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ADULTERATION OF SOFT DRINK

Vadaga Saisri[1] , Ponipireddy Jyothika[2], Mendem Preetham Vikas[3]

1. Student of forensic science, GIET Degree College,Rajahmundry, A.P.
2. Student of forensic science, GIET Degree College,Rajahmundry, A.P.
3. Student of forensic science, GIET Degree College,Rajahmundry, A.P.

1.Abstract:

The abstract of adulteration on soft drinks refers to a summary or brief overview of the topic of adulteration in the context of soft drinks. Adulteration refers to the practice of adding impure or inferior substances to a product, in this case, soft drinks, in order to increase profits or deceive consumers.

The abstract would likely touch upon various aspects related to the adulteration of soft drinks, such as the types of adulterants used, the potential health risks associated with consuming adulterated soft drinks, the methods employed to detect adulteration, and the regulatory measures in place to prevent such practices. It is important to note that without a specific research paper or document to reference, the abstract provided above is a general overview of the topic and may not cover all potential aspects or recent developments in the field of adulteration on soft drinks.

2.Introduction:

Soft drinks, also known as carbonated beverages or sodas, are popular and widely consumed non- alcoholic beverages. They are characterized by their effervescence, sweetness, and a variety of flavors. Soft drinks are typically consumed chilled or with ice and are often enjoyed as refreshing beverage

Soft drinks are some of the most popular beverages in the world. A soft drink is a drink That contains no alcohol but is usually referred to as sugary drink or the sweetened water Balanced beverage usually with balancing acidity.

Generally, a soft drink is:

- Non-alcoholic beverage
- carbonated water
- sweetened by addition of sugar
- is flavored and colored

They are called soft drinks in contrast to the hard drinks which is an alcoholic drink Or alcoholic beverages. These soft drinks may have or contain small amount of alcohol which Is < 0.5 Categories of soft/cool drinks:

Soft drinks are categorized into:

- Carbonated soft drinks

➢ Non-Carbonated soft drinks Carbonated soft drinks:

These are soft drinks which contains carbon dioxide gas and which gives the effervescent taste To the beverages

E.g.,sample 1

Non-carbonated soft drinks:

These are soft drinks which doesn't contain carbon dioxide gas and a sparkling taste. E.g., sample2

Types:

➢ Ready to drink

➢ Dilute to taste

2.1.Ready to drink:

They are also called as RTD, as the name suggests, they are the drinks that are packed in single- Use containers for immediate consumption.[18]

Eg: all colas

2.2.Dilute to taste:

They are simply called as dilutables which is a non-alcoholic concentrated syrup used in Beverage making, it is usually fruit flavored, made from fruit juice water, sugar and sugar Substitute.[18]

E.g., squashes, syrups

Soft drinks are taken as a healthy and enjoyable diet.Soft drinks any of the class of non-alcoholic beverages normally containing a natural or Artificial sweetening agents, edible acids. Natural or artificial flavors and sometimes juices.

Those natural flavors are derived from some fruits and berries and sometimes nuts, roots, herbs Other plant sources. Where, as coffee, tea, milk, cocoa and undiluted fruit and vegetable juices Are not considered as soft drinks. The term soft drinks were originated to distinguish the flavored drinks from that of the distillated spirits.

The soft drinks refers to beverages that claim to provide lot of energy with the combination of The caffeine which is known to be an organic molecule that is present in tea, coffee, energy Drinks etc... and other plant-based stimulants and simple sugar like glucose and fructose and Also glucose glucuronolactone which is a naturally occurring glucose metabolite and also Contain the amount of amino acids like taurine, creatine and herbs and vitamins too.

Soft drinks are also called ready to drink beverages these are the sweetened water-based beverages. Water is the principle component that is needed for the hydration soft drinks are Very popular to the people of every age young and aged too. Generally, people consume these soft drinks to quench their thirst. When the soft drinks are manufactured special attention must be taken to maintain the purity to and uniformity of ingredients, raw materials, source of water and the packaging materials which are actually the source of impurities in soft drinks.

A soft drink is also referred to as soda, soda pop etc.., and a small amount of alcohol is present In soft drinks, but it must be less than 0.5% of volume if the drink is considered as non-Alcoholic.

All ingredients used in these soft drinks must be of high purity and food grade to obtain a Quality beverage.Since the beginning of cold drinks, it was very profitable and many multinational companies Launched their brands and increased their production. The history of soft drinks dates back to ancient civilizations, where carbonated mineral waters were consumed for their perceived health benefits. However, the modern soft drink industry as we know it today began to take shape in the late 18th and early 19th centuries with the invention of carbonation processes and the introduction of flavored syrups.Soft drinks are typically made by combining carbonated water with sweeteners, such as sugar or high-fructose corn syrup, and flavorings. The flavors can range from cola and citrus to fruit flavors like lemon-lime, cherry, or strawberry. These beverages are available in various forms, including regular (full sugar) and diet (low-calorie or calorie-free) versions.Soft drinks have become a significant part of contemporary culture, with major brands becoming household names worldwide. They are often associated with social gatherings, fast-food restaurants, and leisure activities. However, concerns have been raised about their potential health effects due to their high sugar content, artificial additives, and link to obesity and other health issues.In response to health concerns and consumer demands, the soft drink

industry has witnessed the introduction of alternative products, including low-sugar or sugar-free options, natural and organic beverages, and drinks enriched with vitamins or functional ingredients.

Overall, soft drinks have become a ubiquitous beverage choice for many individuals, offering a wide range of flavors and options. However, it is important to consume them in moderation as part of a balanced diet and lifestyle.

2.3.Adulterated soft drinks:

Introduction of adulterated soft drinks refers to the act of introducing fake or low-quality ingredients into commercially available soft drinks, which compromises their safety, quality, and integrity. Adulteration can occur at various stages of production, including sourcing raw materials, manufacturing, packaging, and distribution. Adulterated soft drinks may contain harmful substances, improper proportions of ingredients, or substandard components that deviate from the regulated standards.

The motivation behind adulteration can vary, ranging from economic gain to cutting costs or extending product shelf life. However, the consequences of consuming adulterated soft drinks can be detrimental to human health, potentially causing food poisoning, allergic reactions, chemical toxicity, or other adverse effects.To mitigate the risks associated with adulterated soft drinks, regulatory authorities enforce strict quality control measures and conduct regular inspections of manufacturing facilities. They also set standards for ingredient composition, labeling, and packaging to ensure consumer safety. Consumers are advised to purchase soft drinks from reputable sources and be cautious of suspiciously low prices or unfamiliar brands. It's crucial to remain vigilant and report any suspected cases of adulteration to the appropriate authorities for investigation and necessary actions to protect public health.

2.3.1.History:

2.3.1.2.Soft Drinks Evolution

1.Ancient Times: Natural Springs and Herbal Infusions

- In ancient civilizations such as Mesopotamia and Egypt, people discovered natural springs with carbonated water and believed in their healing properties.
- Herbal infusions, such as those made with ingredients like ginger and dandelion, were

used to create early forms of soft drinks.

2. 17th Century: Development of Carbonated Water

- In the late 17th century, European scientists and inventors began experimenting with carbonated water.
- In 1767, Englishman Joseph Priestley invented a method to infuse water with carbondioxide, creating carbonated water.

3. 18th Century: Early Soft Drinks and Medicinal Tonic

- In the 18th century, carbonated water was used as a base for various medicinal tonics and beverages.
- In 1772, Swedish chemist Torbern Bergman invented a device, the soda fountain, to dispense carbonated water.

4. 19th Century: Birth of Commercial Soft Drinks

- The 19th century saw the rise of commercial soft drinks, primarily in the United States.
- In 1835, the first bottled carbonated water was produced by an American, Doctor Philip Syng Physick.
- In 1851, American John Matthews introduced a carbonated beverage called "soda water" in his pharmacy, using flavored syrups.
- In the 1870s, pharmacist Charles Alderton created a unique blend of flavors, which became the basis for Dr Pepper, one of the earliest soft drinks.
- In 1886, pharmacist John Pemberton invented Coca-Cola, a beverage that would become one of the most iconic soft drinks in history.

5. Early 20th Century: Soda Fountains and Brand Expansion

- The early 20th century saw the proliferation of soda fountains, where carbonated beverages were mixed with flavored syrups and served as fountain drinks.

- Companies like Coca-Cola and Pepsi-Cola grew rapidly, establishing their brands and expanding their distribution networks.

6. Mid-20th Century: Rise of Canned and Bottled Soft Drinks

- In the mid-20th century, advancements in bottling and canning technology allowed for widespread distribution of soft drinks.

- The availability of canned and bottled soft drinks made them more accessible and convenient for consumers.

7. Late 20th Century: Diversification and Globalization

- The late 20th century saw the introduction of a wide variety of soft drinks, including fruit-flavored sodas, diet sodas, energy drinks, and more.

- Soft drink companies expanded globally, reaching new markets and adapting their products to local tastes.

8. 21st Century: Health Concerns and Innovation

- In the 21st century, concerns about the health effects of soft drinks led to increased demand for healthier alternatives, such as flavored water, sparkling water, and natural fruit juices.

- Soft drink companies responded by introducing new products and reformulating existing ones to offer reduced sugar and calorie options. Throughout history, soft drinks have evolved from simple carbonated water to a vast array of flavored beverages, shaping the beverage industry and becoming an integral part of modern culture.

2.3.2. Adulterated Soft Drinks

The history of adulterated soft drinks dates back several centuries, with instances of contamination and adulteration being reported in various parts of the world. Adulteration refers to the act of adding impurities or low-quality substances to a product, with the intention of deceiving consumers or reducing production costs. Soft drinks have not been exempt from such practices, and there have been numerous cases of adulteration throughout history. Here are some notable examples:

1. **Early Instances:** In the 18th and 19th centuries, before the advent of modern food regulations, soft drinks were often produced and sold without strict quality control measures. Adulteration was a common practice during this time. Soda water, for example, was sometimes produced using contaminated water sources, leading to health issues for consumers.

2. **The Cocaine Era**: In the late 19th and early 20th centuries, certain soft drinks, such as Coca-Cola and Pepsi-Cola, contained small amounts of cocaine. These drinks were initially marketed as medicinal beverages, and the stimulant effects of cocaine were believed to have therapeutic benefits. However, as awareness grew about the dangers of cocaine addiction, its use in soft drinks was phased out by the early 1900s.

3. **The Saccharin Scandal**: Saccharin, an artificial sweetener, gained popularity in the early 20th century as a sugar substitute in soft drinks. However, in the 1970s, studies linked saccharin to an increased risk of bladder cancer in laboratory rats. This revelation led to concerns about the safety of saccharin, and although it is still used as a sweetener today, warning labels are required on products containing it.

4. Melamine Contamination: In 2008, there was a major scandal involving the contamination of milk and dairy products in China with the industrial chemical melamine. This contamination extended to some soft drinks as well. Melamine was added to milk products to artificially increase their protein content, leading to serious health issues, particularly in infants. The incident highlighted the need for stricter food safety regulations and quality control measures.

5. Recent Contaminations: In more recent years, there have been instances of adulteration and contamination in soft drinks. These range from issues with ingredients, such as excessive levels of certain chemicals or unapproved additives, to cases of microbial contamination due to poor sanitation practices in manufacturing facilities. Such incidents have resulted in product recalls and increased scrutiny on food safety practices.

It's important to note that while cases of adulteration and contamination have occurred, the majority of soft drink manufacturers adhere to strict quality control standards and regulations to ensure the safety of their products. Government regulations and consumer awareness have played significant roles in improving food safety practices and reducing the occurrence of adulteration in the soft drink industry.

3.Review of literature:

3.1.Engwa Azeh Godwill et.al (2015)

This study examined and evaluated some of the constituents present in soft drinks in Nigeria.In this evaluated constituent by taking 26 soft drinks available in Nigeria and investigated the presence of heavy metal contaminants and these soft drinks were screamed for the presence of sugar, carbon dioxide, phosphate and alcohol as well as the pH and acidity determined then the level of cadmium, mercury and lead were determined using atomic absorption spectrophotometer. This study showed the presence of sugar, carbon dioxide, phosphate and alcohol in this soft drinks. The soft drinks were exist in nature pH ranging from 3 to 5 with a mean of 3.6 and the acid concentration was relatively low between 3 and 12 g/L with a mean of 8.1 g/L. lead was present in all the samples with a mean of 0.8, mercury was present in 22 samples with a mean of 2.08 mg/L, while cadmium is present in only one sample. When compared to WHO and NIS standards, the levels of the heavy metal contaminants were above the tolerated limits for good quality drinking water in most samples. These results suggest that soft drinks in Nigeria may be contaminated with heavy metals which constitute a major public health problem. Thus, quality control is recommended during the production process especially at the stages of sterilization and purification.[6]

3.2.Vartanian.L.R et.al (2007)

Examine the association between the soft drink's consumption and nutrition and health outcomes. This is a meta-analysis of 88 studies, and found a clear association of soft drinks intake with increased energy intake and body weight. Soft drink intake also was associated with lower intakes of milk, calcium and other nutrients and with an increased risk of several medica problems e.g. diabetes. Study design significantly influenced results larger effect sizes were observed in studies with stronger methods. Several factors also moderated effect sizes e.g. gender, age, beverage type. Finally studied results includes the soft drinks consumption in body weight, soft drink consumption and milk and calcium intake, soft drink and nutrient intake, soft drink consumption and health outcomes. In this finding alone suggests that it could be prudent to recommend population decreases in soft drink consumption. And linked to several key health conditions such as diabetes is further represents to recommend a reduction in soft drink consumption.

3.3.John P. Higgins et.al (2010)

View point on impact of energy beverages by those contents present in them. These are generally taken during the exercise this trend was spawned many supplements that purport to aid

performance, muscle growth and recovery. Initially, sport drinks were developed to provide electrolyte and carbohydrate replacement subsequently energy beverages containing stimulance and additives appear in most gyms and grocery stores and are being used increasingly. Long term exposure to various components of energy beverages reserved in significant alterations in the cardiovascular system and the safety of energy has not been fully established for this review searched the MIDLINE and ENBASE databases from 1976 through May 2010 using the key words such as energy drinks power drinks etc …. Alarmingly, energy drinks consumption has been shown to be positively associated with high-risk behaviour. This review of energy drinks describes the various ingredients and discusses their safety and provides recommendations regarding their use, this research query included studies and information involving non athlete consumers. Also, the review differentiates between these population and offers recommendation specific to each group.[7]

3.4.H. Ayshah Fazeenah (2020)

The main objective of the study was to assimilate the knowledge of potential health risks of soft drinks consumption in the healthy life of an individual. The retails the methodology was including the details and their facts on harmful effects of soft drinks were gathered from the WHO reports and the resear4ch articles and scientific journals and through web search the consumption of soft drinks is mainly associate with the weight gain and obesity, diabetes mallitus, weakened bones and the risk of osteoporosis, increased blood pressure and heat burn and metabolic syndrome risk factor, harmful effects on liver, dehydration, impaired digestive system, asthma and behaviour aggression and which also include heart attack, effect on reproduction, cell damage, sleep pattern etc.. are included from various research articles and journals. In addition, this also includes soft drinks use as a pesticides etc… and according to all the findings it can be concluded that any types of the soft drinks produce harmful effects on the human health and is a threat for the future generation.[2]

3.5.Tahmassebi, J.F., BaniHani, A (2019)

Aims to provide information regarding the different types of soft drinks and their risk on the dental and general health of children and adolescents and the use of artificial sweeteners in soft drinks and a discussion of the cost associated with such drinks and mainly focuses on increasing the risk of overweight, obesity, type-2 diabetes, dental caries and dental erosion. The methods which include that the literature was reviewed using electronic data bases Medline and Enbase and was complimented by cross referencing using published references list from reviewed articles in which 62 papers were reviewed and was found that consumption of soft drinks was found to be increased dramatically. The greatest increasing soft drink consumption among children and adolescents. This soft drink consumption can contribute to detrimental oral and general health efforts have been made by manufacturers and government agencies potential harmful effects of sugar containing soft drinks on teeth and general health these include banning the sale of soft drinks in schools, modifying the composition of soft drinks and introducing facts on sugar containing soft drinks and thus it is necessary to educate about the harmful effects of different types of soft drinks.[19]

4.Ensuring purity and safety in soft drinks:

This paper is all about food additives used in soft drinks. Soft drinks have been part of our global lifestyle since the nineteenth century Soft drink is a nonalcoholic beverage, usually carbonated, consisting of water (soda water), flavouring, and a sweet syrup or artificial sweetener.(Avizienis, A., 2007) (Carbonated soft drinks are more commonly known as soda, pop, tonic, fizzy water or soda pop Fizzy drinks sometimes called minerals) Beverages like colas, sparkling water, iced tea, lemonade, squash, and fruit punch are among the most common types of soft drinks.(www.wikipedia.com/ soft drink) There are an enormous number of soft drinks that are formulated to various recipes and not all the ingredients are found in all soft drink products. (Bruce, J.2003) Basic ingredients of a soft drink are water, a sweetener, an acid and a flavor. Water is always the major ingredient and represents approximately 86% of a carbonated drink, 90% of a fruit juice and 100% of bottled waters. Food substances such as fruit, fruit juice, sugars and starches, which can be used without limit and do not have an E number. Additives, for example a sweetener, acid, carbon dioxide, preservative and colour and flvour. Additives are defined under the Food Labelling Regulations 1996 as: any substance not commonly regarded or used as food, which is added to food...to affect its keeping qualities, texture, consistency, appearance, taste, odour, alkalinity or acidity or to serve any other technological function (www.britshsoftdrink.com/information., 2007).Nonalcoholic beverage are usually carbonated, consisting of water (soda water), flavouring, and a sweet syrup or artificial sweetener. Attempts to reproduce the natural effervescence of certain spring waters for presumed health benefits began before 1700 Joseph Priestley's experiments with "fixed air (carbon dioxide) led in the late 1790s to the successful preparation of carbonated mineral water" by Jacob Schweppe of Geneva, by the early 1800s it was being bottled and sold commercially in present there are hundreds of varieties of flavoured soft donks. Some of the world's largest corporations

5.Preservatives:

Soft drinks have been part of our global lifestyle since the nineteenth century and many of the soft drinks we consume today are the same as those first enjoyed centuries ago A preservative is a substance, such as sodium benzoate or potassium sorbate, that enables soft drink products to have a longer shelf life by inhibiting or arresting the growth of micro- organisms such as yeasts, moulds and bacteria. Not all soft drinks contain preservatives. The need for a preservative is dependent upon the type of product and the processing used. The presence of carbon dioxide prevents mould growth and the high levels of acidity and carbonation helps to inhibit the growth of yeasts and lactic acid bacteria.

Adversely those beverages that contain fruit or fruit juices provide additional nutrients that may enable organisms to grow despite the high levels of acidity and carbonation. The soft drink products most likely to ferment are mildly acidic types with low carbonation containing fruit juice and in these instances a preservative is added to prevent micro-biological spoilage. (Bruce, J., 2003)

There are only four preservatives currently used by the softdrinks industry.

- Sulphur Dioxide
- Sodium Benzoate
- Potassium Sorbate
- Dimethyl Dicarbonate

The levels of preservatives permitted by the EU Directive are based upon technological necessity, and therefore are dependent upon the type of product. Bacteria and yeasts differ in their susceptibility to different preservatives, so a mixed preservative system is generally used to provide maximum protection against a range of (organisms.pritshsoftdrink. com/information 2007)

5.1.Sulphur Dioxide (E220)

Sulphur Dioxide is the most effective and wide acting preservative. As an antioxidant, it prevents the browning of citrus drinks and is used mainly in dilutables and glucose drinks However, its main disadvantage is that it cannot be used in drinks that are packaged in aluminium as

contact between sulphur dioxide and aluminium produces hydrogen sulphide which is toxic. It also can be detected by some lasters (www.britshsoftdrink.com/information., 2007)

5.2.Sodium Benzoate (E211)

Sodium Benzoate is one of the most common preservatives used in soft drinks and first antimicrobial compound permitted in food (Branen et al. 2002) Sodium benzoate is the salt of benzoic acid and occurs naturally in the lingon berry, whilst potassium sorbate is found in the rowan berry. Sodium benzoate is effective against yeasts and moulds but can be difficult to dissolve and can impart a slight flavour at high levels Preservative benzoate when combined with fluoride help to avoid the tooth cavities in a study conducted by the University of Rochester Medical Center, New York State. (Bruce, J. 2003)

Conclusion:

The consumption of soft drinks was found to have increased dramatically over the past several decades with the great-est increase among children and adolescents. Excessive intake of soft drinks with high sugar and acid content both regular and diet could cause detrimental impacts on dental and general health including dental caries, dental erosion, overweight, obesity and increased risk of type 2 diabetes. The sugar tax has raised the level of awareness; however, it is important to educate patients about the harmful effects of different types of soft drink as it is not always easy for individuals to know from drink labelling what they actually contain.

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