Microbiological Qualities of some street drinks Sold in the street near at Daffodil international university

A project report by

Maksuda Akter Chaity

ID: 191-34-148

Submitted to the Department of Nutrition and Food engineering in the partial fulfillment of B.Sc. in Nutrition and Food Engineering

Supervised By

Mr. Md. Juwel Rana

Senior lecturer

Department of NFE

Faculty of Allied Health Science (FAHS)

Daffodil International University

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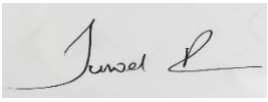
APPROVAL

The project titled "**Microbiological Qualities of some street drinks Sold in the street near at Daffodil international university**", submitted by Maksuda Akter Chaity to the Department of Nutrition and Food Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved as to it's style and contents. The presentation has been held on - - 2023.

EXAMINING COMMITTEE



Mr. Md. Juwel Rana **Member**

Senior lecturer

Department of NFE

Faculty of Allied Health Science

Daffodil international university

Dr. Nizam Uddin

Associate professor & Department Head **Department Head**

Department of NFE

Faculty of Allied Health Science

Daffodil international university

DECLARATION

We here by declare that, this project has been done by us under the Supervision of **Mr. Md. Juwel Rana, Senior lecturer, Department of NFE,** Daffodil international university. We also declare that neither this project has been submitted elsewhere for award of any degree or diploma.

Supervised By:

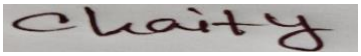
Mr. Md. Juwel Rana

Senior lecturer

Department of NFE

Daffodil international university

Submitted by:



Maksuda Akter Chaity

ID: 191-34-148

Department of NFE

Daffodil international university

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Finally, we must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

Street Drinks plays an important role in common people's life. The quick accessibility of these street beverages makes them one of the most popular beverage choices for city dwellers. Due to the ingestion of tainted non-homemade food over the years, numerous cases of water-borne infections have been observed. This investigation was done to evaluate the microbiological safety of drinks being sold on the street. This study looked at the microbiological quality of the four most popular drink items sold by street vendors in the Dattapara neighborhood of Daffodil International University, Dhaka, Bangladesh. The presence of pathogens that cause urinary tract infections, such as Shigella spp. And Salmonella spp., as well as total viable count (TVC), coliform and staphylococci count (SC), fungal count (FC), and other variables were noted in this study. This study emphasizes the amount of microbial loads present in lemon, papaya, apple & alovera juice. This study shows average of total viable count & coliform by using Nutrient agar medium & Mac conkey agar medium. In this project it has shown the total viable count of lemon juice is (3.2×10^5), papaya juice (3.4×10^5), orange juice (6.76×10^4), Aloevera juice (2.2×10^3) by using Nutrient agar medium & by using Plate count agar medium the total viable count lemon juice is (6.2×10^5), papaya juice is (5.32×10^5), Orange juice (5.76×10^6), Alovera juice (4.2×10^3). Similarly Mac conkey agar medium has found out the count of coliform on the samples lemon juice (1.3×10^6), papaya juice (1.5×10^5), Orange juice (1.3×10^4), Aloevera juice (0.87×10^6). This study shows those microbial levels are more than safety level. As a result These juices are not safe for consuming. The report also suggests that the government and food producers work together to implement some preventive measures and uphold the generally accepted hygienic practices for handling, preparing, and cooking food. To preserve a hygienic environment and prevent the spread of dangerous pathogens through consumption of tainted foods, it is imperative that such procedures, laws, and regulations regarding street drink vendors be put into effect.

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Introduction

1.1 Introduction

Consumers are more drawn to commercial beverages like those found in restaurants and on the street. The preparation and presentation of non-homemade drinks intrigues the public. When people lack the time to prepare food or drinks, it is not always because they are fascinated. For example, people of all ages, from students to working adults, must rely on commercially produced drinks. In order to keep customers' attention and make more money with less work, sellers often compromise on the quality of non-homemade drinks, which are typically unhygienic. Individuals suffer greatly as a result of drinking in unsanitary conditions. This investigation has discovered the microbiological quality of the drinking products sold by sidewalk vendors. Beverages made on the street and drunk there without any additional preparation (S. Rane, 2011). Low-income populations in emerging nations satisfy their dietary needs by consuming reasonably priced street drinks with distinctive flavors (Ackahet al., 2011; Cross et al., 2007; Muzaffar et al., 2009). The street beverages are often offered by hawkers or sellers at the street edge on a cart or in a small kiosk. Typically, street vendors are uneducated, underprivileged, and ignorant of food handling, sanitation, the environment, food service, hand washing, raw material sources, and sources of drinkable water (Bhowmik, 2010). Street drinks are linked to a serious health issue called microbial water borne disease (Biswaset al., 2010; Tabashsumet al., 2013; Mamunet al., 2012). Multidrug resistant water-borne bacteria increased the public health's vulnerability to the food safety scenario (Ali et al., 2011).Typhoid is most water bone prevalent disease and roughly 30 million individuals are suffering In Bangladesh, 30 million people experience a water-borne sickness each year, with typhoid being the most prevalent (FAO, 2012). Disease is brought on by microbial toxins or responses of the body to the pathogen (Khairuzzamanet al., 2014). Each year, waterborne illnesses occur in Bangladesh (FAO, 2012). Disease is brought on by microbial toxins or responses of the body to the pathogen (Khairuzzamanet al., 2014).

The goal of the current study is to determine the microbial load of non-home foods purchased on the street. To observe the microbial growth, four drinks were chosen, including lemonade, papaya juice, orange juice, and Aloevra juice. These food items were collected from the Dattapara area of the university. To evaluate the microbial composition of food. These beverages were chosen based on the average daily intake of people. These juices are typical cooling beverages for individuals, typically sold by the curb. People frequently drink this sweet and tangy lemonade and orange juice if they are weary and thirsty. Aloe vera juice is also well-liked by individuals in addition to this. Both of these liquids are beneficial to health, but aloe juice has special healing qualities. Beverages were collected aseptically and examined at the microbiology lab of Daffodil International University. We measured the number of total viable, enteric pathogens, coli-forms, and fungi and yeast. In addition to these counts, selective media were employed to check for the pathogens vibrio spp., salmonella, and Shigella, which cause erection problems in the urinary system. For the analysis of drink quality, this was doneThe microbiological quality of four specifically chosen food items from corner stores was

examined. Three categories, including invasive, opportunistic, and rare pathogens, were used to categorize pathogens. Each invasive and opportunistic pathogen underwent a biochemical analysis, and diseases they cause as well as the sources of drink contamination were also covered..

1.2 Objective of the study

- Assess the microbiological load of the beverages being sold on the street.
- Identification Microbes & their related health effects
- Nutritive value of street Drinks
- Found out the health effects of consumer's

Chapter 2

Literature review

Several investigations were conducted to evaluate the microbiological safety of street drinks. The goal of this study was to examine the microbial composition of street food.

2.1 Microbial Analysis of street Drinks

Ready-to-eat Street sellers prepare and sell drinks on the sidewalk or in other public areas (Artemis P. et al 2000, Redmond, E.C. et al., 2003). In urbanized nations, the drinking of street alcohol is a fast expanding practice. Poor and developing nations frequently experience high unemployment rates, low wages and employment opportunities, and a lack of social programs. These nations also have high street drink consumption rates because these beverages are inexpensive, delectable, and readily available. The majority of users of street drinks are typically those from lower socioeconomic brackets and students (Oladipo IC, 2010, Chauliacet al, 1998). Major public health risks are brought on by a lack of basic infrastructure and services and unchecked expansion of street drink vending enterprises. Public health risks are also exacerbated by low educational attainment, low socioeconomic level, ignorance of appropriate food handling techniques, vendor movement, diversity, and temporary nature (WHO 1996, Artemis P. et al., 2000).When consumed, street drinks might spread food-borne illnesses since they are manufactured and stored in unhygienic conditions, close to polluted sources, and most of the time without coverings (WHO, 2001, 2003; Mundie and Kuria, 2005; Ghoshet al., 2007, Rane S, 2011). While consuming nutrients, insects and rodents spread pathogens from trash, wastewater, and clogged drains (Tambekaret al., 2009). Due to the quality of the raw components, contamination of street drinks continues during preparation and cooking (Rane S., 2011).Due to a lack of potable water for use in a variety of activities, some vendors clean dishes and utensils in water that has previously been used for other purposes (Rane S., 2011). Utensil contamination with Staphylococcus spp. Is common at vending locations as a result of touching food after touching dishwashing cloths and water after washing hands and dishes, which shows cross-contamination of dishwater, food preparation surfaces, and the street (Mensah P, et al., 2002).

2.2 Microbial Quality of Street Drinks in Dhaka city

Ready-to-eat Street sellers prepare and sell drinks on the sidewalk or in other public areas (Artemis P. et al 2000, Redmond, E.C. et al., 2003). In urbanized nations, the drinking of street alcohol is a fast expanding practice. Poor and developing nations frequently experience high rates of unemployment, low wages and employment opportunities, and a lack of social programs. These nations also have high rates of street drink consumption because these beverages are affordable, delectable, and readily available. Most people who consume street alcohol are typically from lower socioeconomic groups and students (Oladipo IC, 2010, Chauliacet al, 1998). The absence of essential infrastructure and services and the unrestricted growth of street drink vending businesses pose serious hazards to public health. Low levels of education, low socioeconomic status, a lack of knowledge of proper food handling procedures, vendor movement, diversity, and transient nature all increase the hazards to public health

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2.3 Vendors Profile

Small business owners that work for themselves and are independent of any institutional institutions include street food sellers. Their businesses solely depend on their own unique abilities and the assistance provided by their immediate social networks, such as family and other close friends. For the vendors and their dependent family members, the profits from their businesses provide a means of subsistence. As a result, these street drink vendors' commercial activities not only give them and the members of their dependent families a means of support, but they also prevent them from becoming an economic and social burden on the government. Street food vendors can be either men or women, married or single. Many street drink sellers and their families come from rural backgrounds, migrated to metropolitan regions later, or still reside in the country but commute into the city every day to do business. The street drink vendors' educational attainment is rather low, and for the majority, their educational backgrounds ranged from grades 5 to 8. (Khairuzzaman et al., 2014). Due to their precarious socioeconomic situations, many street drink vendors are restricted. The street drink vendors' employment history reveals their prior involvement in a number of urban-based, sporadic, and low-paying income-generating activities that required difficult manual labor before they got into the street food sector. Their participation in such activities wasn't enough to support them (Muzaffar et al., 2009).

2.4 Consumers of street Drinks

The primary force behind the street Drinks industry is consumers. According to observations made on the ground, the poor and working class are the main consumers of many kinds of street cuisine. Some 750,000 rickshaw drivers and 300,000 street vendors reside and work in the Dhaka Metropolitan Area (Islam, 2005). The majority of these people rely heavily on the drinks that the drinks sellers sell. Students of all ages enjoy a variety of street cuisines along with them .The availability and lower cost of these meals tempt individuals, primarily from the lower socioeconomic classes, to consume them. In addition, the majority of clients are impoverished, unconcerned with hygiene, and unconcerned with the food's quality (Rahman and Kabir, 2013). It is challenging to determine the precise number of customers who routinely consume street drinks.

Chapter 3

Material & Methods

3.1 Materials

3.1.1 Sample

Four different street food samples totaling four different varieties were gathered. There were a total of four meal samples, as well as various random drinking samples from various neighborhoods that were gathered and tested.

3.1 Area of sampling, Numbers and Types of sample

Serial no	Types of sample	Description of sample
1	**Lemon juice**	Juice extracted from lemon & mix with water and salt
2	**Papaya juice**	Cut into pieces and blend with water and sugar
3	**Orange juice**	Juice extract from orange and mix with water and sugar
4	**Aloe vera juice**	Pulp extract from alovera and blend with sugar and water

3.1.2 Media

For the total viable count (TVC), enteric coliform count (ECC), and fungus count, various medium types were employed. The media are the Salmonella Shigella Agar (SS), Nutrient Agar, Plate Count Agar, and MacConkey Agar, respectively.

The following culture mediums are used for isolating bacteria:

a) **Nutrient agar medium:** Plate count agar (PCA) It serves as a typical microbiological growth medium for non-fastidious bacterial development. This medium is employed to count all bacteria. Usually, 0.5% peptone, 0.3% beef extract/yeast extract, 1.5% agar, 0.5% NaCl, and 97.2% distilled water make up nutrient agar. Nutrient agar media can be altered to enable the development of particular kinds of bacteria in addition to these

fundamental components. To support the growth of particular bacterial strains, the medium can be supplemented with certain nutrients, such as sugars or salts.

Media preparation procedure:

- Take 2.8gm of media and autoclave it for 15 minutes at 121 degrees Celsius in 100 ml of DW.

b) Plate count agar (PCA)

- To determine the quantity of viable bacteria present in a sample, microbiology labs frequently utilize plate count agar (PCA), a type of microbiological growth media. PCA's chemical structure is intended to facilitate the growth of a wide range of microorganisms and make it simple for them to digest. Peptone, yeast extract, glucose, and agar are the four main ingredients of PCA. A source of nutrients for bacterial development, peptone is a combination of amino acids, peptides, and other nitrogen-containing substances. Glucose acts as an energy source, while yeast extract contains vitamins and minerals that are crucial for microbial growth. The medium is solidified by the gelling agent agar, which also provides a surface for bacterial colonies to grow on.

Media preparation procedure

- 2.3 gm PCA mixed with 100 ml distill water
- Autoclave the media at 121°C for 15 min

c) MacConkey Agar medium

It is a differential and low selectivity medium made to grow Gram negative bacteria as well as differentiate between bacteria that ferment lactose (like Klebsiella and Escherichia coli) and bacteria that do not (like Proteus mirabilis, Salmonella species, and other nonterminating bacteria) (Oxoid 1998). It contains lactose, peptone, neutral red dye, which stains lactose-fermenting germs, bile salts, which prevent the growth of most Gram-positive bacteria with the exception of Enterococcus and some staphylococcus species like Staphylococcus aureus. It will take 24-48 hours of incubation at 37°C. Pink colonies are created by E. coli. Protease peptone, lactose, bile salts, sodium chloride, neutral red, 13.5 grams of agar, 1 liter of water, and pH adjusted to 7.1 are all ingredients in MacConkey agar.

Media preparation

- Take 5.15g for 100 ml Distill water
- and autoclave for 15 minutes at 121°c to prepare the media.

d) SS Agar (Salmonella Shigella agar)

The isolation and separation of Salmonella and Shigella species from clinical, food, and environmental samples is done using Salmonella-Shigella (SS) agar, a type of selective and differential culture medium. Leif son created the media for the first time in 1933, and it has since grown to be a popular medium in microbiology. SS agar has the following ingredients:

Peptone is a source of nitrogen for bacteria to flourish.

A source of carbohydrates is lactose.
Bile salts: Sophisticated substances that prevent the majority of gram-positive bacteria and some gram-negative bacteria from growing.
Citrate of sodium: a carbon source
PH indicator: A pH indicator is neutral red.
Ferric citrate: An iron source
Agar: Agar is a solidifier.
Uses: The SS agar is a selective medium, which means it inhibits the growth of most bacteria except for the targeted species. It is primarily used for the detection and isolation of Salmonella and Shigella species from clinical and food samples. These pathogens are the causative agents of gastroenteritis, typhoid fever, and other foodborne illnesses. The medium is also used for the detection of other enteric pathogens such as E. coli and Proteus species.
The SS agar is differential, allowing for the distinction of several bacterial kinds according to their biochemical traits. For instance, unlike the majority of other intestinal bacteria, Salmonella and Shigella species do not digest lactose. These two species are distinguished by the medium based on their propensity to ferment lactose. Shigella colonies appear as colorless colonies without black centers, but Salmonella colonies appear as colorless colonies with black centers as a result of the formation of hydrogen sulfide.

Media preparation

- 6.36 gm agar mix with 100 ml distill water

3.2 Enrichment Broth

We have to use some types of enrichment broth to dilute the sample & get proper results.

1. **Peptone water**
   It is a broth that is used to enrich food samples in order to promote bacterial growth. If a food sample contains any Vibrio spp. The broth has a higher pH than regular broth.

   Planning – Suspend Peptone water 1.5g in 100ml DW

2. **NACL Broth solution**
   This broth is used to saturate the sample and enrich the growth of Salmonella spp. Salmonella will grow more quickly if it is found in the sample.

   Planning-Prepare by dissolving 7g of NaCl in 100ml of DW.

3.3Sample Collection method

Sample was collected in bottle from street cart and stored in refrigerator . The sample spreading done Within 24 hours from sample collection

3.3.1 Sample preparation

For microbial analysis, 10 ml of sample was mixed with 90ml (0.9%) saline solution (NaCl). For salmonella analysis 9ml peptone water was added to 1 ml sample. For other analysis sample was given as required in the analysis.

3.3.2 Plating of sample for microbial analysis

Six successive dilutions of a saline (NaCl) solution containing the sample were made. For every dilution between 10^{-1} and 10^{-7}, duplicate plates of each agar media, such as PCA, Nutrient agar, MacConkey agar, and SS agar, were used for plating.

1.9ml of NaCl solution were added to 1ml of sample.

2. Up to 10^{-7}, serial dilution is performed.

3. A petri dish is plated from 10^{-1} to 10^{-7} for each sample after the dilution is complete.

4. Agar is incubated at 34 degrees Celsius for 24 hours after it solidifies.

3.3.3 Observation and Reading

After a 24-hour incubation, the growth of bacteria is monitored, and for each kind of agar plate and particular dilution, the colony forming unit is counted. Shigella and salmonella both produce black and pink colonies on SS agar, respectively. Following a 48-hour incubation period, microbial growth was also noticed and noted. Subsequently, various colonies from various selective media were isolated for biochemical tests or subcultured for additional tests.

3.4 Biochemical Test

Catalase test

This test demonstrates the presence of catalase, an enzyme that catalyzes the release of oxygen from hydrogen peroxide (H2O2).

It is used to identify between bacteria that do and do not manufacture the catalase enzyme, such as streptococci and staphylococci.

Procedure:

- Add 1-2 ml of hydrogen peroxide solution to a test tube.
- Using a clean glass rod or wooden stick, place a few colonies of the 18- to 24-hour test organism in the hydrogen peroxide solution.
- Watch for any immediate bubbling. This indicates a successful outcome.
- No bubble indicates a negative outcome

Fig1: Catalase test

Gram Staining:

1) On a clean microscope slide, create a bacterial smear, then allow it to air dry.
2) Crystal violet should be applied in full and left to stand for a minute. Gently rinse the slide with water.
3) Iodine solution should be poured over the slide and left to stand for a minute. Gently rinse the slide with water.
4) Fill the slide with 95% ethanol or acetone and let it sit until no more color comes off. Gently rinse the slide with water.
5) Safranin stain the slide and counterstain it for one minute. Gently rinse the slide with water.
6) Use bibulous paper to gently blot the slide, then leave it to dry naturally.
7) Check out the slide with a microscope. Gram-negative bacteria will look pink or red, while gram-positive bacteria will look purple.

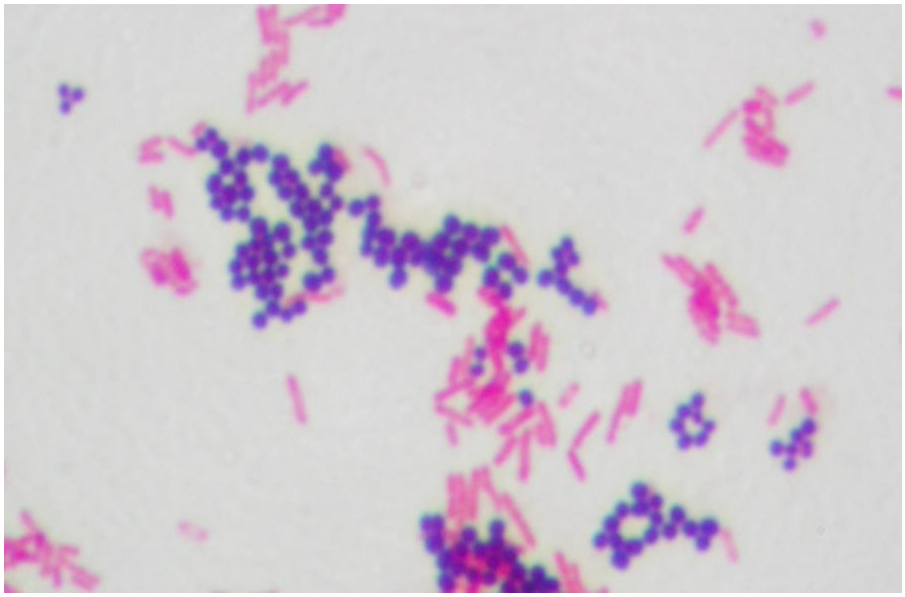


Figure 2 : Gram positive & gram negative cocci

3.5 Bacterial Identification

If a bacterium is catalase-positive and shows up purple under the microscope after gram staining, it would be classified as a gram-positive, catalase-positive bacterium. This can be determined by performing both the catalase test and gram staining. Similar to this, a bacterium would be labeled as a gram-negative, catalase-negative bacteria if it is catalase-negative and displays a pink appearance under the microscope following gram staining.

According to the test above, the following microorganisms could be present:

Gram negative	Gram negative
Bacillus SPP	E. Coli
Clostridium SPP	Legionella pneumophila
Streptococcus SPP	

Chapter 4

Results & Discussion

4.1 Microbial Load of Different Food Items

This study was conducted based on statistical analysis of microbial load of different Drinking Item of street carts. The work was completed at Ashulia near the area of DIU.

4.1.1 Quantitative Result

Several selective and non-selective plates were used to plate selected Drinking samples. Microbial counts were taken after 24 and 48 hours of incubation. Coli-form count in MacConkey agar, total count in Nutrient Agar (NA), and PCA (Mac). The findings are shown in table format in the next section.

4.1.2 Quantitative Result

Serial no	samples	Average Total viable count (CFU/ml)		
		Nutrient agar	Plate count agar	Mac conkey agar
1	Lemonade	3.2×10^5	6.2×10^5	1.3×10^6
2	Papaya juice	3.4×10^5	5.32×10^5	1.5×10^5
3	Orange juice	6.76×10^4	5.76×10^6	1.3×10^4
4	Alovera juice	2.2×10^3	4.2×10^3	0.87×10^6

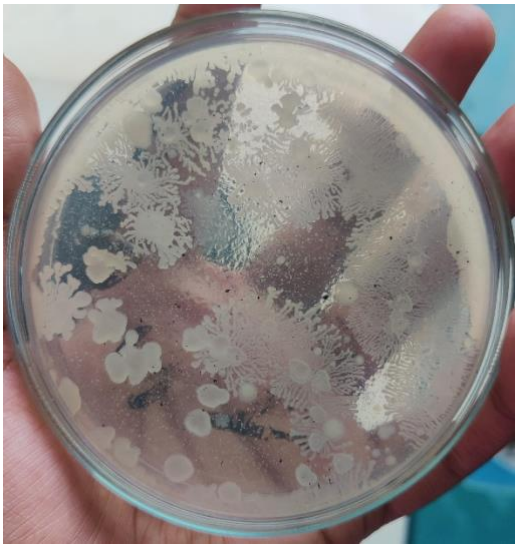


Fig 3 : Total viable count of Lemonade.

Fig 4: Total viable count of orange

Fig 5: Total viable count of papaya vera

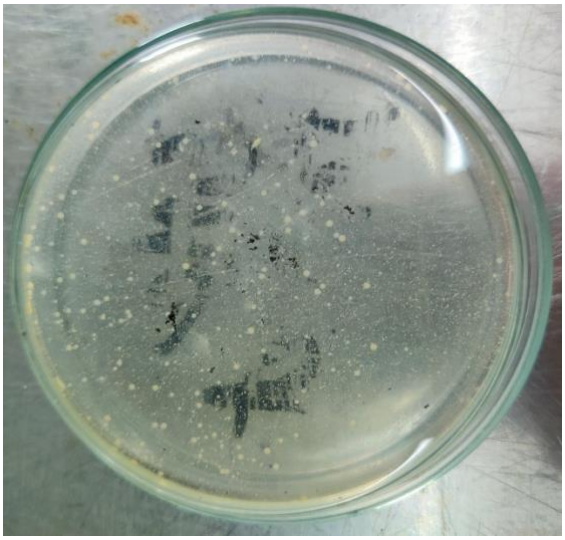


Fig 6: Total viable count of Aloe

4.2 Analytical Test

4.2.1 Determination of pH:

Apparatus:

- Beaker
- pH meter

Procedure

1. First, turn on the light. Insert a sample into a beaker.
2. Ensure that the pH electrode and temperature sensor are dry and clean.
3. Utilizing buffers 1 and 2, calibrate the meter.
4. Gather the sample, and then put the pH in a beaker.
5. Place the pH meter inside the container.
6. Read after adjusting the meters' digits.

4.2.2 Determination of °Brix:

Apparatus

- Spoon
- Brix meter

Procedure:

1. First, insert the sample into the Brix meter.
2. Next, check the color intensity in meters.
3. Write down the reading.

Nutrition Composition of Street Drinks

Tests	Lemonade	Papaya	Aloe Vera	Orange
pH	2.71	3.57	3.35	4.01
°Brix	2	12	10	21

The figure shows the Nutrient Value of Street Drinks (Lemonade, papaya juice, orange juice, Aloe Vera juice). The analysis was with 2 ml sample and the value was converted according to 250 ml or regular serving size.

4.3 Questionnaire & Response

The questionnaire presents how many students of DIU take street juice & how it effected their regular health. The response of 100 students have been recorded.

The questions of the questionnaire has been given bellow

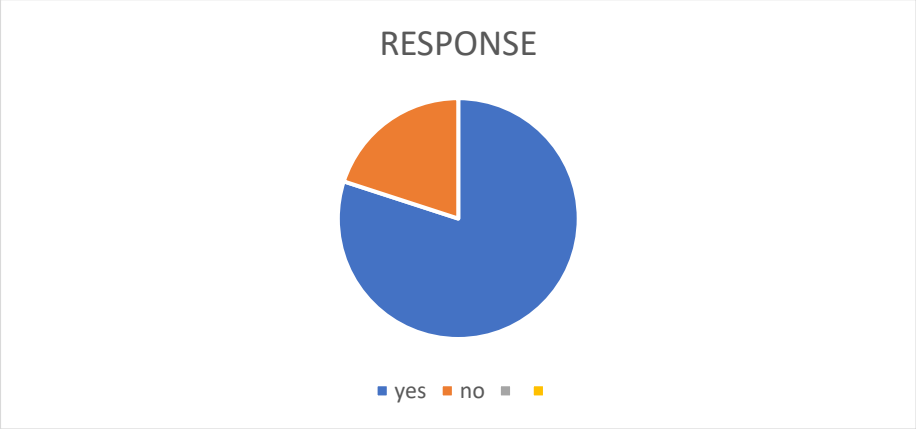
Student Name:

Student ID:

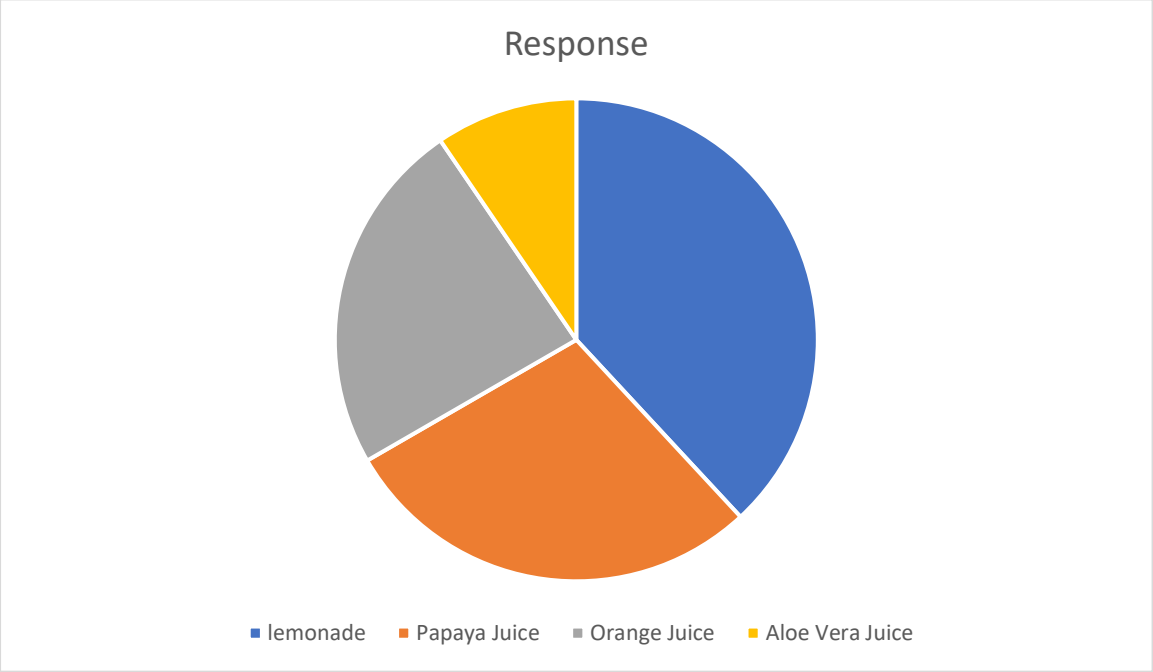
Department:

Date:

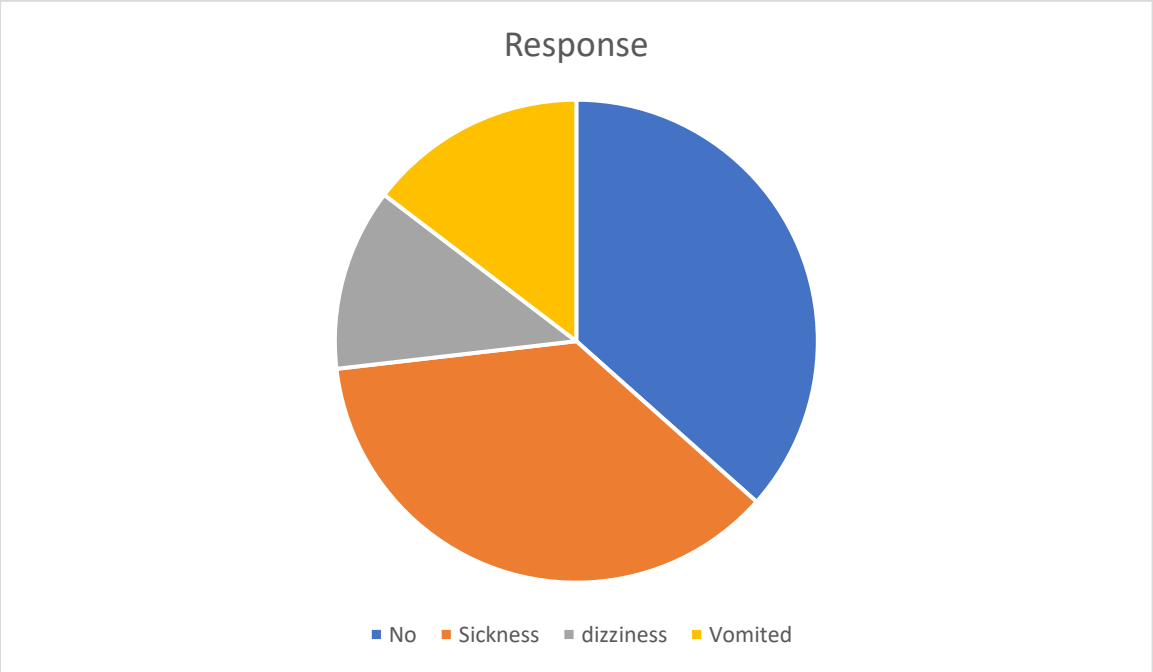
Have you ever consumed any street juice near the campus area?



What kind of street juice have you usually consumed?(Lemonade, papaya juice, orange juice, Aloe Vera juice)



Did you feel sick after consuming street juice near at campus area?



4.4 Response Discussion

The survey represents that more than 85% student consumed street juice near at campus area on regular basis

Lemonade, papaya juice, orange juice, Aloe Vera juice are most consumed juice. For this reasons this 4 items were selected for analysis. The survey shows that how many students have consumed & how many students have health effects after consuming street juice. From the survey it has been found out that maximum no of students have faced Vomiting, Stomach Cramps, Diarrhea. The main purpose of the study was to analyze the microbial status and nutritional value of street juice. Also to Give proper guidelines of hygiene to the vendors near campus area to avoid unhygienic process of making juice. As result student's won't get sick after consuming those items. The authority should also take a look on this matter.

4.5 Result Discussion

Based on this survey study it is observed Total viable count & Coliform count of street juice are very high. This happen when dust from street side mix with water , unhygienic processing, Handling of Raw materials and Utensils at a very unhygienic way, using of unfiltered water, Insects. During the processing of making juice vendors don't usually wear gloves at a result

germs from hand mix with fruits which causes microbial contamination. Usually vendor compromise with the quality of Juice to get a better profit.

4.6 Correlation between Acidity and Juice

The juices from street cart like Lemonade, papaya juice, orange juice, Aloe Vera juice have a lower pH Level, which indicates that these items have higher level of acidity. Tap Waters are not filtered. As a result the water is higher in Acidic level. Acidic Water contains heavy metals. As a result this can cause Health issues like vomiting, diarrhea, kidney disease, liver disease, stomach Cramp and nausea. There are also some water born disease like Typhoid and cholera.

4.7 Correlation between founded microbial and their health effects

The Table shows the Health effect of Microbes that found on street juice

Name of Microbes	**Health Issues**
E. Coli	i. Stomach Cramps ii. Bloody Diarrhea iii. Vomiting
Bacillus SPP	i. Gastrointestinal illness ii. Abdominal Pain iii. Watery Diarrhea
Clostridium SPP	i. Stomach Cramp ii. Loss of appetite iii. Weight lose
Streptococcus SPP	i. Scarlet Fever ii. Prominent Rash iii. Inflammation of Kidney

Chapter 5

Conclusion

5. Conclusion

The goal of the current thesis project is to examine and evaluate the microbiological composition of drinking samples obtained from stalls along the side of the road. In order to protect the juice quality before lab testing to acquire correct microbiological quality and further investigation examination, these gathered samples were treated properly. These lab tests and other pertinent investigations have been conducted with the utmost caution and according to strict standards. Based on the results it can be said that almost all the sample has higher microbial load that has been collected from street .In this thesis, all of these findings have been properly mapped out for further study and future projects. This thesis also includes a number of pertinent comparison studies and figures that especially emphasize the microbial burden in various dietary sources. Street food has a high microbiological burden because it is improperly handled, processed, and cooked in unclean ways, and stored and cooked at the wrong temperature. Food hygiene, public health, the effects of consuming contaminated foods, and diseases that cause them should be known to the government, consumers, food vendors, chefs, and stewards, among other types of individuals. To prevent contamination issues and food-borne illnesses, strict adherence to food safety regulations and their application in food preparation, serving, and preservation is required.

Based on this research study on street food and restaurant food, the following points should be strictly enforced and maintained for future work and further investigative study to improve the food quality:

1. Classification of commercially available non-homemade foods based on microbial burdens and food quality.
2. Ensuring consistent monitoring and inspection of certain food preparation techniques.
3. Consumers' food safety is ensured through ongoing lab testing and analytical lab analysis to look for the unwarranted existence of any new dangerous chemicals in these foods.

Reference

Bryan, F. L. (1977, January). Diseases Transmitted by Foods Contaminated by Wastewater. Journal of Food Protection, 40(1), 45–56. https://doi.org/10.4315/0362-028x-40.1.45

Bryan, F. L., Michanie, S. C., Alvarez, P., & Paniagua, A. (1988, May). Critical Control Points of Street-Vended Foods in the Dominican Republic. Journal of Food Protection, 51(5), 373–383. https://doi.org/10.4315/0362-028x-51.5.373

Figueroa-, B. K., Carrillo-Sanchez, A. K., Rivera-Gutierrez, S., Rios-muñiz, D., Estrada-Garcia, T., & Cerna-cortes, J. F. (2022). In Mexico City, fresh-squeezed street-vended orange juice is contaminated with fecal coliforms, Escherichia coli, and Shiga toxin-producing E. coli: A potential risk for acquiring foodborne diseases. Food Science and Technology, 42. https://doi.org/10.1590/fst.52022

Khan, M. M., Islam, M. T., Chowdhury, M. M. H., & Alim, S. R. (2015, April 19). Assessment of microbiological quality of some drinks sold in the streets of Dhaka University Campus in Bangladesh. International Journal of Food Contamination, 2(1). https://doi.org/10.1186/s40550-015-0010-6

Noor, R. (2016, February 8). Microbiological quality of commonly consumed street foods in Bangladesh. Nutrition & Food Science, 46(1), 130–141. https://doi.org/10.1108/nfs-08-2015-0091

Ogunyemi, B. C., Ogunyemi, A. K., Odetunde, S. K., Olumuyiwa, E. O., Olalekan, A. O., Akinyemi, K. O., & Iwalokun, B. A. (2021, September 30). Microbiological, Physicochemical, Nutritional And Anti-nutritional Evaluation Of Locally made Non-alcoholic Kunun Zaki

Beverage sold in Lagos State, Nigeria. Food and Environment Safety Journal, 20(4). https://doi.org/10.4316/fens.2021.042

Uddin, M., Akter, T., Parvez, M., Nahar, S., Pervin, S., Debnath, B., & Datta, S. (2017, January 10). Microbial Safety of Street Vended Fruit Juices in Dhaka City of Bangladesh. Journal of Advances in Microbiology, 3(2), 1–7. https://doi.org/10.9734/jamb/2017/33651