MINERAL, VITAMIN AND SENSORY PROPERTIES OF SOME COMMONLY CONSUMED BEVERAGES IN ABEOKUTA, OGUN STATE, NIGERIA

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ABSTRACT

Beverages have played an important role in the diet of Nigerians. This study is designed to determine the mineral, vitamin of sensory value of selected beverage in Abeokuta. Mineral, Vitamin and Sensory evaluation of the beverages were determined using standard method. The result of the mineral composition shows that iron, potassium, calcium, magnesium, selenium and sodium values ranged from 6.15 to 8.75, 146.15 to 123.1, 1.58 to 1.76, 1.44 to 1.13, 4.93 to 4.82 and 0.63 to 0.44 in mg/100ml respectively. The results of selected vitamins were 8.28, 0.179, 0.434. 1.97 and 12.9 respectively. The results of the sensory evaluation were observed in all the teas with difference attributes of taste, odour, colour and overall acceptability. Beverage could give mineral and vitamin to the consumer if taken in right proportion.

INTRODUCTION

Energy Drinks represent a relatively new class of caffeinated beverages that are mark to improve energy athletic performances concentration, endurance, and weight loss (Higgins et al; 2010). Important for both healthcare providers, and consumer to recognize the difference between new

product and traditional soft drinks such as coffee, tea, sports drinks, soclas, juice or flavored water. "Energy drinks are wild west of the soft drinks industry; often shockingly and unnecessarily high in sugar caffeine (Howard *et al;* 2010).
Energy drinks has been associated with lower breakfast frequency, higher sugar – sweet, soda intake, videogame use, unhealthy dietary and weight control behaviour, insomig alcohol and substance use, (Larso *et al;* 2015).

Alcoholic beverages prepared with energy drinks are popular amongst adolescent and college student (Verster *et al;* 2015). Practice has been associated with an increase in unhealthy habits including alcoholic consumption, cigarette smoking, and illicit drug abuse. Harmful consequence include driving while impaired, riding with an intoxicated driver, and sexual abuse have reported more frequently by adolescents and young adult who combined energy drinks with alcohol. Moreover, alcohol consumption can increase the half-life of caffeine by upto 72% may potentiate the energy drink exposure effect.

Emergency department visits related to complications of energy drinks consumption are increase in frequency. In 2011 of 2.3million calls to the US national poison Data system, 4854, Energy drinks related. About half the case of energy drinks related toxicity involved unintentional exposure children (6years old) it is important to note that not all cases reported developed but rather involved exposure to potentially toxic substances consumption of energy drinks have associated with

multiple medical complication including seizures, anxiety, agita, hallucinations, pontine, myelinolysis, gastointestina upset, rhabdonyolsis, metal acidoses, Insomnia, Chest pain and other cardiovascular complication.

Green tea is composed of about 30% polyphenols (Dry basis), such as flavonoids, flavonols and phenol acids. Polyphenols have been well known to have various excellent biological activities for example. Inhibition of tooth decay, inhibition of a vergy, prevention of gout and inhibition of oxidation. Especially the inhibitory effect of green tea polyhenol an lipid oxidation was higher than that of the synthetic antioxidant was higher than that of the synthetic antioxidant Butylated Hydroxytoluene (BHT). World production of different beverages from the young tender shoots of tea has continued to rise, despite lack of commensurate increase in consumption. One way of improving the profitability of tea production is by planting high yielding clones with excellent quality. But high quality tea can be obtained within the comeet quality potential. However quantifiable breeding or selection criteria for quality have been elusive. Past tea breeding clonal selection breeding methods for the tea have realized on a combination of morphological, slow and laborious to assess much high yielding and good quality planting material has evolved by chance (Anos, 2005).

There are risk associated with beverage consumption. Most of the producer of this beverage make claims

of the nutritional quality possessed by product. However this claims sometime are false and have to be verify. Therefore, this research work is designed to determine the mineral, vitamin and sensory qualities of the beverages. The finding will help to improve the quality of the selected product and plan that will be more effective to those consumers in the society. It also shows the right or reasonable benefit to the consumers.

MATERIALS AND METHODS

Green tea (beverage) product were purchase from the market (imported product from China) in which the mineral composition of the tea were analyzed in the laboratory at Ibadan I.A.R and T at Apata Ibadan, Qualitatively analyzed for the presence of vitamins and minerals determination.

DETERMINATION OF ASH

Apparatus pereals in crucibles, A dessicator analytical balance and a furnace determination 2 (c), of the sample will be weighed into a purecelain crucible. This was transferred into muffle fumace set at 5.500c and left for about 4 hours. About this time it had turned to white Ash. The crumble and its content will be covered to about 100^0c in air, then non temperature in a dessicator and weighed. This was done in duplicate. The percentage ash was calculated from the formular below

$$\% \text{ Ash content} = \frac{w + \text{of ash}}{\text{Original weight of sample}} \times \frac{100}{1}$$

(A.O.A.C, 1990)

DETERMINATION OF MINERAL ELEMENT CALCIM AND PHOSPHORUS

Calcium Determinations

Apparatus:- Heating mantle, crucible, Glass rod, flame photomate 10uN volumetric flask, whatman x 10; 1 fiter paper, wash 100ttle; kml pipetie funnel.

Reagents: INHCL. (A.O.A.C, 1990)

Determination

The ash of cash sample obtained was digested by adding 10ml of INCHCL to the ash in the crucible and heat to dryness on a heating mantle. 1cm1 of I+IHCL, was added again, heat to boil and filtered through that man No1 filter paper into a 100ml volumetric flask. The filtrate was made up of mark with distilled water stoppered and made ready for reading of concentration of calcium the Jenway Digital flame photocmeter/spotorichief 20. The reading obtained was converted to % by appropriate mathematical relationship applicable to such determination.

% ca = Abs. Reading of sample x Dil. factor x slope

Ca = 1

10ppm = 10 – 1

20ppm = 20

Na= 0.18 – 0.20

K= 0.20 – 0.23

P= 45.44 – 46.25

Zn = 1

Fe = 1

(A.O.A.C, 1990)

PHOSPHORUS DETERMINATION

Phosphorus was determined recutinely by the vanado molybdata colon – metric method

Apparatus:

Specctrophotometer or colormeter, 50ml volumetric flast, kml pipette, filter paper, wash bottle, glass

rod, heating mantle crucibles.

Reagents: Vanadate, - molybelate yellow solution, 2MHCL (A.O.A.C 1990).

PHOSPHORUS DETERMINATION IN PLANT SAMPLE

Reagent:

Variadate molydatie yellow, IN HCL

Procedures

1. Weight 0.2g of well grinded plant sample into a dried crucible
2. PH it inside a fumace sot of 600^0c and the sample to ash for 2 hours.
3. Wash the ash sample by pipetting 1cm1 of INNCL and the ash sample and place it in a hot plate allow it to evaporate to dryness, thenaldd another 100ml of HCL and remove it from hot places Allowcool and wash iron a 10ml - 1dumetric flask using filter paper and funnel make it with dist H_2^0 up 60 – 10cml level.
4. Into a 50ml volumetric flask, pipette 10ml from 10ml of vanadate yellow to it and make it up with distilled 11_2^0. Allow it to develop for 15minutes.
5. Set the spectrometer at 470mm and allow it to wash for 15minutes.
6. Standard phosphorus will be prepared and read first before sample.

The percentages phosphorus were then calculated from this formula; ppm = meter reading + Average gradient x 1^{st} dilute x 2^{nd}

Dilution factor divided by weight of sample x 10

Na k3 Ca

From the washed sample (i.e 100ml) flame photometer was used to read the level of Na, K3, Ca, after

standardized it is respective minerals. The percentage individuals element were carried out using the formula.

Ppin = cu, zn, fe

Ilution, 1:25 were made for my level determination from the washed sample i.e 100ml flask.

After the dilution, it was then read on atomic absorption spectrometer (AAS), after standardized with mystandard) Cu, Zu, Fe were read from the solution that remains in the 100ml flask and also read in AA3 after standardized with respective element (A.O.A.C 1990). They were calculated in parts per million (ppm) by the formula.

$$Fe = \frac{\text{meter reaching} +}{\text{Average gradient} + \text{dilution factor Weight of Sample}}$$

(A.O.A.C, 1990).

SENSORY ANALYSIS

Given tea infusion carried out the following standard protocol according to Roberts, 1966, 2g of Oganogold tea (loose) were infused in hot water previously boiled to 900c. the different infusions were served in a transparent glass bottles without much of sugar. 10 panelists fat close to each other in a tasting book with a wooden barrier in between tasters to prevent interaction and causing undue bias in judgment panelist were supplied with cold water to raise their mouths after each round of fasting coded with sample of oganogold tea were served to the panelists as OGT_{24}, OGT_{36}, and OGT, 44 respectively. Panelists carried out the sensory evaluation in a well ventilated room with high illumination the panelist were asked to take all the

tea in taste, odour, colour and overall percentage of acceptability.

RESULT AND DISCUSSION

RESULT

The results of the mineral were presented in mg/100^{-1} on Table 1a. The mineral determined result was presented in mg/$100g^{-1}$ on table 1a. the value for the sodium content were 8.75, potassium , 184.3, for calcium 1.76, iron 4.85, manganese 1.7, selenium 0.44 for sample A, sodium 7.81, potassium 134.7, calcium 1.69, iron 2.33, manganese 1.21, selenium 0.55 for sample B. while sample C value of sodium 6.15, potassium 146.15, calcium 1.58, iron 4.93 for manganese 1.44 and selenium 0.63. The result for vitamin determined was presented in Table 1b. the value for vitamin A content were 8.28, vitamin B1 0.179 for vitamin B2 0.434,vitamin B3 1.97 and vitamin C 12.

Table 1a: Selected mineral content of the beverages

Samples	Sodium mg/100^{-1}	potassium mg/100^{-1}	calcium mg/100^{-1}	iron mg/100^{-1}	manganase mg/100^{-1}	selenium mg/100^{-1}
Cafe mocha	8.75	123.1	1.76	4.85	1.13	0.44
Café latte	7.81	134.7	1.69	2.33	1.21	0.55
Black coffee	6.15	146.15	1.58	4.93	1.44	0.6

Table 1b: Selected vitamin content of the beverages

	Vitamin A	Vit B1	Vit. B2	Vit B3	Vit C
Green tea	1U/100	mg/100g	mg/100g	mg/100g	mg/100g
	8.28	0.179	0.434	1.97	12.9

Table 1c: sensory content of the beverages

Sample (Tea)	Taste			Odour		Colour			Percentage
	Sweet	Bitter	Sour	Good	Bad	Black	Green	Brown	
A OGT24	10	-	-	6	-	-	-	✓	50%
B OGT36	7	-	-	5	-	-	-	✓	40%
C OGT44	3	7	3	-	5	✓	-	-	10%

DISCUSSION

The mineral determination of this study was presented in table 1a. the mineral content of the three sample was observed and it was observed that the sample of oganogold tea (selected beverages commonly consumed in Abeokuta) was high in mineral except in calcium and absent of phosphorous, value of calcium are1.76, 1.69, 1.53 in the sample can affect the development of some people who are not need to take this beverages. Calcium available as a dietary supplement, and is required for vascular contraction and vasolidation, muscle function, nerve transaction and source of calcium, to

maintain constant concentrations of calcium in blood, muscle and intercellular fluids.

Sodium is also determined on this sample which the value are 8.75, 7.81, 6.15, sodium is a mineral that is essential for life. Its regulated in the body by the kidney and it help control the body's fluid balance, it also help send nerve impulses and affect muscle function. Potassium is a mineral that's crucial for life, it is necessary for the heart, kidneys and organ to work normally. People in the community who consumed this tea, consumed 123.1, 134.7, 146.15, of potassium which is the value content in this analysis, low consumption of potassium is associated with a risk of high blood pressure, heart disease. Stroke, arthrifia, cancer, digestive disorder and infertility. The value for iron content were 4.85, 2.33, 4.925, iron is mineral that s naturally present in many foods and beverages and available as a dietary supplement, iron is a essential component of hemoglobin, an erythrocyte protein that transfers oxygen from the lungs to the tissues. Iron supports metabolism and necessary for growth development, normal cellular function and synthesis of some hormones and connective tissues manganese help to create essential enzymes for building bones. It also acts as a con enzymes to assist metabolic activity in human body, the value content of manganese is 1.13, 1.21, 1.44, which is the regulation of blood sugar level and metabolism of factors and carbohydrates. Selenium is a trace element that is naturally present in many beverages and available as a diet supplement. Selenium content are 0.44, 0.55, 0.63

which is nutritionally essential for humans, is a constituent of more than two dozen selenoproteins that play critical roles in reproduction, thyroid hormone metabolism DNA synthesis and protection from oxidation damage and infection.

Vitamins are a broad strong of organic components that are minor but essential constituents of food required for normal growth self maintain classified in the main groups – water soluble and fat soluble vitamins. In the table below shows vitamin content of the 3 samples was analysis at femtop laboratory. Vitamin A, B1, B2, B3 and C was presented at 1U/100g vimtain A which is chemically known as retinol and it deficiency, is night blindness. Good sources are liver, carrots and spinach. It is fat soluble and therefore can be toxic in large amounts. Synthetic beta – carotene has been shown ineffective in preventing cancer in humans, and seems to be harmful to smokers in the sample vitamin. A determine was 8.28 1U/100g. vitamin B1 which is chemically know as thiamine and cause a deficiency of Beriberi Vit B1 can be derive from peanut, milk, rice. Thiamine is relatively safe, thiamine in this sample was 0.179 mg/100g. vitamin B2 0.434 which is chemically known as Riboflavin and can cause a deficiency of lesions on mouth, lips, skin and can also be found in milk, cheese, leafy vegetable, if is a med antioxidant to its bright yellow color urine after it is taken Vit. B3 which is chemically known as niacin and can causes a deficiency of pellagra, also generate from lean meat, whole wheat, bremer's

yeast. Niacin in higher doses results in a flush reaction, while niacimide is flush-free, niacinamide does not have anti-cholesterol properties through. Vit. B3 content is 1.97.Vitamin C is an antioxidant, and it is channel to have a positive effect against cancer infections and other health disorder. It is generally non-toxic, it can be found in citrus fruits, strawberries, broccoli and causes a deficiency of scurvy which are chemically knows as ascorbic acid, vitamin C content mg/100g is 12.9. In this analysis determinant vitamin C have the highest value in all sample, vit. C in the sample is much, which means Vit C is many than other vitamin in all sample which are essential for life, when consumed.

SENSORY ANALYSIS

The result of the sensory evaluation was shown in **Table 1c**. Significant differences were observed in all the teas with different clones in attributes of taste odour, colour and overall acceptability in percentage (%). In terms of taste, clones as panelist considered. It was significantly different from other clone OGT_{24} and 36. In terms of colour, clone OGT_{29} and 36 appeared to be the same in colour and have high value then all the other clones, No significant difference was observed in colour of tea from clone OGT_{24} and 36.

In term of acceptability rated in percentage (%) clone OGT_{44} was rated 10% because of the bitterness and unacceptable colour with odour. Clone OGT_{24} was rated 50% and OGT_{36} 40%, because of its sweetness and it odour with acceptable colour. In overall quality assessments panelists

observed that done OGT_{24} and 36 were the best.

CONCLUSION AND RECOMMENDATION

CONCLUSION

- Conclusion of the nutrient and ingredient added to it, improve its quality and nutritional value and make it a better choice for those people suffering from some deficiency like, cancer, diabetes hypertension etc. in the society.
- Due to the content in it, the young consumers at a particularly high risk of complication due to hazardous consumption patterns include frequent and heavy use.
- When considering the mineral composition of the samples for the consumers, iron, potassium, calcium and vitamins is observed to be the best.

RECOMMENDATION

The recommendations are:

- Improvement should be made to make all the micro and macro nutrient available in the product for the acceptability of the consumers.
- Further protect/checking of the product should be carried out to ascertain the consumers about the product.

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