



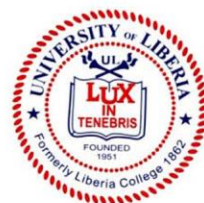
QUANTITATIVE ANALYSIS OF CAFFEINE IN SELECTED  
**ENERGY DRINKS**

IN NEW MATADI COMMUNITY

DECEMBER 2018

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## **AKNOWLEDGEMENTS**

I would first like to give thanks to God for making all things possible. I will like to thank Mrs Mamawa Freeman Moore, founding director of the Honor Program, for her commitment, motivation, and support throughout my stay at the university of Liberia.

I would like to thank Rafael S. Ngumbu, my chemistry 412 instructor for dedication, enthusiasm and willingness to share his knowledge.

I will also like to extend my gratitude to Dr Joseph F. Younn for supervising this thesis work.

## **TABLE OF CONTENT**

<b>ABSTRACT .....</b>	<b>I</b>
<b>DEDECATION .....</b>	
<b>AKNOWLEDGEMENTS.....</b>	<b>VI</b>
<b>TABLE OF CONTENT.....</b>	<b>1</b>

### **INTRODUCTION**

- i. BACKGROUND
- ii. THESIS STATEMENT
- iii. RESEARCH OBJECTIVE
- iv. RESEARCH HYPOTHESIS
- v. SCOPE OF THE STUDY

### **LITURATURE REVIEW**

- i. EFFECTS OF CAFFEINE ON HUMAN HEALTH
- ii. CAFFEINE INTAKE AND IT SOURCE
- iii. WORLD HEALTH ORGANIZATION WANTS BETTER REGULATION FOR ENERGY DRINK
- iv. CONSUMER REPORT (CAFFEINE CONTENT)
- v. MIXING CAFFEINATED ENERGY DRINK WITH ALCOHOL
- vi. CAFFEINE CONTENT OF ENERGY DRINKS CARBONATED SODA, AND OTHER BEVERAGES
- vii. The emerging Public Health Hazard for youth
- viii. Caffeinated energy Drink – A Growing Problem

### **METHODOLOY**

- i. LOCATION OF THE RESEARCH

ii. POPULATION

iii. SAMPLE

iv. STATISTICAL ANALYSIS

**RESULT AND DISCUSSIONS**

**CONCLUSION AND RECOMMENDATION**

**REFERENCES**

## **BACKGROUND**

Caffeine is a naturally occurring compound found in plant species predominantly grown in the tropic or sub-tropic region of the world. It is found in plant constituent such as coffee, cocoa, beans tea leaves and cola nut. It is added to a variety of food product such as baked pastries, ice creams, sweet and cola drink. Caffeine is also found in Energy drink. Some medicine and cosmetics also contain caffeine.

The early human civilization discovered that consuming plant containing caffeine offered stimulating effects and these plants even were considered scared in some cases. Caffeine in small quantities have Therapeutic benefits in some mammals.

Human exploration and trade of tea and coffee has caused caffeine use to be spread throughout the world and today greater than 80% of the World's population uses caffeine in some form or another. (caffeine informer).

With the worldwide consumption of energy drinks increasing in recent years concerns have been raised both in the scientific community and among the public about the health effect of these products (Frontier in Public Health).

Because these drinks contain caffeine in extraordinary amounts, the major concern is that it leads to potential harmful effects.

The risk of heavy consumption of energy drinks among young people have largely gone unaddressed and are poised to become a significant public health Problem in the future (Frontier in Public health)

## **THESIS STATEMENT**

Most people in new Matadi estate consumed energy drinks. Energy drink contain caffeine, Caffeine has a health risk on the human body. Despite the adverse effect of caffeine on the human body, study has not been conducted to determine the amount of caffeine in energy drink that is sold in the new Matadi estate.

Therefore, this research study will make quantitative analysis to determine the amount of caffeine in selected energy drinks in New Matadi estate.

## **RESEARCH OBJECTIVES**

The objectives of this research are:

1. To analyze the quantity of caffeine in each of the selected energy drink brand.
2. To Identified the public health risk associated with drinking caffeinated energy drink.

## **SIGNIFICNT OF THE RESERCH**

This research will also serve as a guide to policy maker in setting standard, guidelines and regulations for the ingestion of caffeinated energy drink in New Matadi Estate

## **RESEARCH HYPOTHESIS**

1. The caffeine content in energy drink that is sold on the market in new Matadi is very high
3. Energy drink consumption is strongly linked to some negative health consequences.

## **SCOPE OF THE STUDY**

This research will be conducted in new Matadi estate only. We are going to collect five brands for analysis with in our school lab.



## **LITERATURE REVIEW**

### **Effects of Caffeine on human Health**

Caffeine is one of the ingredient that is found in the common beverages such as (coffee, tea, soft drinks and energy drink). Caffeine is consumed in many ways by many segments of the population because of the qualities it possesses. It has been considered as the most active frequently ingredient that is ingested Pharmacologically.

Scientist have developed interest similarly to the public in the potential for the caffeine to produce adverse effects in human being.

This come up because of the data reviewed and review on the health of human was found by a diverse literature review. It is considered that for a healthy adult the daily caffeine intake is 400mg

per day (body weight in a 65kg) is not connected with the adverse effects such as toxicity, Change in adult behavior, cardiovascular effects, effects on bone status, calcium balance, and increase in incidence of cancer and effect on male fatality.

The data also shows that women of the age of reproduction are at a risk and should reduce the caffeine intake. Women at the age of reproduction should consume <300mg caffeine per day

## **Caffeine intake and its source: A Review of National Representative Study**

Based on our extensive scientific literature on caffeine (Nawrd 2003) Health Canada reported that the general population of a healthy adult is not at a risk for the possible adverse effect from caffeine at daily consumption level up to 400 mg (Health Canada 2003)

For children, Health Canada advises that 10 – 12 years old should not consume more than 85mg of caffeine per day and not more than 2.5 mg/kg body weight (12 –157mg caffeine for 50-70kg) for adolescents 13-18 years old.

There is concern that caffeine intake would increase especially in children, adolescent and pregnant women, regardless of the different disclosure from health authorities (Health Canada, USFDA, EFSA) that the general population of healthy adult is at risk for potential adverse effect of caffeine.

Notwithstanding the European Food and Safety Authority recently also examined the safety of caffeine intake (European Food Safety Authority, 2005).

To conclude, the adult habitual caffeine consumption up to 400mg per day for children and adolescent does not give rise to the safety concerns. For pregnant women, the maximum daily intake levels of caffeine were set at 200mg per day.

## **World Health Organization Wants Better Regulation for Energy Drink.**

The risk of heavy consumption of energy drinks among young people have largely gone unaddressed and are poised to become a significant public health Problem in the future ( Frontier in Public health)

They say there is a case to seriously consider sale restrictions for children and adolescents. However, eleven out of 27 drinks don't specify the amount of caffeine. What is there fear?

Their brand maybe proprietary. The representative from one of the Company said the company doesn't list the amount of caffeine because there is no legal or commercial business requirement to do so, and also because our products are completely safe, and the actual numbers are not meaningful to most consumers. Yet label on both tested Monster drink like those of the 16 other products- warn against use by the children pregnant or nursing women, and people sensitive to caffeine. The Monster drink and eight other also recommend a daily limit.

There is a need that the Governments make company disclose caffeine content with in their energy drink.

These are carbonated beverage that often contain high amount of sugar, caffeine and other substances which have stimulating effect such as guarana, taurine, ginseng, Theobromine and theophylline. They aim to increase alertness, stamina, physical performance and concentration.

The consumption of energy drink by workers is dangerous for their health. This can directly affect their ability to safely perform physical tasks. Safely operate plant and machinery or increase their exposure to work hazard which may cause accident and injuries.

The use of energy drink has significantly increased in recent years particularly in male dominated industries such as construction, transport, Agriculture, mining and resources.

As a way to stay alert, workers who have jobs that require shift work, high physical demand, long hour's repetitive tasks or those who work more than one jobs are more likely to consume energy drink as a way to stay alert. In compares to other stimulant drink such as tea or coffee, energy drink are often favored because of their sugar content, ability to be consume quickly and cooling effect in hot environments. This can cause workers to consume energy drink in an unsafe amount which have negative impact on health.

The impacts of energy drink to worker's health

1. Dehydration
2. Dizziness
3. Heart pretentions
4. Insomnia
5. Trouble breathing
6. Headaches
7. Anxiety
8. Chest pain
9. Nausea
10. Nervousness
11. Accelerated heart rate

12. Vomiting

13. Shaking

The also contain high rate of illness and mental health issues. The effect of caffeine can impact on sleeping patterns and the sugar of energy drink is similar to that of sport drinks which is known to contribute to weight gain and obesity. Many of the stimulants contained in energy drinks and diuretics, which means they can cause the body to expel more water which can cause dehydration. Dehydration impairs physical, psychological and cognitive performance which can lead to illness, injury and accidents.

### **Work Place**

- ✓ Ensure fresh, cold, palatable water is available

### **Consumer Report (Caffeine Content)**

Caffeine naturally occurs in some foods and may be added to cola and soft drink. Caffeine can stimulate the body and exhibit number of transient effects on the mood performance, and

behavior in human. Caffeine is not considered as additive substance and its consumption is considered to be safe.

However, some population may be at a greater risk from the health effect of caffeine such as pregnant or breastfeeding women and children (Health Canada report)

Guideline for some population as a precautionary measure for daily caffeine intake

For children between the age of 10 – 12, Health Canada recommend a maximum of 85mg/ day of caffeine. For Adolescent 13 years of age, health Canada set a precautionary recommendation of consuming 2.5mg/ kg of body weight of caffeine per day. (125mg of caffeine per 50kg of adolescent)

Older or heavier adolescent may be able to consume caffeine safely up to the recommended limit of adult of 400 mg per day

### **Mixing caffeinated energy drink with Alcohol.**

The mixing of caffeinated energy drink with alcohol is very common among adults in Monrovia.

This mixing is a critical concern for public health. The mixture combines the stimulant properties of caffeine with the depressant properties and impairment effect of alcohol. Caffeine does not affect alcohol

metabolism by the liver and thus does not reduce the risk of alcohol attribution ham.

The concern about this combination is increasing every day with the rising popularity of mixing energy drink with alcohol. The concern of mixing of mixing energy drink with alcohol is drawing the attention of scientists and regulatory body around the world.

The caffeine content in each cane range from 6 milligrams to 242 milligrams, some energy drink even has more than the specific amount on the cane.

The highest amount of caffeine was found in 5-hour energy Extra Strength and the lowest was found Oxymoronic 5- hour energy decaf. (consumer Report)

## **Caffeine Content of Energy Drinks Carbonated Soda, and other Beverages.**

The regulation of caffeine on the Liberian market has resulted in the high intake of caffeine by many Liberians. Because of this, there is high intake of caffeine by many young peoples.

There are high health concerns arising from the consumption of energy drink because of the caffeine intake. It will be very wise for individuals to know the caffeine content before taking in the energy drink.

It will also be good that warning label be place on each cane of energy drink.

Some cases of the high intake of caffeine may be by mixing there sodas much heavier with less carbonated water and more syrup thus leading to more or higher concentrated drink with more caffeine preserving, where as some establishment may serve a more dilute with less caffeine pre-serving .



## **Energy Drink: An emerging Public Health Hazard for Youth**

The consumption of energy drink is increasing among young people especially the youth this is becoming a public health threat.

Some of the caffeinated energy drink contain very high content of caffeine sugar and other ingredients. They are often marketed in places where youth are found, such as youth center and university campus and high schools. Some of the cans labeling contain no specification of the quantity of caffeine in the can.

In the united state a survey was conducted on the caffeine content disclosure and warning labels of energy drink regulations, the results show that 85% of parent agree that regulation was warranted.

The regulation structure of energy drink in the United states was analyzed practically looking at the legal and self-regulation strategies to protect consumers, especially the young people from the adverse effect of those caffeinated energy drink. We recommend the intervention of government with respect to labeling requirement and addressing problem with ingredient and the issue with sale restrictions.

## **Caffeinated Energy Drink – A Growing Problem**

Energy drink is aggressively marketed due to the absence of and oversight. Energy drink regulation include the labeling of content and health warning which is different across different countries. Hundreds of different energies drink are sold across the world.

Energy drink marketing is targeting young males because of Psychoactive, performance enhancing and stimulant drug effects. Numbers of report showing caffeine intoxication because of energy drink injection is growing. Children and adolescent who do not take in caffeine are usually more vulnerable to caffeine sad effect. Caffeine and this may increase due to the absence of pharmacological tolerance. Other factors that may contribute to vulnerability as individual to caffeine as it relatesrelates to disorder are caffeine intoxication, dependence and withdrawal. Another risk factor that is increasing is the combination of caffeine and alcohol, some studies shows that it may increase the rate of injury which result from alcohol. Other studies also suggesting that the consumption of caffeinated energy drink may become a means of entry to other form of drugs dependence. Some studies also discuss the regulatory implementation concerning labeling, advertising and implication for children and adolescents.

## **Energy Drink consumption in Europe: A review of the risk, adverse effect and policy options respond**

Energy Drink is consumed all over the world and the rate of consumption is increasing also, there is a concern for the public in general and scientist concerning the public health effect of caffeinated energy drink. Studies in recent year also have provided data on the consumption in Europe. Energy Drink industries is growing very fast. In 2006, about 500 new brand of energy drink were brought to the global market. It is estimated that the energy drink industries are worth 12.5 billion USD in 2012. In the 1960, the first energy was produced for the public and it was produced in Europe in the year 1987 and started expanding all over Europe. In the Us it was Launched in 1997.

Energy drink is a relatively new drink and it is becoming a holistic of a party structure for young people with the bad practice of mixing energy drink with alcohol. The major challenge with this drink is the aggressive marketing of the drinks.

## **Health effects and Public Health concern of energy Drink Consumption in the United States**

In the united states, the consumption of energy drink is increasing very fast. This is also increasing all over the world. There is a need to investigate the nutrient found in energy drink. There is a need to investigate the ingredient that is in each can of the energy drink and it effect on public Health.

Scientific proved is connecting energy drink injection with so many health problems. Example is the adverse cardiovascular effects, risk seeking behaviors, poor mental health, metabolic, dental conditions. The adverse health effect associated with energy drink are in combination with the inability of regulation and bad marketing by the company that is directed toward adolescents. However, the new pattern of mixing energy drink with alcohol is growing rapidly, this may lead to problem and there is a need for researcher to start addressing these issues.

To solve these issue, there is a need for policy makers to consider creation a separate regulatory category for energy drink. It will be good for policy maker to set higher limited on caffeine. They also need to look at sale restriction of energy drink and regulation the current marketing strategies that is directed to children and adolescents.

## **Caffeinated Energy Drinks: Technical report on Public Health Concerns and Regulation in Canada**

Caffeine sugar, and the practice of mixing caffeinated energy Drink with alcohol are strongly related to

public health issues with caffeinated energy drink in Canada especially youth and young adults are

involved in the consumption daily. Caffeinated energy drink contains more caffeine preserving compared to caffeinated cola and soft Drink.

Another ingredient that is found in the caffeinated energy drink are guarana and singsong. Caffeinated

energy drink can be consumed cold or at room temperature.

Moreover, caffeine exists in some food naturally. It adds flavors to some food product and it is added to some drinks. One of the quality that caffeine has is the ability to stimulate the body

It also changes the mood and behavior in some people. Caffeine is not considered as a dangerous substance, it is safe for human consumption. Notwithstanding, Health Canada regulations for caffeine consumption for Canadians in order to help them prevent the health hazard that is associated with the caffeinated energy drink. Some of the health problems that is associated with the consumption of the drink are insomnia, headaches, irritability and nervousness.

A segment of the population such as pregnant or breast-feeding women and children may be at high danger from the health hazard of caffeine. Health Canada also set a general rule for some segment of the population as a preventive measure for example, children between the age 10 – 12 years. Health Canada recommends a caffeine limit maximum of 85 mg / day. Adolescents ( 13 years of age) Health Canada recommend them consuming no more than 2.5mg/kg – body

weight of caffeine per day ( 125mg of caffeine for a 50kg adolescent) The caffeine limit for older adolescent and adult is 400mg per day. There are other factor that may contribute to the occurrence of health hazard, health Canada recommend reducing caffeine intake as a preventive measure to avoid further problem.

## **METHODOLOGY**

### **Material and method**

#### **Sample**

Five brands of caffeine will be collected at randomly for analysis

## **Statistical analysis**