

Assessment of Sugar Levels in Different Soft Drinks: A Measure to Check National Food Security

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Abstract: Ten samples of soft drinks available in Nigerian markets were analyzed for total soluble sugars using spectrophotometric technique. The sugar contents of the soft drinks ranges between 9.91 ± 0.0141 g/100ml in A1 to 13.55 ± 0.0071 g/100ml in A3 respectively. The sugar contents of these selected samples were found to be within the specified standard of standard organization of Nigeria of 7.00 – 14.00 g/100ml.

Keyword: Soft drinks, Sugar content, Spectrophotometric technique, Food security

1. Introduction

Malnutrition problem is a matter of great concern in developing countries. Health profile of a community is greatly influenced by its nutritional status and life style (Rakesh et al 2013). Nigeria is one of the developing countries of the world where aforesaid problem is common. Nutritionist have raised concern on the nutritive value of soft drinks because they have been included in the human diet since prehistoric time and now in the western and developing countries, there is habit to take bottled drink after meal or snacks and confectionaries. (Rels et al. 1987). Soft drinks may contain many beneficial qualities to one's health; they provide pleasant flavour minerals, antioxidants and fibers, which are an essential vehicle for hydration. They are usually absorbed more readily than water (because of their osmolality), can replace lost salt and energy quickly and are rapidly thirst quenching. Jasmine (2012).

There are three main areas of particular nutritional significance for soft drinks. The first is energy, some soft drinks are formulated to deliver a rapidly assimilated energy boosts to the consumer. All carbohydrates and important sources of energy but soft drinks generally contain soluble sugars which are easy to administer. (Euromonitor 2014).

The second area of nutritional significance is that of the so called isotonic drinks which are of equivalent osmolality to body fluids. They promote extremely rapid uptake of body salts and water and are very important products for sports people and other requiring almost instant dehydration.

Third, soft drinks has been widely formulated to low calories forms and for those who wish to enjoy such beverage and yet minimize their caloric intake. Other nutritional benefits that are claimed by some producers include the delivery of essential vitamins, and minerals, especially to children. (Euromonitor 2014).

Many people consume soft drink on daily basis. Soft drinks are one of the convenient way for people to receive

the various nutritional benefits highlighted above. However, they may also have high sugar content. Although the sugar is natural, it may not be healthy if high quantities are consumed. It was suggested that too much sugar could pose harmful health effects as people could develop diabetes, obesity, heart disease, and other complications from excess consumption (France 2000).

Chemically, sugar is one of carbohydrates and is a source of energy in human diet. Sucrose or table sugar has the chemical formula $C_{12}H_{22}O_{11}$ and is a disaccharide of fructose and glucose. It has a white crystalline appearing; it is the most popular of the various sugar for flavouring, exhibiting properties such as sweetening, preservation and texture in food and beverages. Sugars, especially sucrose are obtainable from sources such as sugar cane, beet sugar, honey etc. it is hard to trace the origin of sugar. But, today table sugar is obtained commercially from only two plant; sugar cane and beet sugar, which provide 56% and 44% respectively of the world total sugar.

Although, sugars has been assumed to rise blood glucose level more quickly than starch because it has very simple chemical nature than starch (without scientific research) but results from more than twenty studies demonstrated that sugar and starch cause blood glucose to rise at similar rates. (Okonkwo et al (2012). Therefore, there is need to monitor and control all sugar containing drinks and carbohydrate foods to enhance food security.

There are different types of soft drinks within Nigeria originated from different manufacturers which many people believed some of them to have higher values of sugar content and could raise the blood sugar content. It is important therefore to determine the percentage composition of Nigeria soft drinks to prevent any health problems or threat to the teeming population. For certain number of reasons: it is important to know if the sugar content does not exceed recommended dietary consumption. If the assertion of people concerning some of these drinks believed to contain lesser quantity of sugar is true, to establish the fact that the sugar content of some of these drinks have exceeded the stipulated dietary allowance and if the sugar content in these selected soft

drinks is higher than recommended dietary allowance, people may want to reconsider the amount of commercial soft drinks they consume. In addition, excessive sugar consumption is an ongoing concern. It is therefore important to validate the quantity of sugar added to ensure food security.

Furthermore, search through the literature reveals some interesting information about the sugar content of some fruit juices with additional sugar content and fruit juices with no sugar added, using diverse method of analysis but there are scanty information about some of the soft drinks available within our locality which also need to be evaluated for sugar content.

2. Materials And Method

Ten widely consumed soft drinks were purchased locally for the study and labelled as: A1, A2, A3, A4, A5, A6, A7, A8, A9 and A10. These samples were processed and analyzed as follows:

1g each of the sample was weighed into a boiling tube with an analytical balance. 25ml of hot 80% Ethanol was added into the boiling tube and shake on a Vortex Mixer. The material was allowed to settle for 30 minutes and then filtered through Whatman No. 41 filter paper into a beaker. The above steps were repeated again for complete extraction of glucose for 3 times. The extract was evaporated until the ethanol is evaporated. 10ml water was added to dissolve the contents and transferred into 100ml volumetric flask. The beakers content was washed 3 times and added to the volumetric flask and made up with distilled water to 100ml flask.

1ml aliquot of the above was pipetted into a test tube and 1ml water as blank was pipetted into another test tube. 1ml of 5% phenol solution was added and shaken followed by the careful addition of 5ml 96% H_2SO_4 to shake on a shaker vigorously for 2 minutes and cooled. Standard glucose solutions of range 10-50 μ g/ml were treated with 5% phenol and H_2SO_4 as above. The absorbances of the golden yellow colour solution of the sample and glucose standard were read on a spectronic 21D spectrophotometer at wave length 490nm against the blank. (AOAC 1990) the total soluble sugar was calculated using the formular.

$$\% \text{ Total soluble} = \frac{\text{Absorbance X Au Gradient x Dilution of sample factor}}{1000 \times \text{wt of sample}}$$

Table 1: Result of Chemical Analysis

Sample	Total Sugar (g/100ml)
A1	9.21 \pm 0.0141
A2	10.13 \pm 0.0071
A3	13.55 \pm 0.0071
A4	12.69 \pm 0.0141
A5	11.38 \pm 0.000
A6	9.98 \pm 0.0071
A7	12.92 \pm 0.0212
A8	11.49 \pm 0.0212
A9	12.81 \pm 0.0212
A10	12.01 \pm 0.283

The assessment of the total soluble sugar content of ten soft drink samples using spectrophotometer were presented in the Table 1 above. The sugar content ranges from 9.9 \pm 0.0141 to 13.55 \pm 0.0071 g/100ml in A1 and A3 respectively. Among the ten samples considered, A3 has the highest sugar content while A1 has the least total soluble sugar content.

However, the results showed that the sugar levels are virtually within the range specified for soft drinks (7-14g/100ml). Notwithstanding care should be taken by manufacturers to ascertain that the standard recommended values for sugar contents in food and beverages are complied with. The consumption of high amount of sugars has been found to be particularly associated with negative health outcomes which include the following:

- Insulin resistance which can eventually lead to diabetes, hyperglycemia and hypoglycemia.
- Sugar is the major cause of dental deterioration-cavities in the teeth, bleeding gums, failure of bone structure and loss of teeth.
- Excessive consumption of sugar has also been traced to heart disease, arteriosclerosis, mental illness, depression, senility, hypertension and cancer. (Cynthia et.al, 2011).
- Sugars also have an extremely toxic effect in unbalancing the endocrine system and thus damaging its component glands such as the adrenal glands, pancreas and liver, causing blood sugar level to fluctuate widely. (Agbazue et al. 2014).
- It is also responsible for triglyceride deposition in the liver and kidney stones.

With a view to the above highlighted consequences of sugar, sugar need to be consumed with moderation and serious causation because the side effects of sugar manifest after prolong accumulation in the body.

3. Conclusion and Recommendation

This research examine that the levels of sugar in the soft drinks sample are within the accepted limit of regulatory standards. It was discovered that the sugar content of the ten samples evaluated are in, the following ascending order of magnitude.

A1<A6<A2<A5<A8<A10<A4<A9<A7<A3

It is therefore recommended that people with medical restriction could take A1 and A6 whereas people who need quick energy for their daily activity could take A3 and A7. But to prevent negative cumulative effects of sugar in the body, soft drinks with higher sugar be taken occasionally and if possible should be avoided to prevent the risk of any of the above listed problems caused by sugars.

References

- [1] Agbazue, V. E. Ibezim, A. ad Ekere N. R. 2014; Assessment of Sugar levels in Different Soft Drinks. Int. J. Chem. Sci 12(2) pg 327 – 334.
- [2] AOAC International, Official Methods of Analysis AOAC International, Arlington VA 1990.
- [3] Cynthia L. Brain K. K, Magaret D. C. and Sohyun P. (2011); Consumption of Sugar Drinks in the United States 2005-2008. NHHS Data Brief. No 71 pg 1-3.
- [4] France K. I. (2000); “Public Attitudes towards the healthiness of Fruit Juices”. Journal of Human Nutrition & Dietetics Vol 13 No 5, 2000, P.139.
- [5] Jasmine Y. S. (2012); Comparison of Sugar content in Bottled 100% Fruit Juice Versus Extracted Juice of Fresh Fruit. Journal of food and Nutrition Sciences 3 pg 1509 – 1513.
- [6] Okonkwo S. I., Ogbouneke R. U. and Uyo B.K. (2012), Elucidation of Sugar in Edible Fruit – Pineapple (Ananas Comosus). Research Journal of Chemical Sciences. Vol 2(1) pg. 20-24.
- [7] Rakesh Kumar, Saurabh Vijay and Nawaz Whan (2013); Comparative Nutritional Analysis and Antioxidant Activity of Fruit Juices of some Cities Spp. Journal of Bio Sciences Vol 1, 1 pg 44-53.
- [8] Rels C.P., Kline K and Wea Ver S. O. (1987) Impact of Commercial Eating on Nutrient Adequacy. J. Am. Diet Assoc 87; 463 -468.
- [9] www.blog.Euromonotor.com retrieved 8th November, 2014.