

Nutritional Up-gradation of Some Vegetarian Preparations from Konkan region.

Mejora nutricional de algunas preparaciones vegetarianas de la región de Konkan.

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ABSTRACT

Malnutrition is widespread in India. Even comparatively literate and economically fairly advanced state like Goa is not an exception. Ailments like diabetes, blood pressure, heart diseases and even cancer are on the rise. Other symptoms typically found in cases of malnutrition were also visible amongst the populace of Konkan. Though it cannot be claimed that malnutrition was the sole cause of all these ailments, malnutrition definitely appeared to be one of the causes in many of these cases. In any case malnutrition makes individuals susceptible to diseases. Though a substantial part of the populace had non vegetarian meals, be it the breakfast, proper meal or snack, rice, wheat and coconut together formed almost 80 to 90% of their daily food. A study was conducted with the aim of finding the approximate nutritive value of the various components of the daily food of plant origin and making improvement in nutritive value wherever possible. Substantial amount of data was collected and analysed. Based on the analysis of the data, preparations were modified using 2 prominent traditionally used legumes. Modified preparations were actually cooked, tasted and the increase in the amount of some vital nutrients, in case of some important preparations, was tabulated. This paper reveals the increase/decrease in quantity of each of these vital nutrients as percentage of the quantity present in the original traditional (before modification) preparation.

Key words: Malnutrition, Konkan, Vegetarian, Nutritive value, traditional, legumes.

RESUMEN

La desnutrición está muy extendida en la India. Incluso un estado comparativamente alfabetizado y económicamente bastante avanzado como Goa no es una excepción. Las dolencias como la diabetes, la presión arterial, las enfermedades cardíacas e incluso el cáncer van en aumento. Otros síntomas que se encuentran típicamente en casos de desnutrición también fueron visibles entre la población de Konkan. Aunque no se puede afirmar que la desnutrición sea la única causa de todas estas dolencias, la desnutrición definitivamente parece ser una de las causas en muchos de estos casos. En cualquier caso, la desnutrición hace que las personas sean susceptibles a las enfermedades. Aunque una parte sustancial de la población tenía comidas no vegetarianas, ya fuera el desayuno, una comida adecuada o un refrigerio, el arroz, el trigo y el coco juntos formaban casi del 80 al 90% de su comida diaria. Se realizó un estudio con el objetivo de encontrar el valor nutritivo aproximado de los diversos componentes de la alimentación diaria de origen vegetal y mejorar el valor nutritivo siempre que sea posible. Se recopiló y analizó una cantidad sustancial de datos. Con base en el análisis de los datos, las preparaciones se modificaron utilizando 2 leguminosas prominentes de uso tradicional. Las preparaciones modificadas se cocinaron, probaron y se tabuló el aumento en la cantidad de algunos nutrientes vitales, en el caso de algunas preparaciones importantes. Este artículo revela el aumento / disminución de la cantidad de cada uno de estos nutrientes vitales como porcentaje de la cantidad presente en la preparación tradicional original (antes de la modificación).

Palabras clave: Desnutrición, Konkan, Vegetariano, Valor nutritivo, tradicional, legumbres.

INTRODUCTION

Rice and, to some extent, wheat in the form of bread constitute the bulk of Indian diet. In coastal region of peninsular India grated fresh coconut forms the bulk of all types of garnishing and gravies used in curries and other preparations. Both the cereals are rich in carbohydrates and poor in proteins especially essential amino acids, which body has to obtain from food. Moreover coconut is rich in saturated fat and low in other nutrients. Saturated fat is one of the major dietary causes of ischemic heart disease. Indians also use either oil or ghee (dehydrated butter) or margarine in most of their preparations. If Indian climate and physical activity of the populace at present in general is taken into account lesser number of calories are required. It means restricting the intake of both carbohydrates and fats is a necessity. Restricting the intake of common salt is also a

necessity because sodium in excess increases blood pressure. With the aim of lowering the percentage of carbohydrates, saturated fat, unsaturated fat, and sodium and increasing the percentage of essential amino acids, vitamins and other minerals in appropriate amount some modifications were carried out in traditional as well as some popular preparations. These modifications included replacing a part of rice or wheat or grated fresh coconut by black gram¹ and green gram 'dals'(split seeds). In all 60 vegetarian preparations from 'Konkan' region (the central part of western coast of India falling in 3 states of Goa, Karnataka and Maharashtra) were modified without compromising on the original taste and the social norms to any significant extent. For the purpose of this paper 10 representative preparations have been considered and increase/decrease in percentage of about 30 nutrients as a result of modification of 10 preparations mentioned above have been tabulated.

The selected preparations and the modifications carried out in these preparations have been described in short below: 1) 'Aluwadi' or Arum leaf roll is a snack by itself. It is sometimes served as a part of proper meal. The modification in this preparation is half the quantity of chick pea flour is replaced by equivalent weight of a mixture of black gram and green gram dals taken in the proportion of 1:1. The dry dals are soaked, ground into a thick paste and used. Pure chick pea causes flatulence and though a legume has less quantity of essential amino acids as compared to black gram and green gram. 2) 'Batatyachibhaaji' or Vegetarian potato preparation without gravy. It is served as a part of breakfast, snack and even as a part of proper meal. Modification is addition of 235 gm. green gram dal(soaked and half cooked) to every kilo of potato (boiled, peeled and chopped). 3) 'BatatyacheRayte' or Potato salad with yoghurt and sprouted green gram is a part of proper meal. Modification is addition of 235 gm. sprouted and peeled green gram to 885 gm. of traditional salad. 4) 'Pakoda' or Slices of onions or other vegetables dipped in chick pea flour batter and fried. It forms a snack by itself or served as a part of a meal. Modification is half the quantity of chick pea flour replaced by a 1:1 mixture of black gram and green gram paste as described in preparation No. 1 for reasons described in prep.1. 5) 'Bhaakri' or Indian flat bread. In this preparation dough is flattened by pressing between both the palms rather than rolling on the board using a rolling pin. It is served as a part of breakfast or a proper meal. Traditionally 1 part of wheat flour is added to 2 parts of rice flour. Modification is adding a 1:1 thick paste prepared out of 2 parts of mixed, soaked dals of black gram and green gram so that final dough contains black gram dal 1 part, green gram dal 1 part, rice flour 2 parts and wheat flour 1 part by weight. 6) 'Western

¹ Kindly refer to the glossary at the end of the paper which provides common names and botanical names of the various cereals, legumes and ingredients used in the prepararions. The common names have been arranged as per first appearance of the ingredient.

Bread' is normal wheat flour bread prepared using yeast. In India it is served as a part of breakfast and meal as a substitute for Indian bread. Modification is addition of 1:1 mixture of soaked dals of black gram and green gram to double quantity of wheat flour by weight. So the final dough contains 1 part of black gram, 1 part of green gram and 4 parts of wheat flour by weight. 7) 'Dhokra' is a preparation traditionally from the state of Gujrat but is becoming very popular in Konkan region. Traditionally chick pea flour is fermented overnight using yoghurt and after about 10 hours of fermentation (temperature between 28 degrees to 35 degrees Celcius). The fermented mixture is then poured in a vessel with flat and wide bottom so that about 1 inch thick layer is formed at the bottom. Thereafter it is steamed until it is properly cooked. The preparation is served as a snack. Modification in this preparation is replacement of half the quantity of chick pea flour by equivalent quantity by weight of 1:1 mixture of black gram and green gram dal paste. The final batter contains 1 part of black gram dal, 2 parts of chick pea flour, 1 part of green gram dal and 1 part of yoghurt by weight. 8) 'Plain Dosa' is a very popular preparation. It is served as both as a breakfast and a snack. Traditionally the batter is prepared either by using plain soaked rice and a teaspoon of fenugreek seeds to ferment it overnight or is prepared from 1 part of black gram dal and 2 parts of rice by weight and fermenting it overnight. Modification is preparing the batter using 1 part each of soaked black gram dal, green gram dal and rice and fermenting the batter overnight. 9) Gravy for Curries and other spicy preparations in south India are traditionally prepared using grated fresh or dry coconut as bulk, onion and chilli peppers along with other spices for the requisite taste. These preparations form part of breakfast, proper meal and snacks. Modification is replacement of grated coconut by black gram dal, green gram dal and hulled watermelon seeds (known as 'magajbeej'). The ratio is equal volumes (measuring by cups) of each. The result is outstanding. 10) 'Zunka' is a preparation from interior Maharashtra state mainly consumed by persons involved in farm labour or intense physical activity who stay away from the coast on Deccan plateau. The migrant workers brought it to the coastal region. It is a tasty and nutritious preparation traditionally prepared out of pure chick pea flour. It causes flatulence. Modification is half of the chick pea flour is replaced by 1:1 mixture of black gram and green gram dal as is done in case of preparation 1 'Aluwadi' and preparation 4 ' Pakoda'

MATERIALS AND METHODS

Nutritive value of various vegetarian preparations is improved by 4 methods.

1. Replacing half the quantity of chick pea flour by 1:1 mixed paste of black gram and green gram dal as in case of chick pea based preparations 1, 4, 7 and 10
2. Adding soaked and lightly cooked green gram dal or sprouted and peeled raw green gram seeds to the preparation as in case of preparations 2 and 3 respectively.
3. Adding 1:1 mixture of black gram and green gram dal paste to the batter or dough as in case of preparations 5,6 and 8.
4. Replacing entire quantity of coconut by a mixed paste prepared by grinding equal volumes of black gram, green gram and watermelon seeds. e.g. 1 cup of each.

Quantity of a specific nutrient in a preparation is sum total of that specific nutrient in each of the ingredients of the preparation. The quantity of each nutrient in each ingredient of each preparation is obtained from nutritional data bases. The percentage increase/decrease of each nutrient has been calculated using the formula:-

$$\frac{A - B \times 100}{B}$$

A – Total amount of nutrient present in the modified preparation.

B – Total amount of nutrient present in the original (traditional) preparation.

Negative figure indicates % decrease in the quantity of nutrient after modification.

RESULTS AND DISCUSSION

Taking into consideration climatic conditions in India in general and Konkan in particular reduction in carbohydrates, saturated fat, sodium and chlorine to a reasonable extent and increase in essential amino acids, vitamins and minerals other than sodium and chlorine can be considered as positive impact and vice versa. From the collected and processed data and tables, it is clear that out of a total of 300 parameters 251 parameters indicate positive impact of the modifications. Also in 207 parameters the positive impact is 10% or more and in 44 parameters it is less than 10%. Also the negative impact is indicated in 49 parameters out of which in 23 parameters it is less than 10% in remaining 24 it is more than 10%. The most outstanding results were obtained in preparation 9. In 20 out of 30 parameters in this preparation the positive impact was 100% or more highest being 2304% (23 fold) increase in essential amino acid leucine, 1963 % (19.63 fold) increase in calcium, 752% (7.52 fold) increase in lysine, a very important essential amino acid associated with formation and preservation of both bones and teeth. The 96.5% reduction in saturated fat in case of preparation 9 is also a good indication but 295% increase in carbohydrates and 115% increase in unsaturated fats is a negative impact. So

persons medically advised to avoid fat should not use watermelon seeds but can use black gram and green gram dal mixed paste to replace grated coconut in the gravy.

Note: Refer to Table 1 and Table 2 for details showing increase/decrease in percentage of nutrients after modification of the traditional recipes

As conclusion, considering the results it may safely be concluded that the modifications to the vegetarian preparations have clearly improved nutritive value of the preparations and the modified preparations will certainly have positive impact on the health of consumers in general.

Glossary

Sr. No.	Common Name	Botanical Name
1	Rice	<i>Oryza sativa</i> , Linn.
2	Wheat	<i>Triticum aestivum</i> , Linn.
3	Coconut	<i>Cocos nucifera</i> , Linn.
4	Black gram	<i>Phaseolus mungo</i> , Roxb. syn. <i>Vigna mungo</i> , Linn.
5	Green gram	<i>Phaseolus aureus</i> , Roxb. syn. <i>Vigna radiata</i> , (Linn.) Wilczek
6	Arum leaves	<i>Colocassia sps.</i> (edible)
7	Chick pea/Gram	<i>Cicer arietinum</i> , Linn.
8	Potato	<i>Solanum tuberosum</i> , Linn.
9	Onion	<i>Allium cepa</i> , Linn.
10	Chillies	<i>Capsicum frutescens</i> , Linn. syn. <i>Capsicum annum</i> , Linn.
11	Watermelon seeds	<i>Citrullus vulgaris</i> , Schrad.

Table 2: Showing increase/decrease in percentage of nutrients after modification of the traditional recipes 7 to 10

Preparation Number	>	7	8	9	10
Carbohydrates		17.50	-8.40	295.60	-0.04
Saturated fats		-32.70	6.80	-96.50	-32.80
Unsaturated fats		-27.50	1.80	115.00	-38.30
Arginine		34.40	31.40	303.60	12.60
Histidine		46.10	54.60	16.50	24.30
Lysine		40.10	74.80	752.00	18.37
Tryptophan		57.80	32.30	434.50	40.40
Phenyl alanine		34.60	57.60	582.40	14.10
Tyrosine		12.50	5.80	350.20	-3.20
Methionine		43.20	21.30	82.50	24.20
Cystine		32.30	26.20	409.30	11.30
Threonine		36.30	38.40	550.20	16.80
Leucine		30.60	46.90	2304.80	10.90
Isoleucine		47.10	51.90	650.10	25.40
Valine		41.40	10.30	439.80	21.10
Vitamin A as beta-carotene		-22.90	19.50	*	-7.70
Vitamin B 1		12.80	75.80	469.10	-3.60
Vitamin B2		7.50	46.80	303.80	7.20
Vitamin B3		13.90	8.60	492.80	-4.00
Vitamin B9		3.20	63.30	413.00	-12.00
Calcium		12.60	37.30	1963.80	78.50
Phosphorus		22.70	34.70	277.60	9.50
Magnesium		15.90	22.40	*	-1.50
Sodium		-10.30	6.00	170.30	-11.20
Chlorine		-4.00	0	*	-5.50
Potassium		34.40	143.00	*	17.40
Iron		2.70	61.60	233.20	-13.40
Copper		-9.60	29.90	28.80	-25.10
Zinc		51.40	26.80	69.30	34.60
Manganese		16.50	25.70	-65.30	-2.80

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