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Bourn Vita and Milo Beverage Drinks Frequent Intake May Lead to Diabetes

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Abstract

There is increase in sugary drinks in our environment and associated disease e.g diabetes mellitus. There is no cure for this disease and hence the investigation into Milo and Bournvita beverages to evaluate the blood glucose levels. A total of 16 adult male and female albino rats were studied including alloxan induced ones. There was significant increase ($P < 0.05$) in blood glucose level in rats fed with Bournvita on initial day 1 than the group fed with Milo drink. Also on day 7 increase in blood glucose level was observed in group of rats fed with Bournvita than Milo. However, on day 14 Bournvita fed group had significant reduction ($P < 0.05$) in blood glucose level than Milo group. But on day 21 the difference in blood glucose levels between the two beverages were not significant, ($P > 0.05$). And on day 28 the blood glucose level of Bournvita fed rats was significantly lower than the Milo fed group. Generally, the blood glucose levels in the two beverages were within the normal range except in Bournvita group on day 7. The decline in blood glucose levels on day 14 and 21 in alloxan induced diabetic rats suggests insulin resistance. It is advised that consumption of Bournvita and Milo beverage drinks be minimized to avoid associated disease; diabetes.

Keywords: Bournvita, Milo, beverages, glucose levels, diabetes.

Introduction

Beverages are powder food drinks that are consumed globally. The sugary contents are those of chocolate and malt. Milo for instance is very popular in Nigeria as per the rate of consumption than Bournvita one of the oldest of the beverages, it contains saturated fat, cholesterol, carbohydrate, protein, vitamins and minerals, fatty acids, sodium, amino acids and calcium, (Jess 2014). It is produced by Nestle, Milo was developed by Thomas Mayne an industrial nutritionist in Sydney in 1934, (Jess, 2014). Thomas Mayne combined malt extract, obtained from malt barley, cream milk powder, cocoa, sugar, mineral salts, iron vitamins, A and D to arrive at what is called Milo today. The beverage was formerly in the liquid form but through evaporation it becomes solid

particles or powder as it is today. The drink is called Milo and is 50% sugar (Ozuru, 2014) to depict its strength, naming after the 6th century BC Greek Wrestler, Milo of Croton who was known for his strength in Wrestling (Jess 2014). The beverage is manufactured by Nestle Nigeria Ltd for the consumers in Nigeria. Bournvita is also another popular beverage food drinks, one of the earliest beverages. The consumption rate is still high, it is granulated and not powdering like Milo, it has malt and chocolate. The name Bournvita is derived from the model village of Bournville where the chief of factory of Cadbury is located. It contains sugar, liquid glucose, salt, flavouring substances, caramel IN150C, malt sugar milk, wheat, vitamins, cocoa

minerals, soy (Azim, 2015). It is also energy drink and widely distributed (Inder, 2015). The analysis of these drinks shows the sugary content, which with high rate of consumption can lead to raise glucose level and diabetes as a disease. However, the present of vitamins A, B1 and B2 in Milo drink benefit, the body for good sight, release of energy from food, calcium for bone development, iron for haemoglobin development. It is hoped that all these listed quality contents are there. But the present of caramel IN150C which is said to restore food colour is linked with gastrointestinal hypersensitivity (Azim, 2015). These beverages are highly consumed daily and the tendency of having diabetes is very high with high consumption. Diabetes is a sugar linked disease hence this study with beverages. It is a metabolic disorder that has to do with the availability or inavailability of insulin for the uptake of glucose into the body cells (Zisma, 2000). Apart from insulin and raise glucose in the blood stream as major factors in diabetes disease, lifestyles is ranked as an important causative factor in diabetes incidence globally, (Shanley, 2017) particularly in type – 2 diabetes, said to be a lifelong disease and non-insulin dependent and insulin resistant, (Olokoba, 2012), (Li, 2008). It involves weight increase and insulin resistance as major factors, i.e. there is insulin availability, but the body does not utilize it; (Samreen, 2009). It is the most common in the world, it is prevented by change of lifestyle, loss of weight, (Shanley 2017). Type 1 diabetes' is an autoimmune disease which there is the destruction of the pancreas that produces insulin and it is insulin dependent diabetes, (Isley, 2005). Gestational diabetes develops mostly in pregnant women at the third trimester due to hormonal changes, excess weight and family history (Samreen, 2009, Fusimoto 2013). The disease ends after the delivery but there could be tendency for type – 2 diabetes in such persons. Gestational diabetes can cause preeclampsia, premature delivery, macrosomia i.e. overweight infant, jaundice and respiratory complications in born babies (Linsay 2009). The aim of this study was to find out if the consumption of these beverages can lead to raise blood glucose level that can to diabetes. The manufacturing companies would do great deal of help to the populace by reducing the sugar contents in the beverages they produce. This will reduce the rate of diabetes and also reduce the mortality rates globally.

Materials and Methods:

Sixteen male and female matured albino wistar rats weighing 110-180g were used for the study. The animals were fed with water and pellets and kept in a well-ventilated animal house, Faculty of Pharmacy, University of Uyo. The animals were maintained according to the regulation of institute of animal and ethical committee (IAEC) of Helsinki, 1964.

Preparation of Drinks:

The beverage food drinks; Nestle Milo and bournvita were obtained in sealed packages from a registered supermarket in Uyo Metropolis. The drinks in solid particles in 1500g container were kept at room temperature for the experiment. Four teaspoonfuls of both Nestle Milo and Cadbury Bournvita were mixed separately with 250ml of water (the size of a mug). This was done according to the Nestle Milo and Cadbury Bournvita instructional directive on the labelled containers. The average weight of human (70kg) was used in determining the dosage in the different rats per their weight, which gave 357.14mg/kg with stock concentration of 100mg/ml.

Grouping of the animals and administration of drinks:

The rats were grouped into 4 with 4 in each group. Group 1 was given distilled water, Group 2 rats were induced with alloxan (5%), group 3 had Nestle Milo while group 4 was given Cadbury Bournvita. The animals were administered with the drinks orally per body weight using canula by- passing the oesophagus and delivered into the stomach, (Robert, 1979). The drinks were administered for 7, 14, 51, 28 days.

Alloxan induced diabetes:

Five percent (5%) solution of alloxan in distilled water was injected intraperitoneally into the rats in group 2 in a single dose corresponding to 150mg/kg. The induction of diabetes by alloxan was established by blood glucose levels done after 72 hours of the drug administration (Lenzen, 2008) (Szkudelski, 1998). It was done using glucose strip and glucometer reader- and the results recorded. The physical signs of diabetes, especially polyuria was established in the animals. The essence of this aspect of the study was to be able to establish likely raise values of glucose with Bournvita and Milo administration to assess the tendency of diabetes in the drinks.

Table 1: Glucose levels in Bournvita and Milo Beverages

Group	Drinks	Day 1	Day 7	Day 14	Day 21	Day 28
1	Control group	89.25+4.76	89.75+4.79	78.75+4.27	74.25+4.57	70.75+10.45
2	Alloxan induced diabetes	409.33+188.9	83.25+28.70	83.00+1.41	83.00+8.48	128.50+62.93
3	Nestle Milo	87.75+7.54	109+17.80	87+22.41	77+26.9	82.00+5.60
4	Cardbury Bournvita	90.75+12.37	136.25+8.18	64.00+9.54	80.00+9.8	68.67+7.23

Results:

The study comparing Nestle Milo and Bournvita has shown different levels of blood glucose compared with control and alloxan induced diabetes. The initial data on day 1 with alloxan induced diabetes, distilled water, Nestle Milo and Bournvita beverages have the blood glucose levels as follows: 409.32 + 188.94 for alloxan induced diabetes, 89.25+4.76 (distilled water), 87.75+7.5 (Milo) and 90.75+12.37 (Bournvita). The glucose levels were within the normal range except in alloxan induced diabetes with significant increase $P < 0.05$, Table 1. On day 7 the values of blood glucose levels were 89.75 + 4.70, 83.25 + 28.70, 109 + 17.80 and 136.25 + 8.18 for control alloxan induced diabetes, Nestle Milo and Bournvita respectively, which were significantly different, $P < 0.05$ compared with control, Table 1. On day 14, the glucose levels were also significantly different among the groups, 78.75 + 4.57, 83 + 1.41, 87.0 + 22.41 and 64.0+ 9.54 for control, alloxan induced diabetes Nestle Milo and Bournvita respectively and were significantly different $P < 0.05$. On day 21 significant difference in blood glucose levels $P < 0.05$ was established among the groups; 74.25+4.57, 83.0 + 8.48, 77.0+26.9 and 80.0+98 for control, alloxan induced diabetes, Milo and Bournvita respectively. And on day 28, the glucose levels were 70.75 + 10.45, 128.50 + 62.95, 82.0 + 5.60 and 68.67 + 7.25 for control, alloxan induced diabetes, Milo and Bournvita and were significantly different, $P < 0.05$.

Discussion:

The initial blood glucose levels established among the groups in the study showed normal values among the beverages as compared with control. This implies that glucose levels before a week at consumption may not be abnormal. And many may depend on this result without further analysis of their blood glucose

level a week after. Though it was not significant but the glucose level with Bournvita was higher than that of Milo on the initial day (day 1). On day 7 there was increase in same Bournvita group than Milo. This affirms that Bournvita has the tendency of increasing blood glucose level than Milo. This is an established fact about sugar drinks and the raise glucose level, (Gibson 2008). It was surprising to find decrease in blood glucose level in group 2 alloxan induced diabetes on day 7 against its initial day 1 the value which was lower than those of Milo and Bournvita. This perhaps may be due to increase production of insulin to cope with the increase glucose level on day 1 and a case of resistance to high glucose level, (Carvallo, 2005, Kanda, 2006) (Schrier 2007). On day 14 there was a drastic reduction in the blood glucose level in the Bournvita group than Milo. This is a likely situation of increase release of insulin to react to increase glucose level observed in this group on day 7. But on day 21 Nestle Milo had a reduction in glucose than Bournvita. However, on day 28, Bournvita group had a drastically reduced blood glucose level than Milo and all other groups. But all through the period of administration of the beverage drinks, Nestle Milo had the normal range of blood glucose level than Bournvita and all other groups. It is affirmed in this study that there is the safety in terms of glucose level in Milo drink. However, it is not advisable to continue to increase the intake since there is tendency for high glucose level in continuous consumption as shown on day 28. The result with Bournvita on day 28 seems to be encouraging with a low blood glucose level as the period of consumption increases. There is need to do further work at increase consumption of Bournvita over a period of three months. The values on day 14 and day 28 indicate that the drink may not lead to diabetes but likely the potential's of hypoglycemia. But the

caramel constituent with the likely gastro-intestinal hypersensitivity (Azim, 2005) is rather worrisome.

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