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Nutritional Composition of Sorghum and Moth Bean Incorporated Traditional Recipies

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ABSTRACT Cereals and pulses are important sources of energy and protein particularly in the developing countries. Cereals are less costlier source of energy compared to fats, like wise pulses are less costlier source of protein compared to animal proteins in the developing countries. Sorghum and mothbean are found to be underutilized cereals and pulses in Southern Karnataka. The present study was conducted at Department of Rural Home Science, Bangalore and it has been observed that underutilized cereal sorghum and pulse mothbean which are equally nutritious to any other traditional cereal and pulse can be incorporated in daily dietaries.

INTRODUCTION

Cereals and pulses are important sources of energy and protein and thus continue to occupy an important place in human nutrition particularly in the developing countries. Cereals and pulses also contribute to minerals and vitamins in the daily dietary especially in the low income families. Among the rural people who subsist on cereals and millets, sorghum is the main source of protein and calories. Grain sorghum is the sixth most important dietary source of calories for the world's population after rice, wheat, sugar, maize and potatoes. The grain is rich in carbohydrates like other cereals and millets and contains several water soluble B-complex vitamins and minerals (Anonymous, 1996).

Mothbean has been identified as one of the potential protein food source. It is rich in protein (23.6 g), calcium (202 mg) in it can make it an excellent supplement to cereal diet. In view of this, the present investigation was undertaken to evaluate the nutritional composition of traditional recipes incorporated underutilized cereal sorghum and pulse mothbean.

MATERIALS AND METHODS

The present study was conducted at Department of Rural Home Science, University of Agricultural Sciences, Bangalore.

Samples Used: Sorghum and mothbean was procured from local market and used in the product preparation. Totally fifteen products out of which seven sorghum incorporated, six mothbean incorporated and two both sorghum and mothbean incorporated products were prepared.

Preparation of the Samples and Analysis: The sorghum incorporated products laddu, sweet kadabu, masala roti, chapathi, upuma, kesaribath, chakli were prepared by replacing the main cereal used in the basic recipe by sorghum and its fractions at 25, 25, 100 and at 50 per cent, respectively. The mothbean incorporated products holige, masala vadai, nucchinundae, payasam, kharasev were prepared by replacing the main pulse used in the basic recipe at 50 per cent level and papad at 100 per cent. Both sorghum and mothbean incorporated products idli and dosa were prepared by replacing the main cereal and pulse used in the basic recipe at 50 per cent respectively. These sorghum and mothbean incorporated products were homogenized individually, dried at 60°C and finely powdered. The dried powder was further used in the analysis of macro and micro nutrients. Nutrients such as moisture, protein, fat, crude fibre, total ash, calcium, iron were analysed as per AOAC (1980) methods. Energy content was estimated by Bomb Calorimetric method and carbohydrate was calculated by differential method.

RESULTS AND DISCUSSION

Table 1 presents information regarding the mean nutrient composition of sorghum incorporated products (per 100 g dry weight basis). Results showed that moisture content was highest in upuma (37.2%) and least in chakli (0.57%). The protein content was high in chapathi

with 9.47 g followed by upuma (8.8 g), masala roti (7.80 g), laddu (6.35 g), sweet kadabu (5.08 g), kesaribath (5.7 g) and chakli (1.48 g). This may be due to 50 per cent of wheat atta present in chapathi which has higher protein content than any other cereals or cereal fractions. Being a fried food item chakli had a higher fat content of 33.06 g and least was in chapathi with 15.1 g. With respect to ash content masala roti had highest ash content of 2.15 g and laddu had the least ash content of 0.95 g. The addition of vegetable might have slightly increased the ash content in masala roti. The same reason holds good for the high fibre content in masala roti with 2.4 g and lower crude fibre of 0.35 g was present in kesaribath. The carbohydrate content was highest in sweet kadabu (69.96 g) followed by laddu (64.6 g), chakli (61.62 g), chapathi (47.38 g), kesaribath (41.38 g), masala roti (39.79 g) and least of 23.55 g in upuma. Laddu and sweet kadabu being a sweet product had higher carbohydrate content. Presence of higher amount of sugar and cereal may be contributing factor for higher carbodhyrate content. The energy content was highest in chakli (520 kcal) followed by laddu (516 kcal), kesaribath (512 kcal), masalaroti (455 kcal), upuma (432 kcal), sweet kadabu (360 kcal) and least was found in chapathi, which could be due to use of less oil and only cereal in the product preparation. The calcium content of the selected products ranged from 85.35 mg to 15.41 mg. Kesaribath had higher calcium content among the product. This may be due to use of milk in the product preparation other than sorghum soji and wheat soji. Iron content was highest and almost equal in upuma and masala roti with 3.4 mg and 3.2 mg, respectively. The presence of greens and onion might be one of the contributing factor for higher iron content among the product. However, chakli had a lowest of 1.01 mg of iron. Statistically there was a significant difference in the nutrients among the products. The range of protein content 1.48 to 9.47 g/ 100 g among the developed products is in par with the study reported by Farzana et al. (2003) where the protein ranged from 1.0 to 7.3 g/ 100 g for wheat based products. The range of fat, calcium and iron were 0.4 to 14.4 g, 4 to 27 mg and 0.1 to 4.9 mg/ 100 g for wheat based products which are less than that found in the present study which could be due to the use of combination of cereal and pulse in the product preparation.

Table 2 presents information regarding mean nutrient composition of mothbean incorporated products (per 100 g dry weight basis). Results showed that the per cent moisture content was highest in payasam (56.2 g) and lowest in Kharasev (1.01 g). The protein content ranged from 9.8 g to 18.8 g, highest was found in papad which is a 100 per cent mothbean substituted product. This could be well compared to the study reported by Khot et al. (1996) which reveals that the crude protein of mothbean usal was 14.93 g. Similarly another study by Begum (1999) found higher protein content of 18.6 g in ricebean papad followed by nucchinundae (17.08 g), masala vadai (16.28 g), kharasev (15.09 g), payasam (13.01 g) and lowest was found in holige (9.8 g) per 100 g. The highest fat content was observed in kharasev (35.4 g) which may be due to the absorption of fat during frying which is in par with pakoda a fried product with 34.8 g fat/ 100 g as quoted by Khot et al. (1996). Lowest fat was found in payasam which might

Table 1: Mean nutrient composition of developed products from sorghum (per 100 g dry weight basis).

S. No.	*Products*	*Moisture (%)*	*Protein (g)*	*Fat (g)*	*Ash (g)*	*Crude fibre (g)*	*Carbo hydrate #*	*Energy (kcal)*	*Calcium (mg)*	*Iron (mg)*
1.	Laddu	3.61	6.36	24.00	0.95	0.35	64.60	516	16.50	1.95
2.	Sweet Kadabu	0.60	5.08	22.50	1.32	1.29	69.96	360	37.40	2.43
3.	Chapathi	21.60	9.47	15.10	1.52	0.83	47.28	218	21.90	2.90
4.	Upuma	37.20	8.80	26.60	1.93	1.80	23.55	432	53.10	3.43
5.	Masala roti	21.50	7.80	27.40	2.15	2.40	39.79	455	52.20	3.20
6.	Kesaribath	36.70	5.70	19.00	1.02	0.66	41.38	512	85.35	1.83
7.	Chakli	0.57	1.48	33.06	1.20	1.48	61.62	520	15.41	1.01
	'F' value	240031.98*	8930.90*	11714.50*	1688.9*	1376.92*	12005.79*	4242786.20*	19754.38*	2012.96*
	C. D. at 5%	0.1138	0.0989	0.1850	0.0673	0.0674	0.5578	0.1849	0.6261	0.0666

* Significant @ 5% level
# Differential method

Table 2: Mean nutrient composition of developed products from mothbean (per 100 g dry weight basis).

S. No.	Products	Moisture (%)	Protein (g)	Fat (g)	Ash (g)	Crude fibre (g)	Carbo hydrate #	Energy (kcal)	Calcium (mg)	Iron (mg)
1.	Holige	13.50	9.80	16.25	1.30	0.96	58.99	385	71.30	2.40
2.	Masala vadai	1.24	16.28	25.40	5.50	4.00	51.52	501	123.40	6.73
3.	Nucchiunde	48.70	17.08	13.60	4.01	3.68	16.40	368	154.30	7.32
4.	Payasam	56.20	13.01	5.12	2.63	2.01	22.98	417	232.20	3.64
5.	Kharasev	1.01	15.09	35.40	2.00	2.12	46.80	560	92.40	3.64
6.	Papad	1.15	18.89	26.70	3.86	3.81	49.38	507	196.40	7.70
	'F' value	518951.70*	24065.50*	3398.30*	1850.53*	33431.87*	48470.20*	1590360.10*	1519784.00*	11670.82*
	C.D. at 5%	0.1289	0.0753	0.6721	0.1291	0.0246	0.2830	0.2265	0.1817	0.0760

* Significant @ 5% level
# Differential method

Table 3: Mean nutrient composition of developed products from sorghum and mothbean (per 100 g dry weight basis

S. No.	Products	Moisture (%)	Protein (g)	Fat (g)	Ash (g)	Crude fibre (g)	Carbo hydrate #	Energy (kcal)	Calcium (mg)	Iron (mg)
1.	Dosa	25.50	10.40	16.10	2.85	1.21	45.04	467	51.10	2.40
2.	Idli	28.70	12.60	1.60	1.69	1.45	56.35	397	61.10	3.04

be due to more fluid used in the preparation. The product masala vadai had got highest ash and crude fibre content which could be due to use of green leafy vegetables in the product preparation and lowest was observed in holige (1.30 g). The carbohydrate content was highest in the product holige with 58.99 g which could be due to use of jaggery, pulse and maida which are good source of carbohydrates. The product kharasev had got highest energy content of 560 kcal as it is a fried product oil might be contributing factor to increase the energy content in the product and the product nucchinundae had got lowest energy content of 368 kcal as it was a steamed product with no fat used in the prepara-tion. The calcium content of the moth-bean ncorporated products ranged from 71.3 mg to 232.20 mg with highest being in payasam and lowest in holige. The iron content ranged from 2.40 mg to 7.70 mg per 100 g among the products with highest being in papad and lowest in holige. Statistically there was a significant difference between the products for all the nutrients.

Table 3 presents the information regarding mean nutrient composition of both sorghum and mothbean incorporated products (per 100 g dry weight basis). The products idli and dosa at 50 per cent substitution level had almost same amount of nutrients. Idli had higher content of of moisture (28.7 g), protein (12.6 g), crude fibre (1.4 g), carbohydrate (56.35 g), calcium (61.10 mg) and iron (3.04 mg) whereas dosa was found to have higher per cent of fat (16.1 g), ash (2.85 g) and energy (4.67 kcal) respectively. This could be due to the use of oil in the preparation of dosa.

CONCLUSION

Protein energy malnutrition can be tackled more efficiently and successfully by incorporating underutilized cereal and pulse which are equally nutritious like any other traditional cereal or pulse in daily dietaries. Most of the traditional recipes can be prepared by incor-porating sorghum and mothbean without affecting the sensory and nutritional quality of the products.

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