Project Report

On

"Study on microbiological analysis of street sugarcane juices available in Farmgate, Dhaka"

Submitted to

Professor Dr, Md. Bellal Hossain

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Submitted by

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LETTER OF TRANSMITAL

Date: 22 December 2018

Professor Dr, Md. Bellal Hossain

Head, Department of Nutrition and Food Engineering

Daffodil International University

Subject: Submission of Project report

Dear Sir,

It's a great honor for me to have the opportunity to submit the project report on "Study on microbiological analysis of street sugarcane juices available in Farmgate, Dhaka" as a part of BSc in Nutrition and Food Engineering (NFE) program curriculum.

It's a great achievement and experience for me to in this project work under your active supervision. This report based on "Study on microbiological analysis of street sugarcane juices available in Farmgate, Dhaka" under the supervisor of **Effat Ara Jahan,** Lecturer department of Nutrition and Food Engineering, Daffodil International University.

This project work gave me both academic and practical exposure. In this time I have gained knowledge about the microbiological analysis of any juicess.

Sincerely Yours

Md. Mahmudul Hasan Polin

ID: 151-34-360

Department of Nutrition and Food Engineering

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CERTIFICATE OF APPROVAL

I am pleased to certify that the internship report on "Study on microbiological analysis of street sugarcane juices available in Farmgate, Dhaka" conducted by **Md. Mahmudul Hasan Polin**, bearing respectively ID NO: 151-34-360, department of Nutrition and Food Engineering has been approved for presentation, defense and viva-voce.

I am satisfied to certify that the data and the findings in this report are authentic work of **Md. Mahmudul Hasan Polin.** I am strongly recommended the report presented by **Md. Mahmudul Hasan Polin** for further academic recommendations and defense and viva-voce. **Md. Mahmudul Hasan Polin,** bears a strong moral character and well personality. It has a great pleasure working with him and wish him a successful life.

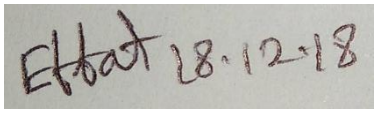
.....

Professor Dr, Md. Bellal Hossain

Head,

Department of Nutrition and Food Engineering

Daffodil International University



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Effat Ara Jahan

Lecturer

Department of Nutrition and Food Engineering

Daffodil International University

ACKNOWLEDGEMENT

First of all I would like to express my heartiest gratitude to almighty Allah for his mercy extended to completing my internship report on "Study on microbiological analysis of street sugarcane juices available in Farmgate, Dhaka". Practical experiences is also needed in parallel with the academic knowledge to fill the gap of theoretical knowledge.

My Deep gratitude and sincere thanks to the honorable Dean, Faculty of Allied Health Science, **Professor Dr. Ahmed Ismail Mustafa** for this kind cooperation and to accept this Degree.

I am encouraged to take this privilege to deliver my gratitude to each and every people who are involved with me in every phase of my lives. I am very grateful to **Professor Dr. Md. Bellal Hossain,** Head, Department of Nutrition and Food Engineering, Daffodil International University

I am deeply indebted to my Supervisor **Effat Ara Jahan** Lecturer, Department of Nutrition and Food Engineering, Daffodil International University, for her whole-hearted supervision during my organizational attachment period.

I would like to express my warmest thanks to **NFE Faculty members** for their countless inspiration and encouragement during the student life.

Dedicated to:

My Parents……

Abstract:

The study was conducted on microbial analysis of street sugarcane juicess collected from selected areas of Dhaka, Bangladesh. There were four samples of sugarcane juicess were collected from Farmgate, Dhaka. In this study four samples of sugarcane juicess the pH found in the range of (5.06 to 5.95) and the acidity (0.009 to 0.018) and the brix (17-28^0). The TSS, TDS and TS (27.75 g/l to 49.75 g/l), (57.371 g/l to 126.575), and (85.121 g/l to 176.32 g/l) respectively .In this study the lowest TVC (total viable count) is 2.5×10^8 Cfu/ml in sample-2and the highest TVC (total viable count) is 3.7×10^9 Cfu/ml in sample-3. The lowest TCC (total coliform count) is 5×10^6 cfu/ml in sample-1 and the highest TCC (total coliform count) is about 4×10^7 cfu/ml in sample-3. E.coli is also found in this study the lowest E.coli found in sample-4 is about 2.0×10^4 cfu/ml and the highest is about 3.6×10^4 cfu/ml in sample-3. Salmonella and shigella are also found in few number. The lowest number is 5.2×10^2 cfu/ml in sample-2, and 1.7×10^4 cfu/ml in sample-2. And the highest number is about 15×10^3 cfu/ml in sample-3 and 1.2×10^5 cfu/ml in sample-1.

Key words: Sugarcane juicess, TVC, TCC, E.coli, Salmonella, Shigella

Contents:

Introduction:

1.1 Overview

Sugarcane juices is most popular drinks in the city of Dhaka. Mostly in summer season the demand of sugarcane juices is high. People lose a lot of minerals by sweating in summer season. For fill the lost nutrient people drinks street juices like sugarcane juices. But during this summer season different types of disease like Diarrhea, Typhoid, Vomiting, Nausea etc. are common because of these street juices. The microbial load is so high for which different type of disease occurs. Food borne diseases generally affect the gastrointestinal tract. Food borne disease are transmitted through of contaminated food, juices or drinks. So street juices could prove to be a public health threat. (Reena Kulshrestha*, 2013). Contaminated food product can consequence many disease or problem ranging from mild bloating, infecting and gas to serious incidents of food poisoning and dehydration. The consumption of unsafe and unhygienic street juicess like sugarcane juices causes serious outbreak of food borne illness. (Mahbub Murshed Khan1, 2015)

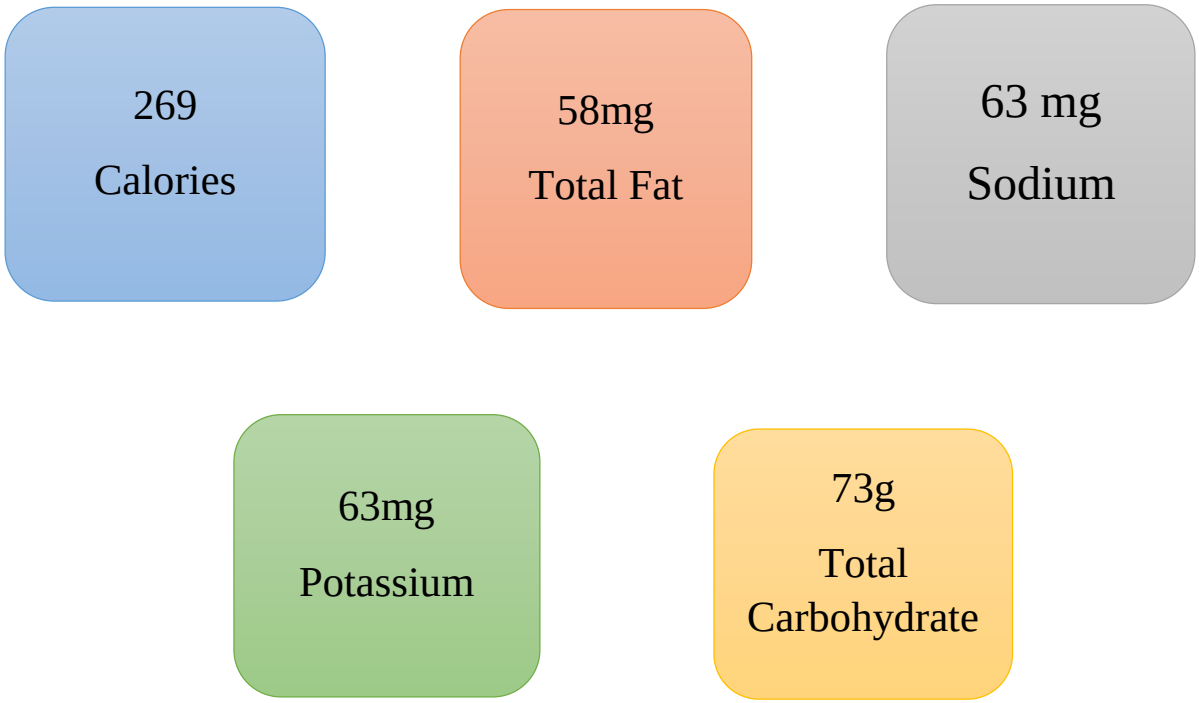
Generally raw materials, equipment's, handlers hand are responsible for contamination. The entry of bacterial pathogens or microbial load is transferred by raw materials, equipment's, improper handling, and prevalence of unhygienic condition. (Mahbub Murshed Khan1, 2015) Sometime water is used for preparation of juices is a major source of microbial contamination like coliforms, fecal streptococci, fecal coliforms etc. (Mahbub Murshed Khan1, 2015)

1.1.2 Nutrient content of Sugarcane Juices

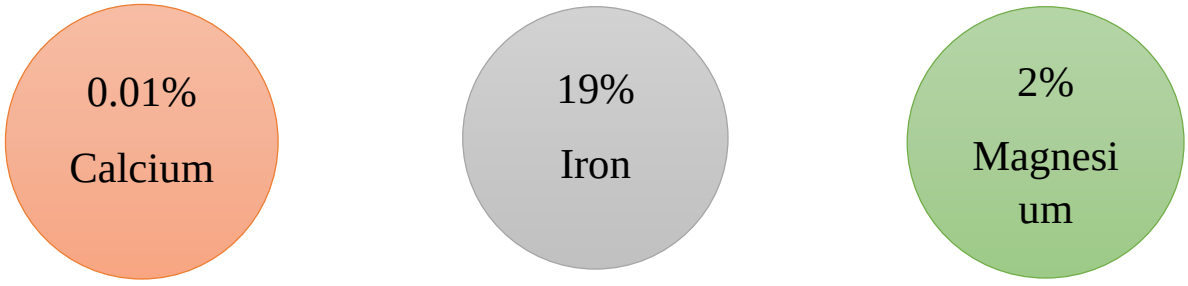
Sugarcane juices can be very healthy juices as it contains a lot of vitamins and minerals which is very essential for our immune system. It contains 63-73% water, 2-3% non-sugar, 12-16% soluble sugar and 11-16% fiber. Sugarcane juices contain 30 grams of sugar with 250 calories.[5]

Fats and proteins and cholesterol are generally low but it contains numerous amounts of magnesium, iron, and calcium. (lybrate, 2018)

Nutritional facts in 100 grams sugarcane (lybrate, 2018)



Vitamins and Minerals (lybrate, 2018)



1.1.3 Health Benefits of Sugarcane juices. (lybrate, 2018)

- Helps to prevents cancer
- Helps the kidneys
- Helps to combat skin conditions
- Source of energy booster
- Prevents tooth decay
- Helpful in pregnancy
- Helps in febrile disorders

1.2 Objective of this study

1.2.1 General Objective:

- "To study on microbiological analysis of street sugarcane juices available in Farmgate, Dhaka"

1.2.2 Specific Objective:

- To Conduct chemical test
- To identify different types of microbes in sugarcane juices
- Calculate colony forming units
- Compare sugarcane juices with ice and without ice

Chapter Two

"Literature Review"

2.0 Literature Review

In the study of 115 samples of fruits juicess sold in the street ware analyzed and from them 98 types of organisms ware isolated. In different fruits juicess sample collected from local vendors and streets four types of bacteria ware found based on the presence of microorganism. Pathogens like E.coli, S.aureus, Salmonella and shigella were found enough which is too much. In his study he found pathogens like E.coli was found 33.33%, Shigella in 17.14%, S.aureus 23.80%, salmonella 19.04%. (U.Sharma, 2013)

In the study of 30 samples. From 30 samples they found 27 samples were contaminated with bacteria. They found that *Enterococci* (55.5%), *E.coli* (48.1%), *Citrobacter* (14.8%), *Klebsiella spp.* (18.5%) and *Enterobacter spp* (14.8%). (Aparna S. Y., 2011)

Asssesment of microbiological quality of some drinks sold in the street of Dhaka University Campus in Bangladesh, they that Average estimation of Total viable count and total coliform from the drinks are, (Mahbub Murshed Khan1, 2015)

Type of drinks	Number of sample	Average TVC (cfu/ml)	Average MPN (cfu/100ml)
Sugarcane juices	3	2.55×10^6	290
Tukmair sherbet	3	9×10^8	1100
Lemon sherbet	3	7.7×10^3	210
Wood apple sherbet	3	3.4×10^5	240
Papaya juices	3	1.98×10^6	460

Human Bactrria in Street Vended Fruits Juicess: A Case Study of Visakhapatnam City, India. Their study shows that in most areas vended fruit juicess are hygienically poor because of bacterial load. They found that the Toyal viable count and coliform count is very high (HVC 0.88-33.6 $\times 10^4$ cfu/100ml), TC (0.8-22.2 $\times 10^4$ cfu/100ml). In this study they also found that fecal coliform (0.4-11.0 cfu/100ml) and fecal streptococci (0.06-6.6 cfu/100ml) which is highly impacted and unsafe for human consumption. They also found some pathogens like E.coli (27.7%), Streptococcus faecalis (6.2%), Salmonella typhi and Salmonella typhimurium was present in an alarming enough. In their study they found 66.6% of the sample was contaminated by different types of pathogens. (Joy E. Lewis1, 2006)

Microbiological Quality Assesment of Handmade Juices in Street of Dhaka City. In their study they found, the present study was carried out for the bacteriological study of handmade juices in the street of the city of Dhaka. For this isolation of total bacterial count (TVBC),Purification, Gram stain, selective isolation and interpretation of the results were determined in mango juices (Mangifera indica), apple juices (Malus domestica), orange Juices (Citrus sinensis), Malt Juices (Helichrysum melitense) and Lacchi. In this investigation, the biggest of TVBC ($1.4x10^6$) and ($1.2x10^6$) was observed in the mango Juices and juices of Alovera which is Khilkhet (street) and Sadarghat (street) and the lowest TVBC ($9.0x10^5$) was observed in the Malt juices that is collected in Banani ($1.2x10^6$) and TVBC ($9.0x10^5$) was observed in the papaya that is collected from the Banani. (Kaniz Fatema*1, 2016)

Microbiological Quality of Local Market Vended Freshly Squeezed Fruits Juicess in Dhaka City, Bangladesh. In their study they found the total viable count (TVC) of the tested sample are ranged from 3.00 $x10^2$ to 9.60 $x10^8$ and fungal count 1.00 $x10^2$ to 8.05 $x10^4$. They tested 114 samples and found 99% sample showed the presence of coliform and E.coli. Other bacteria like B.cereus (64.91%), Staphlococcus aureus (6.14%), Salmonella (7.89%), Streptococcus ware found 5.26%. (M. Shakir Uddin Ahmed, 2009)

Chapter Three

"Materials and Methods"

Materials and Methods

3.1 Sample collection:

For this study the street sugarcane juicess samples are collected from from Farmgate, Dhaka. After collecting the juicess the samples are stored at 4^0c for further process and tests.

3.2 Study place:

The laboratory work of this study was conducted in "Chemistry Laboratory" and Microbiological test ware conducted in "Microbiology Laboratory" of the Department of Nutrition and Food Engineering of Daffodil International University.

3.3 Study period:

This study work was carried out November-2018 to 1st week of December-2018.

3.4 Materials

3.4.1 Materials for Physiochemical test for Sugarcane Juices

- Digital P^H Meter
- Refractometer
- Beaker
- Burette
- Conical Flask
- Thermometer
- Filter paper
- Oven
- Funnel
- Weight machine
- Desiccator

3.4.2 Chemical and Reagents for Physiochemical test for Sugarcane Juices

- 0.1 N NaOH
- Indicators- Phenolphthalein

3.4.3 Materials for Microbial test of Sugarcane Juices

- Petridis
- Test tube
- Conical Flask
- Spreader
- Micropipette
- 10 ml Pipette
- Tips blue and yellow
- Autoclave
- Laminar Flow Cabinet
- Incubator
- Parafilm
- Spirit Lamp
- Water bath
- Magnetic Hotplate

3.4.4 Media and solution used in Microbial test of Sugarcane Juices

- Plate Count Agar for TVC
- Purified Agar Powder
- EC medium broth for Coliform count
- SS agar for salmonella, Shigella and E.coli.
- Distil water
- 70% ethanol

3.5 Study design flowchart:

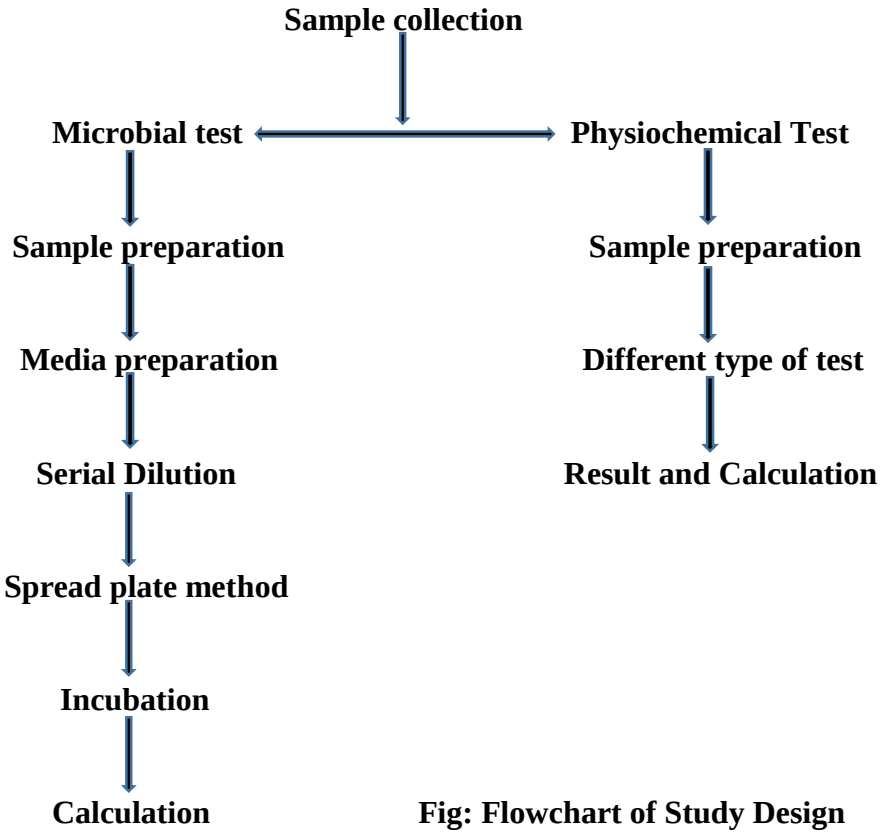


Fig: Flowchart of Study Design

3.6 Physiochemical and Microbial test: some physiochemical test and microbial test are conducted by me for my study. These tests are

Table: 01

Physiochemical Test	Microbial test
P^H	TVC (total viable count)
Brix	TCC (total coliform count)
Acidity	E.coli
TSS (total suspended solids)	Salmonella
TDS (total dissolve solids)	Shigella
TS (total solids)	

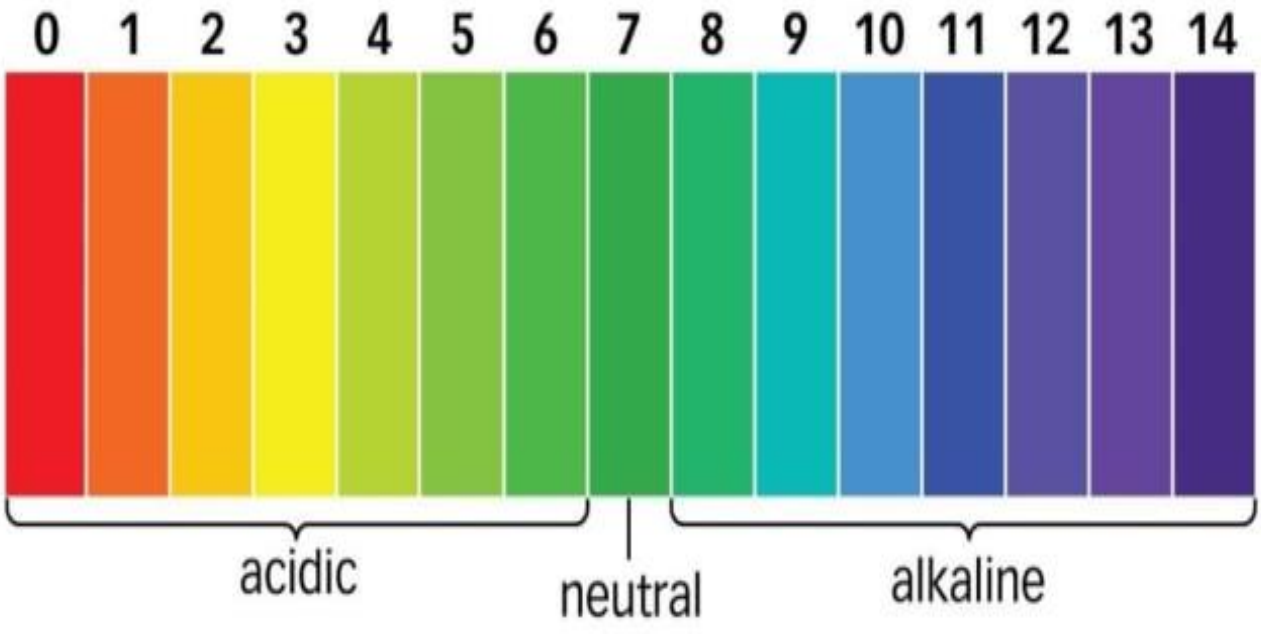
3.7 Methods for Physiochemical Test

3.7.1 Measurement of P^H:

P^H is the measurement of Hydrogen ion concentration of a solution. High concentration of hydrogen ions have low pH and low concentration of hydrogen ion have high pH.

Picture: pH meter

P^H of these samples are calculated by digital P^H meter. First of all the sample are taken in beaker. Then calibrate the P^H meter. After that I found result at 25^0c. The results are given below.



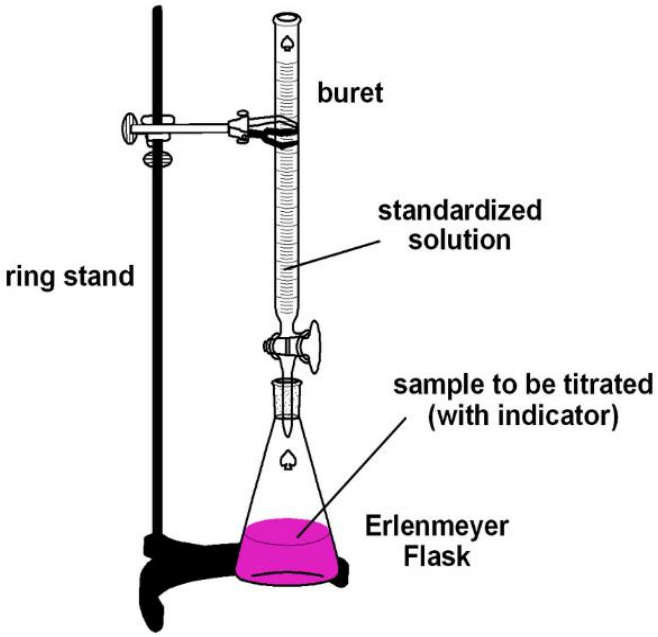
Picture: pH Scale

3.7.2 Measurement of Brix:

To measure brix of Sugarcane juices 1st we need to clean the refractometer by distill water. Then put 1-2 drops of sample into the refractometer and put down the daylight plate cover. After that looking into the eyepiece and we saw the result. The result of Brix of four sample are given in result and discussion

3.7.3 Measurement of Acidity

To measure acidity of sugarcane juices first I took 10 ml of sample in a conical flask and add 2 drops of Phenolphthalein. Then I took 50 ml of 0.1 N NaOH in the burette. Then I put the conical flask under the burette. Then genteelly add 0.1 N NaOH until the color change into light pink. In my study the result of four sample are given below



Picture: Titration methods for acidity

3.7.4 Measurement of TSS (Total Suspended Solids)

To measure TSS of sugarcane juices first we need to take 40 ml of sugarcane juices in a measuring cylinder. Then take a filter paper and take the weight of filter paper and fold it as we need. Put the

Picture: Filtration for TSS

filter paper in a funnel and put the funnel in a conical flask. Then carefully put 40 ml juices in the funnel. After filtration dry the filter paper in the oven at 105^0c. After drying take the final dry filter weight. Then calculate the TSS of Sugarcane juices.

Calculation:

$$TSS = \frac{(\mathrm{A}-\mathrm{B})\times 1000}{\text{ml of sample}} \quad \text{g/L}$$

Here,

A= weight of filter +dried residue (g),

B= weight of filter (g)

Picture: Filter paper for TSS

3.7.5 Measurement of TDS (Total Dissolve Solids)

To measure TDS of Sugarcane juices take the filtrate juices which was taken from TSS. The filtrate juices then put into a beaker and took the weight of the beaker and then put the beaker in the Oven at 105^0c until the juices dry. Put out the beaker and weight it. After getting the weight calculate the TDS of Sugarcane juices.

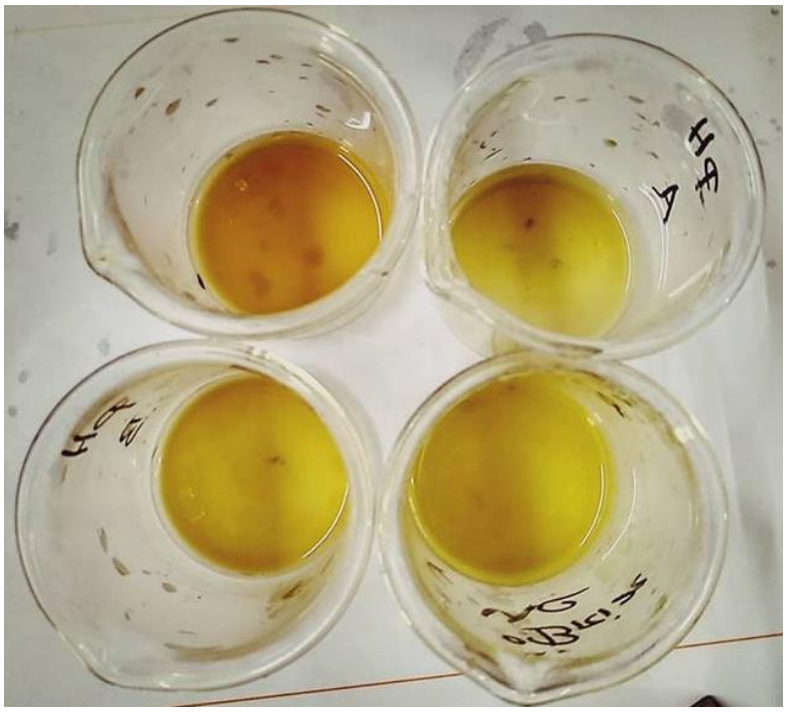
Calculation:

$$TSS = \frac{(\mathrm{A}-\mathrm{B})\times 1000}{\text{ml of sample}} \text{ g/L}$$

Here,

A= Final weight of dry beaker

B= beaker + sample weight



Picture: TDS sample

3.7.6 TS (Total Solids):

To calculate total solids first of all we should know TSS (Total Suspended Solids) and TDS (Total Dissolve Solids). TS is the amount of solids present in the sample.

TS = TSS+TDS

3.8 Methods for Microbial Test

3.8.1 TVC (Total Viable Count)

Total Viable count is a quantitative estimation of the concentration of microbial load in any sample.

Methods: Spread plate methods

Media use: Plate count agar

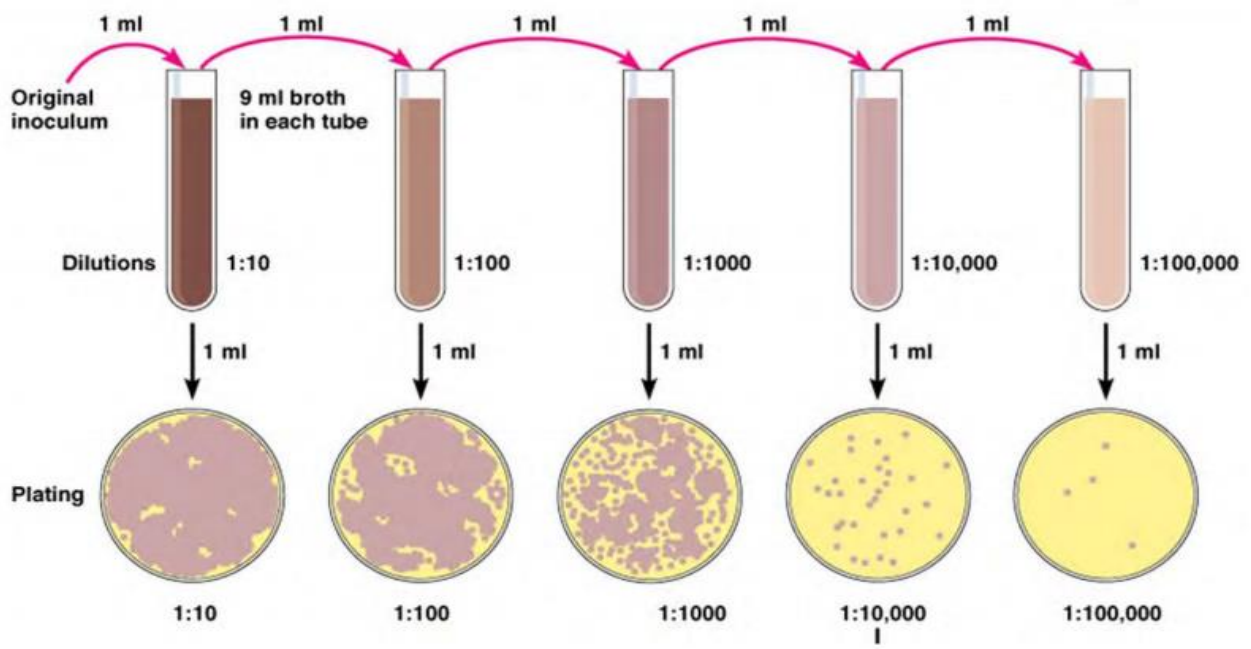
Amount of media: 4.7 gram in 200 ml distill water

Procedure:

- First we need to clean all the equipment's and apparatus.
- After that take 200 ml distill water in a conical flask.
- Weight 4.7 gram of Plate count agar and put the agar into the conical flask.
- Mix it well by using magnetic hot plate.
- On the other hand ready all the materials like petri dish, Distill water, test tube, micro pipette, tips, spreader, 10 ml pipette, and 200 ml media for Autoclave.
- Then Autoclave the all the apparatus (121^0c for 15 psi and 30 min)
- Turn on the luminary air flow and switch on the UV for 10 minutes. After 10 minutes turn of the UV and increase the rate of air flow.
- Carefully put all the autoclaved materials / apparatus in the Luminary air flow.
- Then Put the media into the petri dish and wait few minutes to let the media be solids.

Serial Dilution:

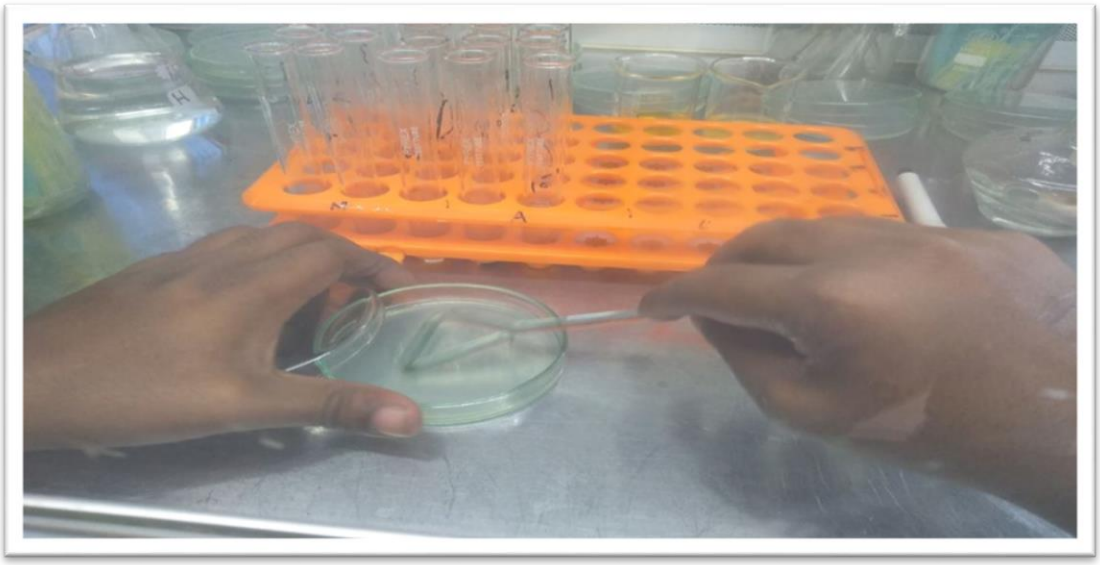
- First take 9 ml of autoclaved distill water in all test tube as need for dilution.
- Then add 1 ml of sample in first test tube which is diluted as 10^{-1}.
- Then take 1 ml of sample from 10^{-1} test tube and transferred to 2nd test tube (10^{-2}).
- This this action is repeated for each test tube we need.



Picture: Serial Dilution

Spread Plate Methods:

- After finishing the serial dilution take PCA petri dish labeled as 10^{-5}, 10^{-6} and 10^{-7}.
- Take 0.1 ml of sample from 5, 6 and 7 number test tube and drop the solution in 10^{-5}, 10^{-6} and 10^{-7} petri dish.
- Using spreader genteelly spread the solution and after that use perafilm to seal the petri dish.
- Then incubate the petri dish at 37^0c for 24 hours. After 24 hours calculate the cfu/ml



Picture: Spread plate method

Calculation:

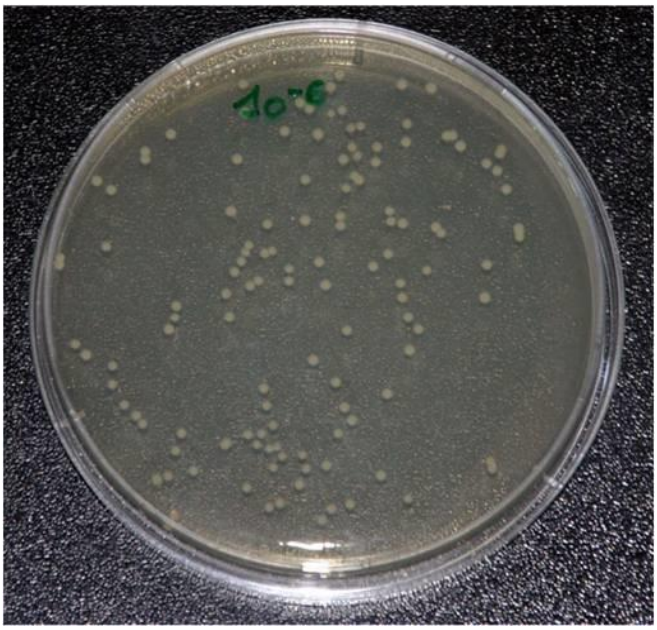
$$TVC = \frac{\text{colony} \times \text{dilution factor}}{\text{Volume of sample}} \text{ cfu/ml}$$

For Example, if the plate of the 10^{-6} dilution and found 120 colonies the result of 1 ml of original can be calculated as,

$$\text{TVC} = \frac{\text{colony} \times \text{dilution factor}}{\text{Volume of sample}}$$

$$= \frac{120 \times 10\text{^}6}{1 \text{ ml}}$$

$$= 120{,}000{,}000 \text{ or } 1.2 \times 10^8$$



Picture: Colony in Media

3.8.2 TCC (Total Coliform Count):

Methods: Spread Plate Methods

Media: EC broth or EC medium

Amount of media used: 5.55 gram EC broth + 3 gram of Purified agar powder in 150 ml distill water.

Procedure:

- First we need to clean all the equipment's and apparatus.
- After that take 200 ml distill water in a conical flask.
- Weight 5.55 gram of EC broth + 3 gram of purified agar powder and put the agar into the conical flask.
- Mix it well by using magnetic hot plate.
- On the other hand ready all the materials like petri dish, Distill water, test tube, micro pipette, tips, spreader, 10 ml pipette, and 200 ml media for Autoclave.
- Then Autoclave the all the apparatus (121^0c for 15 psi and 30 min)
- Turn on the luminary air flow and switch on the UV for 10 minutes. After 10 minutes turn of the UV and increase the rate of air flow.
- Carefully put all the autoclaved materials / apparatus in the Luminary air flow.
- Then Put the media into the petri dish and wait few minutes to let the media be solids

Serial Dilution: Serial dilution is done by same procedure as done in TVC. In this serial dilution I take 5 test tube which means dilution is done up to 10^{-5}. (Kaniz Fatema*1, 2016)

Spread Plate Method:

- After finishing the serial dilution take petri dish used media as EC medium, labeled as 10^{-3}, 10^{-4} and 10^{-5}.
- Take 0.1 ml of sample from 3, 4 and 5 number test tube and drop the solution in 10^{-3}, 10^{-4} and 10^{-5} petri dish.
- Using spreader genteelly spread the solution and after that use perafilm to seal the petri dish.
- Then incubate the petri dish at 35^0c for 24 hours. After 24 hours calculate the cfu/ml

Calculation:

$$TVC = \frac{\text{colony} \times \text{dilution factor}}{\text{Volume of sample}} \text{ cfu/ml}$$

3.8.3 cfu/ml for Salmonella, Shigella and E.coli

Media: SS agar

Methods: Spread Plate Methods

Amount of media used: 12.6 gram ss agar in 200ml distill water

Incubation Time and Temperature:

- For salmonella and shigella incubate at 35^0c for 18-48 hours
- For E.coli incubate at 44^0c for 24-48 hours

*Do not need Autoclave

Put the media in Water-bath at 100^0c for 45-60 minutes

Procedure, Serial dilution and the calculation is same as TVC, TCC

Chapter Four

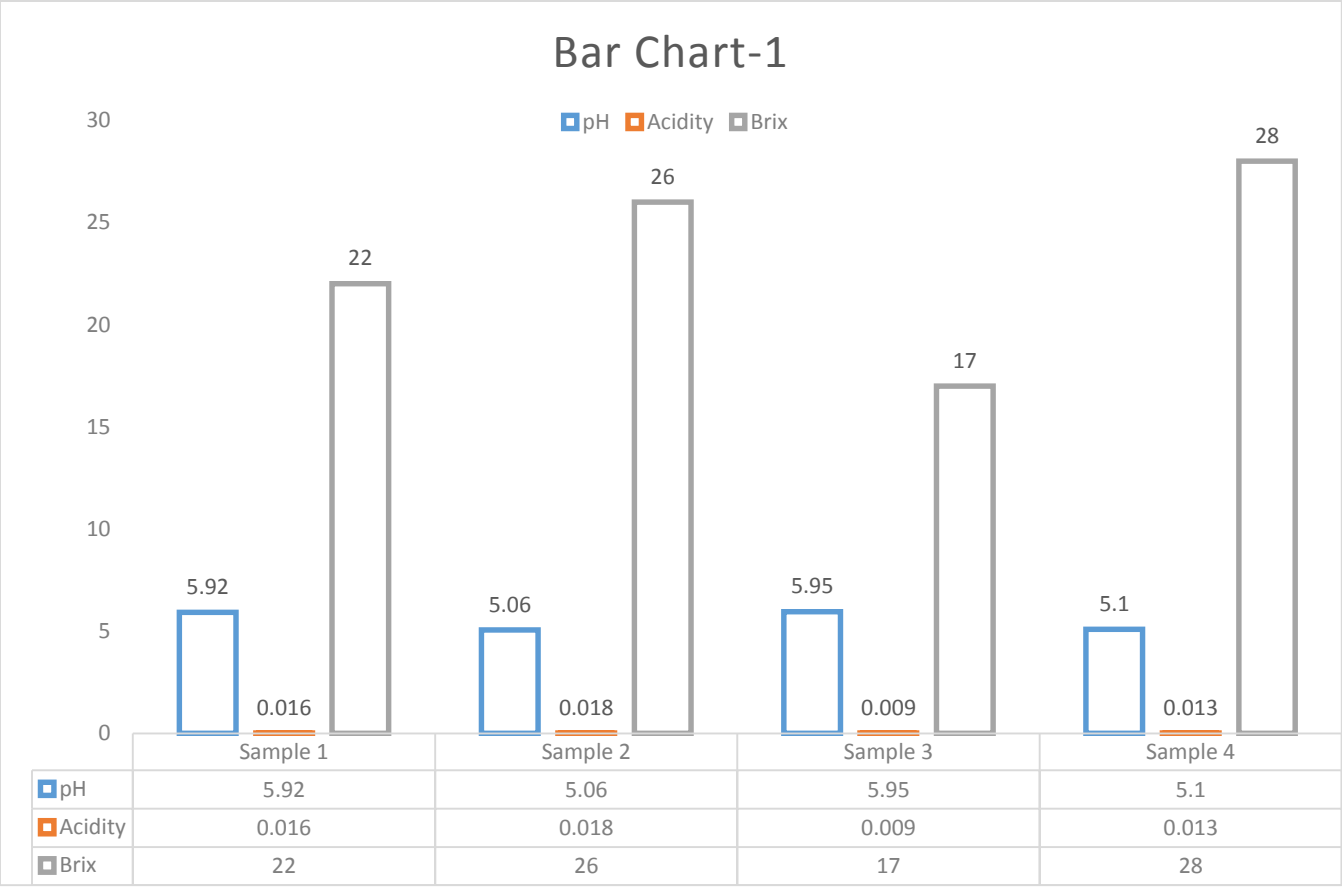
"Result and Discussion"

4.1 Result:

P^H, acidity and ^{0}brix of four sugarcane juices sample.

Table-02

Sample	pH	Acidity	Brix
Sample-1	5.92	0.016	22^0
Sample-2	5.06	0.018	26^0
Sample-3 (ice)	5.95	0.009	17^0
Sample-4	5.10	0.013	28^0



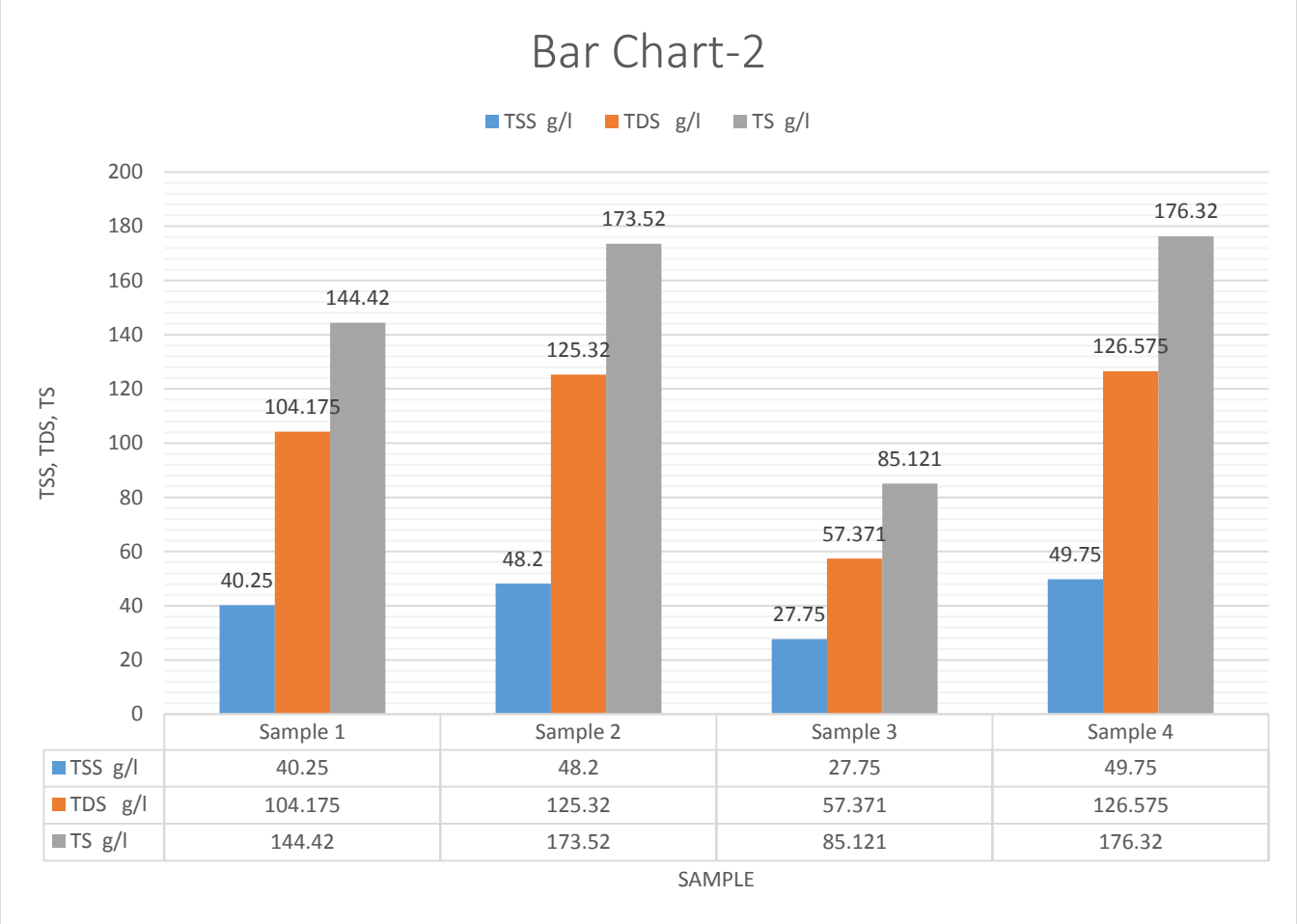
Bar chart-1: Assessment of pH, Acidity and ^{0}Brix of four sugarcane juices

From this bar chart-1, we can see that the sample-3 have higher pH (5.95) and lower acidity (0.009) with lower ^{0}Brix (17) then other three sample. As sample-3 have ice water mixed with it. On the other hand sampl-2 have lower pH (5.06) and higher acidity (0.018) then other sample. And sample-4 have higher ^{0}Brix (28) and sample-3 have lower ^{0}Brix (17).

TSS, TDS, TS g/L of four sugarcane juices sample

Table-03

Sample	TSS (Total suspended solid) g/L	TDS (Total dissolve solid) g/L	TS (Total solid) g/L
Sample-1	40.25 g/L	104.175 g/L	144.42 g/L
Sample-2	48.2 g/L	125.32 g/L	173.52 g/L
Sample-3 (ice)	27.75 g/L	57. 371 g/L	85.121 g/L
Sample-4	49.75 g/L	126.575 g/L	176.32 g/L



Bar chart-2: Assessment TSS, TDS and TS of four sugarcane juices

In this bar chart-2 we can see that sample-3 have lower TSS (27.75), TDS (57.371) and TS (85.121) then other sample. On the other hand sample-4 have higher TS (176.32), TDS (126.575) and TSS (49.75). As sample -3 have ice water mixed with is that's why sample-3 have lower TSS, TDS and TS.

TVC, TCC, E.coli, Salmonella, Shigella of Four sample of sugarcane juices

Table-04

Sample	TVC (cfu/ml)	TCC (cfu/ml)	E.coli	Salmonella (cfu/ml)	Shigella (cfu/ml)
Sample-1	3.6×10^{9}	5×10^{6}	2.8×10^{4}	10×10^{3}	1.2×10^{5}
Sample-2	2.5×10^{8}	9×10^{6}	21×10^{3}	5.2×10^{2}	1.7×10^{4}
Sample-3 (ice)	3.7×10^{9}	4×10^{7}	3.6×10^{4}	15×10^{3}	32×10^{3}
Sample-4	1.9×10^{9}	1×10^{7}	2.0×10^{4}	6.8×10^{3}	2.9×10^{4}

The recommended Microbiological standards for any fruits juices sold in the Gulf Region (Gulf Standard 2000)

Table-05

Test	Total aerobic bacterial count (cfu/ml)	Total coliforms (cfu/ml)	Yeasts and molds (cfu/ml)
Maximum count	5.0×10^{3}	10	100
Maximum count permitted	5.0×10^{4}	100	1.0×10^{3}

The microbial loads in these four samples are, Height TVC was found in sample-3 (with ice water) is 3.7×10^{9} and lowest TVC was found in sample-2 is about 2.5×10^{8} which is shown in (Table-04). The height total coliform is found in sample-3 which is about 4×10^{7} and the lowest TCC was found in sample-1 is 5×10^{6} which is shown in (Table-04). E.coli in sample-3 is 3.6×10^{4} is height and the lowest was found in sample-4 is 2.0×10^{4} which is shown in (Table-04). Salmonella in sample-3 is 15×10^{3} which is height number and the lowest is about sample-2 is 5.2×10^{2} which is shown in (Table-04). And shigella in sample-1 is about 1.2×10^{5} and sample-2 is 1.7×10^{4} is lowest which is shown in (Table-07). The contamination of microbial load in these four sample is much higher than the (Gulf Standards.2000) which is shown in (Table-09). (M. Shakir Uddin Ahmed, 2009)

4.2 Discussion:

For the study of microbiological analysis of street sugarcane juices four samples are collected from. From these four sample one sample _sample-3) contain ice water mixed with it. The pH of sample-3 is higher and the acidity is lower than other samples. The TS, TDS, TS of sample-3 is lower than other three samples.

Microbiological loads are also higher than the standard. TVC is higher in sample-3 (3.7×10^9) other three samples and the lowest TVC in sample-2 (2.5×10^8). Which is similar to (Muhammad Ekhlas Uddin1*, 2017) . E.coli in sample-3 is 3.6×10^4 which is higher than other three sample of sugarcane juices. The highest number of Salmonella found in sample-3 and highest number of Shigella found in sample-2. So it is said that the microbial load in sample-3 is higher.

However, while collecting juices samples, it was found that cutting board, knives, spoons, glass and jugs were not frequently washed and a chance of cross contamination was possible. Cross contamination can be avoided if utensils or equipment's used in juices processing are washed properly with detergents and water frequently. (Muhammad Ekhlas Uddin1*, 2017)

4.5 Conclusions:

The main reason for this study is to determine the Microbiological load in street sugarcane juices As sugarcane juices is available at a low price peoples are addicted to it. It is now said that all the result of this study include that the samples of street sugarcane juices contained higher microbial load than the standard (gulf standard 2000). This study shows that the highest TVC found in sample-3 ($(3.7\times10^9$ cfu/ml) and lowest TVC found in sample-2 is about (2.5×10^8 cfu/ml). TCC is too much in sample-3 (4×10^7 cfu/ml) and highest E.coli, salmonella, Shigella are also present at an alarming rate (3.6×10^4 cfu/ml), (15×10^3 cfu/ml), (1.2×10^5 cfu/ml) respectively. Regular monitoring of the quality of fruit juicess for human consumption must be introduced to avoid any future bacterial pathogen outbreak.

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