, 10th, 20th and 30th days was found to be 0.00, 2.90, 4.30 and 5.90X10⁴/gm respectively.

Microbial study of sweet potato biscuits

Total bacterial population in sweet potato biscuits 3 at initial, 10th, 20th and 30th days of storage presented in Table-17. The bacterial population of SB2 at initial, 10th, 20th and 30th days was found to be 0.00, 3.20, 5.40 and 7.40 × 10⁴ respectively.

Total bacterial population in sweet potato biscuits 3 at initial, 10th, 20th and 30th days of storage presented in Table-17. The bacterial population of SB2 at initial, 10th, 20th and 30th days was found to be 0.00, 3.20, 5.40 and 7.40X10⁴ /gm respectively. Oluwalana et al. (2012) reported that, five blends were prepared by homogeneously mixing sweet potato flour with wheat flour in the percentage proportions of: 0:100, 5:95, 10:90, 15:85 and 100:0 (PF:WF) and later used to bake bread. The microbiological results of the bread ranged from 1.0X10³ to 4.0X10³cfu/g of product.

SUMMARY AND CONCLUSION

Organoleptic evaluation of the sweet potato products were evaluated by 20 semi- trained panel members using a 9 point Hedonic scale. The products were evaluated for appearance,

color, texture, aroma/ flavor, taste and overall acceptability. Overall acceptability of the sweet potato chips, value added sweet potato flakes and sweet potato biscuit ranged from 8.28 to 7.86, 8.25 to 7.75 and 8.10 to 7.40 respectively.

Shelf life study was conducted for a period of 30 days. The sweet potato products were packed in aluminium foil bags and kept at ambient temperature. Observation was recorded for sensory attributes for 10, 20 and 30 days interval. It was observed that from initial to 30th day, the overall acceptability decreased ranged between 8.05 to 5.90 in SC3, 7.90 to 6.85 in SPF3 and 8.03 to 6.54 in SB2.

The sensory score for stored products were found to be significantly decreased, and also increased microbial population in all the stored products was observed as the number of days increased.

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