

Assessment of Sugar Content from Different Soft Drinks Sold in Nigeria

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ABSTRACT

Soft drinks exist in various forms and brands and are marketed by different brewery industries across the country. Nigeria been an underdeveloped country were aforesaid health problems are common, people tends to consume them lots believing it gives more energy. This study was therefore set to assess the sugar content from different soft drinks sold in Nigeria. Ten (10) soft drinks registered and licensed in Nigeria by their respective companies were purchased from a supermarket in Ihumudumu environment of Ekpoma, Nigeria. The sugar contents were assessed using standard methods. Result showed significant differences ($p < 0.05$) in ranges of 0.36g/100ml (Limca) to 3.88g/100ml (Teem Bitter Lemon). Conclusively, the sugar contents were all below recommended value and it can be consumed by those who need low sugar in the body.

Keywords-- Glucose, Soft drinks, Sugar content, Health

I. INTRODUCTION

Chemically, sugar belongs to the class of food "carbohydrates" and it's an energy source in the human diet. Sucrose or table sugar contains the chemical formula $C_{12}H_{22}O_{11}$ and is a disaccharide of fructose and glucose [1]. It has a white crystalline appearance; is the most popular of various sugars to taste, displaying properties such areas as sweetening, storage and texture of food and beverage [2]. Sugars, especially sucrose are found in various sources, but today table sugar is available commercially from only two plants; sugar cane (56%) and beet sugar (44%) to global sugar [3,4].

Soft drinks are complex mixtures containing different substances such as colour combinations, flavouring agents, acidifiers, sweeteners, preservatives and caffeine [5]. Soft drinks are usually mixed with water plus 1-3% liquid carbon dioxide, 3-5% liquid sugar, acidified to a pH of about 2.4-4.0, emulsifiers, colours, flavours and/or spices, herbs and extracts of roots, leaves, seed and flower or bark [6]. A soft drink is any category of non-alcoholic beverages, which is usually but not very necessarily carbonated, containing natural or synthetic sweetening agents, edible acids, natural or artificial flavours [7]. Soft drinks have many health problems. Natural acids and sugars have all the acidogenic and cariogenic potentials that can lead to dental caries and enamel erosion [8].

The public health profile is strongly influenced by its dietary status and health style [9]. Nigeria is one of the developing countries of the world where the aforementioned

problem is common. Healthcare providers have raised concerns about the importance of soft drinks since they have been included in human diets since time immemorial and now in western and developing countries, there is a tendency to consume soft drinks after meals or snacks and confectionaries [10]. Soft drinks can contain many beneficial qualities in a person's health; they provide pleasant flavour minerals, antioxidants and fibres, which are an important vehicle for hydration. They are usually more easily absorbed than water (due to their osmolality), they can quickly recover the lost salt and energy and dry up faster to dissolve [11]. There are three main areas for the nutritional significance for soft drinks. The first is energy, second area is that of the so called isotonic drinks which are of equivalent osmolality to body fluids and thirdly, it has been formulated to low calories for those who wishes to minimize their caloric intake [12].

There are different types of soft drinks within Nigeria from various manufacturers that many believe some of them have high sugar content and can increase the blood sugar level. It is therefore important to determine the sugar content of soft drinks found in the surrounding environment. It is important to know that 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 and it's therefore vital to assess the quantity of sugar added to soft drinks in Nigeria, in order to ensure food security.

II. MATERIALS AND METHODS

Ten (10) soft drinks such as; Coca-cola, Dubic malt, Fanta, Limca, Mirinda, Pepsi, Teem bitter lemon, Teem soda, 7up and Sprite, registered and licensed in Nigeria by their respective companies were purchased from a supermarket in Ihumudumu environment of Ekpoma, Nigeria. The sugar content was determined using the method adopted by Dubois *et al.* [13] and the statistical analysis were performed using Graph Pad Prism 6.4.

III. EXPERIMENTAL RESULTS

Table 1: Factory Label of some Soft Drinks in Nigeria Market

Brand	Manufacturer	Constituents Claimed By Respective Manufacturer
Coca-Cola	Nigerian Bottling Company	Carbonated Water, Sugar, Caramel, Colour, Phosphoric Acid, Flavouring and Caffeine.
Dubic malt	Guinness Nigeria	Carbonated Water, Sucrose, Caramel, Sorghum, Hops and Stabilizer (E405).
Fanta	Nigerian Bottling Company	Carbonated Water, Sugar, Acidulants (E330, E296), Stabilizer (Modified Food Starch, E445; E444), Flavouring, Sodium Benzoate, Colourants, Sunset Yellow, Non-Nutritive Sweeteners (Acesulfame-K, Sucralose).
Limca	Nigerian Bottling Company	Carbonated Water, Sugar, Acidulants (E330, E296, E331), Stabilizer (Modified Food Starch, E415; E444; E445), Non-Nutritive Sweeteners (Acesulfame-K, sucralose), Antioxidant (Ascorbic Acid), Flavor (Lemon and Lime Flavor) and Preservative (Potassium Sorbate).
Mirinda	7-up Bottling Company	Carbonated Water, Sugar, Citric Acid, Gum Arabic, Sodium Benzoate, Ester Gum, Natural Flavours, Yellow No. 6 (Sunset Yellow), Ascorbic Acid, Yellow NO. 5 (Tartrazine), Propylene Glycol.
Pepsi	7-up Bottling Company	Carbonated Water, Sugar, Caramel, Colour, Phosphoric Acid, Caffeine, Gum Arabic and Natural Flavour.
Teem Bitter Lemon	7-up Bottling Company	Carbonated Water, Sugar, Lemon Flavor, Quinine, Caramel, Sodium Benzoate, Citric Acid, Gum Arabic and Ester Gum.
Teem Soda	7-up Bottling Company	Carbonated Water, Sugar, Clear and Colourless Colour, Sodium Bicarbonate, Sodium Chloride and Potassium Sulphate.
7up	7-up Bottling Company	Carbonated Water, Sugar, Citric Acid, Malic Acid, Sodium Citrate, Natural Lemon and Lime Flavours, Sodium Benzoate Preservative.
Sprite	7-up Bottling Company	Carbonated Water, Sugar, Acidulants (Sodium Citrate, Citric Acid), Lime and Lemon Flavourant, Sodium Benzoate.

Table 2: Evaluating the Sugar Content of some Soft Drinks in Nigeria

s/n	Soft Drinks	Sugar content (g/100ml)	Unit volume (cl)
1	Coke	3.17	60
2	Dubic malt	2.74	33
3	Fanta	2.39	60
4	Limca	0.36	60
5	Mirinda	3.62	50
6	Pepsi	3.14	60
7	Teem Bitter Lemon	3.88	50
8	Teem Soda	0.37	50
9	7up	3.55	50
10	Sprite	2.96	60

Values are expressed as mean \pm SD (Standard Deviation). All ten original brands of soft drinks were analyzed and each of these brands had two batches bringing the total number of samples to twenty (20).

IV. DISCUSSION

The sugar content (g/100ml) showed significant differences ($p < 0.05$) in ranges of 0.36g/100ml (Limca) to 3.88g/100ml (Teem Bitter Lemon) (Fig-2). The concentrations of glucose in the various brands of soft drinks showed the following trend: Teem Bitter Lemon > Mirinda > 7up > Coke > Pepsi > Sprite > Dubic Malt > Fanta > Teem Soda > Limca. The result of this researches was slightly lower than that reported by Akroekia *et al.* [14], who reported that the sugar contents of selected soft drinks ranges between 9.91g/100ml to 13.55g/100ml. The difference in the value

may be because of the different soft drinks used and the method used to determine the sugar level in those soft drinks. The Standard Organization of Nigeria recommended limit range of 7-14 g/100ml for soft drinks [15]. All the soft drinks were below the stated recommended limits.

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