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Development and nutritional evaluation of value added products using Pumpkin powder

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ABSTRACT

Pumpkin is rich in vitamins and minerals but low in calories. Pumpkin seeds, leaves, and juices all pack a powerful nutritional punch. Pumpkins contain antioxidants, such as alpha-carotene, beta-carotene and beta- cryptoxanthin. Under this research pumpkin rich recipes were prepared. The recipes for the preparation of products from pumpkin powder were prepared using 10 and 20% of powders and sensorily acceptable recipes were selected for evaluation of chemical composition. It was observed that the supplemented *Burfi* was rich in β-carotene (1.41 mg/100 g) as compared to control 1.32 mg/100 g. Also, the β-carotene content of supplemented *Namakpara* was 1.93 mg/100 g, while it was 1.14 mg/100 g in control. The increase in the β-carotene in supplemented *Burfi* and *Namakpara* are attributed to pumpkin powder used, which is a good source of β-carotene.

Key Words : Pumpkin, Supplemented , Antioxidants, Chemical composition

INTRODUCTION

Pumpkin is a highly nutrient-dense food. It is rich in vitamins and minerals but low in calories. Pumpkin seeds, leaves, and juices all pack a powerful nutritional punch. Pumpkins contain antioxidants, such as alpha-carotene, beta-carotene and beta-cryptoxanthin. These can neutralize free radicals, stopping them from damaging your cells. Supplementary nutrition means identifying and fulfilling the deficiencies of calories, protein, minerals, and vitamins in the existing diet avoiding cut packs in the family diet and taking other measures for nutritional correction and rehabilitation (Jamir, 2002). Although the Indian diet, which is being routinely given in underprivileged families, is poor in vitamin A, however, with appropriate modification and diversification, it can be made vitamin A adequate. Varieties of food products are provided as supplements in the Integrated Child Development Services scheme. Locally available food commodities as well as food products provided by world food programme are utilized. The type of food varies from state to state but usually consists of hot meal cooked at anganwadi, containing a varied combination of pulses, cereals, oils, vegetables and sugar (NIPCCD, 2002).

Some commercial supplementary foodstuffs prepared using expensive technology are available in the market but being used only by economically affluent elites since the cost of these commercial products are beyond the reach of common man, hence, need of the day is to locate nutrient rich foodstuffs. The use of locally available low cost foodstuffs patterned around the dietaries of the children has been suggested as viable remedial measures. Gopalan (1990) suggests that an increased intake of β-carotene rich food in habitual diet may also be preferred to massive synthetic vitamin A dosage but it is better to consume vitamin A rich vegetables such as beet leaf, spinach, drumstick leaves, amaranth leaves, coriander, mint, carrot, tomato, and yellow-fleshed fruits like papaya and mango, which contain large amount of β-carotene. India has rich dietary resources and a combination of

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different foodstuffs can provide adequate quantity of vitamin A in sustainable manner. Simply, there is a need to supplement these green leafy vegetables and yellow-fleshed fruits in various recipes to make them popular among vulnerable group and to introduce these nutritious recipes in intervention programme to overcome the previously mentioned problems. The green leafy vegetables and yellow-fleshed fruits are available only for a short period but these can be dried for long storage, as dehydrated green leafy vegetables are rich source of β-carotene.

METHODOLOGY

Pumpkin was obtained in a single lot from local market of HIssar. Pumpkin was peeled (remove seeds in case of pumpkin), washed and made shreds. Then pumpkin shreds were blanched for 10-15 seconds. The pumpkin shreds were dried at 50±5^{0}C and dried pumpkin were ground in mixer and grinder to make a fine powder.

The recipes for the preparation of products from pumpkin powder were prepared using 10 and 20% of powders and sensorily acceptable recipes were selected for evaluation of chemical composition.

RESULTS AND DISCUSSION

Pumpkin based products:

Burfi:

The *Burfi* prepared without incorporation of 10 and 20% of pumpkin powder. The panel member evaluated the products for the colour, appearance, flavour, texture, taste and overall acceptability. The result of the sensory analysis is presented in the Table 1. The control *Burfi* received thigh score in the range of 7.60-7.70, for different attributes. Incorporation of 10% level brought down the scores for all sensory attributes and rated as moderately desirable in terms of colour and texture and slightly desirable in terms of appearance, flavour, taste and overall acceptability. However, *Burfi* prepared by incorporating 20% of the pumpkin powder was slightly desirable in terms of colour, flavour, texture and overall acceptability and neither desirable nor undesirable in terms of appearance and taste.

Namakpara:

The sensory characteristics of *Namakpara* prepared by using pumpkin powder, *i.e.*, 10% and 20% levels are presented in Table 1. The sensory characteristics showed that the *Namakpara* prepared from 100% refined flour, *i.e.*, control was scored 8.00 and rated desirable in terms of colour, appearance, flavour and texture and scored 7.80 and 7.96 for taste and overall acceptability, respectively and rated moderately desirable. Perusal of Table reveals that the incorporation of 10% powder was moderately desirable in term of colour, whereas, in terms of appearance, flavour, texture, taste and overall acceptability, it was 'slightly desirable'. *Namakpara* prepared by using 20% powder was 'slightly desirable' in all terms. With addition of 20% powder all sensory attributes decrease except appearance. *Namakpara* prepared by 10% was better accepted as compared with 20% incorporated *Namakpara*.

Table 1 : Mean scores of various sensory characteristics of pumpkin based products

Products	Colour	Appearance	Flavour	Texture	Taste	Overall acceptability
Pumpkin powder *Burfi*						
Control	7.70±0.15^a	7.70±0.15^a	7.60±0.16^a	7.70±0.15^a	7.60±0.16^a	7.66±0.12^a
I (10% powder)	7.00±0.14^b	6.80±0.20^b	6.90±0.18^b	7.10±0.10^b	6.90±0.23^{aa}	6.94±0.15^b
II (20% powder)	6.10±0.23^c	5.80±0.29^c	6.30±0.21^c	6.10±0.23^c	5.90±0.31^b	6.04±0.17^c
CD (P≤0.05)	0.52	0.64	0.54	0.49	0.71	0.43
Pumpkin powder *Namakpara*						
Control	8.00±0.01^a	8.00±0.01^a	8.00±0.01^a	8.00±0.01^a	7.80±0.13^a	7.96±0.02^a
I (10% powder)	7.00±0.14^b	6.80±0.20^b	6.70±0.21^b	6.40±0.34^b	6.80±0.20^b	6.74±0.17^b
II (20% powder)	6.80±0.20^b	6.80±0.20^b	6.10±0.34^b	6.10±0.27^b	6.00±0.25^c	6.36±0.20^b
CD (P≤0.05)	0.41	0.47	0.68	0.73	0.59	0.45

Values are mean± SE of ten panelists

Control= 100% Bengal gram flour, I= 90% B.G.F.+10% powder, II= 80% B.G.F.+20% powder in *Burfi*

Control= 100% Refined flour, I= 90% R.F.+10% powder, II= 80% R.F.+20% powder in *Namakpara*

Pumpkin based products:

Proximate composition:

Moisture:

The moisture content in control *Burfi* was 1.72%, while it was 2.24% in supplemented *Burfi as* shown in Table 2. There was a significant difference in moisture content of supplemented *Namakpara* (1.56%) as compared to the control ones (1.31%).

Protein:

The protein content of control *Burfi* was 11.95%, which was lower than in supplemented *Burfi* (12.29%). Similarly in pumpkin *Namakpara,* the protein content was 13.70% in control and 14.14 % in supplemented ones.

Fat:

The fat content in control *Burfi* was 23.60% while it was 24.06% in supplemented *Burfi*. There was a significant difference between the fat content of supplemented (23.53%) as compared to control *Namakpara* (23.00%).

Fibre:

Persual of data in Table 2 reveals that the increase in fibre content of supplemented *Burfi* (1.08%) was significantly higher as compared to the control *Burfi* (0.76%), and the fibre content of supplemented *Namakpara* was 1.53%, while it was 1.43% in control ones.

Mineral content:

Calcium:

It is evident from the Table 2 that supplemented products contained significantly higher calcium content than their respective controls. Calcium content was 28.79 and 85.10 mg/100 g in control *Burfi* and *Namakpara*, respectively, and it was 32.53 and 97.39 mg/100 g, respectively in supplemented *Burfi* and *Namakpara*.

The increase in Fe and Zn contents of supplemented products was significantly different as compared to their respective control. The Fe and Zn contents in *Burfi* were 2.51 and 0.76 mg/100 g in supplemented and 2.36 and 0.71 mg/100 g in control. The values for these minerals in *Namakpara* were 5.78 and 2.77 mg/100 g in supplemented and 5.24 and 2.32 mg/100 g in control ones. Both the products had significantly higher Mg and P content as compared to their respective controls. Magnesium content in control *Burfi* and *Namakpara* was 72.09 and 78.45 mg/100g, respectively, whereas, in supplemented products, the values were 81.18 and 80.70 mg/100 g. The values for phosphorus in control were 131.51 (*Burfi*) and 291.53 (*Namakpara*) and in supplemented products, the values were 139.42 (*Burfi*) and 301.81mg/100 g (*Namakpara*), respectively.

Vitamins and oxalic acid content:

The data on β-carotene, ascorbic acid and oxalic acid are presented in Table 3.

Beta-carotene

It was observed that the supplemented *Burfi* was rich in β-carotene (1.41 mg/100 g) as compared to control 1.32 mg/100 g. Also, the β-carotene content of supplemented *Namakpara* was 1.93 mg/100 g, while it was 1.14 mg/100 g in control. The increase in the β-carotene in supplemented *Burfi* and *Namakpara* are attributed to pumpkin powder used, which is a good source of β-carotene.

Ascorbic acid:

Ascorbic acid content of control *Burfi* was 0.76-mg/100 g on dry weight basis, and it was 1.06-mg/100 g

Table 2 : Proximate composition of pumpkin based products (%on dry weight basis)

Products	Moisture	Protein	Fat	Fiber
Pumpkin powder *Burfi*				
Control	1.72±0.01	11.95±0.29	23.60±0.23	0.76±0.10
Supplemented (10% powder)	2.24±0.03	12.29±0.04	24.06±0.17	1.08±0.05
t_{cal}	13.78**	NS	NS	4.60*
Pumpkin powder *Namakpara*				
Control	1.31±0.01	13.70±0.29	23.00±0.11	1.43±0.01
Supplemented (10% powder)	1.56±0.01	14.14±0.14	23.53±0.17	1.53±0.05
t_{cal}	53.74**	NS	2.52*	NS

Values are mean ± S.E. of three independent determinations.

* Significant at 5% ** Significant at 1% NS= Non-significant

Table 1 : Impact of 'NP' Counseling on Adjustment behavior of selected school going obese boys

Areas of adjustment	Level	Boys(90)				'Z' values
		Before		After		
		Frequency	%	Frequency	%	
Emotional	Good	12	13.3	14	15.6	$(1.40)^{NS}$
	Average	54	60.0	67	74.4	(3.38)**
	Unsatisfactory	17	18.9	08	8.9	-(3.20)**
	Very unsatisfactory	07	7.8	01	1.1	-(2.71)*
Social	Good	09	10.0	13	14.4	(2.60)*
	Average	56	62.2	63	70.0	(2.75)*
	Unsatisfactory	22	24.4	14	15.6	-(2.41)*
	Very unsatisfactory	03	3.3	00	--	--
Educational	Good	13	14.4	14	15.6	$(0.14)^{NS}$
	Average	40	44.4	52	57.8	(3.11)**
	Unsatisfactory	23	25.6	19	21.1	-(2.39)*
	Very unsatisfactory	14	15.6	05	5.6	-(2.46)*

*Significant at 5% level; **Significant at 1%level; NS non-significant

in supplemented *Burfi*. It was observed that ascorbic acid content was significantly higher in supplemented *Namakpara* (1.64 mg/100 g) as compared to control *Namakpara* (0.75 mg/100 g).

Oxalic acid:

There was non-significant difference between the oxalic acid content of control and supplemented products of pumpkin. Oxalic acid content of control *Burfi* and *Namakpara* was 0.28 mg/100 g and 0.30 mg/100 g, respectively and it was 0.29mg/100 g and 0.32 mg/100 g, respectively in supplemented *Burfi* and *Namakpara* (Table 3).

Conclusion:

Pumpkin powder supplemented products contained significantly higher moisture, protein and fibre content as compared to respective controls. It was observed that the supplemented *Burfi* was rich in β-carotene (1.41 mg/100 g) as compared to control 1.32 mg/100 g. Also, the β-carotene content of supplemented *Namakpara* was 1.93 mg/100 g, while it was 1.14 mg/100 g in control. The increase in the β-carotene in supplemented *Burfi* and *Namakpara* are attributed to pumpkin powder used, which is a good source of β-carotene. Magnesium content in control *Burfi* and *Namakpara* was 72.09 and 78.45 mg/100g, respectively, whereas, in supplemented products, the values were 81.18 and 80.70 mg/100 g Hence, it is concluded that these products could be recommended for supplementation in nutrition programs.

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