

Quality Assessment and Sensory Characteristics of Noodles Developed by Blending of Selected Grains

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Abstract

Results revealed that over all acceptability as the key factor showed that NB2 (50:50, with hedonic score 7.7 and 11.3%, 3.2%, 2.2%, 70.53%, 1.1%, 1.3% and 360.79%, protein, fat, ash, carbohydrate, fibre, mineral and energy value respectively) among bajra blended, NJ2 (50:50, with hedonic score 7.7 and 10.7%, 1.1%, 1.9%, 72.93%, 1.4%, 1.3% and 348.32%, protein, fat, ash, carbohydrate, fibre, mineral and energy value respectively) among jowar blended, NR2 (50:50, with hedonic score 7.6 and 9.15%, 1.4%, 2.2%, 72.5%, 2.4%, 1.6% and 348.6%, protein, fat, ash, carbohydrate, fibre, mineral and energy value respectively) and NR4 (20:80, with hedonic score 7.6 and 8.02%, 1%, 1.9%, 70.96%, 3.1%, 2.2% and 337.32%, protein, fat, ash, carbohydrate, fibre, mineral and energy value respectively) among ragi blended and NA2 (50:50, with hedonic score 7.7 and 12.8%, 4.3%, 1%, 65.3%, 3%, 3% and 363.1%, protein, fat, ash, carbohydrate, fibre, mineral and energy value respectively) among amaranth blended treatment were superior to other treatment and had better acceptability while among the rest of treatment few are rich in nutritional value but not preferred. Hence it was concluded that low cost high protein energy noodles should be developed.

Keywords: - Grains, proximate analysis and sensory characteristics, wet noodles and wheat flour substitution.

Introduction

Instant noodles are prepared by means of an extrusion machine. These products can be described as hard brittle pieces formed into thread like structure by extruding, cutting and drying tough dough. Instant noodles are consumed in more than 80 countries and have become internationally recognized food. Cereals like wheat, rice, maize and millets are staple food grain for majority of population around the world. These are the rich source of carbohydrates and supply of calorie and other nutrients to the consumers. Wheat (*Triticum aestivum*) is an important cheapest source of

Material and Methods

Processing of selected grains: - As the food grains were procured from the local market, and further that were gone through cleaning: the food commodities were taken (Table 1) and cleaned to remove the stones, dust, woods and any other foreign materials

energy and protein in the diets of population in developing countries. Wheat as the 'King of cereals' or 'Golden grain', wheat and wheat products supply most of the nutrients. Wheat flour contains all the essential amino acid except lysine and tryptophan, vitamins and minerals required by man. Wheat flour is used to produce several ready-to-eat foods. To improve the nutritive value of noodles the locally available cheaper food items should be tested so that these can solve the problem of malnutrition and other micronutrients deficiency among the population.

from the grains. After that, Preparation of flours by grains was thoroughly cleaned to remove dirt, dust, insect excreta/feathers and admixture of other food grains. The clean graded grains were grounded in the electric grinder to make fine flour and sieved by 80 -

100 mesh sieves. **Preparation of noodle:** - On a large flat surface, 2 cups of flour were dropped to form a volcano (that is to say, a mountain of flour, with a hole in the middle). Sprinkled with salt to taste and added enough eggs to make 1/2 cup of water in the middle and gently covered with, some of the flour, with gently mixing and kneading, once this is achieved, wrapped in plastic paper and left to rest for at least 30 minutes and rolled it out by hand or by a pasta machine and dried.

The moisture content, fat content and crude protein contents of the samples were estimated by the standard methods, the total carbohydrate in the samples was estimated by hydrolysis method^[1]. The fibre content was determined by fibra plus-operational procedure for crude fibre. The total energy values were calculated by using values 4, 4, and 9 for protein, carbohydrate and fat respectively as follows: Total energy ($k_{cal}/100g$) = $[(\% \text{ available carbohydrates} \times 4)$

Results and Discussion

Protein content increased with incorporation of other grains. Table showed that maximum protein content was found in NB4 (11.50), NJ1 (10.9), NR1 (10.00), and NA4 (14.60). Different combinations of noodles supplemented with 70-80% other grains were significantly superior to other formulated noodles. This could be due to the supplementation with the grains. **Fat:** The fat content of noodles increased gradually among different grains supplementation. However, a significant increase was observed in grains supplemented noodles at the 70 to 80% level in (wheat and bajra), (wheat and ragi), (wheat and jowar), (wheat and amaranth). **Ash:** The ash content was recorded maximum value in different combination Wheat and bajra NB3 (2.40), wheat and jowar NJ3 (2.1), wheat and ragi NR2 (2.20), and wheat and amaranth NA4 (2.70) respectively. Different combinations of noodles supplemented with 70 to 80% were significantly superior to other formulated noodles. **Carbohydrate:** The data showed that carbohydrate content was decreased with the supplementation of different grains. Maximum

+ (% protein x 4) + (% fat x 9)]. Minerals contents of noodles were obtained by calculation using table values^[4]. In this case, percentage mineral content was calculated based on the mineral content of different ingredients used in the formulation of the noodles.

Sensory characteristics: - All the combinations of noodles were cooked respectively in boiling water and Sensory properties of nutritious noodles were evaluated by the panel of 10 judges based on the sensory attributes of colour and appearance, taste, flavour, mouth feel and overall acceptability. The evaluation was done on a nine point hedonic scale^[3]. The results of the analysis for different parameters were analyzed statistically to assess the degree of variation within the treatments as compared to the control. The trial was laid out in randomized block design with five replications. The data were statistically analyzed^[1].

carbohydrate content was found in combination of wheat and bajra NB1 (72.20), wheat and jowar NJ2 (73.23), wheat and ragi NR1 (73.40), and wheat and amaranth NA1 (69.10) respectively. 25 to 50% grains combination showed maximum carbohydrate content as compared to other combinations. This might be due to the high carbohydrate content of the formulations. **Fibre:** The table showed that the fibre content was increased with increasing the ratio of supplementation of grains. Wheat and Bajra NB1 (1.16) and wheat and jowar NJ1 (1.30) supplementation of 25% grain was recorded in maximum fibre content and wheat and ragi NR4 (3.10) and wheat and amaranth NA4 (3.30) supplementation of 70 % grain recorded maximum fibre content respectively. Energy value was observed to be higher for all formulated Nutri-rich noodles. Maximum percentage was found in wheat and Bajra NB3 (361.52) supplementation 70% of Bajra, wheat and jowar, NJ2 (349.42) supplementation 50% of jowar, wheat and ragi NR1 (356.10) supplementation of 25% ragi and wheat and amaranth NA4 (377.90)

supplementation of 80% amaranth grain. Data showed that incorporation of Bajra, Jowar, Ragi and Amaranth enhanced the energy value of formulated noodles. This might be due to supplementation of protein, fat and carbohydrate rich flour. Similar findings have been supported by [2]. It is obvious from all the tables that incorporation of different grains

had different effect on the mineral content. Different combination of wheat and Bajra NB4 (1.80), wheat and jowar NJ4 (1.4), and wheat and ragi NR4 (2.20) was supplemented with 80% grain and wheat & amaranth NA3 (3.46) was supplemented with 70% amaranth grain recorded maximum mineral content respectively as compared to other treatments.

Table 1 Different formulations for development of Nutri rich noodles

Treatments	Wheat (g)	Bajra (g)	Treatments	Wheat (g)	Jowar (g)
Control	100	-	Control	100	-
NB1	75	25	NJ1	75	25
NB2	50	50	NJ2	50	50
NB3	30	70	NJ3	30	70
NB4	20	80	NJ4	20	80
Treatments	Wheat (g)	Ragi (g)	Treatments	Wheat (g)	Amaranth (g)
Control	100	-	Control	100	-
NR1	75	25	NA1	75	25
NR2	50	50	NA2	50	50
NR3	30	70	NA3	30	70
NR4	20	80	NA4	20	80

Table 2 Proximate composition of Nutri rich Noodles developed from wheat and bajra

Treatments	Proximate composition (%)						
	Protein	Fat	Ash	Carbohydrates	Fibre	Minerals	Energy V (Kcal)
NB1	11.20	2.25	2.03	72.20	1.16	1.03	358.49
NB2	11.30	3.23	2.20	70.53	1.10	1.30	360.79
NB3	11.40	3.80	2.40	69.30	1.13	1.53	361.52
NB4	11.50	4.29	23.6	68.60	0.12	1.80	359.49
CD at 5%	0.191	0.14	0.20	0.26	0.15	0.20	9.04
SEm ±	0.06	0.04	0.06	0.08	0.04	0.06	3.01

Table 3 Proximate composition of Nutri rich Noodles developed from wheat and Jowar

Treatments	Proximate composition (%)						
	Protein	Fat	Ash	Carbohydrates	Fibre	Minerals	Energy V (Kcal)
NJ1	10.9	1.2	2.0	71.50	1.30	0.85	345.60
NJ2	10.7	1.1	1.9	73.23	0.95	0.11	349.42
NJ3	10.5	1.0	2.1	72.93	1.4	1.3	348.32
NJ4	10.2	0.9	1.8	70.8.	1.26	1.4	337.14
CD at 5%	0.13	0.06	0.19	0.48	0.26	0.27	6.15
SEm ±	0.43	0.19	0.06	0.14	0.07	0.08	1.86

Table 4 Proximate composition of Nutri rich Noodles developed from wheat and ragi

Treatments	Proximate composition (%)						
	Protein	Fat	Ash	Carbohydrates	Fibre	Minerals	Energy V (Kcal)
NR1	10.00	1.70	2.00	73.40	1.80	1.10	356.10
NR2	9.15	1.40	2.20	72.50	2.40	1.60	348.60
NR3	8.14	1.10	1.50	72.30	2.80	2.00	343.94
NR4	8.02	1.00	1.90	70.96	3.10	2.20	337.32
CD at 5%	0.95	0.30	0.34	0.90	0.30	0.25	10.16
SEm ±	0.28	0.09	0.10	0.27	0.09	0.07	3.06

Table 5 Proximate composition of Nutri rich Noodles developed from wheat and Amaranth

Treatments	Proximate composition (%)						
	Protein	Fat	Ash	Carbohydrates	Fibre	Minerals	Energy V (Kcal)
NA1	12.00	2.90	2.30	69.10	2.60	2.60	360.90
NA2	12.80	4.30	1.00	65.30	3.00	3.00	363.10
NA3	13.80	5.40	2.50	64.60	3.46	3.46	376.04
NA4	14.60	5.90	2.70	63.30	3.30	3.30	377.90
CD at 5%	1.00	0.37	0.37	0.34	0.42	0.42	6.14
SEm ±	0.30	0.11	0.11	0.10	0.12	0.12	1.94

Table 6 Sensory score of Nutri rich noodles developed from wheat and bajra

Treatment	Colour	Flavour	Taste	Texture	Overall acceptability
Control	6.5	6.4	6.7	7.3	6.7
NB1	7.1	7.3	7.7	7.5	7.5
NB2	7.8	7.7	7.8	7.7	7.7
NB3	6.4	6.5	6.6	6.7	6.5
NB4	6.7	6.6	6.6	6.4	6.5
CD at 5%	0.18	0.18	0.23	0.27	0.30
SEm ±	0.58	0.57	0.74	0.86	0.95

Table 7 Sensory score of Nutri rich noodles developed from wheat and Jowar

Treatment	Colour	Flavour	Taste	Texture	Overall acceptability
Control	7.1	7.3	7.7	7.5	7.5
NJ1	6.5	6.4	6.7	7.3	6.5
NJ2	7.8	7.7	7.8	7.7	7.7
NJ3	6.4	6.5	6.6	6.7	6.5
NJ4	6.7	6.6	6.6	6.4	6.5
CD at 5%	0.07	0.15	0.09	0.14	0.09
SEm ±	0.24	0.48	0.29	0.46	0.30

Table 8 Sensory score of Nutri rich noodles developed from wheat and Ragi

Treatment	Colour	Flavour	Taste	Texture	Overall acceptability
Control	6.2	6.0	6.5	6.1	6.0
NR1	6.8	6.7	6.6	6.6	6.6
NR2	7.8	7.7	7.6	7.9	7.6
NR3	7.2	7.4	7.5	7.4	7.3
NR4	7.3	7.6	7.7	7.5	7.6
CD at 5%	0.07	0.15	0.08	0.11	0.06
SEm ±	0.21	0.45	0.24	0.34	0.18

Table 9 Sensory score of Nutri rich noodles developed from wheat and Amaranth

Treatment	Colour	Flavour	Taste	Texture	Overall acceptability
Control	6.5	6.4	6.7	7.3	6.5
NA1	6.4	6.5	6.6	6.7	6.5
NA2	7.8	7.7	7.8	7.7	7.7
NA3	7.1	7.3	7.7	7.5	7.5
NA4	6.7	6.6	6.6	6.4	6.5
CD at 5%	0.08	0.15	0.09	0.12	0.06
SEm ±	0.25	0.45	0.28	0.36	0.18

Overall acceptability: The overall acceptability of Nutri-rich noodles was significantly affected by different processing variables and declined with increase of storage period. The highest mean scores for overall acceptability of Nutri-rich noodles was found in NB2, NJ2, NR2, NR4 and NA2 formulated

Conclusion

On the Basis of findings it was concluded that Bajra, jowar, ragi, and amaranth blended noodles could be considered the best from both nutritional and sensory point of view. The Nutri rich noodles at the ratio of 50:50, 30:70 and 20:80 with Bajra, jowar, ragi, and amaranth were good in terms of protein and minerals. While NB2 (50:50), NJ2

Nutri-rich noodles in both packaging material at initial stage of storage. The maximum mean score value was recorded in NB2, NJ2, NA2 (7.7) and NR2, NR4 (7.6). These findings are in agreement with the results of [3] in supplementation of food formulation.

(50:50), NR2 (50:50), NR4 (20:80) and NA2 (50:50) were superior to rest of treatment with respect to overall acceptability and supplementation of selected grain increased the amount of calcium, phosphorus, iron, fibres and calorific value in noodles^[4]. Hence it was concluded that low cost high protein energy noodles could be developed.

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