Amounts of Added Sugar in selected foods from the Sri Lankan Market

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Abstract: Sri Lanka is a developing country in the South Asian region of the world. In the Country's efforts in the overall development of its people, dietary surveys are essential to estimate nutrient intake, as it plays a major role in the health and well being leading to productivity. Sugars are a class of carbohydrates and thus one of the most common elements found in the foods and a major source of energy. In this study, we analyzed six food samples broadly representing nine food categories from the Sri Lankan market in 2014. Fehling's method was used in our analysis. The high sugar content was found to occur in the spreads, jams and chewing gums having 53.34 – 56.67 and 40.97-43.41 g per 100 g respectively. The lowest sugar content was found in the soft drinks, which was around 13 g/100 mL. American Heart Association recommends the daily added sugar level for women to be below six teaspoons and for men should be below nine teaspoons in order to fulfill their calorie requirements. Increased sugar intake through food is associated with chronic diseases like diabetes. Further study is necessary to evaluate a wider range of food items and continuous monitoring of their sugar content to ensure the safety of food and to maintain good health among people.

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Introduction

Sugars are common components of our food supply and comprise simple carbohydrates (CHO) such as monosaccharides and disaccharides. During the digestion process, except for dietary fiber and resistant starches, CHO converts into simple sugar. Simple sugar is easily converted into glucose because its molecular structure breaks down faster than other molecules like amino acids and glycerol.[1]

Sugars are used in food and beverages mainly as sweeteners as well as to improve their palatability and as a preservative in some food items. Consumer food items such as biscuits, cakes, chewing gums, carbonated beverages, ready to serve drinks, jams and spreads are rich in sugar. [2]Most of the food items mentioned above have a nutrition label on which the available nutrition per serving has to be indicated. It can then provide better information regarding the product and give a chance to the consumer to decide on his requirement.[3]

According to the world Health Organization (WHO) recommendations on sugar, higher intake of sugar rich food items may contribute to an excess energy supply, thus increasing the risk of overweight and obesity. Further, it may increase the risk of diabetes mellitus, some cancers and dental caries.[4]

Sugar in foods increases the blood sugar level, which could damage the pancreas cells that produce insulin. It is the main reason for diabetes. [5]Tooth decay is a common health problem among children in Sri Lanka. There is a link in between tooth decay and the sugar intake. Most of the school children prefer to consume chocolate, toffee, chewing-gum and other sweets. The hidden sugar level of those items may cause dental caries.[6]

Sugar contributes more in increasing blood glucose levels in comparison with other carbohydrates (CHO). According to the American Diabetes Association (ADA), diabetics should be highly concerned about their consumption of all types of CHO and not just sugars. Diabetics should aim to consume between 45-60 g of CHO at each meal, which helps in maintaining the blood glucose level within acceptable limits.[7]

According to the American Heart Association (AHA) the maximum amount of added sugar for men would be around 37.5 g or 9 teaspoons and for women would be around 25g or 6 teaspoons. Those added sugar levels supplied the daily required 150 calories in men and 100 calories in women.

According to WHO recommendations, the recommended sugar intake for adults should be 10% of the total daily calorie requirement. Average calorie requirement of men between the ages of 30 – 51 yrs is 2500 calories and for women within the same age group would need 2100 calories per day.

Aim of this study

The current study focuses mainly on analyzing total sugar levels in selected food items and comparing

these values with levels recommended by the Institute of Sri Lankan Standards (SLSI) for those food items.

Methodology

Sampling

Samples were collected during the latter part of 2014 and early part of 2015. This involved the purchase of a total of six specimens of each type within all categories of food items from supermarkets, retail markets and food outlets within the Western and Southern provinces in Sri Lanka. They were then delivered to the Analytical Chemistry Laboratory of the National Aquatic Resources Research and Development Agency (NARA) in Colombo. All information on the collected food items were recorded and maintained in a database.

Sample preparation

Approximately 2 grams of the sample were weighted to an accuracy of 4 decimal points by using an analytical balance (AAA300L, Bradford, UK). It was then transferred to a 250 mL beaker; 75 ml of distilled water was added and boiled for 10-15 minutes while stirring in a water bath. Subsequently 3 mL of conc. HCL (AR, Sigma Aldrich, USA) was added and boiled again for 3 minutes. The sample was neutralized by using 10% NaOH with phenolphthalein as the end point indicator. The sample was centrifuged at 2000 rpm for a period of 20 min to separate the liquid and solid phases and transferred to a volumetric flask through filter paper and marked up.

Titration of samples

Fehling's A and B solutions were measured in a pipette and 5 mL each was added to the Erlenmeyer flask along with 3-5 drops of methylene blue. This was brought to boiling by heating with a Bunsen burner. The prepared sample was then taken into the burette and the content of the flask was titrated until the color of the methylene blue just disappeared.

Certified quality control material (CQM) (canned meat meal T/0188) from Food Analysis Performance Assessment Scheme (FAPAS, Sand Hutton, York, UK) for total sugar was treated and analyzed in the same manner as the sample and the resulting CQM values were checked against the true CQM values.

The serving amount of the some selected food items taken from the "Food Dietary Guideline for Sri Lankans" published by ministry of health Sri Lanka and some Food Dietary Guideline published by European and Asian Countries. The Results of the study expressed according to the Sugar intake published by American Heart Association (AHA).

Results

Table 1: Range of sugar content in selected consumer products

Food Item	Sugar g/ 100 g or 100mL	Serving Amount	Equivalent sugar intake (g)
Soft Drink (n=6)	10.01-13.60	200 ml	20.02-27.20
Cookies and Donuts (n=6)	10.80-25.12	20 g	2.16-5.02
Cakes (n=6)	33.05-39.10	50 g	16.53-19.55
Ice cream (n=6)	13.23-13.40	100 g	13.23-13.40
Candies and chewing gum (n=6)	40.97-43.41	3 g	1.23-1.30
Canned fruit packed in syrup (n=6)	28.00 -32.50	100 mL	28.00-32.50
Spreads and jam (n=6)	53.34-56.67	20 g	10.67-11.33
Milk shake (n=6)	11.42-11.60	200 mL	22.84-23.2
Cafe drink (n=6)	11.52-13.56	200 mL	23.04-27.12

Table 2: Balanced amount of sugar amount for men and women after one serving

Food Item	Serving Amount	Equivalent sugar intake (g)	Mean value	Balanced sugar amount	
				For men (37.5 g)	For women (25 g)
Soft Drink	200 ml	20.02-27.20	23.61	13.89	1.39
Cookies and Donuts	20 g	2.16-5.02	3.59	33.91	21.41
Cakes	50 g	16.53-19.55	18.04	19.46	6.96
Ice cream	100 g	13.23-13.40	13.32	12.09	11.68
Candies and chewing gum	3 g	1.23-1.30	1.27	36.23	23.73
Canned fruit packed in syrup	100 ml	28.00-32.50	30.25	7.25	-5.25
Spreads and jam	20 g	10.67-11.33	11.00	26.5	14.00
Milkshake	200 ml	22.84-23.2	23.02	14.48	1.98
Café drink	200 ml	23.04-27.12	25.08	12.42	-0.08

The calculated Certified Quality control Material (CQM) used for check the accuracy of the analytical procedure. The calculated CQM value has been compared with true CQM value and the calculated value equals 12.42 g/ 100g and true value equals between 10-13 g/100g. The sugar levels in the selected food items shown as the of sugar level range. Table 1 shown the sugar level in the selected food items purchased from the markets.

According to the American Heart Association (AHA), daily maximum amount of added sugar for men should be equivalent to 150 calories or 37.5 g (9 teaspoons) of sugar and for women, an equivalent of 100 calories or 25 grams of added sugar (6 teaspoons). Table 2 shows the balanced levels of sugar for men and women.

Discussion

Consumption of appropriate foods with adequate nutrients is important for a healthy life. Many countries, including Sri Lanka have come up with dietary guidelines for their people to maintain a healthy lifestyle by reducing health risks. Dietary guidelines for Sri Lankans published by the Ministry of Health provide recommendations on the intake of salts, sugar, fats and other nutrients. Foods that provide energy and nutrients have been categorized into six groups. It is best to eat a variety of foods daily in recommended quantities.

The number of servings needed from each food group depends on the age, sex, body build, and the level of activity of the individual. This may also differ during illness. Serving size helps to understand how much food is recommended on a daily basis from each food group.

Sugar is a common item in the Sri Lankan diet. It has no nutritive value other than the calories. Sugar consists of simple carbohydrates and during the digestive process it is converted into glucose.

Sugar has been used for many centuries to sweeten foods as well as for its contribution to color, flavor and the texture of foods. Many sweet products are sold locally. Much Like carbohydrates such as starch, sugar too provides four kilocalories of energy per gram. Food manufacturers use different types of sugars as some are better suited than others depending on the products. According to the EU regulation No 1169/2011 on the provision of food information to consumers, sugar content has to be indicated in the nutritional declaration on the back of the product packaging. It is to be quoted as ‘carbohydrates/sugar represented as grams per 100 g or 100 ml of the product. Table 1 shows the sugar content in the selected products found in the district of Colombo in Sri Lanka.

The accuracy of this analytical procedure was maintained by running the Certified quality control material (CQM) (canned meat meal T/0188) from Food Analysis Performance Assessment Scheme (FAPAS, Sand Hutton, York, UK) for total sugar. This has been routinely treated and analyzed in the same manner as the sample. The calculated CQM value has been compared with the true CQM value. If the CQM value equals 12.42 g/100g the true value is taken to be between 10-13 g/100g. According to the Calculated CQM value, it is in the true range. It shows the accuracy of the analytical procedure as well as its quality control.

We consume many types of sugars. Added sugar and hidden sugar are the two main types of sugar, which are found in foods. When we prepare tea, we add a known amount of sugar. But we eat many other food items during the course of the day during which we intake an additional amount of hidden sugar. Table 1 shows the added amount of sugar in the experimental consumer, food items per serving. According to the American Heart Association (AHA), the daily maximum amount of added sugar for men should be equivalent to 150 calories or 37.5 g (9 teaspoons) of sugar and for women, an equivalent of 100 calories or 25 grams of added sugar (6 teaspoons). Table 2 shows the balanced levels of sugar for men and women. These should be considered with the age, sex and physical activity of the individual.

The present study was carried out using the mixed approach system. Different types of food items were categorized into individual groups. As an example, we selected the fruit cake, chocolate cake and cakes with different sugar creams as a common group of cakes. Different types of biscuits and cookies were selected as a common group of cookies and donuts. Therefore, we need to interpret the data as a range and not as a point. Some food items such as biscuits and cookies have different quantities per serving. As an example, the serving for the biscuit known as Brand A Tikiri Mari is 17.5 grams, which amounts to 5 biscuits. A serving of Brand B chocolate biscuits is 23 g. For Bran C custard cream biscuits it is 20 grams. Thus the servings for biscuits differ within brands and the type. Therefore, 20 grams were taken as an average serving for an assortment of biscuits. Table 2, gives a clear picture of how to maintain a balance in the sugar intake when several categories of food are being taken which also depends on the gender. Normally males need much sugar or calories in comparison with women because of their physiological buildup. When a woman consumes canned fruit in sugar syrup, already the sugar intake surpasses their daily quota. In cases like these, a lesser serving can be taken and the physical

activity can be increased to burn out the extra glucose.

Exceeding the daily quota of sugar regularly, may lead to an excess supply of energy. This can cause overweight and obesity. Obesity is a risk factor for a number of diseases, coronary heart disease, diabetic mellitus and some types of cancers among them. Sugar in foods, increases the blood sugar levels rapidly, causing damage to the pancreatic cells that produce insulin leading to diabetes. There is a high incident of diabetes in people not depending on their age group. Consumption of sugar has to be done sensibly consuming minimum amounts of added sugar and enjoy the natural taste of foods. The Sri Lanka Standards Institute has released guidelines or standards for some food items in relation to the added sugar levels. However, in some foods like cakes, the added sugar is considered a minor ingredient and has escaped these stipulated standards. Therefore, continuous monitoring of the sugar content in consumer food items in the market and the new innovation of the foods with differing sugar levels is an important factor for controlling sugar related diseases in the society.

Conclusion:

It can be concluded that the selected consumable food items, taken individually, do not exceed the daily added sugar requirement. However, we should control the sugar intake to reduce health risk.

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