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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. The per rupee contribution of energy was highest from sweet items (76 Kcal) followed by fried foods (68 Kcal,) 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 per cent, 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 giving less time to cook at home. Nevertheless, tremendous growth of small nuclear families have resulted in the rapid proliferation of street foods as these act 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 of 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. Though 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

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

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 Kcals (Table 1). As expected the sweet items supplied more energy followed by non-vegetarian foods (305 Kcal). While fried and Cereal foods followed the next order. 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 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 (Nadagouda, 1992) [4]. 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 (Gopalan *et al.*, 1994) [2].

Table 1: Macronutrient contribution of selected street foods

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

Per rupee contribution of nutrients from street foods

As the cost and serving size varied widely between the vended street foods, it was thought pertinent to compute nutrient contribution on the cost basis, keeping the value of rupee as a constant. The computed values of per rupee contribution of energy, protein, fat, carbohydrate and fibre in the selected street foods are illustrated below.

The energy supplied on per rupee expenditure basis of street foods ranged between 37 to 76 Kcal (Table 2). The sweet items contributed more energy (76 Kcal) followed by fried foods (68 Kcal), cereal foods (57 Kcal) and non-vegetarian foods (41 Kcal). While fast foods supplied less energy on a rupee basis (37 Kcal).

The per rupee protein supplied by these foods ranged from 0.97 to 2.47 g, which was more in fried foods (2.47 g) compared to non-vegetarian (1.60 g), cereal foods (1.29 g) and sweet items (1.15 g). The fast foods supplied least protein in the categories (0.97 g).

The per rupee contribution of fat ranged between 1.48 to 4.80g, which was highest in fried foods (4.80 g) compared to non-vegetarian foods (2.98 g) and sweet items (2.18 g) while fast foods (1.80 g) and cereal foods (1.48 g) supplied the lower fat on a rupee value.

The carbohydrate content of foods ranged between 3.42 to 12.37 g. The per rupee carbohydrate contribution was highest from sweet items (12.37 g) followed by fried foods (10.52 g) while cereal (8.51 g) and fast foods (5.20 g) followed the next order. The non-vegetarian foods contributed lowest carbohydrate in the category (3.42 g).

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.

The calorific value of a food product invariably depends on the fat contents both visible and invisible types (Gopalan *et al.*, 1994) [2], which further depends on the type and amount of ingredients used and the method of preparation involved (Lawson, 1985) [3] for example the *bhajji*, a pulse based item, contributed higher fat content and thus inturn 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 (Campbell *et al.*, 1979) [1]. Thus, high moisture, low temperature and longer time of exposure to frying oil added more visible fat for *bhajjis*.

Table 2: Per rupee contribution of nutrients in 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

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