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ATTA (WHOLE WHEAT FLOUR) INCORPORATED WITH MULTI-WHOLEGRAINS & FLOUR: DEVELOPMENT, CHARACTERIZATION, NUTRITIONAL PROFILING AND EVALUATION OF CHAPATI MAKING QUALITY

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ABSTRACT

Multigrain had been a part of human diet for tens of thousands of years. Whole Grain are associated with various health benefits. Including lower risk of diabetes, heart diseases, and high blood pressure. Obesity, CVD (Cardiovascular disease), cholesterol, Millets and cereals can provided more nutrients, phytochemicals and antioxidants which should be in demands for maintain a good health's status. The main objective of the study was to develop multigrain flour for multipurpose. The products were developed under laboratory condition. Standard step was followed to develop the products. Standardization, sensory evaluation, nutrients calculation and self-life testing were done for the developed flour. The results showed that millets multipurpose flour products has a great nutrients composition compare to normal Atta.

KEYWORDS: Multigrain Flour, Millets, Products development. Nutrients, Sensory evaluation.

INTRODUCTION

Nutritional Quality of food is the most important parameter for maintain human health and complete physical well-being. Millets are the oldest foods known to humans. They are highly nutritional and easily digestible grains available in the world. Apart from the health benefits millets are also good source of energy, protein, vitamins, and minerals. In addition to these cultures also contain biologically active compounds that include tannins, phenol, and anthocyanin. Flavonoids. Which has been linked to possible antioxidants activities.

Millets observed as nutritious and health beneficial food grains and help in management of disorders. Innovative millets processing technologies are helping the tool to provide multi-grain, multi- purpose, easy -to-use, ready -to-cook, ready -to-eat flour and commercial- scale safe food to feed a large population in urban areas, considered millets as basis Minor foods or cereals.

Millets have nutraceutical such as help in lowering the risk of obesity, high blood pressure, CVD, type -2 diabetes, cholesterol, cancer, anaemia, and celiac disease. Based on the back ground the study was aimed to developed multigrain flour based on the multiple health benefits of the rarely used millets like **wheat, soya, fenugreek, ragi, foxtail, millets, bajra**, and **Bengal gram**. An attempt has made to standardize **"Multigrain Flour".**

A majority of the population is suffering with diseases like diabetes, heart diseases, stroke, hypertension, obesity bloods pressure, abdominal obesity, cholesterol etc. These all are metabolic syndrome disorders. The reason behind this is life style in this many due to the dietary habits, for betterment of the dietary habits. The researcher wants to develop a multigrain – purpose multigrain flour which is differ to develop from the available products in the market.

In this recent era the life becomes so busy and fast so people are not able to eat more and timely so that they can maintain their health and nutritional level in the body. So if they will consume these multigrain products in daily life they can full fill all nutritional requirements of the body. The multigrain flour mixture contains different types of grains including of wheat, soya, fenugreek, ragi, foxtail, bajra, Bengal gram which are very rich in many nutrients like soluble fibre consisting especially proteins, energy, good quality fat, carbohydrates, vitamins and minerals, such as calcium, magnesium, manganese, copper, iron and zinc.

Antioxidants and phytochemicals in the millets make it easy and slowly digestive. It also helps to control blood glucose levels in diabetic patients very efficiently. Foxtail millets are helpful for preventing many diseases like Osteoposisis, prevent for depletion of enamel on the teeth's and make stronger to the bones and many other benefits. Millets are useful for preparation of functional foods of potential application for those suffering with metabolic syndrome. Bajra millets shows their properties in iron deficiency disorders. Fenugreek seed have a healthy nutritional profile. Ex- control diabetes, blood sugar levels, testosterone level

in the men, appetite control and it contain a good nutritional profile including fibre and minerals. The prepared products was evaluated for colour, flavour, taste, texture, appearance and overall acceptability using departmental semi trained panel member on 5 points hedonic rating scale. The sensory score revealed that we can make many other recipes like from multigrain flour and easily incorporate with other cereals also. The coast of all products is not more so it can be consumed by low socio economic and vulnerable groups.

Materials and methods for development of multigrain flour

Product development was done by taking various foods grains which are rich in phytochemical and nutrients. Table 1 data shows the preparation of two several of flours developed in different levels of other millets combinations ex: v1 and v2 were made and standardized.

Raw Materials

Wheat, Soya, fenugreek seeds, Bengal gram dal, foxtail millets, ragi, and bajra base preparation were purchased from the local market of Bundi & kota, Rajasthan.

The experimental work based on development and quality assessment of multigrain flour by using Wheat, Soya, Fenugreek, Ragi, Foxtail and Bengal gram. Bajra millets were selected to multigrain flour. The products development was done in the Quality Department & research lab, Adani Wilmar, Bundi, Rajasthan.

Collection of raw ingredients

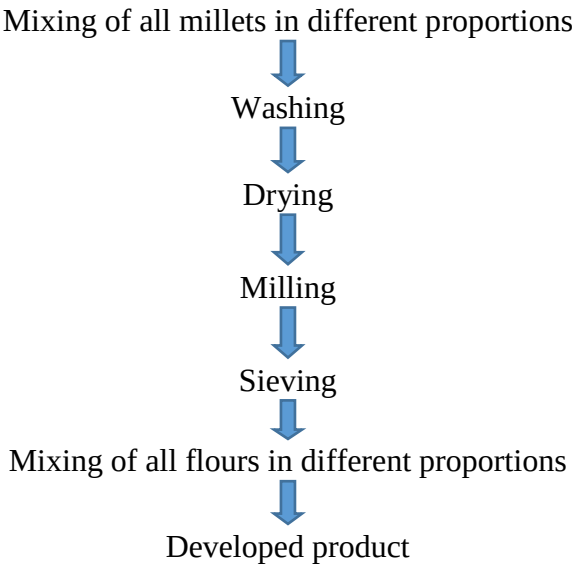

Fig.1 Flow chart of the processing of the multigrain flour.

Nutritional composition of multigrain flour

The present nutrient composition of the flour was calculated based on the ICMR nutritive value book (4^{th}).The mentioned described by AQAC(5). Was used for determination of proximate composition of selected multigrain flour. This included estimation of moisture, fat, protein.

The cleaned grains and multigrain were made them free from dust and the foreign materials which can be harmful for human consumption. Wash out all the grains using water and keep them for drying in dehydrator at 60 c for a day. When drying have been done keep all dried grains in millets for making flour. When grinding has been done, collect the flour and make them for use after sieving. Figure 1 shows the processing of multigrain flour.

Sensory Evaluation

Sensory evaluation was done using 5 points hedonic scale with 10 panel members. Sensory evaluation is a scientific discipline principle of experimental design and statistical analysis to the use the human senses (sight, smell, taste, touch and hearing) in order to evaluate consumer products. The researcher developed the products from the multigrain flour to perform the sensory evaluation.

Table 1: Composition of the variation and standardization of the multigrain flour.

Ingridients	Variation 1 (gm)	Variation 2(gm)
Wheat	40	40
Bajra	10	-
Soya	20	25
Fenugreek	15	10
Bengal gram	5	-
Foxtail mille	10	10
Ragi	-	15
Total	100	100

Table 2: Sensory evaluation score of the developed products

S.No	Attributes	Variation -1	Variation -2
1	Apperance	8.6	7.1
2	Taste/Flavour	8.6	7.3
3	Texture	8.4	7.4
4	Aroma/Smell	8.5	7.1
5	Overall acceptability	8.1	7.4

Product variations and its sensory evaluation

The data from table 2 showed the sensory scores of the developed multigrain flour products. The variation -1 scored better than variation -2. But the mean score of the entire alternative was closer.

Nutrient composition of the multigrain flour

Table 3 and 4 shows the calculated nutrients composition of the multigrain flour variation – 1 and variation-2. The energy content of variation -1 was 364.8k. Cal and variation -2 365.3k.cal respectively. Carbohydrates, protein, fat, iron, and fibre values of variation -1 and variation-2 were almost same. Slight variation of phosphorus and potassium were observed.

Shelf Life

Up to three months there were no changes in colour, flavour and taste of the flour were observed. In the variation-1 and variation-2.

Cost calculation of the flour

The data in table 5 shows the calculated cost of the variation-1 and variation-2. The cost of the variation-1 was RS 7/- and cost of the variation-2 was RS 6.50/- respectively.

RESULTS AND DISCUSSIONS

The multigrain flour which is available in the market they are adding only 10% of multigrain, But in the developed products in the present study contains 60% of the multigrain. The nutrients composition of the developed products shows higher than the available one. The cost itself is reasonable for all the groups of people.

Table 3 Calculated nutrient composition of the variation - 1 Multigrain Flour

Ingredients	Amt(gm)	Energy (K.cal)	CHO(gm)	Protien (gms)	Fat(gms)	Fiber(gms)	Calcium(mg)	Iron(mg)	Phosphors(mg)	Potassium(mg)
Wheat Flour	40	138	28.4	4.72	0.6	5	16.4	2.12	122.4	113.6
Soya	25	108	5.22	10.8	4.87	5.75	60	2.6	172.5	-
Fenugreek See	10	33.3	4.41	4.41	0.58	0.47	16	0.65	37	53
Ragi	15	49.2	10.8	1.09	0.19	1.72	51.6	0.58	42.4	61.2
Foxtail millets	10	36.3	7.31	1.05	0.27	0.34	1.4	0.48	28	28
Total	100	364.8	54.14	20.2	6.51	13.28	145.4	6.43	402.3	255.8

Table 4 Calculated nutrient composition of the variation - 2 Multigrain Flour

Ingredients	Amt(gm)	Energy (K.cal)	CHO(gm)	Protien (gms)	Fat(gms)	Fiber(gms)	Calcium(mg)	Iron(mg)	Phosphors(mg)	Potassium(mg)
Wheat Flour	40	13.8	28.4	4.72	0.6	5	16.4	2.12	122.4	113.6
Soya	10	36.1	6.75	1.16	0.5	1.13	4.2	0.8	29.6	122.8
Fenugreek Seed	15	49.9	6.61	3.63	0.8	0.7	24	0.97	55.5	79.5
Bengalgram Dal	5	18.6	2.9	1.04	0.28	0.76	2.8	0.26	16.5	3.66
Foxtail millets	10	36.3	7.31	1.05	0.27	0.34	1.4	0.48	28	28
Bajra	10	36.1	6.75	1.16	0.5	1.13	4.2	0.8	29.6	122.8
Total	100	365.3	56.15	20.54	6.35	12.53	96.8	6.71	39	347.5

Table 5: The cost calculation of the variation -1 and variation-2 multigrain flour.

Ingredients	Cost	Ingredients	Cost
Wheat Flour (40g)	1	Wheat Flour (40g)	1
Soya (20g)	2	Soya (20g)	2
Fenugreek (15)	1	Fenugreek (15)	1
Bajra(10g)	1	Bajra(10g)	5
Bengal gram Dal(5g)	1	Bengal gram Dal(5g)	1
Foxtail millets(10g)	1	Foxtail millets(10g)	1
Total Amount-100	7 rupees	Total Amount-100	6.5 rupees

NANDI Ecavo	NANDI MULTIGRAIN ATTA INGREDIENTS QUANTITY		
S.No.	**RATIO**	**INGREDIENTS**	**Mixing Percentage**
1	90:10	Whole wheat	90.00%
2		Barley (Jau)	2.00%
3		Chana	1.50%
4		Jowar	1.50%
5		Ragi	1%
6		Makka	1%
7		Bajra	1.50%
8		Soyabean	1.50%

S.No.	RATIO	INGREDIENTS	Mixing Percentage
1	60:40	Whole wheat	60.00%
2		Barley (Jau)	8.00%
3		Chana	6.00%
4		Jowar	6.00%
5		Ragi	4.00%
6		Makka	4.00%
7		Bajra	6.00%
8		Soyabean	6.00%

MULTIGRAIN ATTA INGREDIENTS QUANTITY (DIFFERENT BRANDS)			
S.No.	**BRAND**	**INGREDIENTS**	**Mixing Percentage**
1	PATANJALI	Whole wheat	60.64%
		Barley	39.36%
		Amaranth	
		Maize	
		Sorghum	
		Gram	
		Water caltrop (Singhara)	
		Soyabean	
		Pearl Millet	
2	AASHIRVAAD MULTIGRAIN ATTA	Whole wheat	90.90%
		Soyabean	5.20%
		Chana	0.50%
		Oats	1.40%
		Maize	0.90%
		Psyllium Husk	1.10%
3	GO SHUDH ATTA MULTIGRAIN	Whole wheat	60%
		Soyabean	40%
		Ragi	
		Fingermillets	
		Ragi	
		Corn	
		Barley	
		Jawari	
		Bajra	
		Oats	
		Flax Seeds	
4	24 MANTRA ORGANIC	Whole wheat	73%
		Bajara	27%
		Jowar	
		Green Mungbean	
		Barley	
		Ragi	
		Soyabean	
5	PILLSBURY MULTIGRAIN ATTA	Whole wheat	90%
		Soy	10%
		Maize	
		Barley	
		Ragi	
		Oats	
		Chana Daal	

CONCLUSION

The above results which were obtained from the research it could be concluded that the simple wheat flour chapati or other could be replaced by multigrain products without much changes in taste because all the multigrain flour have a very good sensory score and more acceptable by the panel. In this paper, the multigrain wheat flour fibre contained were introduced briefly. In this we collected the raw materials, then processed it and did sorting, washing, drying, grinding it and developed a new product. Which is very good for human health.

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