

Nutritional Significance of Sorghum - Black gram Mix

Anjali Devi C

Professor Department of Food and Nutrition, Osmania University, Hyderabad, India

Abstract: Most of the tertiary foods were formulated using refined flour, which are lacking in one more nutrients. Whole cereal and legume combinations are found to possess high nutritional value which could complement one another if accurately processed and combined. Sorghum and black gram mix was proved to be an ideal combination compared to other legumes by animal and human study. Noodles were prepared with this mix drawing protein in the ratio of 2:1 two from cereal and one from legumes. Twenty boys studying 7-9th classes age 12-14 years were randomly selected from the high income educated parents and have normal BMI were asked to taste and give ranking for the product Parents of the boys are well educated and placed in good Positions (high income group). Acceptability of the product was tested using the 9 point hedonic scale. 16 boys (80%) have scored 9 (like extremely) the highest rank, 15 percent (3 boys) gave a score of 8 (Like very Much), one boy scored 7 (like moderately). In the present days of increasing millet consumption by adults and leaving children to eat in school canteens or at vendors, it is important that advocating of such cost effective, nutritious, and easy to prepare noodles and tackle the double burden of malnutrition.

Keywords: Cereal –legume blend, Sorghum black gram mix, BMI, Noodles

1. Introduction

Most of the tertiary foods are formulated using refined flour, which are lacking in one more nutrients. Whole cereal and legume combinations are found to possess high nutritional potential, which could complement one another if accurately processed and combined. It is necessary to formulate blends and carries out scientific research to ascertain the nutritive adequacy of the cereal and legumes blends for possible use as tertiary foods in fact can be main dishes also (1). The exploratory work reported is that a blend with cereal 65 % and legume 35 % is considered to be the most desirable blend as the protein, fiber, calcium, zinc and iron content of the blend are found to be ideal(2).The study on sorghum-legume combination revealed that sorghum and black gram combination promoted better growth, on weaning rats, among all the legumes tested in combination with sorghum (3) the study on pre-school children (4) revealed that the preparations made with the same mixture- Vermicelli, biscuits, laddu and diamond cuts, fed to preschool children of 1-6 years for 1 year revealed that the height and weight of children increased two times than the control group, indicating that this mixture can be used for feeding programs. The dramatic switch over to millet consumption by adults of high income group and allowing their school going children to buy snacks from school canteens and vendors is resulting in malnutrition- overweight and under weight, this double burden malnutrition can be tackled by promoting this mix The present study is an attempt to try one product – noodles with sorghum- black gram blend and study the acceptability by the school children (7th, 8th and 9th classes) aged 12 – 14 years. Noodles are selected as it is considered a prestige food and children like noodles.

2. Methodology

The purpose of the study is to assess the acceptability of Sorghum -black gram product by school age children (12-14 years) of high-income group.

Selection of children for judging the noodle preparation:

20 Boys of classes 7th, 8th and 9th aged 12 to 14 years were randomly selected from high income groups. Height and weight measurement are taken and those with ideal BMI (18.5-23 kg/m²) were chosen (8). Parents education and occupation was taken to determine the economic status and the acceptance the product (Table 1)

Preparation of the mix: Sorghum -black gram mixes identified as an ideal combination were selected. (2,3). Noodles were prepared and standardized using a noodle machine. These noodles were prepared like Maggie noodles and acceptability study was done using hedonic scale (5, 6, 7), High income group was selected as millets are accessible to the rich and noodles are more liked by Children of higher income groups. The composition of mix is given in Table 3. Acceptability of the product was tested using the 9 point hedonic scale- the scores specified are Score 9- like extremely, 8- like very much, 7-like moderately, 6- like slightly, 5- Negative like or dislike, 4- dislike slightly, 3 dislike moderately, 2 dislike very much 1. Dislike extremely.

3. Results and Discussion

Data is presented under the following heads:

- 1) Demographic profile
- 2) Association of Health profile of children - height, weight, BMI and ponderable index with parents socio economic status.
- 3) Acceptability of Sorghum black gram preparations.

Demographic Profile: Children studying 7th, 8th and 9th classes, in the age group of 12years to 14 years formed the study group. Students were selected from Hyderabad. Educational level of parents indicated that all mothers are qualified ranging between undergraduate level to professional degrees (Table 1) Six mothers are housewives and 9 are working, educational qualifications are B. Tech , MBA MA, Bed, M.Phil. and PhD. Among fathers with PG

level education (two are MD and MDS), four are graduates with one being a B.Tech. Occupation wise two are doctors, others are software professionals, officers in government and private companies and business. Students were given instructions as to how to rate the product.

Composition of the Mix (Table2) in 100 grams of the mix, Sorghum constitutes 66 grams and black gram 16 grams and cornstarch 18g. The total protein in 100 mixis calculated to derive 10 percent (10g/100g mix) deriving protein in the ratio of 2:1, from sorghum and black gram.

Table 2: Amino Acid Composition- Sorghum – Black gram Mixture

Amino Acid	g/100g * protein	WHO RDA g/100g
Lysine	4.8	5.44
Threonine	3.7	4.00
Methionine & cysteine	2.8	3.52
Leucine	12.2	7.04
Isoleucine	4.4.	4.00
Valine	5.6	4.96
Phenyl alanine & Tyrosine	9.0	6.08

Table 3: Composition of Sorghum- Black gram Mix (100g)

Foods	Quantity g.	Protein g
Sorghum	66	6.58
Black gram	16	3.45
cornstarch	18	--
	100	10.03

black gram respectively. The Amino Acid composition of the mix (Table 3) is close to or higher than WHO recommended allowances

Acceptance of the Product: Noodles were prepared and served to the students . They were asked to give their rating on the scale. Eighty percent (16) have given the highest score of 9 stating that they “ liked extremely “,while 15 percent (3) have given a score of 8 “ like very much” 1 child has given a score of 7 “like moderately”

Noodles have a prestige value compared to roti it can be served instead of rice as the protein is a complete protein proving all the essential amino acids in the required quantity.

Table 4: Hedonic Scale Rating

Hedonic Scale	Rating	No.	%
Like Extremely	9	16	80
Like very much	8	3	15
Like moderately	7	1	5
Like slightly	6	0	0
Negative Like or dislike	5	0	0
Dislike slightly	4	0	0
Dislike moderately	3	0	0
Dislike very much	2	0	0
Dislike extremely	1	0	0

Suggestion is that it can be introduced in feeding program to address malnutrition. As noodle, preparation requires little or no oil the problem of obesity can be addressed, helps to tackle the double burden of malnutrition.

References

- [1] Vasantha Kumari Paarree and Narayanasamy Sangeeta (2017) Nutritional significance of Cereals and legume based food mixes- A review. Int. J .of Agricultural and Life Sciences Vol.3, 115-122.
- [2] Walle Helen, Haile Moges Demewez (2017) Optimization of cereal –legume based ratio to enhance the nutritional quality and functional property of Complementary food European J. of Science and Tech. Vol.10, (2) 109.
- [3] Pushpamma and Anjali Devi C. (1979). Nutritional quality of Sorghum and legume based food mixtures for infants and Preschool children – Nutrition reports international 19,635.
- [4] P.Pushpama, A.Ratnakumari and P. Geervani (1979) Nutritional quality of sorghum and legume based food mixture for infants and preschool –II Nutritional Reports International Vol.19,No.5,pgs 643-648.
- [5] PeryamD.R. and Girardot, NF 19052 Advanced taste test method. Food Engineering 24,58-61,194
- [6] Jones LV, Peryan DR. and Justone LL (1955), Development of a scale for measuring soldier’s food preferences. Food Research 20,512-520.
- [7] Peryam D.R and Pilgrim F.J (1957) Hedonic scale method form ensuring food preferences. Food Technology Sept.1957,9-14.
- [8] BMI standards WHO 1st April 2020, WHO.int/news. room/fact sheets global-detail/obesity and overweight

Table 1: BMI of Children with Parents Education, Occupation

	Mother		Father		BMI
	Education	Occupation	Education	Occupation	
1	MSc Physics	Teacher	M. Tech	Scientist	19.6
2	B.Tech	Housewife	MD	Doctor	19.3
3	MCA	Teacher	MCA	Software	20
4	B.Com	Working	PG ,DBM	Working	18.8
5	MA, MPhil ,B.Ed.	Housewife	MA,B.Ed.	Warden	19.2
6	BSc.	Housewife	MS.	Doctor	19.5
7	PG	Teacher	PG	Company	21.4
8	Degree	House wife	PG	Business	20.3
9	MBA Ph.D.	Housewife	B.Tech	Manager	20
10	UG	Housewife	Degree	Private	19.9
11	UG	House wife	Degree	Private	22.1
12	BD.S	Dentist	Ph. D	Professor	19.5
13	MSc. M.Ed.	Teacher	BSc	SWE	19.6
14	MA.Phil	Teacher	MSc,BL	Station Master	20.8
15	B.Com	Working	PG DBM	Working	19.3
16	UG	House wife	Degree	Private	22.1
17	MA	House wife	Ph. D	Professor	19.5
18	MSc. M.Ed.	Teacher	MSc	Government	19.6
19	MA.Phil	Teacher	MCA	Software	20.8
20	B.Com	Working	PG DBM	Business	19.3

Table 4: Hedonic Scale Rating of Mix

Hedonic Scale	Rating	No.	%
Like Extremely	9	16	80
Like very much	8	3	15
Like moderately	7	1	5
Like slightly	6	0	0
Negative Like or dislike	5	0	0
Dislike slightly	4	0	0
Dislike moderately	3	0	0
Dislike very much	2	0	0
Dislike extremely	1	0	0
		20	100