Int.J.Curr.Microbiol.App.Sci (2018) *7*(1): 3081-3087

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 7 Number 01 (2018)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2018.701.365

Nutritional and Keeping Quality Characteristics of Value Added Composite Flour *Sev*

Laxmi Pandey[1*], Veenu Sangwan[2] and Kamla Malik[3]

[1]Department of Food Science and Nutrition, College of Home Science, MPUAT, Udaipur, Rajasthan-313001, India
[2]Department of Foods and Nutrition, I.C College of Home Science, CCS Haryana Agricultural University, Hisar, Haryana- 125004, India
[3]Department of Microbiology, College of Basic Sciences and Humanities, CCS Haryana Agricultural University, Hisar, Haryana- 125004, India

**Corresponding author*

Keywords

Keeping quality, Composite flour, Sevs, Supplementation, Nutritive value

Article Info

Accepted:
26 December 2017
Available Online:
10 January 2018

A B S T R A C T

The study was done to assess the nutritional and keeping quality characteristics of value added *sev* developed from newly released wheat varieties' (WH-1129 and HD-2967) flours supplemented with sorghum and soybean flours. The control *sev* had mean score of overall acceptability 6.16 whereas all other types of sevs made from composite flours had mean scores of overall acceptability ranging from 7.48 to 8.32, which were significantly higher ($P \leq 0.05$) than that of control *sev*. The protein and fat content in control *sev* were 9.32 and 13.48 per cent, respectively which significantly ($P \leq 0.05$) increased in composite flour *sev* of WH-1129 wheat flour to 11.36 and 16.55 per cent, respectively and to 11.19 and 17.14 per cent, respectively in that of HD-2967 flour. The crude fibre and ash contents in control *sev* were 1.56 and 3.56 per cent, respectively which significantly ($P \leq 0.05$) increased in composite *sevs* of WH-1129 flour to 4.23 and 3.87 per cent, respectively and to 3.53 and 3.47 per cent, respectively in that of HD-2967 flour. All types of composite flour *sevs* were organoleptically acceptable upto 90 days of storage and fell in the category of' 'liked moderately' to 'liked very much'. The total bacterial count of *sev* of WH-1129:SGF:SBF (60:30:10) and (40:40:20) varied from 0 to 7×10^2 and 0 to 8×10^2 cfu/g of *sev*, respectively while that of HD:SGF:SBF (60:30:10) and (40:40:20) ranged from 0 to 9×10^2 and 0 to 8×10^2 cfu/g of *sev*, respectively.

Introduction

Now a day's savouries and snack foods have become an integral part of the diet and hence offer great scope for development of value added savouries aimed at providing nutrition and health. Soya flour, both full fat and defatted have been used as ingredients in the preparation of high protein snacks. Cereal and legume-based products blended with full fat soya flour were found to have acceptable quality (Gandhi, Mishra, and Ali, 1983). Incorporation of soybean flour into a staple food like wheat and coarse cereal like sorghum is a feasible means of increasing the nutritive value of people's diet. Soya

proteins have been accepted in many applications because they provide desirable functionalities in fabricated foods at lower cost (Lusas and Rhee, 1995). Defatted soya flour contains about 50–54% good quality protein and can be used as an ingredient in various types of food (Liu, 1997; Lusas and Riaz, 1995). It has been extensively and widely used for the preparation of various types of value added *sev*, bakery products like biscuits, cakes, cookies, bread, etc., traditional products like *ladoo, chapatti* etc., throughout the world (Omueti and Morton, 1996; Marques *et al.,* 2000, Pandey and Sangwan, 2016). Wheat flour is an important source of not only energy and protein but also provides substantial amounts of vitamins and minerals in human diets specially low income group people. Sorghum is important crop for food security in semi-arid and arid regions due to their high nutritional quality and low production inputs. Sorghum is gluten free and can be important food source to millions of people who are intolerant to gluten (celiac disease), including diabetic patients, in both developed and developing countries (Masilamani *et al.,* 2012).

In India, different types of deep fat fried snacks have been studied with particular reference to incorporation of soya flour and sorghum flour in traditional Indian snacks and sweets such as *murukku, methu pakkoda*, *sev* and *laddu* (Jayalakshmi and Neelakantan, 1987; Ahluwalia *et al.,* 1995). In today's world considering the increasing awareness and demand amongst the masses for healthy food alternatives containing high protein, which are also, cost effective have led scientists to develop value added products from locally and easily available ingredients. Keeping this in view the present study was undertaken to develop nutrient rich *sevs* by incorporating wheat, sorghum and soybean flours and were evaluated for organoleptic acceptability, nutritional characteristics and keeping quality.

Materials and Methods

Procurement and processing of raw material

Two newly released wheat (*Triticum aestivum)* varieties (WH-1129, HD-2967), traditional wheat variety (C-306) and *Sorghum vulgare* (HJ-541) used for product development in the present study were procured in a single lot from the breeders, Department of Genetics and Plant Breeding, CCS Haryana Agriculture University, Hisar. Wheat and sorghum grains were cleaned and ground in an electric grinder and flours thus obtained were sieved through a 60 mesh sieve and packed in airtight plastic containers for product development and further analysis. Soybean flour along with other ingredients required for the development of value added sevs were procured from local market

Development and organoleptic characteristics of value added *Sevs*

The preparation method of value added *sevs* is presented in Table 1. Using two ratios (60:30:10 and 40:40:20) of each wheat variety flour (WF), sorghum flour (SGF) and soybean flour (SBF) four types of *sevs* were developed. 100% wheat flour *sev* prepared from C-306 were kept as control.

The *sevs* were organoleptically evaluated by a panel of ten judges for sensory parameters like colour, appearance, flavour, texture, taste and overall acceptability using 9 point hedonic scale (1=dislike extremely, 5=neither like nor dislike, 9 to like extremely). Between tasting different samples, participants rinsed their mouth with warm water. On the basis of organoleptic acceptability, from each category the *sevs* rated higher for organoleptic characteristics were selected for further study.

Method

Sieved flours and added salt, *ajwain*, turmeric, red chilli powder and baking powder.

Added one table spoon oil in flour mixture and mixed water.

Made soft dough using water.

Made thin *sevs* of the dough using sev machine directly in hot oil.

Fried and broke into small *sevs*.

Nutritional characteristics of value added *Sevs*

Proximate composition (moisture, crude protein, crude fat, crude fibre and ash) of one most acceptable ratio of *sevs* developed from wheat, sorghum and soybean flour blends were estimated by employing the standard method of analysis (AOAC, 2000).

Keeping quality of value added *Sevs*

The *sevs* were evaluated for sensory parameters using 9 point hedonic scale by a panel of ten judges and total bacterial count at regular intervals of 0, 15, 30, 45, 60, 75 and 90 days.

Estimation of total bacterial count

Plate count agar media was prepared in distilled water and autoclaved at 121.6˚C (15psi) for 15 min. All the glassware were sterilized in hot air oven at 160˚C for 2 hour.

One g of sample was dissolved into 9.0 ml of sterilized distilled water blank and shaken thoroughly. One ml of 10-1 dilution was taken and dissolved into another 9.0 ml sterilized water blank. This was 10-2 dilution. Similarly 10-3 dilution was made. 0.1ml of 10-1, 10-2 and 10-3 dilutions were poured in petri plate containing PCA media. Plates were incubated at 30±2˚C for 24-48 hours. Numbers of colonies were counted and colony forming unit (cfu) was calculated by using formula:-

No. of colonies × dilution factor × 10 = cfu /g of sample

Statistical analysis

The data were statistically analysed in complete randomized design for analysis of variance, mean, standards deviation and critical difference according to the standard method (Sheoran and Pannu, 1999).

Results and Discussion

Organoleptic characteristics

Table 2 had shown that the control *sev* had mean score of 6.16 for overall acceptability whereas *sev* made from composite flour containing 60:30:10 and 40:40:20 level of wheat, sorghum and soybean flours, in both types of wheat flours WH-1129 and HD-2967, had significantly ($P \leq 0.05$) higher mean score of overall acceptability in comparison to control. The overall acceptability score was in the category of 'liked very much' and ranged from 7.48 to 8.32 in different types of supplemented *sevs*. Our findings were in agreement with those of other workers (Singh, 2003, Singh and Sehgal 2008).

Nutritional composition of value added *Sevs*

The protein and fat contents in control *sev* were 9.32 and 13.48 per cent, respectively which significantly ($P \leq 0.05$) increased in composite flour *sev* of WH-1129 wheat flour to 11.36 and 16.55 per cent, respectively and similarly in HD-2967 flour *sev* increased to 11.19 and 17.14 per cent, respectively (Table

3). The crude fibre and ash contents in control *sev* were 1.56 and 3.56 per cent, respectively which significantly (P≤0.05) increased in composite flour *sevs* at 40:40:20 level in WH-1129 flour to 4.23 and 3.87 per cent, respectively and in HD-2967 flour to 3.53 and 3.47 per cent, respectively. WH-1129 wheat flour supplemented *sev* had significantly (P≤0.05) higher contents of crude fibre and ash content as compared to HD-2967 wheat flour supplemented *sev*.

These results are in agreement with those of earlier workers (Gupta, 2001; Rani *et al.*, 2008; Punia and Gupta, 2009 and Sangwan and Dahiya, 2013), who found that proximate composition of value added products were higher than that of control products developed from 100 per cent wheat flour. The difference in proximate composition of value added products developed from two different wheat varieties was basically due to difference in the proximate composition of wheat varieties.

Table.1 Ingredients and Preparation Method for Development of *Sevs*

Supplementation level (%)	Wheat flour (g)	Sorghum flour (g)	Soybean flour (g)	Salt (g)	*Ajwain* (g)	Red chilli powder (g)	Turmeric powder (g)	Garam masala (g)	Oil
Control(100%WF)	100	-	-	4	2	4	2	2	For frying
WF: SGF: SBF 60: 30: 10 40: 40: 20	 60 40	 30 40	 10 20	 4 4	 2 2	 4 4	 2 2	 2 2	 For frying For frying

Table.2 Mean Score of Organoleptic Acceptability of Value Added *Sevs*

Products	Colour	Appearance	Aroma	Texture	Taste	Overall acceptability
Sev						
Control (100% WF)	6.20±0.13	6.30±0.21	5.90±023	6.30±0.21	6.10±0.23	6.16±0.08
Type I	7.80±0.25	7.90±0.23	8.10±0.24	7.90±0.18	7.90±0.18	7.92±0.05
Type II	8.50±0.17	8.50±0.17	8.10±0.23	8.10±0.23	8.40±0.22	8.32±0.09
Type III	7.60±0.16	7.50±0.21	7.70±0.15	7.20±0.13	7.40±0.16	7.48±0.08
Type IV	7.90±0.18	7.70±0.21	7.90±0.23	7.50±0.22	8.00±0.15	7.80±0.09
CD (P≤0.05)	0.52	0.57	0.63	0.57	0.50	0.24

Type I (WH-1129: SGF: SBF 60:30:10) Type II (WH-1129: SGF: SBF 40:40:20)
Type III (HD-2967: SGF: SBF 60:30:10) Type IV (HD-2967: SGF: SBF 40:40:20)
WF = Wheat flour (WH-1129 and HD-2967). SGF= Sorghum flour. SBF=Soybean flour

Table.3 Proximate Composition of Composite Flour *Sevs* (%, on dry matter basis)

Supplementation level (%)	Moisture	Protein	Fat	Crude fibre	Ash
Sev					
Control (100% WF)	12.97±0.04	9.32±0.02	13.48±0.10	1.56±0.03	3.56±0.06
Type II	13.87±0.05	11.36±0.04	16.55±0.33	4.23±0.09	3.87±0.02
Type IV	13.39±0.06	11.19±0.09	17.14±0.65	3.53±0.12	3.47±0.06
CD(P≤0.05)	0.19	0.21	1.50	0.31	0.18

Type II (WH-1129: SGF: SBF 40:40:20) Type IV (HD-2967: SGF: SBF 40:40:20)
WF = Wheat flour (WH-1129 and HD-2967). SGF= Sorghum flour. SBF=Soybean flour

Table.4 Effect of Storage Period on Overall Acceptability Scores of Wheat, Sorghum and Soybean Composite Flour *Sevs*

Supplementation level (%)	Storage period (days)							
	0	**15**	**30**	**45**	**60**	**75**	**90**	**Mean**
Overall Acceptability								
Control (100% WF)	6.16±0.12	5.94±1.16	5.68±0.22	5.50±0,26	5.34±1.15	5.08±0.17	4.90±0.19	5.46±0.21
Type I	7.92±0.09	7.68±0.13	7.46±0.21	7.26±0.13	7.08±0.10	6.78±0.22	6.56±0.14	7.18±0.11
Type II	8.32±0.20	8.04±0.09	7.80±0.16	7.60±0.15	7.42±0.12	7.02±0.15	6.74±0.09	7.54±0.21
Type III	7.48±0.10	7.30±0.16	7.14±0.18	6.96±0.20	6.82±1.15	6.68±0.13	6.54±0.25	6.94±0.10
Type IV	7.80±0.12	7.58±0.14	7.42±0.19	7.32±0.15	7.12±0.22	7.00±0.11	6.72±0.20	7.24±0.17
Mean	7.53	7.30	7.10	6.92	6.75	6.51	6.29	
CD(P≤0.05)	Period: 0.19	Supplementation level: 0.16	Period × Supplementation level: NS					

Type I (WH-1129: SGF: SBF 60:30:10) Type II (WH-1129: SGF: SBF 40:40:20)
Type III (HD-2967: SGF: SBF 60:30:10) Type IV (HD-2967: SGF: SBF 40:40:20)
WF = Wheat flour (WH-1129 and HD-2967). SGF = Sorghum flour. SBF = Soybean flour

Table.5 Total Bacterial Count (Cfu/G) of Composite Flour *Sevs* at Different Storage Period (On Dry Weight Basis)

Supplementation level (%)	Storage period (days)						
	Total bacterial count (cfu/g)						
	0	**15**	**30**	**45**	**60**	**75**	**90**
Control (100% WF)	0	1×10^{1}	4×10^{2}	9×10^{2}	24×10^{2}	39×10^{2}	48×10^{2}
Type II	0	2×10^{1}	4×10^{2}	8×10^{2}	34×10^{2}	42×10^{2}	51×10^{2}
Type IV	0	2×10^{1}	5×10^{2}	8×10^{2}	29×10^{2}	41×10^{2}	53×10^{2}

Type II (WH-1129: SGF: SBF 40:40:20) Type IV (HD-2967: SGF: SBF 40:40:20)
WF=Wheat flour (WH-1129 and HD-2967). SGF= Sorghum flour. SBF=Soybean flour cfu=colony forming unit

Keeping quality of value added *Sevs*

Table 4 had shown that mean scores of overall acceptability in control, WH-1129:SGF:SBF (60:30:10 and 40:40:20), and HD:SGF:SBF (60:30:10 and 40:40:20) *sev* showed gradual decrease from 6.16 (zero day) to 4.90 (90th day), 7.92 (zero day) to 6.56 (90th day) and 8.32 (zero day) to 6.74 (90th day) and 7.48 (zero day) to 6.54 (90th day) and 7.800 (zero day) to 6.72 (90th day), respectively during storage. On mean basis the *sevs* fell in the category of 'neither liked nor disliked' (control), 'liked moderately' (WH-1129: SGF: SBF (60:30:10) and both levels of supplementation of HD-2967 value added *sev*) and 'liked very much' (WH-1129: SGF: SBF, 40: 40: 20). The total bacterial count of control *sev* varied from 0 to 9×10^2 cfu/g of *sev* during zero to 45th day of storage (Table 5). The total bacterial count of WH-1129:SGF:SBF (60:30:10) and (40:40:20) varied from 0 to 7×10^2 and 0 to 8×10^2 cfu/g of *sev*, respectively while that of HD:SGF:SBF (60:30:10) and (40:40:20) ranged from 0 to 9×10^2 and 0 to 8×10^2 cfu/g of *sev*, respectively. These findings are in agreement with those of several other workers (Sangwan and Dahiya, 2013; Chandel, 2014; Rana, 2015) who found that the value added products developed from composite flour could be stored upto 90 days.

The utilisation of alternative sources of food specially less utilised coarse cereals and refinement of technology is need of the hour. From the present study it is concluded that protein rich soybean and coarse cereals like sorghum can be utilised for supplementing the wheat flour which is staple diet of the population. The development and utilization of the composite flour *sevs* on one hand will promote value addition of the products and on the other hand will provide low cost nutritious alternatives specially in poor developing countries for combating malnutrition among children and vulnerable sections of the society. Setting up of small scale industries for production of *sevs* by rural women will ensure the economic, food and nutrition security and it will also encourage utilisation of low input, sustainable crops, together with staple crops.

Acknowledgement

I am extremely grateful to my advisor Dr. Veenu Sangwan and Department of Foods and Nutrition, CCS HAU, Hisar, Haryana for providing all facilities related to my research work.

References

Ahluwalia, T., Usha, M. S., and Awasthi, P. 1995. Traditional snack foods from defatted soy flour: textural properties and consumer acceptance. Beverage and Food World, May, 22–24.

AOAC, 2000. Official Methods of Analysis of Association of Official Analytical Chemists. Washington, D.C.

Chandel, J., 2014. Development, Acceptability and Nutritional Evaluation of Linseed Supplemented Value-Added Products. M.Sc. Thesis, CCS Haryana Agricultural University, Hisar, India.

Gandhi, A. P., Mishra, V. K., and Ali, N. 1983. Organoleptic assessment of full fat soy flour in various indigenous products. J. Food Technol, 18, 771–775.

Gupta, S., 2001. Utilization of Vegetable Powder for Value Added Baked Product. M.Sc. Thesis, CCS Haryana Agricultural University, Hisar, India.

Jayalakshmi, N., and Neelakantan, S. 1987. Studies on the acceptability of sorghum–soya blends in south Indian dishes and their keeping quality. Indian J Nutr Diet, 24, 136–141

Liu, K. 1997. Soybeans: chemistry, technology and utilization. Gaithersburg, Maryland: Aspen Publishers.

Lusas, E. W., and Riaz, M. N. 1995. Soy protein products: processing and use. J Nutr, 125, 573S-580S.

Lusas, E. W., Rhee, K. C. 1995. Soy protein processing and utilization. In D. R. Erickson (Ed.), Practical handbook of soybean processing and utilization (pp. 129–133, 151–157). Champaign, Ilinois and St. Louis, Missouri: AOCS Press and United Soybean Board.

Marques, M. D. F., Bora, P. S., and Narain, N. 2000. Development of some high protein conventional foods based on wheat and oilseed flours. J. Food Sci. Technol, 37(4), 394–399.

Masilamani, M., Wei, J., and Sampson, H.A, 2012. Regulation of the Immune Response by Soybean Isoflavones. Immunological Research. 54; 95-110.

Omueti, O., and Morton, I. D. 1996. Development by extrusion of soyabari snack sticks: a nutritionally improved soya–maize product based on the nigerian snack (kokoro). Int. J. Food Sci. Nutr, 47, 5–13.

Pandey, L. And Sangwan V. 2016. Keeping Quality of Sorghum Soybean Supplemented Wheat Flour Ladoos. Int. J. Adv. Nutr. Health sci, 2016. 4(1); 196-202.

Punia, D. and Gupta, M, 2009. Sensory Characteristics, Nutrient Composition and Storage Studies of Value Added Products for Children. J Nutr Food Sci, 39 (5) 503-510.

Rana, N., 2015. Nutritional Evaluation and Acceptability of Value Added Products Based on Composite Flour (Pearl Millet-Sorghum-Mungbean-Marwa). Ph.D. Thesis, CCS Haryana Agricultural University, Hisar, India.

Rani, V., Grewal, R.B., and Khetarpaul, N., 2008. Sensory and Nutritional Evaluation of Soy Supplemented Nutritious Baked Products. J Dairy Foods Home Sci, 27 (3/4) 209-215.

Sangwan, V. and Dahiya, S., 2013. Physico-Chemical and Nutritional Properties of Wheat-Sorghum-Soybean Composite Flours and Their Biscuits. Asian J. Dairy Fd. Res. 32 (1) 65-70.

Sheoran, O.P, Tonk, D.S., Hasija, R.C., and Pannu, R.S., 1998. Statistical Software Package for Agricultural Research Workers in Recent Advances in Information Theory, Statistics and Computer Application. Hooda D.S. and Hasija R.C. (eds.) 139-143.

Singh, G. and Sehgal, S. 2008. Nutritional Evaluation of Ladoo Prepared from Popped Pearl Millet. J Nutr Food Sci. 38; 310-315.

Singh, G., 2003. Development and Nutritional Evaluation of Value Added Products from Pearl Millet (*Pennisetum glaucum*). Ph.D. Thesis, CCS Haryana Agricultural University, Hisar, India.

How to cite this article:

Laxmi Pandey, Veenu Sangwan and Kamla Malik. 2018. Nutritional and Keeping Quality Characteristics of Value Added Composite Flour *Sev*. *Int.J.Curr.Microbiol.App.Sci.* 7(01): 3081-3087. doi: https://doi.org/10.20546/ijcmas.2018.701.365