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Development of Health Promoting and Nutritionally Dense Pasta Product for the Geriatrics

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Abstract

Finger millets which are rich not only in macro but also in micro nutrients. Raw, fermented and puffed flours of ragi at 10.0, 20.0 and 30.0 percent were incorporated with bael fruit at 15.0 percent to make spaghetti suitable for old people. The prepared products were analyzed for crude fat, crude protein, ADF, NDF, total sugars, reducing sugars and vitamin C. The products were then compared with whole wheat spaghetti. The blended spaghetti had a profound nutritional improvement. The products can safely be used for geriatrics.

Keywords: Pasta; Spaghetti; Ragi; Finger millet; Aged; Geriatrics; Health food

Introduction

As the age advances, many diseases mark their entry such as Diabetes, Osteoporosis, Cardiac and various other degenerative diseases. The need is to provide a suitable food with nutraceutical properties which can help to overcome these problems. Hence, ragi being dense in macro and micro nutrients was complemented with bael fruit (with immense therapeutic values being used in one or the other human ailment) to be added to whole wheat flour and make pasta product which is easy-to-cook and digestible such as Spaghetti. The prepared products were analysed nutritionally.

Material and Methods

The grains of local variety of ragi were procured from the Department of Plant Breeding and Genetics, Himachal Pradesh Agricultural University, Palampur. The grains were cleaned, washed, dried and were processed into three types of flours as discussed below.

A. Whole ragi flour: The cleaned grains of ragi were divided into three lots. One of the lots was milled into flour and considered as whole ragi flour.

B. Fermented ragi flour: The second lot was soaked in 1:3 parts of water for two days at room temperature. After two days water was discarded and the residue was made into paste and allowed for sedimentation, out of which small balls were made and dried in an air drier for 4 hours at 500C and after drying, balls were ground to flour.

C. Puffed ragi flour: The third lot was popped in a hot pan at a temperature above 1000C. Then the popped seeds were ground into flour.

Bael fruit was procured from local village and processed as per the method suggested by Roy & Singh [1] and then the pulp was preserved. The preparation involved the mixing of each flour of ragi at 10.0, 20.0 and 30.0 per cent with wheat flour and bael pulp at 15.0 percent by adding optimum water. All these ingredients were mixed properly to get a desirable consistency of dough. The dough was then extruded by the hand extruder through suitable shaped die. The product so obtained was dried for six hours at 50-550 C. after drying they were cooled, powdered and analysed nutritionally. Crude fat and crude protein were estimated by standard AOAC [2]. Neutral detergent fibre (NDF) and Acid detergent fibre (ADF) were estimated by the method of Van Soest & Wine [3]. Sugars and vitamin C were calculated by the method suggested by Ranganna [4].

Results and Discussion

A perusal of data in Tables 1-3 indicates that all the nutrients of the blended products increased by adding processed flours of ragi and bael pulp to wheat except for the crude fat content. It decreased from 2.07-1.97; 2.06-1.80 and 2.15-2.06 with the mean values of 1.97, 1.92 and 2.11 in case of raw, fermented and puffed ragi: bael blended Spaghetti respectively. This might be because ragi flours and bael pulp have less fat. The

protein content showed good improvement in fermented and puffed ragi spaghetti with the mean values of 11.69 and 13.11 percent. The increase in protein content with fermentation is also reported by [5] who stated that slight reductions in fat and utilization of carbohydrates as the energy source by the fermenting agents contributed to the improvement of protein level during fermentation. Whereas, increased protein in puffed products has also been reported by [6].

Table 1: Nutritive Value of Raw Ragi: Bael Blended Spaghetti.

Treatments	T0	T1	T2	T3	Mean	CD at 5%	Ct. Vs. Others
Crude fat (%)	2.33	2.07	1.99	1.86	1.97	NS	0.04
Crude protein (%)	11.56	11.68	11.44	10.45	11.18	0.07	0.04
NDF* (%)	10.15	14.56	15.46	16.09	15.37	0.85	0.64
ADF* (%)	3.16	6.57	6.81	7.1	6.83	0.2	0.15
Total sugars (%)	1.5	5.3	5.75	6.14	5.76	0.05	0.04
Reducing sugars (%)	1.07	4	4.32	4.67	4.33	0.07	0.06
Vitamin C (mg/100g)	-	4	4.04	4.04	4.03	NS	NS

Table 2: Nutritive Value of Fermented Ragi: Bael Blended Spaghetti.

Treatments	T0	T1	T2	T3	Mean	CD at 5%	Ct. Vs Others
Crude fat (%)	2.33	2.06	1.92	1.8	1.92	NS	0.04
Crude protein (%)	11.56	12.48	11.56	11.01	11.69	0.07	0.04
NDF* (%)	10.15	13.08	12.33	11.43	12.28	0.85	0.64
ADF* (%)	3.16	6.29	6.15	6	6.15	0.2	0.15
Total sugars (%)	1.5	5.38	5.75	6.11	5.74	0.05	0.04
Reducing sugars (%)	1.07	3.71	3.79	3.86	3.76	0.07	0.06
Vitamin C (mg/100g)	-	4.53	4.57	4.93	4.66	NS	NS

Table 3: Nutritive Value of Puffed Ragi: Bael Blended Spaghetti.

Treatments	T0	T1	T2	T3	Mean	CD at 5%	Ct. Vs Others
Crude fat (%)	2.33	2.15	2.12	2.06	2.11	NS	0.04
Crude protein (%)	11.56	13.37	13.28	12.69	13.11	0.07	0.04
NDF* (%)	10.15	18.33	22.2	26.64	22.39	0.85	0.64
ADF* (%)	3.16	6.96	7.39	7.94	7.43	0.2	0.15
Total sugars (%)	1.5	5.14	5.25	5.35	5.25	0.05	0.04
Reducing sugars (%)	1.07	3.7	3.76	3.78	3.75	0.07	0.06
Vitamin C (mg/100g)	-	4.51	4.66	4.72	4.63	NS	NS

T0= control, T = Ragi flour, T1=10%, T2=20%, T3=30%

*NDF-Neutral Detergent Fibre.

*ADF-Acid Detergent Fibre.

Ragi flours being rich in fibre increased the NDF and ADF content when added to whole wheat along with bael pulp. The NDF value obtained in whole wheat spaghetti was 10.15 percent. The blending of raw ragi and puffed ragi flours upto 30.0 per cent increased the content to 16.09 and 26.64 with the mean values of 15.37 and 22.39 respectively. The ADF content observed in whole wheat Spaghetti was 3.16 per cent while it increased to the mean values of 6.83 and 7.43 per cent by adding raw and puffed ragi flours with bael pulp. However, both the contents decreased with higher proportions of fermented flour. This can be attributed to the degradation of hemi cellulose during fermentation. Similar observations were reported by Morrison [7] and later by Sharma. Whereas, higher content observed in puffed ragi blended spaghetti is due to the formation of residue resistant to chemical detergents [8] also observed an increase in NDF content of puffed samples.

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Total and reducing sugars found in wheat spaghetti were 1.50 and 1.07 per cent respectively. A considerable increase was found by blending the processed flours of ragi. The mean values observed for total sugars were 5.76, 5.74 and 5.25 per cent in raw, fermented and puffed flours respectively; while that for reducing sugars were 4.33, 3.76 and 3.75 per cent respectively. The highest content observed in case of raw ragi spaghetti is due to the presence of starch, which is disrupted after popping (Mandoza and Bressani, 1987) resulting in lower content. Some amount of Vitamin C obtained in the products has essentially been contributed by the addition of bael pulp achieving the mean values of 4.03, 4.66 and 4.63mg/100g.

Conclusion

A profound improvement found in the ragi: bael blended spaghetti can be beneficial. Less fat content of the products can be useful for the diabetic and cardiac patients and for those requiring fewer calories. The protein content can be useful for the catabolic reactions taking place during the old age. Due to high fibrous content of the products they can be used as dietetics. The existence of vitamin C in the products made them acquire anti-oxidental property desirable for the aged group. Hence an improved nutritive food can be developed by blending wheat with ragi flours and bael pulp to provide a solution for various diseases of the elderly.

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