



## Macronutrient Composition of Popular Snacks Available at Food Outlets in Sri Lanka

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### ABSTRACT

**Background:** Non-Communicable Diseases (NCDs) account for 75% of deaths in Sri Lanka. Most common causes for NCDs include poor diets and physical inactivity. The majority of snacks available in the food outlets are calorie-dense, thus lack of vitamins and minerals. Continued consumption of calorie-dense snacks may lead to certain NCDs. In Sri Lanka, only commercially packed foods provide information on the nutritional composition. However, foods available in sales outlets lack such nutritional information which is vital for health-conscious consumers.

**Objectives:** This study aimed at identifying the total energy and the macronutrient composition of popular snacks available for sale at food outlets in Sri Lanka.

**Materials & Methods:** Thirty (30) popular snacks were identified from 18 food outlets in Sri Lanka. The data on the recipes, raw ingredient weights and final cooked weight were collected. Energy and macronutrient compositions of one serving size of the snacks were analyzed using Food base 2000 software.

**Results:** The total energy supplied by one serving size of snacks ranges from 46 to 436 kcals. Mean calorie contribution by carbohydrate, protein and fat were 58.5%, 9.4% and 32.1%, respectively.

**Conclusions:** Most of the snacks available in the outlets were of high-calorie density and are based on carbohydrates providing more than the expected calorie contribution to the consumer.



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## INTRODUCTION

World Health Organization (WHO) predicts that 71% of global deaths are due to NCDs. Non communicable diseases are the most prominent health problem in Sri Lanka during the past two decades (Jayawardena et al., 2014) and this epidemic is partially associated with the unhealthy dietary habits of the population. Diet-related chronic diseases are predicted to be increased up to 40% by 2025, globally (Fareeza, 2011). According to WHO, unhealthy diets are one of the major risk factors which are responsible for NCDs. Diet with high calories and fat cause insulin resistance leads to type 2 diabetes mellitus (T2DM). The development of hypertension in adolescents occurs due to the unhealthy lifestyle including excessive intake of total, and saturated fat, cholesterol and salt, inadequate intake of potassium etc (Aboderin et al., 2002). The nutrition transformation of the traditional diet to a Western diet is one of the causes for the occurrence of NCDs (Weerasekara et al., 2018). The quality of dietary fat appears to be affected when the energy from fat is high (greater than 37% of total energy) (WHO & FAO, 2003). Studies have shown that about 33% of cancers, 80% of coronary heart disease and 90% of T2DM incidence could potentially be avoided through changing lifestyle factors such as eating healthy and engaging in adequate physical activity thereby maintaining normal weight throughout life (Hu et al., 2001; Key et al., 2002). Unhealthy diets have a positive relationship with the metabolic risk factors for NCDs in the undergraduate population (Olatona et al., 2018). Consumption of nutrient-dense foods and low energy-dense foods contribute to reducing the risk factors associated with cardiovascular disease and T2DM (Iriti et al., 2020). Snacks are defined as small foods consumed between the main meals (FAO). The frequency of snacks consumed per day has increased over the past decades with

increased urbanization. Most of the snacks available in the outlets in Sri Lanka are fried and rich in carbohydrates and fats. Some studies define snacks as energy-dense, nutrient-poor foods, which are rich in sodium, sugar and or fats (Wang et al., 2012; Duffey et al., 2013; Lipoeto et al., 2013; Bellisle, 2014). Due to the increased calorie density and poor nutrient quality often snacks are considered unhealthy foods (Yeo et al., 2020). The contribution of snacks towards energy consumption in men and women are 17 and 21% respectively (Myhre et al., 2015).

Nearly 70% of Sri Lankan adults exceed the recommended level of daily starch intake (Jayawardena et al., 2013). People tend to compromise the intake of leafy vegetables, fruits, yams, meat, eggs, fish and dairy products due to the rise of prices of these items (Nimanthika et al., 2018). In case of snacks, majority of the population prefer to buy snacks from food outlets rather than making them at home due to the busy lifestyle. Most of the snacks which are purchased from outlets are calorie-dense and high in carbohydrates and fats.

Most of the commercially packed foods in Sri Lanka include nutritional information on its label. However, the snacks prepared in ordinary food corners lack nutritional information. People are unaware of the calorie density of these snacks they consume. Long-term consumption of unbalanced and calorie-dense snacks lead to the development of NCDs. However, there are no reported studies that have been done in Sri Lanka regarding the nutritional composition of popular snacks available in local food outlets. Presence of such information would help the consumer to choose their snacks according to their calorie preference and the health condition. Therefore, this study focused on identifying the energy and macronutrient composition of popular snacks available at the food outlets in Sri Lanka.

## **MATERIALS & METHODS**

### **Data collection**

Data were collected from selected food outlets and food producers located in Jaffna, Kurunegala and Gampaha districts based on convenience. Nine (09) locations from Jaffna, six (06) from Kurunegala and, three (03) from Gampaha were selected. Owners of food outlets participated in the interviews. Snacks were selected based on popularity, availability and on the ethnic background of the country. Some small-scale shops do not prepare the snacks in their kitchen, and they used to purchase snacks from other food producers. With the help of food outlets operators, original food producers were contacted to collect data. Weight of raw ingredient lists, recipes and final weight of the selected thirty snacks were collected from food outlets and food producers. When snacks were prepared by several outlets, data of the raw ingredient lists were collected from all food outlets. Highly deviated (if different ingredients were added which are not included in other recipes) data were removed. The average weight of ingredients from other ingredient lists was calculated and taken for the analysis. Snacks which were taken into the analysis were “Bajjie”, “Boli”, “Bonda”, “Boonthi laddu”, “Chicken bun”, “Susiyam”, “Egg rolls”, “Fish pastry”, “Fish patties”, “Fish rolls”, “Jam bun”, “Kaddlae vada”, “Kesari”, “Kollukattai”, “Lalaria”, “Maalu paan”, “Mashmallow”, “Mothakam”, “Muscat”, “Omlet bun”, “Palkova”, “Pani appa”, “Potato roti”, “Sausage bun”, “Sausage pastry”, “Ulundhu vada”, “Vaipan”, “Vattalappam”, “Vegetable patties” and “Vegetable rolls”.

Snacks were freshly prepared by using collected raw ingredient lists and recipes in the Dietetic Laboratory, Department of Applied Nutrition, Wayamba University of Sri Lanka. The actual amounts of oil used to fried snacks were measured.

Nutrient retention factors were not applied by assuming that macronutrients do not lose during heating or other processing steps as this study was limited to analyzing the energy and macronutrient composition of selected snacks. The weight of the edible portion was measured for required items from the collected raw ingredients. The portion size of each snack was determined using the data collected from the food servers in each selected food outlet. Data on the usual number of similar types of snacks consumed by consumers at a time were collected and the average consumption number was calculated and round off to zero decimal point. That was considered average consumption. The data were also analyzed for one portion size of selected snacks.

### **Data analysis**

“Foodbase® 2000” software was used to analyze the data of the energy and macronutrient composition of the studied snacks. The raw ingredient list and weight of each edible raw ingredient to prepare one serving size of snacks were calculated and tabulated. All the calculated raw ingredients to make one serving size of the snacks were entered into the “Foodbase® 2000”. The energy and the macronutrient composition of each snack were calculated using the recipe calculation method.

## **RESULTS**

One snack (item) was considered as one serving size of a snack. The weight of one serving size was taken as an average weight of 10 similar snacks. Table 1 shows the serving sizes of selected snacks. Table 2 shows the energy and macronutrient composition of one serving size of selected 30 snacks for the study.

**Table 1.** Serving sizes of selected snacks (based on mean and standard deviation)

Snack	Serving size (g) †	Snack	Serving size (g) †	Snack	Serving size (g) †
<i>Bajjie</i>	19	<i>Jam bun</i>	65	<i>Palkova</i>	42
<i>Boli</i>	76	<i>Kaddlae vada</i>	32	<i>Pani appa</i>	58
<i>Bonda</i>	55	<i>Kesari</i>	66	<i>Potato roti</i>	83
<i>Boonthi laddu</i>	46	<i>Kolukattai</i>	94	<i>Sausage bun</i>	88
<i>Chicken bun</i>	138	<i>Lavaria</i>	83	<i>Sausage pastry</i>	55
<i>Susiyam</i>	52	<i>Maalu paan</i>	122	<i>Ulundhu vada</i>	40
<i>Egg roll</i>	73	<i>Marshmallow</i>	12	<i>Vaipan</i>	62
<i>Fish pastry</i>	48	<i>Mothakam</i>	78	<i>Vattalappam</i>	60
<i>Fish patties</i>	54	<i>Muscat</i>	102	<i>Vegetable patties</i>	61
<i>Fish roll</i>	71	<i>Omlet bun</i>	91	<i>Vegetable rolls</i>	72

†The serving size is based on the mean and standard deviation

**Table 2.** Energy and macronutrient composition per one serving size of snacks

Snack	Energy (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)
<i>Bajjie</i>	107	7.2	1.4	8.3
<i>Boli</i>	274	45.6	6.6	8.5
<i>Bonda</i>	135	9.9	1.4	10.3
<i>Boonthi laddu</i>	149	18.7	3.5	7.3
<i>Chicken bun</i>	312	34.8	11.3	15.2
<i>Susiyam</i>	139	16.2	3.3	7.2
<i>Egg roll</i>	172	26.5	5.2	5.8
<i>Fish pastry</i>	116	16.6	4.2	4.2
<i>Fish patties</i>	104	16.9	2.7	3.3
<i>Fish roll</i>	161	27	4.6	4.6
<i>Jam bun</i>	162	34	2.7	2.6
<i>Kaddlae vada</i>	96	7.7	3.5	5.9
<i>Kesari</i>	252	42.9	2.9	8.8
<i>Kolukattai</i>	173	30.3	4.9	4.4
<i>Lavaria</i>	123	23.1	1.4	3.5
<i>Maalu paan</i>	368	62.5	11.1	10.0
<i>Marshmallow</i>	46	11.4	0.8	0.0
<i>Mothakam</i>	148	26	4.6	3.6
<i>Muscat</i>	436	63.6	2.8	20.6
<i>Omlet bun</i>	177	28.4	6.1	5.1
<i>Palkova</i>	157	20.1	4.7	7.0
<i>Pani appa</i>	106	17.3	1.0	4.1
<i>Potato roti</i>	118	26.6	3.7	0.4
<i>Sausage bun</i>	185	28.9	5.7	5.9
<i>Sausage pastry</i>	139	17.2	4.3	6.4
<i>Ulundhu vada</i>	141	15.6	6.2	6.4
<i>Vaipan</i>	238	38.3	3.1	9.0
<i>Vattalappam</i>	129	21.5	2.7	4.2
<i>Vegetable patties</i>	130	21.1	2.9	4.3
<i>Vegetable rolls</i>	154	24.4	3.2	5.5

**Table 3.** Percentage of calorie contribution by macronutrients per serving of snacks

<b>Snack</b>	<b>Carbohydrate (%)</b>	<b>Protein (%)</b>	<b>Fat (%)</b>
<i>Bajjie</i>	26.4	5.1	68.5
<i>Boli</i>	63.9	9.3	26.8
<i>Bonda</i>	28.7	4.1	67.2
<i>Boonthi laddu</i>	48.4	9.1	42.5
<i>Chicken bun</i>	43.3	14.1	42.6
<i>Susiyam</i>	45.4	9.2	45.4
<i>Egg roll</i>	59.2	11.6	29.2
<i>Fish pastry</i>	54.9	13.9	31.2
<i>Fish patties</i>	62.5	10.0	27.5
<i>Fish roll</i>	64.4	11.0	24.7
<i>Jam bun</i>	79.9	6.3	13.7
<i>Kaddlae vada</i>	31.5	14.3	54.2
<i>Kesari</i>	65.4	4.4	30.2
<i>Kolukattai</i>	67.2	10.9	22.0
<i>Lavaria</i>	71.4	4.3	24.3
<i>Maalu paan</i>	65.0	11.6	23.4
<i>Marshmallow</i>	93.4	6.6	0.0
<i>Mothakam</i>	67.2	11.9	20.9
<i>Muscat</i>	56.4	2.5	41.1
<i>Omlet bun</i>	61.8	13.3	25.0
<i>Palkova</i>	49.6	11.6	38.8
<i>Pani appa</i>	62.9	3.6	33.5
<i>Potato roti</i>	85.3	11.9	2.9
<i>Sausage bun</i>	60.4	11.9	27.7
<i>Sausage pastry</i>	47.9	12.0	40.1
<i>Ulundhu vada</i>	43.1	17.1	39.8
<i>Vaipan</i>	62.1	5.0	32.8
<i>Vattalappam</i>	63.9	8.0	28.1
<i>Vegetable patties</i>	62.7	8.6	28.7
<i>Vegetable rolls</i>	61.0	8.0	31.0

**Table 4.** Portion sizes and average number of portions of snacks

<b>Snack</b>	<b>Average portion number</b>	<b>Portion size (g)</b>	<b>Snack</b>	<b>Average portion number</b>	<b>Portion size (g)</b>
<i>Bajjie (Banana)</i>	2	38	<i>Lavaria</i>	2	166
<i>Bonda</i>	2	110	<i>Marshmallow</i>	3	36
<i>Susiyam</i>	2	104	<i>Mothakam</i>	2	156
<i>Egg roll</i>	2	146	<i>Pani appa</i>	2	116
<i>Fish pastry</i>	2	96	<i>Potato roti</i>	2	166
<i>Fish patties</i>	2	108	<i>Sausage pastry</i>	2	110
<i>Fish roll</i>	2	142	<i>Ulundhu vada</i>	2	80
<i>Kaddlae vada</i>	2	64	<i>Vaipan</i>	2	124
<i>Kolukattai</i>	2	188	<i>Vegetable patties</i>	2	122

(Snacks with the same portion size and serving size are not included in the table)

Macronutrients supplied by one serving size of snacks were in the range of carbohydrate (7.2 g - 63.6 g), protein (0.8 g - 11.3 g) and fat (0.0 g - 20.6 g).

The energy density for one serving size shows a huge deviation among snacks. "Muscat" had the highest calorie density while "Marshmallow" had the lowest. "Muscat" supplied the highest amount of carbohydrates while "Bajjie" was the lowest. "Bonda", "Kadallae vada" and "Bajjie" provide less than 10 g of carbohydrate for one serving size. These commonly used snacks were not good sources of protein. One serving size of a snack that provides the highest amount of protein was a chicken bun. "Muscat" supplied the highest amount of fat per portion.

The snacks tested in this study supplied a higher calorie through carbohydrate and fat. Table 3 shows the percentage of calorie contribution of each snack from carbohydrate, protein and fat. Calorie (energy) contribution through carbohydrates varies from 26.4 to 93.4%. Eighteen out of thirty snacks provide more than 60% of calories from carbohydrate. Calorie contribution through protein was comparatively low (2.5 - 17.1%). Except for "Ulundhu vada", all other snacks provide less than 15% of calories through protein ("Uludu vada" is a pulse-based product). Calorie contribution through fat varies from 0% to 68.5%. Fifteen of the tested snacks provide more than 30% of calories through fat.

Calorie density varies from 46 to 436 kcals per serving of selected snacks. Except for two, all other snacks provide more than 100 kcals. But the portion size may vary from one snack to another, and it depends on the type, size, taste and individual preference of snacks. Table 4 shows the average portion size of a few selected snacks. The calorie density of one portion size of snacks ranged from 138 to 476 kcals.

Individual calorie and nutrition intake were not dependent on serving size. It was dependent on the portion size/ quantity of snacks consumed by the person at a time. Considerable changes were observed in nearly two thirds (2/3) of snacks in their portion size, nutritional composition when compared to serving size, while they remained the same with the rest of snacks.

## DISCUSSION

Regular consumption of snacks may lead to higher calorie intake and subsequently increase the risk of NCDs in the long run. If the average calorie intake is considered as 2000 kcals, consumption of a single portion of these snacks provides energy in the range of 6.9 to 23.8%. When considering the 30 snacks, the mean calorie supplied by one portion size of snack is 257.96 kcals. It is 12.9% of the daily calorie intake of a person if he or she consumes the snack available in the marketplace as the only snack. However, Sri Lankans usually consume tea or other beverages in combination with more than one snack. This signifies the regular trend of higher calorie consumption. The guidelines developed for a healthy canteen at the workplace by the Ministry of Health, Sri Lanka indicates that calorie distribution per snack time (morning snack/evening snack) as 1/10 of the daily calorie intake (Ministry of Health, Sri Lanka., 2013). However, the mean calorie contribution by the snack with one serving was 12.9% according to the present study. It is 2.9% higher than the requirement of calorie for a snack time. If any other beverage is consumed with that calorie consumption is increased further. If a person consumes snacks regularly, that increases the daily calorie intake leading to the development of NCDs in long-term. Some commonly consumed bakery items like "Mallu paan" provides 368 kcals per snack. This is about 18.4% of the total daily calorie intake which is double the required amount. Many adolescents and school children consume bun items like "Mallu Paan" as their common snacks which increase the

calorie intake to a significant level. Mean calorie contribution by carbohydrate, protein and fat were 58.5%, 9.4% and 32.1%, respectively. The majority of the studied snacks were calorie-dense, high in carbohydrate and fat and low in protein.

Similar research carried out on thirty Chinese New Year (CNY) snacks shows that the energy density of twenty-one CNY snacks was in the range of 2011 kJ/100 g (~481 kcals) to 2743 kJ/100 g (~656 kcals). In a 100 g of the snacks, the carbohydrate content ranged from 4.5 g - 85.3 g, protein content ranged from 0.1 g - 42.6 g and the fat content ranged from 7.7 g - 51.9 g (Yeo et al., 2020). An Indian research showed unhealthy fat content of snacks in low-socioeconomic settings in India. According to their study, total fat and trans-fat content in 100 g of Samosaa (which is similar to vegetable patties) were 29.62 g - 10.35 g, 24.01 g - 10.25 g in Fan (similar to pastry puffs), and 31.99 g - 11.67g in Kachori (deep-fried, salted, puffed bread made of wheat flour) respectively. Fat content of most of these snacks was in the range between 25-30% and few snacks identified with more than 50% of fat content (Gupta et al., 2016). In comparison to selected Sri Lankan snacks fat content in the Indian street snacks are high.

Based on the guidelines for healthy canteen in workplace and the daily average calorie requirement of 2000 kcal, one portion size of snacks that provide more than 200 kcals are considered as high-calorie snacks. Based on the recommendations by the Institute of Medicine for the National Academics of USA, average contribution for total daily energy intake from carbohydrate, protein and fat should be 45 - 65%, 10 - 35% and 20-35% (Institute of Medicine-USA, 2002). One portion size of snacks supplying more than 27.5 g of carbohydrates are considered as high in carbohydrate; when there is more than 5.0 g of fat are considered as high in fat and when supplies less than 13.75 g of protein

are considered as low protein. Out of the selected snacks more than half of the snacks provide high amount of carbohydrate and fat and low amount of protein than the recommended range.

Inability to generalize the findings of the study due to limited island-wide representation and convenient sampling are limitations of the study. However, the findings of the present study provide basic understanding of the calorie density and macronutrient composition of the popular snacks available at the food outlets in Sri Lanka.

## CONCLUSIONS

Selected snacks available in the food outlets in Sri Lanka are high in calories, carbohydrate, fat, while low in protein. The mean calorie supply by a snack at one serving is higher than the recommendations of the local guidelines.

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## CONFLICT OF INTEREST

The authors declare that they have no competing interests.

## REFERENCES

- Aboderin, I. A. G., Kalache, A., Ben-Shlomo, Y., Kuh, D., Lynch, J. W., Yajnik, C. S., & Yach, D. (2001). *Life course perspectives on coronary heart disease, stroke and diabetes: the evidence and implications for policy and research*. World Health Organization, Geneva.
- Mufas, A. H. M., Rifas, A. H. M., Fareeza, A. H. L., & Perera, O. D. A. N. (2013). Nutrition knowledge on

- diet-related chronic non-communicable diseases among the graduates from South Eastern University of Sri Lanka. *SEUSL*, 6-7.  
<http://ir.lib.seu.ac.lk/handle/123456789/268>
- Gupta, V., Downs, S. M., Ghosh-Jerath, S., Lock, K., & Singh, A. (2016). Unhealthy fat in street and snack foods in low-socioeconomic settings in India: a case study of the food environments of rural villages and an urban slum. *Journal of nutrition education and behavior*, 48(4), 269-279.
- Hu, F. B., Manson, J. E., Stampfer, M. J., Colditz, G., Liu, S., Solomon, C. G., & Willett, W. C. (2001). Diet, lifestyle, and the risk of type 2 diabetes mellitus in women. *The New England journal of medicine*, 345(11), 790-797.  
<https://doi.org/10.1056/NEJMoa010492>
- Institute of Medicine for the National Academics-USA. (2002). Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients), 1-1331.  
<https://nap.nationalacademies.org/catalog/10490/dietary-reference-intakes-for-energy-carbohydrate-fiber-fat-fatty-acids-cholesterol-protein-and-amino-acids>
- Iriti, M., Varoni, E. M., & Vitalini, S. (2020). Healthy diets and modifiable risk factors for non-communicable diseases - the European perspective. *Foods*, 9(7), 940. MDPI AG. Retrieved from <http://dx.doi.org/10.3390/foods9070940>
- Jayawardena, R., Byrne, N. M., Soares, M. J., Katulanda, P., Yadav, B., & Hills, A. P. (2013). High dietary diversity is associated with obesity in Sri Lankan adults: an evaluation of three dietary scores. *BMC public health*, 13(1), 1-8.  
<https://doi.org/10.1186/1471-2458-13-314>
- Jayawardena, R., Thennakoon, S., Byrne, N., Soares, M., Katulanda, P., & Hills, A. (2014). Energy and nutrient intakes among Sri Lankan adults. *International Archives of Medicine*, 7(1).  
<https://doi.org/10.1186/1755-7682-7-34>
- Key, T. J., Allen, N. E., Spencer, E. A., & Travis, R. C. (2002). The effect of diet on risk of cancer. In *Lancet* (Vol. 360, Issue 9336, pp. 861-868). Elsevier Limited.  
[https://doi.org/10.1016/S0140-6736\(02\)09958-0](https://doi.org/10.1016/S0140-6736(02)09958-0)
- Ministry of Health, Sri Lanka. (2013). Guidelines for a healthy canteen in workplace. Accessed at [http://www.health.gov.lk/moh\\_final/english/public/elfinder/files/publications/list\\_publications/Canteen%20Guidelines%20English%20Book.pdf](http://www.health.gov.lk/moh_final/english/public/elfinder/files/publications/list_publications/Canteen%20Guidelines%20English%20Book.pdf)
- Nimanthika, M., Dona, L., Lange, K., & Chidmi, B. (2018). Household Food Consumption and Demand for Nutrients in Sri Lanka. Southern Agricultural Economics Association's 2018 Annual Meeting, 3-6.  
<https://ideas.repec.org/p/ags/saea18/266670.html>
- Olatona, F. A., Onabanjo, O. O., Ugbaja, R. N., Nnoaham, K. E., & Adelekan, D. A. (2018). Dietary habits and metabolic risk factors for non-communicable diseases in a university undergraduate population. *Journal of health*,



*population and nutrition*, 37(1), 1-9. <https://doi.org/10.1186/S41043-018-0152-2/TABLES/5>

Weerasekara, P., Withanachchi, C., Ginigaddara, G., & Ploeger, A. (2018). Nutrition transition and traditional food cultural changes in Sri Lanka during colonization and post-colonization. *Foods*, 7(7), 111. MDPI AG. Retrieved from <http://dx.doi.org/10.3390/foods7070111>

World Health Organization. (2003). *Diet, nutrition, and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation* (Vol. 916). World Health Organization.

Yeo, M. T. Y., Yeo, P. L. Q., Bi, X., & Henry, C. J. (2020). Energy density and nutrient contents of selective Chinese New Year snacks. *Foods*, 9(8), 1137. MDPI AG. Retrieved from <http://dx.doi.org/10.3390/foods9081137>