



Daffodil
International
University

THE THESIS REPORT

ON

**PHYSICO - CHEMICAL AND MICROBIAL ANALYSIS OF DIFFERENT
DEVELOPED CHEESE PRODUCTS**

SUBMITTED TO:

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Date of Submission : 22th December 2018

LETTER OF TRANSMITTAL

Date 22th December, 2018

Prof. Dr. Md. Bellal Hossain

Department of Nutrition & Food Engineering

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Subject: Submission of thesis report.

Dear Sir,

I am here by submitting my thesis report, which is a part of NFE program curriculum. It is a great achievement to work my active supervision. This report is based on different types of cheese making and analysis. At Daffodil International University. This project give me both academic & practical exposures. First of all learned how to increase product quality by using cheese. This project give me the opportunity to develop a network with the processing field in Bangladesh.

Your sincerely

Rafiqul Islam

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CERTIFICATION OF APPROVAL

I am pleased to certify that the thesis report on different types cheese making and analysis at daffodil international university conducted by Rafiqul Islam ID: 161-34-495 of department of nutrition and food engineering has been approved for defense/viva-voce. Under my supervisor Rafiqul Islam worked in the laboratory at the Institute of Food and Radiation Biology, Bangladesh Atomic Energy Commission.

I am pleased to hereby certify that the data & test presented in the report are authentic work of Rafiqul Islam. I strongly recommended the report presented by Rafiqul Islam for further academic recommendation & defense/viva-voce. Rafiqul Islam bears a strong moral character & a very pleasant personality. It has indeed a great pleasure working with him. I wish him all success in life.



Professor Dr. Md. Bellal Hossain
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ACKNOWLEDGEMENT

At First of all I am grateful to almighty Allah for empowering me to complete my research work and successively submit the thesis report.

My sincere thanks and gratitude go to my Principal Supervisor, Professor Dr. Md. Bellal Hossain, for his guidance, valuable discussions and suggestions throughout the course of study and in preparation of manuscripts. Lecturer Ms. Najia kamrul was highly dedicating to this work and the manner in which he efficiently dealt with problems to the progress of this project was greatly positive. I would like to express gratitude to my Co-supervisor Ms. Nasima Akter Mukta (Department of Nutrition and food engineering, Daffodil International University) for his extensive support. I would like to express my sincere gratitude, endless love and infinite respect to my Mother Fatema Begum and brother Anower Hossain for their great prayers and support during my Bsc. study together with my father, sisters and all family member. I am highly grateful to my Daffodil International University for their kind friendship, and Technical Staff for their help and support during the Bsc. study. . Also, a great thanks to Dr. Tabbassum Mumtaz , Assistant scientific officer Md. Razib Khan and other staffs from the Institute of Food and Radiation Biology, Bangladesh Atomic Energy Commission for their great help to analyses texture profile of all cheeses.

Rafiqul Islam
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DEDICATION

TO MY RESPECTED PARENTS AND TEACHERS

ABSTRACT

The Cheese is a dairy product derived from milk that is produced in a ample range of flavours, textures, colour and forms by coagulation of the milk protein casein. The development and quality assessment of cheese prepared by using: Cream, mozzarella and cheddar cheese. It is formation proteins and fat from milk. The time of production, the milk is usually acidified, and adding the enzyme rennet causes coagulation. The cheese making is a complicated process the including many processing steps and biochemical transformations. In this my study following to all the developed cheese products were tested to find out over all acceptability. The chemical analysis of mozzarella cheese protein – 20.03%, Ash- 2.4%, moisture 54.96%, pH-5.1 ,fat-18, cream cheese protein - 23%, Ash- 2.7%, moisture 55%, pH-4.4 ,fat-33%, cheddar cheese protein - 27%, Ash- 3.1%, moisture 49%, pH-4.7 ,fat-30% the microbial stability of the products were determined by taking into consideration TVBC and E-coli after 7 days storage at 7⁰C.

List of Table

Table 1 : Tips for how to add citric acid.

Table 2 : Table 2: Tips for adding rennet

Table 3 : Composition of mozzarella cheese

Table 4 : Composition of cheddar cheese

Table 5 :Composition of cream cheese

Table 6 : Result of organoleptic test

Table 7 : Petri dish count of TVBC

Table 8 : Result of E-coli into different types of media

List of Figures

Fig 1 : Flow chart of cheese processing

Fig 2 : How to add citric acid.

Fig 3 : Adding cool water

Fig 4 : Cutting curd

Fig 5 : Remove whey from curd

Fig 6 : Remove whey and striking or pressing

Fig 7 : Flow chart of E-coli test

Fig 8 : Flow chart gram stain

Fig 9 : Pie chart percentage of fat

Fig10 : Pie chart percentage of protein

Fig11 : Pie chart of moisture percentage.

Fig 12 : Colony Count

Fig13 : Lactose broth gas formation

Fig 14 : Check of gram staining

Fig15 : Colony count of EMB media

List of ABBREVIATION

%	=	Percentage
:	=	Ratio
<	=	less than
>	=	greater than
/	=	per
°C	=	degree celsius
cfu	=	colony forming unit
fig	=	Figure
ml	=	milliliter
gm	=	gram
TVBC	=	Total viable bacteria count
TS	=	Total solid
NA	=	nutrient Agar
LB	=	lactose broth
EMB	=	Eosin methylene blue agar
μl	=	microliter
WHO	=	world Health Organization

TABEL CONTENT

SL.No.	Title	Page No.
01	Letter of Transmittal	I
02	Certification of Approval	II
03	Acknowledgement	III
04	Dedication	IV
05	Abstract	V
06	List of Table	VI
07	List of figures	VII

Chapter	Title	Page No.
1	INTRODUCTION	1-2
2	REVIEW OF LITERATURE	3-4
3	MATERIALS AND METHOD	5-15
4	RESULTS AND DISCUSSION	16-22
5	CONCLUSION	23
	REFERENCES	24

INTRODUCTION

1.0 History of cheese

According to ancient records passed down through the centuries, cheese is made for more than 4000 years. No one knows that who was made the first cheese. It is known from ancient history that it was made accidentally by an Arabian merchant who put his supply of milk into a pouch made from a sheep's stomach, one day he started the journey in the desert. The rennet in the lining of the pouch, combined with the heat of the sun, caused the milk to separate into curd and whey. That night he is found that the whey satisfied his thirst, and the cheese (curd) had a delightful flavour which satisfied his hunger.

1.1 Cheese (Brief Description):

What is cheese?

Word cheese –Latin causes meaning to ferment/ become sour. The cheese is the unique a dairy product. It's a solid food made from curdled milk from sheep, goats, caws, camel and other mammals ruminants. There are various types of cheese about over 4000 kinds of cheese in the world in wide ranging textures, flavors and forms.

The Cheese is a unique dairy product its format from milk that is produced sufficient range of flavors, textures, and form by coagulation of the milk protein casein. It is formation proteins and fat from milk, usually the milk of cows, buffalo, goats, or sheep. The time of production, the milk is usually acidified, and adding the enzyme rennet causes for coagulation. The solids parts are separated from whey and pressed into final form. the Most cheese melt at cooking temperature.

Hundreds types of cheese from different countries are produced. There is styles, textures, flavors and color depend on the origin of the milk because including the animal's diet, they have been pasteurized, and the butterfat content, the bacteria and mould, the processing, and aging. there are different types of spices, herbs or wood smoke may be used as flavoring agents. In many cheeses it is added from yellow to red color, such as Red Leicester, is produced by adding annatto and other ingredients may be added to some cheeses, such as black pepper, garlic, chives or cranberries. Approximately above 15% of annatto color used in the various types of cheese in the world.

Different types of rennet are also used for making cheese such as culf rennet, vegetarian rennet and Microorganism rennet. The Vegetarian alternatives to rennet are the available and

the most are produced by fermentation of the fungus *Mucor miehei*, but others have been extracted from different species of the *Cynara* thistle family.

1.2 OBJECTIVES

1. To prepare cheese spread by using Cream, mozzarella and cheddar cheese in different ratios.
2. To assess the sensory and chemical quality of cheese spread.
3. To assess the microbiological quality of cheese spread.
4. To estimate the cost of production of cheese spread.

Literature Review

This chapter provides to the literature related with this study. The first part covers the general information the cheese including the uses of them. The third part describes prepare the different type cheese, which are responsible for deteriorating the quality of cheese and the third part is related about the literature of this present study. Cheese represent a fast growing segment of food in world because of consumer demands for convenient and nutritious food products. The consumers demand has increased for the quality food products with taste, safety, convenience and nutrition. The chemical, technological, biological and sensory characteristics for cheese products have also been studied. However the literature available relevant to present study has been reviewed under the following headings.

- Functional activities
- Nutritional Attributes
- Composite Technology
- Biochemical and Nutritional Assay

2.0 Different types of cheese

1. Soft cheeses such as Brie, cream cheese, Camembert and feta it have been ripened for a short time.
2. Hard cheeses are ripened for the different lengths of time and range from semi hard to hard. They are including Cheddar, Gouda, Muenster, Parmesan and Romano.
3. Blue cheese are ripened by green molds and including Gorgonzola, Roquefort and stilton.

2.1 Common characteristic of Cheese

All cheeses have a few things in common

- ❖ The milk of the greater part of the milk protein and fat of the milk are concentrated in the cheese which is thus a very nutritious product.
- ❖ The cheese is storage time longer than milk and also longer than fermented milks. During keeping there are changes in its properties this is called ripening or maturation.
- ❖ Generally the cheese has a distinct and characteristic flavor due to greater number of flavor compounds formed during ripening. The process of ripening in the particular show great variation.

2.2 Biochemical Changes of Cheese

The ripening process are the most of ch biochemical changes are caused by one or more of the following agents:

- coagulant activity
- the indigenous of milk enzymes, and especially proteinase and lipase, which are the particularly most important in cheese made from the raw milk.
- the starter bacteria and their enzymes
- the most of secondary microorganisms and their enzymes
- non-starter the lactic acid bacteria.

3.0 General flow chart of cheese manufacture

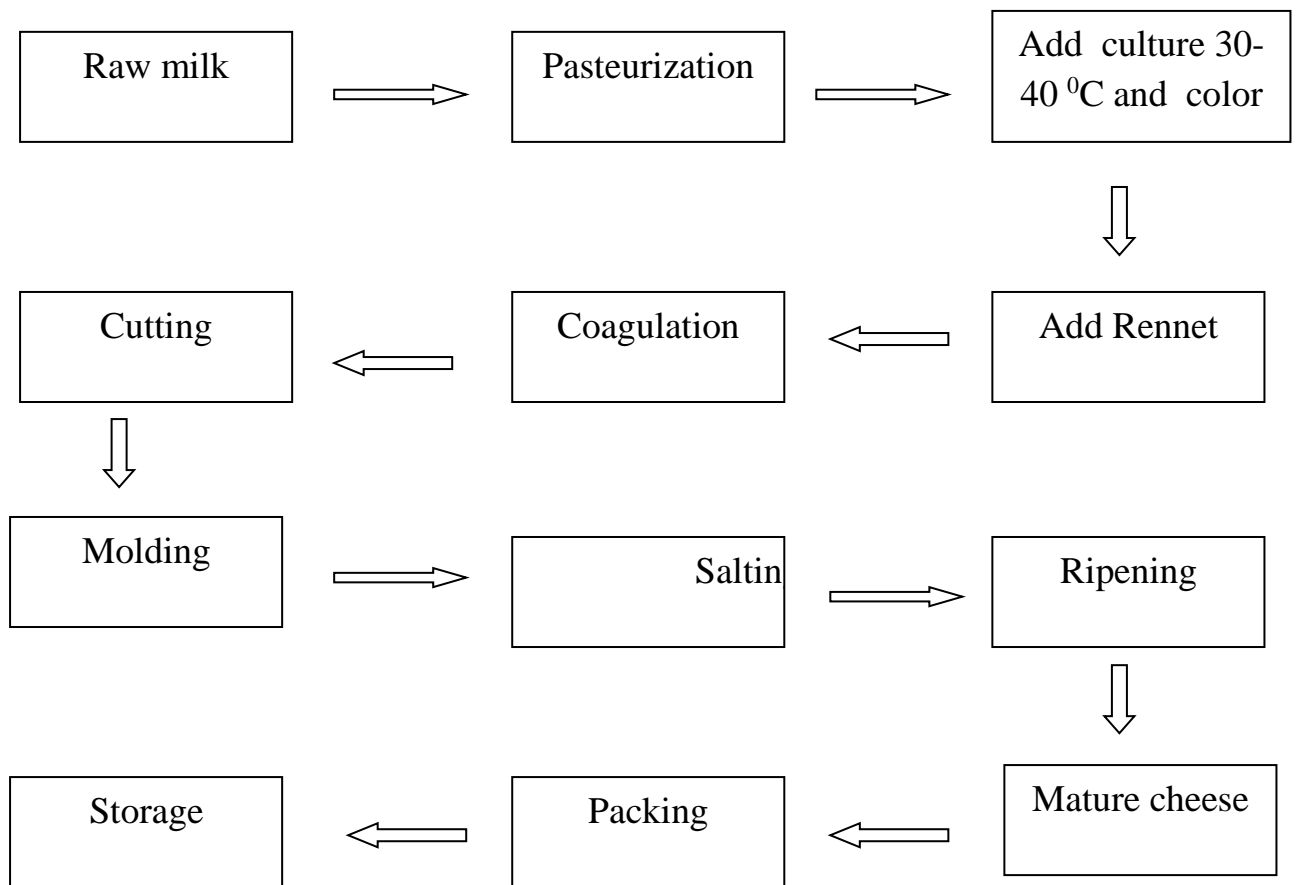


Fig 1: Flow chart of cheese processing

1. Raw milk
 - ❖ Selection
 - ❖ Pre-treatment
 - ❖ Standardization

2. Cheese Milk, Addition of:
 - ❖ Starter Culture (Acidification)
 - ❖ Colour (Optional)
 - ❖ CaCl₂ (Optional)
 - ❖ Coagulation

3. Coagulum (gel)
 - ❖ Cut coagulum
 - ❖ Stiring
 - ❖ Heat
 - ❖ Acidification

4. Curds
 - ❖ Acidification
 - ❖ Special operations
 - ❖ Salting
 - ❖ Moulding
 - ❖ pressing
5. Fresh Cheese
 - ✓ Ripening

6. Mature cheese

7. Packing & storage

Briefly description of flow

3.1 Raw milk

3.1.1 Selection of milk

The prepare of the cheese is required very high quality milk. The cheese milk is especially depend on protein, fat, calcium and P^H.. If the low-grade milk is selected to make cheeses, then it is not possible to make good quality cheeses. When is selected of milk to make cheese

the milk should be of very good microbiological quality, as the bacteria contamination will be concentrated in the curd and may cause defects in cheese or public health problems.

3.1.2 Standardization of Milk Composition

Milk is the first ingredient for preparing cheese. If we want to make good quality cheese then we need to collect good quality milk. In milk, various component nutrients of the raw milk are added, some ingredients are added, and standardization is increased.

The cheese making is depending on the ratio required, it can be modified by:

- Adding skim milk
- Removing some Milk fat by natural creaming
- Adding cream
- Adding micellar casein (prepared by ultrafiltration)
- Adding evaporated milk, adding milk powder, it increases total solids content of the milk.

3.1.3 Heat Treatment of Milk

The raw or heat treatment of milk for cheese can be both prepared. The heat treatment of milk usually applies to heat for raw milk 72-73 °C /15-20 seconds. The pasteurization is important for milk because the most of pathogenic organisms are destroyed and there is no growth. Pasteurization has two important parameters and it is recommended to be highly controlled for mainly two reasons.

- LTST low temperatures and shorter time are applied, will not effect properly on microorganism and thereby defects in the quality of the final product.
- HTLT high temperatures and longer time are applied, whey proteins are to high denatured influencing the coagulation process.

3.2 Cheese milk

3.2.1 Cheese colour

Color is the very important contribute of foods and serves as index quality. There are different types of color is use into the cheese, but the most of use carotenoid or annatto color in the cheese. Color is not essential use for preparation of cheese.

3.2.3 Acidification (Starter culture)

During the acidification high amount of starter culture used because the fast require acidification in the cheese preparation. when used the starter culture it can not control of

acidification rate but when the used of organic acid its most controllable of acidification. The starter culture are used in the cheese to increase flavor and texture.

3.2.5 Renneting (30-40 min)

The rennet is one kind of enzyme. There are different types of rennet found in the market. Usually there are three types of rennet available in the market such as vegetarian, animal, and microbial rennet. This enzymes is used for making cheese when the rennet is adding the milk coagulation and forming gel. The milk protein is coagulate when used rennet. When the rennet is used in milk, the milk protein becomes a gel form and it is called coagulation.

3.3 Coagulum (gel)

3.3.1 Cut Coagulum /Cutting gel

After added 30- 40 rennet when the milk is properly formatting to gel or curd shape then the curd small size cutting by knife. the curd or gel cutting to cubes size if the curd are formation very week it has synergies and the loss of fat protein with the way. For the hard cheese curd size into 5- 10 mm.

3.3.2 Stirring/scalding 30 min/ 40°C

After curd cutting The curd is continuously stirred in the whey until sufficient acid has been produced and whey is separated from the curd. For the controlling of water content the duration of stirring and scalding temperature are very importance. It must should be around 40°C. The Curd particles contract when the heating and as a result moisture is removed. The activity of the culture is influenced by the temperature from *Lactococcuslactis* sspl *cremoris* not growing when scalding while *Lactococcuslactis* ssp. *lactis* is more heat resistant.

3.3.3 Cheddaring

Cheddaring step is one the most unique in making cheddar type cheese. In which blocks of curds are piled on top of each other to expel moisture. Then the curds are milled and grounded in to small pieces, molded and pressed to give a crumbly texture to the final cheese..

3.3.4 Remove of curd from whey

When the cheese is cut in size cubes or another, water starts releasing from outside layer of the cheese and it is called whey. The whey to the cheese must be removed very well.

3.3.5 Salting

The manufacture of cheese is the last method of salting. The Salting method is promotes to synergies but it is not a satisfactory method for the controlling of moisture content of the cheese curd which is the best achieved by ensuring that the degree of acidification, heating and stirring in the cheese vat are appropriate to the particular variety. In the cheese salt has there are various types function. Although the salting method should be a very simple operation frequently it is not performed properly, with consequent adverse effects on cheese quality. The different types of cheese are used the several amount of salt. Acid production is

inadequate if the cheese contains over 5 to 5.5% salt in water, as at less than 4.5% salt concentration the lactic acid bacteria ferment too very fast

3.3.5.1 Brine Solution

The brine solution is the most of popular salting method. when the cheese are kept in the as a result loss of moisture and decrease growth of microbial activity. brine solution Generally cheeses are made from brine solution, mixed with 1750 ml of water with 250gm of salt. Then put this molding cheese into brine solution for 2-3 hours.

3.3.6 Molding / pressing

If the pressing is inadequate the structure of the final product may be affected negatively. The pressing time, the applied to pressure and the temperature of the curd is important to ensure a good quality of the product. Then from a quality point of view the pressing could be a CCP and the mentioned of parameters should be controlled.

3.4 Fresh Cheese

3.4.1 Ripening

Ripening the process is very important for cheese because during the ripening time is the control the color, flavor, texture improving. During the ripening are kept in the control of humidity and temperature. Usually the different types are used various ingredient and follow different method. As a result the various types of cheese are maintain ripening time. The most of rennet are coagulated the cheese are ripened curd matured for the period ranging from 2 week to more than 2 years. The curd formation are difference for every cheese. Ripening process during composition change of moisture, flavor, texture, aroma pH and biological formation activity. , the types of starter culture and in many cases by secondary inoculums added to, or gaining access to, the milk or curd.

3.5 Preparation of cheese

The cheese is the very valuable a dairy product. Hundreds of years ago people have been producing cheeses. All kinds of cheeses are produced in the world. The most of formula of all kinds of cheeses are almost near. On the basis of formula is changed of cheese texture, taste, color , flavor.

Requirement of Materials:

1. Fresh full cream raw milk
2. Starter culture
3. Rennet
4. Salt
5. Annato Color

6. Calcium chloride
7. Oil
8. Wax paper

Requirement of apparatus:

1. Knife
2. Stainless steel vat
3. Burner
4. Thermometer
5. Mould
6. Pressure device
7. Hand gloves
8. Muslin cloth
9. Incubator
10. Freeze

Ingredients of cheddar cheese

1. Raw milk ----- 5 litter
2. Culture ----- 1/8 tsp
3. Calcium chloride – 1.25 ml
4. Rennet ----- 1.25 ml
5. Annatto ----- 6 drops
6. Salt ----- ½ tbsp

Procedure steps:

1. At first the milk should be heated to 31 °C/ 88 °F
2. The next step add culture and wait for ripen 40 minute.
3. Then add Annatto (color) mixture.
4. Next add CaCl₂
5. Then mix 1.25 ml of rennet with ¼ cup water and add the mixture to the milk and wait for 40 min.
6. After 40 minutes the milk should be curd, if it is curd form then cut curd into 1.25 cm or 1/2 inch cubes by a knife.
7. Then allow curds to heat for 5 minutes and slowly increase heat to 39c/102f over 45 minutes. Stir continuously

8. Then allow to settle for 40 minutes then remove whey
9. Next cheddaring process, cut curd mass in half and turn each half, rest for 10 minutes and keep curd mass at 39c/102f then again and turn each half, rest for 10 minutes this system again.
10. Then the drain curd slabs and cut into 1.25 cm / ½ inch fingers then cubes and break cubes into halves (milling) and mix in salt.
11. This salt mixing milling curd press at 11kg/24lbs for 1 hours into cheese pressure this system turn then press again.
12. Then keep air dry for 2 to 3 days turning twice daily after 2 to 3 days cloth banding of cheese with muslin cloth and melt solid fat or oil coat cheese, start wrapping.
13. Then mature 10c 50f for 3 months minimum or longer for a sharper cheddar turn weekly.

3.7 Testing of control & experimental product.

1. Organoleptic Test:

- Color and appearance
- Body and texture
- Flavor
- Overall acceptability

2. Chemical analysis:

- Moisture
- Fat
- Protein
- Carbohydrate
- Ash

3. Microbial Analysis:

- TVBC test
- Coli form test.

3.7.1 Composition of nutrition value

Composition of Mozzarella cheese (per 100gm)

Component	percentage
protein	20.03
Fat	18
Ash	2.4
Moisture	54.96
pH	5.1

Table 3: Composition of mozzarella cheese

Composition of cheddar cheese (per 100gm)

Component	Percentage
Moisture	49
Fat	30
Protein	27
Ash	3.1
pH	4.7

Table 4 : Composition of cheddar cheese

Composition of cream cheese (per 100gm)

component	Percentage
Moisture	55
Fat	33
Protein	23
Ass	2.7
pH	4.4 to 4.9

Table 5 : Composition of cream cheese

3.8 Chemical Analysis

Determination of moisture percentage:

Moisture content in cheese spread was determined by digital moisture analyzer.

Determination of fat percentage

The fat content in cheese spread was determined by soxhlet extraction method.

Determination of protein percentage

The protein content of processed in cheese spread was determined by kjeldahl method.

Determination of Ash percentage

Ash content in cheese spread was determined by the method of muffle furnace.

Determination of pH

pH check in cheese spread was determined by digital pH meter.

3.9 Microbiological Test

Methods to follow:

Flow diagram :

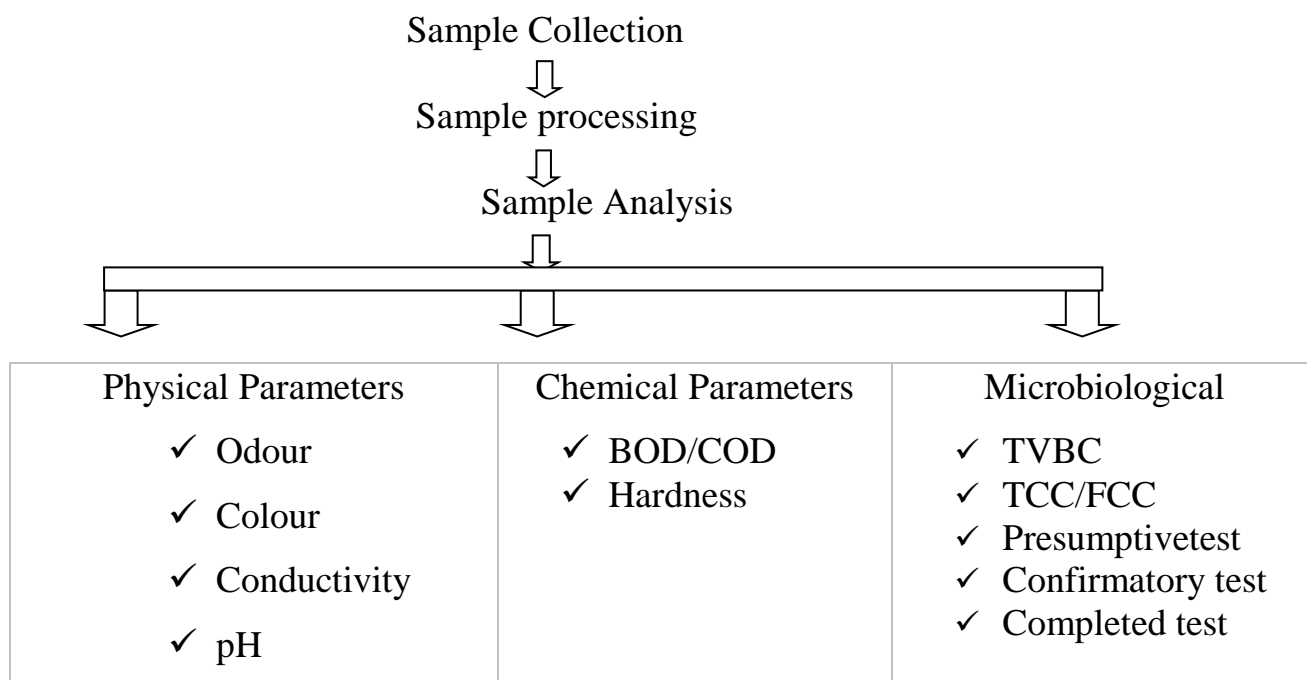


Fig 7: Flow chart of E-coli test

3.10 Microbiological Parameters

3.10.1 Total Viable Bacterial Count

For this test Nutrient Agar media prepared and autoclaved with other requirements. After autoclaving moved them to lamina air flow. Sample diluted to 10^{-1} – 10^{-3} and D2 and D3 used in plates for test. Nutrient Agar media poured the minimum amount 20 ml into plates and waited for setting. Then spreaded 100ul sample into plates with the spreader. Then incubated for 24 hours at 37C.

3.10.2 Total Coliform Count

Total Coliform test consist of three stages presumptive, confirmatory and completed test.

Presumptive Test: For presumptive test lactose broth media used to identify evidence of coliform. After preparing lactose broth media 25 ml placed it into test tubes with durham tube and then autoclaved. Then transferred to laminar air flow for next process. Direct 20 ml sample of cheese added to test tube containing lactose broth and kept in incubator at 37C for 24 hours.

3.10.3 Confirmatory Test: E-Coli (Gram Stain test) :

Used MacConkey Agar media to identify the possible coliform as gram positive or negative. MacConkey agar inhibits the growth of gram positive bacteria. After autoclaving the prepared media moved to laminar air flow for inoculation. Poured media into plates and waited for set up the gel. Then added 100ul of diluted sample of 10^{-1} , 10^{-2} and 10^{-3} into plates and spreaded finely. Then kept it in incubator at 37C for 24 hours.

3.10.4 Gram staining :

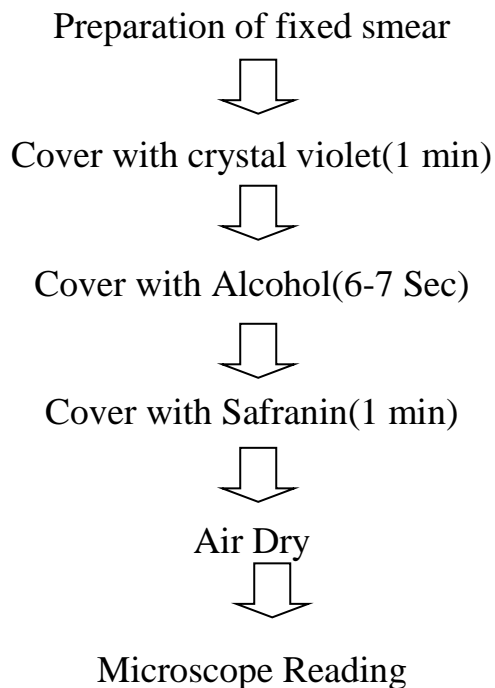


Fig 8: Flow chart gram stain

3.10.5 E-Coli Test for cheese

Eosin Methylene Blue Agar Eosin Methylene Blue Agar(EMB) used to identify bacteria characteristics. It inhibits the growth of gram positive bacteria. If the sample contain gram negative bacteria only they can survive. After preparing the EMB placed it into autoclave for sterilization. Then moved to laminar air flow for next process. Poured EMB media into plates and added 100ul of prepared cheese sample into it. Then spreaded finely with the glass spreader. Then kept it into incubator at 37C for 24 hours.

4.2 Physico chemical characteristics of cheese spread:

4.2.1 Fat percent in control and the experimental of cheese

It can be observed from upon the table. The percent fat of the three types of cheese spread. The highest percent of fat has contain such as cream cheese 33 % and mozzarella cheese 30% and cheddar cheese 18%. There are different types of cheese contain different percentage of fat because different types cheese process are different.

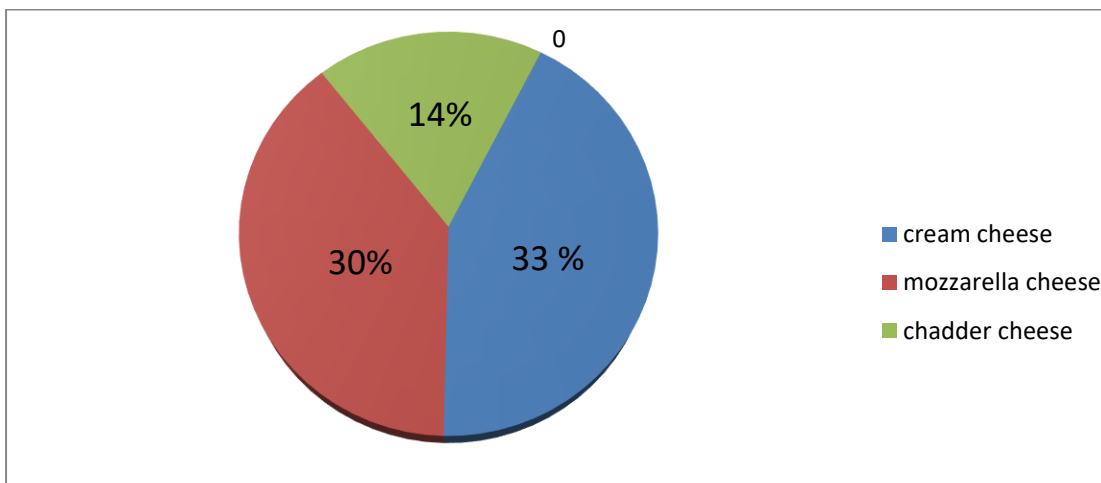


Fig 9: pie chart percentage of fat

4.2.2 Protein percent the experiment of cheese

It can be observed from upon the table 4.1..Three types of cheese spread is the highest percent of protein has contain such as cream cheese 23 % , mozzarella cheese 20.03% and cheddar cheese 27%.. There are different types of cheese contain different percentage of protein because it is different types of cheese process add various ingredient are different.

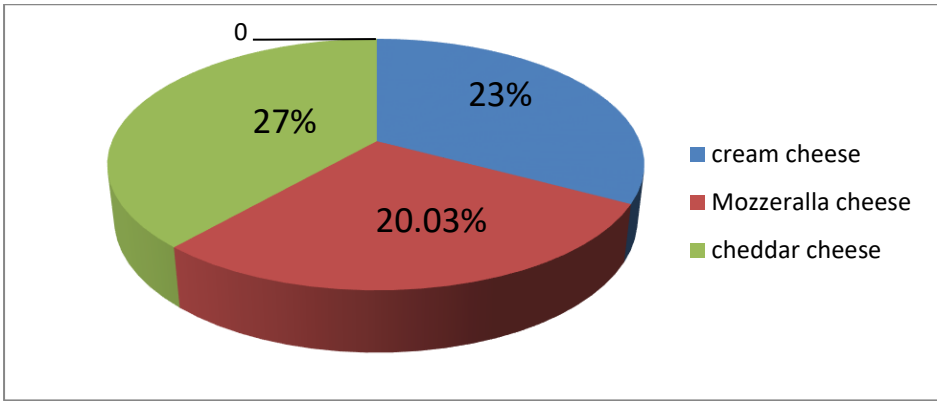


Fig 10 : pie chart percentage of protein

4.2.3 Moisture percent the experiment of cheese

It can be observed from upon three types of cheese spread is the height percent of moisture has contain such as cream cheese 55 % , mozzarella cheese 54.95% and cheddar cheese 49%. There are different types of cheese contain different percentage of moisture because it is different types of cheese process add salting ripening time are vary.

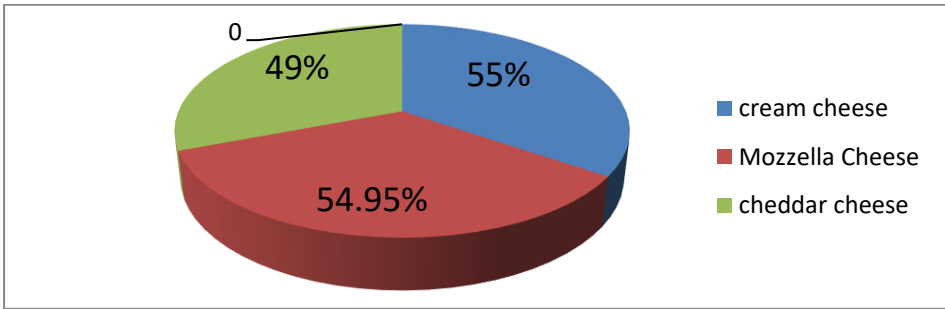


Fig 11 : pie chart of moisture percentage.

4.3 Result and discussion of microbiological Test

4.3.1 Total viable bacteria cont (TVBC):

All kind of bacteria are present in the sample. The most of bacteria are easily growth in the nutrient agar. For Total viable bacteria count are used nutrient agar.

Petri dish count of NA

Sample	Consented sample	D 10 ⁻²	D 10 ⁻³
Cheese	205 cfu	20 cfu	5 cfu

Table 7: Petri dish count of TVBC

Calculation:

Consented sample: 205 cfu

= 205 cfu/ 100 μ l

= 205 \times 10 = 2050 cfu/ 1 ml

= 2050 \times 100 = 205000 cfu

= 2.050 \times 10⁵ cfu

Result: 100 ml of consented cheese sample total TVBC 205000 cfu.

Dilution cheese sample: D 10⁻² = 5 cfu

= 20 cfu / 0.1 ml

= 2.0 \times 10⁻² = 200 cfu / 1ml

Dilution cheese sample: D 10⁻³ = 5 cfu

= 5 cfu / 100 μ l

= 0.05 \times 10⁻³ = 50 cfu

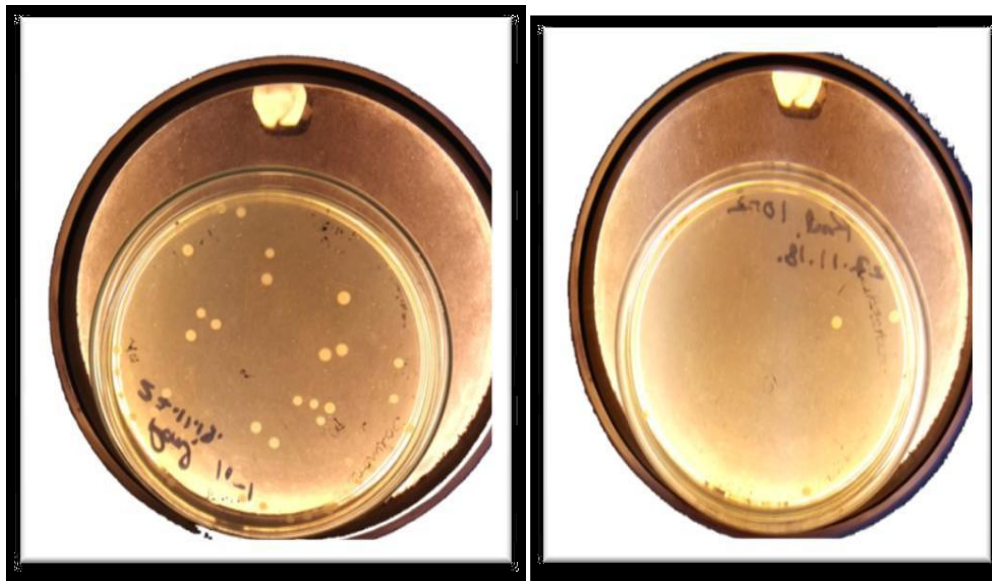


Fig 12 : Colony Count

The amount of bacteria that can be found in the mathematical term but more bacteria are found in the biological term. According to the mathematical calculation the amount of bacteria received in 10⁻² and ten times less than 10⁻³, but the finally is seen that it is much more available.

4.4 Result and discussion of E-coli.

4.4.1 Presumptive Test:

This test was done for both the sample cheese Lactose broth used as media for detecting the evidence of gas formation. Both the sample produced gas in the tube of lactose broth. The Durham tubes floated up with containing gas. This test shows that sample may contain coliform bacteria.

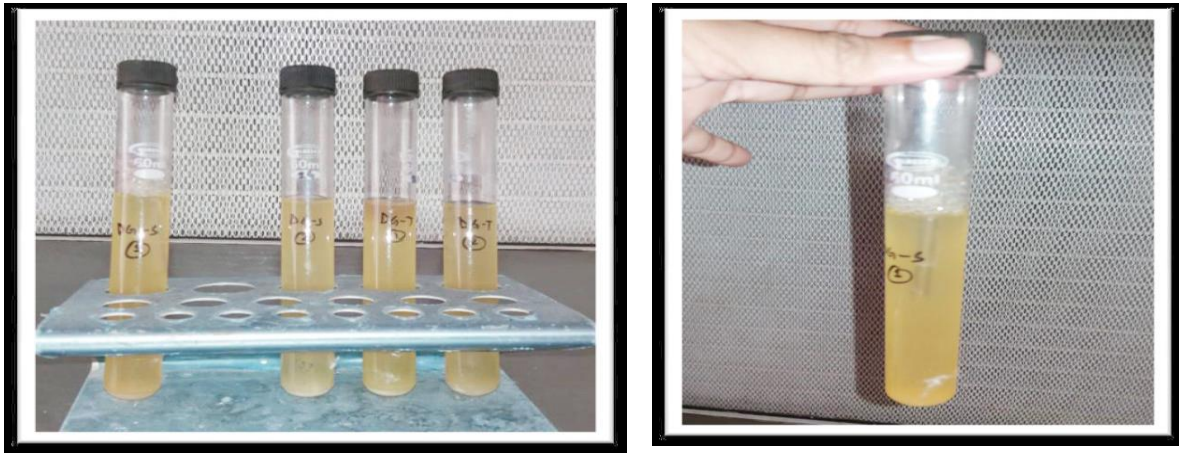


Fig 13 : Lactose broth gas formation

4.4.2 Confirmatory Test:

MacConkey Agar(Gram stain): There are some growth of bacteria on MacConkey agar media. To differentiate the bacteria we did gram staining to check it is gram positive or negative. Gram staining shows that it is rod shaped but contains violet color which means it is gram positive bacteria. So we found that this bacteria is not from coliform group(gram negative). The coliform bacteria is always show gram negative.

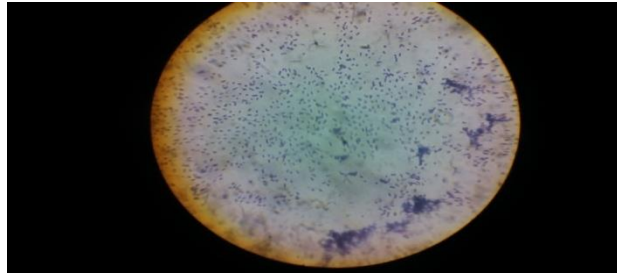
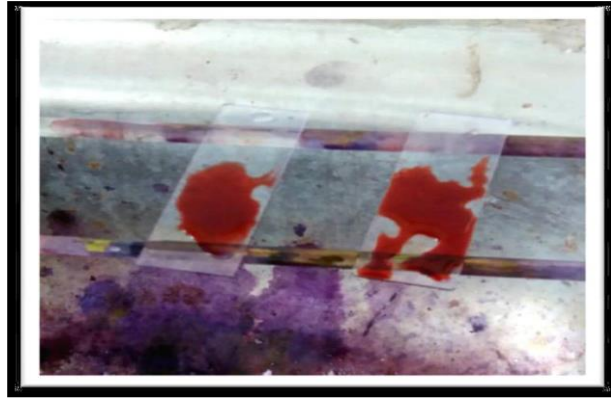


Fig 14 : check of gram staining

4.4.3 E-coli Test for cheese EMB Test :

This test confirms the presence of coli form bacteria. It will show different characteristics to identify which group bacteria it is. Usually EMB inhibits the growth of gram positive bacteria. coli aerogenes organisms produce characteristic colonies

Escherichia: small colonies, dark, almost black greenish, metallic sheen.

Enterobacter: Large, Pinkish mucoid colonies, dark centers, rare metallic sheen The result shows no sign of bacteria growth on EMB media plates. That means sample does not contain E-Coli.

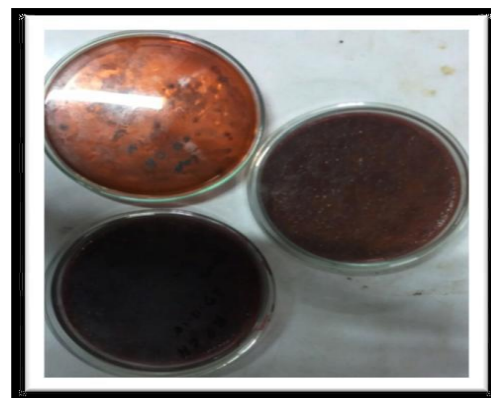


Fig 15 : Colony count of EMB media

4.4.5 Result of E-coli into different types of media

Sample	LB	MacConky Agar	EMB	Gram staining
Cream cheese	Gas from	E-coli not present	E-coli not present	Positive
Mozzarella cheese	Gas from	E-coli not present	E-coli not present	Positive
Cheddar cheese	Gas from	E-coli not present	E-coli not present	Positive

Table 8 : Result of E-coli into different types of media

4.5 Organoleptic Test:

panelist	Mozzarella cheese				Cheddar cheese				Cream cheese			
	Appearance & colour	Texture	Flavour	Taste	Appearance & Colour	Texture	Flavour	Taste	Appearance & colour	Texture	flavour	Taste
01	7	1	3	1	6	1	3	1	7	2	1	2
02	5.50	1	2	1	9	1	3	2	8	3	3	2
03	9	2	3	1	8	3	3	2	6	1	3	2
04	8	3	2	3	7	2	1	1	7.50	2	3	2
05	7	1	1	2	8	3	2	1	5	2	2	2

Table 6 : Result of organoleptic test

4.5.1 Result & Discussion of mozzarella cheese

The organoleptic test is appearance & color the maximum number is given 9 and minimum number 5.5 but average number is good. Three panelist is given result 1, is strike, one panelist is given 2, is not strike and another one panelist is given result 3, is ok. Two panelist is given result 2, is semi milky, one panelist is given 1, is milky and another two panelist is given result 3, is different. Three panelist is given result 1, is salty, one panelist is given 2, is sour and another one panelist is given result 3, is different.

4.5.2 Result & Discussion of cheddar cheese

The organoleptic test is appearance & color the maximum number is given 9 and minimum number 6 but average number is good and result is good. Two panelist is given result 1, is hard, one panelist is given 2, is semi hard and another two panelist is given result 3, is ok. Three panelist is given result 3, is different, one panelist is given 2, is semi milky and another one panelist is given result 3, is different. Three panelist is given result 1, is salty, one panelist is given 2, is sour.

4.5.3 Result & Discussion of cream cheese

The organoleptic test is appearance & color the maximum number is given 8 and minimum number 5 but average number is good and result is good. The maximum score <5 the product is reject. Three panelist is given result 2, is soft, one panelist is given 1, is semi soft and another one panelist is given result 3, is ok. Three panelist is given result 3, is different, one panelist is given 2, is semi milky and another one panelist is given result 1 is milky. The panelist is given result 2, is sour.

4.6 The panelist result of cheese

List of cheese	Texture			Flavour			Taste		
	Hard %	Semi Hard %	Ok %	Milky %	Semi Milky %	different %	salty %	sour %	different %
Mozzarella cheese	60	20	20	20	40	40	60	20	20
Cheddar cheese	40	20	40	20	20	60	60	20	20
Cream cheese	60 soft	20 Semi soft	20	20	20	60	-	100	-

Table 7 : Sensory evaluation of panelist result

CONCLUSION

CHAPTER FIVE

CONCLUSION:

The manufacturing of the cheese production is passing step into complex a process that includes has many manufacture steps and the unit operations which all the affect the quality of the product. The Cheese is a hard semi hard and soft cream dairy product is carried from milk it is produced in a sufficient the range of flavors, textures, colour and forms by coagulation of the milk protein casein. The cheese is a dairy product its do not carefully handling as a result microbial effects on the cheese. In my study there are different types of test apply in the cheese such as organoleptic test result was found average very good and the chemical analysis found it is very satisfaction. The microbial test is very important for the cheese. There was applied the different types of microbial test such as TVBC test, E-coli test. This types of test has different step following such as presumptive test, confirmatory test and completed test. The step by step test was followed and complete for E-coli test. The cheese is very sensitive product so it will be apply well packaged and storage at low temperature. Further,study should be focused on the cheese based on the various type of milk, beneficial bacteriarole and their metabolites function in cheese. Those studies might enhance the nutritional roleof cheese.

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