Journal of Nutrition & Food Sciences
ISSN: 2155-9600

Koodagi et al, J Nutr Food Sci 2013, 3:3
DOI: 10.4172/2155-9600.1000198

Research Article Open Access

Macronutrient Status of Street Foods

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Abstract

Street foods are quite common in urban areas. Several varieties of street foods are available to the public and quality of such ready-to-eat foods is primarily important from public health point of view. The selected (popular) street foods from various categories were subjected to quality analysis during the time of investigation, in Dharwad city in terms of nutrients. All the selected street foods differed significantly with respect to macro nutrients. Sweet items supplied more energy (311 Kcal) followed by non-vegetarian foods (305 Kcal) and least from fast foods (239 Kcal). The protein and fat content of non-vegetarian foods was more followed by fried foods, while cereal foods supplied the least. The carbohydrate content of sweet items was more (49.46 g) followed by fried foods (42.09 g) and lowest from non-vegetarian foods (24.08 g). The fried and fast foods supplied more fibre and non-vegetarian and sweet items supplied less fibre in the group. Contribution of energy was highest from sweet items (76 Kcal) followed by fried foods (68 Kcal) and cereal foods (57 Kcal), while lowest from fast foods (37 Kcal). The protein and fat content of fried foods was more. The carbohydrate content of sweet items (12.37 g) and fibre of cereal foods (2.36 g) was found to be on higher side in the street foods.

Keywords: Street foods; Vendors; Nutrients

Introduction

Street foods are defined as ready to eat foods and beverages prepared and sold by vendors in the streets and other similar public places. The popularity of street food vending is spreading rapidly all over the world due to several reasons *viz.*, economic and industrial developments followed by tremendous increase in urban population at an average annual growth rate of 4.2%, which is likely to continue in the years to come. Besides an increase in the number of working women over the last decades, from 76.2 to 105.7 million, employments far away from the home, modern life style compels both men and women to go to work and giving less time to cook at home. Nevertheless, tremendous growth of small nuclear families has resulted in the rapid proliferation of street foods as these acts as convenient source of food. The street foods being quickly served, tasty and available at reasonable rates and offering a variety of traditional foods have become an attraction to many customers. The street foods provide considerable amounts of valuable nutrients, depending on the raw ingredients used. Purchase of such ready-to-eat foods often pre-occupied with food price and convenience rather than with food safety, quality and hygiene. Persons who vend the street foods are often free from taxes, thus selling what they want and few existing regulations on the subject are not usually enforced. The street foods with substantial amounts of nutrient contribution are also likely to deteriorate in their quality. Hence, the present study is undertaken to study the macro nutrient status of street foods.

Material and Methods

Nutrient computation

Among the various snacks being sold by street food vendors, 28 most popular items were selected in triplicates for nutrient computation. For procuring the raw equivalent of street foods, the street vendors were requested to provide raw equivalents per kg of street foods. The raw food equivalents of cooked foods was computed for energy, protein, fat, carbohydrate and fibre per serving using Annapurna Version 3.0 a software developed by M.R. Chandrashekhar .

Per rupee contribution of nutrients

To assess the density of nutrients provided per rupee contribution of energy, protein, fat and carbohydrate, from each of the selected foods, was calculated by using the formula

$$\text{Per rupee contribution of nutrients} = \frac{\text{Total nutrient (g)}}{\text{Cost of the food sample (Rs)}}$$

Statistical analysis

The data obtained from nutrient contribution of street foods was statistically analysed as described by Gomez and Gomez. The means of nutrients from different food groups was compared by using one way analysis of variance technique. The results were tested at 5% level of significance.

Results and Discussion

Contribution of nutrients by selected foods

The mean energy available from the street foods was 250 Kcal ranging from 239 to 311 Kcal (Tables 1 and 2). As expected, the sweet items supplied more energy followed by non-vegetarian foods (305 Kcal). The Fast foods supplied the least energy among the groups (239 Kcal).

The mean protein supplied by the street foods was 7.10 g ranging from 4.60 to 11.44 g; apparently non-vegetarian foods supplied more protein compared to fried foods (9.89 g). While cereal foods (5.63 g) and sweet items (4.60 g) supplied the least in the groups. Similarly, the mean fat content of the street foods was 12.81 g ranging from 6.62 to 21.77 g. As expected the non-vegetarian foods supplied more fat followed by fried foods (19.20 g). The cereal foods supplied the least in the group (6.62 g). The mean carbohydrate contribution of street foods

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Received January 09, 2013; **Accepted** March 05, 2013; **Published** March 07, 2013

Citation: Koodagi K, Mahesha HM, Sanath Kumar VB (2013) Macronutrient Status of Street Foods. J Nutr Food Sci 3: 198. doi:10.4172/2155-9600.1000198

Cereal foods	Fast foods	Fried foods	Non-vegetarian foods	Sweets
Upama	*Panipuri*	*Samosa*	Egg *omlet*	*Kesaribhath*
Idli	*Masalapuri*	*Alubonda*	Egg fried rice	*Jilebi*
Dosa	*Dahipuri*	*Khandabhajji*	Fried fish	
Avalakki	*Bhelpuri*	*Golbhajji*	Chicken fry/*kabab*	
Vegetable *pulav*	*Sevpuri*	*Mirchibhajji*	Mutton *biriyani*	
Plain rice	Cutlets			
	Gobimanchuri			

Table 1: Documentation of the selected street foods vended.

Foods	Energy (Kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Fibre (g)
Cereal foods (n=6)	261	5.63	6.62	37.09	2.47
Fast foods (n=7)	239	6.29	11.48	32.19	3.66
Fried foods (n=5)	275	9.89	19.20	42.09	4.95
Non-vegetarian foods (n=5)	305	11.44	21.77	24.08	1.36
Sweet items (n=2)	311	4.60	8.72	49.46	1.37
Mean	**250**	**7.10**	**12.81**	**31.83**	**2.83**
S.Em±	22.83	1.04	1.63	6.15	0.53
CD (5%)	61.64	2.81	4.40	16.61	1.43

Table 2: Macronutrient contribution of selected street foods.

Foods	Energy (Kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Fibre (g)
Cereal foods	57	1.29	1.48	8.51	2.36
Fast foods	37	0.97	1.80	5.20	0.56
Fried foods	68	2.47	4.80	10.52	1.24
Non-vegetarian foods	41	1.60	2.98	3.42	0.23
Sweet items	76	1.15	2.18	12.37	0.35
S.Em ±	9.51	0.33	0.75	2.08	0.49
CD (5%)	25.68	0.90	2.02	5.63	1.34

Table 3: Per rupee contribution of nutrients in selected street foods.

was 31.83 g ranging from 24.08 to 49.46 g. The sweet items supplied more carbohydrates followed by fried foods (42.09 g), while the non-vegetarian foods supplied the least in the groups (24.08 g).

The mean fibre content of street foods ranged between 1.36 to 4.95 g, which was highest in fried foods (4.95 g), followed by fast foods (3.66 g). Cereal foods followed the next order. The sweet items (1.37 g) and non-vegetarian foods (1.36 g) supplied the least in the groups.

The moisture content of a finished product can be attributed to the desired textural and other sensory characters of the product, the amount of water used and changes that take place during its processing [1]. However, the type and amount of ingredients added in a preparation can either increase or decrease the total solids level in the final product. For example, the onion, a high moisture root vegetable used in *bhajii* increase the fat absorption during frying but lower the total solids content in the final product [2]. Street foods provide a source of affordable nutrients to the majority of the people especially the low income group in the developing countries. Street foods were also prepared by several methods *viz*., frying, roasting, boiling, baking and steaming, as well as served raw with pre processing techniques. In general, the nutrient profile of a ready-to-eat food depends on its density of total solids, which in turn is related to its protein, fat, carbohydrates and mineral content [3].

The calorific value of a food product invariably depends on the fat contents both visible and invisible types [2], which further depends on the type and amount of ingredients used and the method of preparation involved [4] for example the *bhajji*, a pulse based item, contributed higher fat content and thus in turn energy. The deep fat frying of *bhajjis* added more visible fat, as the rate of fat absorption depends on several factors such as, time and temperature of frying, moisture content of food, surface area of exposure and smoking temperature of the fat used [5]. Thus, high moisture, low temperature and longer time of exposure to frying oil added more visible fat for *bhajjis*.

Per rupee contribution of nutrients from street foods

The per rupee contribution of fibre ranged from 0.23 to 2.36 g, which was highest in cereal foods (2.36 g) compared to fried foods (1.24 g). While fast foods (0.56 g), sweet items (0.35 g) and non-vegetarian foods (0.23 g) contributed the lower values for fibre (Table 3). Thus, per rupee contribution of energy was highest in sweet items, as it is a sugar based recipes followed by fried foods. Protein and fat contribution was more from fried foods, while fibre contribution was more from cereals. The per rupee contribution of nutrient in a food sample depends on its cost per serving, which in turn varies initially with the cost of the ingredients added labor cost, method of cooking, demand for the product and packaging [6]. The cost analysis of the products revealed that per serving cost was highest in non-vegetarian foods, where egg, mutton and rice combination was used. This was followed by fast foods, where pulse and cereal combination followed by deep fat frying was used with high demand and large serving size. *Bhajjis* with vegetable and pulse combination followed by deep fat frying, with less serving size are popular and costed less. However, inspite of deep frying, cereal foods costed less as it was cereal based product with less serving size and because cereals are cheaper than pulse.

The building blocks of any material is the protein content [7], which varies widely, depending on the type and amount of raw ingredients

used [2]. Thus the protein content of fried foods with pulse flour was highest followed by non-vegetarian foods, cereal foods, sweet items and fast foods. The rupee per availability of fat was similar to that of protein.

The carbohydrate content of the food not only provides energy but also it can impart textural quality to the product [6]. The carbohydrate content of a product varied with the type of raw ingredients used and its availability depends on the fraction of carbohydrate as well as its complexity. The carbohydrate content was highest in sweet items, which were due its composition of refined wheat flour and semolina having high content of both digestible and indigestible fibre. The second highest food item with respect to carbohydrate content was fried foods, which is based on Bengal gram flour with added onion. The least carbohydrate content was seen in non-vegetarian foods due to its combination. The per rupee availability or carbohydrate was highest in sweet items - a low cost cereal product. Invariably the serving size also contributed to either higher or lower amounts of nutrients on per rupee availability basis. As expected fibre contribution was more from cereal foods, followed by fried foods.

Conclusion

In the present investigation, the sweet items and non-vegetarian foods as expected supplied more energy followed by fried foods, cereal foods and fast foods. The carbohydrate content contributed to the higher energy of sweet items while protein and fat of non-vegetarian foods contributed more energy. Similarly the fat, protein and carbohydrate content of fried foods contributed to the energy followed the next order.

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