

PREPARATION OF YOGURT FORTIFIED WITH ALOEVERA

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Technology degree in Biotechnology.

by

ABINAYA P (37230001)



**DEPARTMENT OF BIOTECHNOLOGY SCHOOL
OF BIO AND CHEMICAL ENGINEERING**

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

**Accredited with Grade "A" by NAAC | 12B Status by UGC | Approved by AICTE
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119**

April - 2021



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of Abinaya P (37230001) who carried out the project entitled Dr.V.Ramesh Kumar under my supervisor from January 2021 to April 2021.

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DECLARATION

I **Abinaya P** hereby declare that the Project Report entitled "**PREPARATION OF YOGURT FORTIFIED WITH ALOE VERA**" done by me under the guidance of **Dr.V. Ramesh Kumar** (Internal) at Head of the Department of Biotechnology, Sathyabama Institute of Science and Technology, Chennai is submitted in partial fulfillment of the requirements for the award of Bachelor of Technology degree in Sathyabama Institute of Science and Technology, Chennai.

DATE:15.04.2021

PLACE:CHENNAI

SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of SATHYABAMA for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to Dr.V. Ramesh Kumar and Dr. Narendra Kumar, Head of the Department, Dept. of Biotechnology for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide Dr.V. Ramesh Kumar suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Biotechnology who were helpful in many ways for the completion of the project.

ABSTRACT:

Preparation of fortified yogurt with Aloe Vera (Aloe Vera yogurt) is a natural and traditional method. Aloe vera has some health benefit, these are beta-carotene is a yellow-red pigment it's found in aloe vera. Eating milk product food daily, that specific yogurt, helps to nutritional benefits recommendations. The most important function benefits of Aloe vera yogurt are digestive health, lowering cholesterol, joint health and immune system boosting. Adding Aloe Vera as a natural ingredient in yogurts provides the correct combination of nutrition and taste. Aloe Vera is a medical plant and also known for its anti-inflammatory, skin protect, anti-viral, antiseptic and etc. Yogurt is a everyday using milk product so Aloe vera adding in yogurt, it will give maximum health and medical and health benefits. yogurt is made with a type of ingredients including cow milk and Aloe vera extract. During the study cow milk yogurt fortified with Aloe vera was analyze for color, flavors, body and texture, taste, & contamination. Aloe vera extract added 50% and milk added 50% both are added equal amount because its main source aloe vera health benefits. Aloe vera extraction is a main job in this work and removal of bitterness. This method also traditional and aloe vera has 90% of water content, so extraction process was properly. The aloe vera yogurt daily checked the contamination, taste, smell, quality and etc., everything is good. The yogurt has maximum solid content. The main objective of this research work was to optimize the levels of Aloe vera in yogurt, to investigate the Physico-chemical, textural properties and sensory changes of yogurt added by Aloe vera and to analyze microbial properties and effect of storage period time of yogurt. The yogurt samples were prepared by using cow milk procured from house, The Physico-chemical attributes determined were fat, protein, moisture, total solids, ash, pH, acidity and color characteristics of yogurt. The sensory evaluation was carried out in respect of color and appearance, flavor, body and texture, taste and overall acceptability. The levels of Aloe vera for final experimental trials were finalized in PR experimental trials on the basis of sensory evaluation. The levels were selected as 20 and 50 per cent for further study. Finally check the Antimicrobial activity and isolate and identify the microorganisms (*Streptococcus* sp. and *Lactobacillus* sp.). This aloe vera yogurt product will be taking 3 days within contamination without refrigerator, it is kept in refrigerated at 40°F after 25 days it will be contaminated.

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LIST OF ABBREVIATIONS

- 1. TGYA Tryptone Glucose Yeast Agar**
- 2. MRS Man, Rogosa and Sharpe agar**
- 3. SP. Species**
- 4. °C Celsius**
- 5. °F Fahrenheit**
- 6. Hrs Hours**
- 7. WHO World Health Organization**
- 8. FAO Food and Agriculture Organization**

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CHAPTER-1. INTRODUCTION:

The fermented dairy products such as yogurts into the diet of human being is thought to date back to the dawn of the civilization. The use of yogurt as a calcium amount has made it one of the most fast-growing milk products, but presently it is more than just a calcium amount. Yogurt same to the fermented dairy products are on the way to becoming most nutraceuticals aimed at handle a types of disease conditions. Specific types of yogurt product produced for dietetic and/or therapeutic purposes are known as bio-yogurt. Aloe vera yogurt first found in japan. This product maximum available in American and japan countries. It is Japanese-style aloe vera yogurt because Japanese are first found the aloe Vera yogurt. Yogurt is a special milk product because the starter cultures actually synthesis that β - galactosidase enzyme which breaks the main carbohydrate in milk during fermentation. Thus, the cow milk sugar in aloe vera yogurt is faster digested, even for lactose-intolerant individuals. For about 100 years, Liliaceae family has been used as functional agent in different types foods and also has been applied as a traditional medicine for treatment of digestive and viral diseases.

Aloe vera is a member of the lily family (Liliaceae) and use of Aloe vera juice in the yogurt will be a promising trend towards use of herb as well as functional ingredients in the dairy foods. The addition of Aloe vera juice may improve the activity of starter cultures in the product. Yogurts are also mostly healthy having high amount of minerals, antioxidant, dietary fibers, vitamins and maximum other benefit nutrients. Traditional of Indian milk products our country, can be using to effectively as carrier for herbal to satisfying to the needs of health-conscious consumers. Aloe vera is one of the oldest known as medicine plants gave by nature. Aloe vera also called miracle plant, is known by different names. There are over Two hundred types of Aloe vera and of these only four or five are most commonly used in pharmacy. The most used variety of Aloe vera is Barbadense Millar. This is the perennial, succulent plant with stiff fleshy leaves kind of aloe vera. Aloe vera is a clean clear thin gelatin material that comes from inside the Aloe vera plant. when administered in adequate amounts, confers health benefit to the host" (Araya et al. 2002) [1]. Lactobacillus and Bifidobacterium species are the most common probiotics. An important characteristic of probiotic bacteria is that they need to survive through the gastrointestinal.

Yogurt is a fermented milk or product made from fresh cow milk and or reconstituted milk by using bacteria, such as *Lactobacillus bulgaricus* and *Streptococcus thermophilus* with or without any additional food ingredients materials and permitted food additives” (Tammie and Robinson, 1999) [11]. Probiotic food products have been consumed by the human being in the form of fermented foods for many years. According to FAO/WHO probiotics are: “Live microorganisms which, Nal tract of the host.

Special types of yogurt manufactured for dietetic and/or healing purposes are known as bio-yogurt (Kaur et al. 2015) [4]. Yogurt has smooth texture and a mild sour and pleasant flavor. It is obtained from pasteurized or boiling heat milk soured by naturally present or lactic acid fermenting bacteria i.e., *Lactobacillus* sp. and *Streptococcus* sp., The sensory characteristics of Aloe vera yogurt are due to its content of carbonyl, mainly acetaldehyde, acetone, diacetyl and ethanol produced by yogurt bacteria. The high amount level of yogurt is in Mediterranean, Asia and central Europe countries. Aloe vera Yogurt has for its nutritious food, healing, and probiotic effects of such as digestion strengthening, immune system elevates, anticarcinogenic activity and reduction of serum cholesterol (Penna et al. 2007; Najafi et al. 2008) [9, 6]. Savary and its extracts have long to be used as natural remedies for cured health related problems intricacy and metabolic disorders problems. Imbued with several functional components, they can react a wide range of the biological functional. A considerable portion of today’s useful food market consists of herbal improve functional foods.

Traditional Indian milk dairy products the country, can be used energetically as carrier for herbs to satisfy the needs of health-aware consumers. Aloe vera is one of the oldest known medicinal plants gifted by nature. Aloe vera, often called miracle plant, is known by many names. It is having above 200 types of Aloe vera plants and of these only 5 or 6 are commonly used in medicine. The most used variety of Aloe vera is *Barbadense* Millar. It is perennial, succulent plant with stiff fleshy leaves plant. Aloe vera is a full Japanese-style yogurt brand Aloe is expanding its range in the US with the addition of new Aloe vera yogurt drinks? While the Aloe vera plant is most often seen in health and health products, Aloe vera drinkable are increasing in the mainstream markets after being produced in Asia for decades. Colleen Sherfey, senior director of marketing at Aloe said: “Our buyers and retailers are looking for something new. "Aloe vera is a new drinkable food, which comes in Aloe vera, coconut and strawberry banana flavors is expected in early 2019. Sherfey describes the Aloe taste as silkier and smoother than traditional yogurt. The new drinkables are made with milk sourced from California and Aloe vera from Thailand. thin gelatinous material that comes from inside the Aloe vera leaves (Neal, 1965) [8]

CHAPTER-2. LITERATURE SURVEY:

The main objective of this research work was to optimize the levels of Aloe vera in yogurt, to investigate the Physico-chemical, textural properties and sensory changes of yogurt added by Aloe vera and to analyze microbial properties and effect of storage period of yogurt. The yogurt samples were prepared by using cow milk procured from Research cum Development Project on Cattle, M.P.K.V., Rahuri, Dist. Ahmednagar. The Physico-chemical attributes determined were fat, protein, moisture, total solids, ash, pH, acidity and color characteristics of yogurt. The sensory evaluation was carried out in respect of color and appearance, flavor, body and texture, taste and overall acceptability. The levels of Aloe vera for final experimental trials were finalized in pre-experimental trials on the basis of sensory evaluation. Kaur et al. 2015) [4]. (Tammie and Robinson, 1999) [11] , (Penna et al. 2007; Najafi et al. 2008) [9, 6]. "Our buyers and retailers are looking for something new. "Aloe vera is a new drinkable food, which comes in Aloe vera, coconut and strawberry banana flavors is expected in early 2019. Sherfey describes the Aloe taste as silkier and smoother than traditional yogurt. The new drinkables are made with milk sourced from California and Aloe vera from Thailand. thin gelatinous material that comes from inside the Aloe vera leaves (Neal, 1965) [8]. Special types of yogurt manufactured for dietetic and/or healing purposes are known as bio-yogurt (Kaur et al. 2015) [4]. This is the perennial, succulent plant with stiff fleshy leaves kind of aloe vera. Aloe vera is a clean clear thin gelatin material that comes from inside the Aloe vera plant. when administered in adequate amounts, confers health benefit to the host" (Araya et al. 2002) [1]. Yogurt is a fermented milk or product made from fresh cow milk and or reconstituted milk by using bacteria, such as lactobacillus bulgaricus and streptococcus thermophilus with or without any additional food ingredients materials and permitted food additives" (Tammie and Robinson, 1999) [11].

CHAPTER-3.AIM & SCOPE:

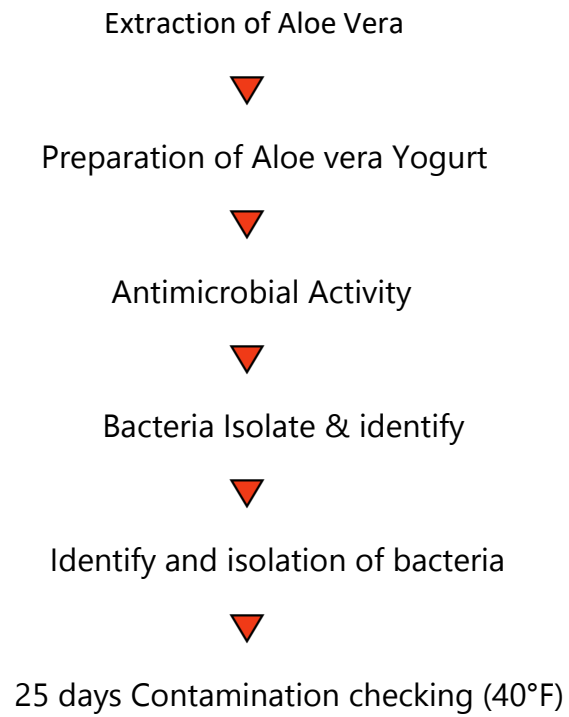
- Production of yogurt using aloe vera
- Identify the Antimicrobial activity of aloe vera yogurt
- Isolate and identify the microorganisms
- The main objective of present investigation was to study the effect of Aloe vera on physical and microbial properties of yogurt.

CHAPTER-4.MATERIALS & METHODS:

4.1 MATERIALS:

- Aloe vera (Extract 50%)
- Cow Milk 50%
- Curd (10%)
- Lemon
- Ice water
- Bowl & glass bottle
- Knife
- Tryptone Glucose Yeast Agar (TGYA)
- MRS Medium
- Conical flask
- Culture plate
- Glass slide
- Incubator
- Refrigerator
- Microscope

4.2. METHODS:



4.2.1. EXTRACTION OF ALOE VERA:

Extraction of Aloe vera juice from the Aloe vera. Cultivated of Aloe vera plant and remove and peel the skin, cut small pieces and wash into the cold-water then soak into the cold water and add 2ml of lemon juice after 2hrs, transfer another bowl then add sugar and kept in 30 mins. Then grind the pieces, extract the aloe vera juice. In with the present invention an extract of aloe vera juice is prepared by first sterilizing clean the whole leaf plant. The grind and aloe vera layer are then physically separated from the gel in the leaf to remove the grind and a layer to a depth of approximately 10 inches.

Aloe Vera juice was extraction using cold extraction method then juice was prepared. Freshly cultivated Aloe Vera leaves were lemon water, sugar& cooling water and washed properly with tap water and kept for flash cooling to 50°C for gel stabilization. Treating after stabilizing the Aloe Vera cut small pieces into two halves and gel was separated using steel knife, allowed to settle for 12 hours and then finally homogenized using mixer grinder and enzymatically treated for 20 minutes. Then it is filter & clean and transfer to another bowl. Further it was detreated, heating, flash cooled and stored.

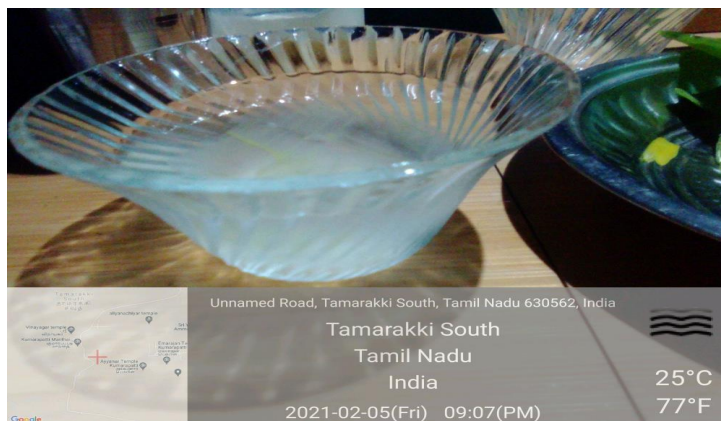
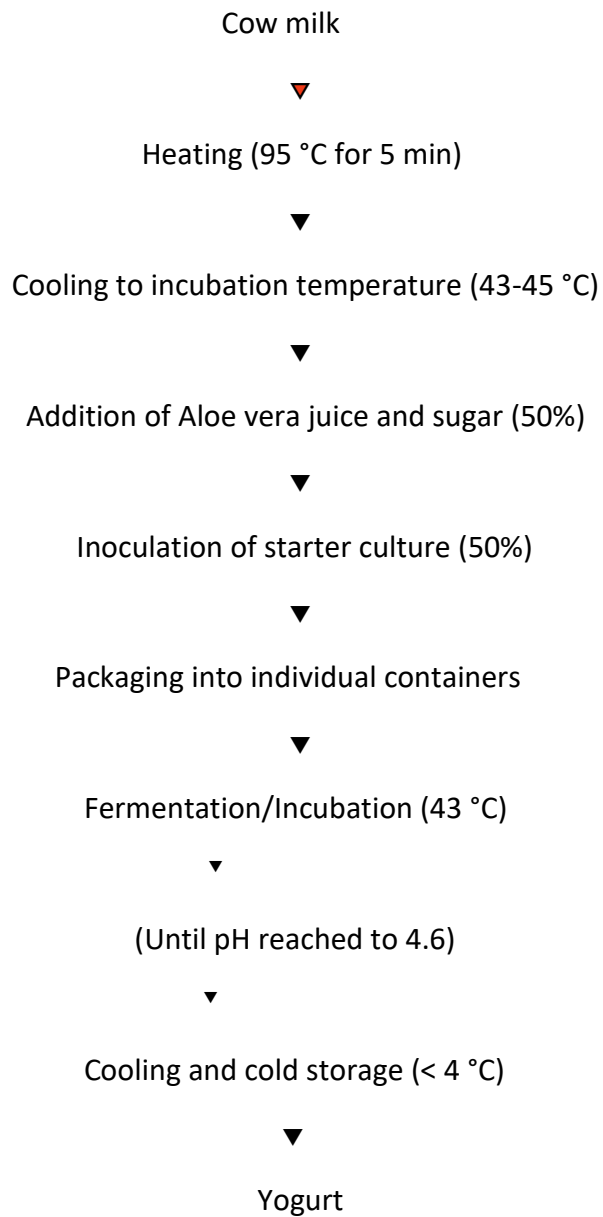


Fig.4.2.1. Aloe vera Extract

4.3. PREPARATION OF YOGURT:

4.3.1: FLOWCHART OF YOGURT PREPARATION



Fresh cow milk was cultivated, then milk was heating at 100°C/30 min. While heating, sugar (30%) and was added. Then the milk was cooled and starter culture was inoculated at and incubated for about 4 hrs. until pH drops to 4.6. while adding of Aloe Vera juice with 50% levels. Finally, yogurt drink was refrigerated at 4 °C.

- **Heat the milk to 180 degrees Fahrenheit:** This kills whatever unwanted microbes may be lurking in milk and ensures got no remnant bacteria, pathogens, mold, or spores. When create an environment for bacteria to multiple, only want the good bacteria to multiply. Heating the milk also creates a thicker level.
- **Cool the milk to Room Temperature:** after heated the milk was cooling at room temperature.
- **Add yogurt starter** – the good bacteria. Pour out of 50% warm milk and stir in either a yogurt starter or 10% of curd. For a good starter, look for lactic acid forming bacteria.
- **the yogurt culture with the rest of the milk:** This spread moves the good bacteria through the all of the milk.
- **Pour the milk into jars and incubate for 7-9 hours:** A consistent, warm temperature is paradise for all good bacteria and promotes their growth. The longer incubate yogurt the thicker and tangier it'll be. And after about 12 hours, it has delicious, healthy, thick and creamy yogurt.
- **Place the jars in the fridge to cool and set:** Cool the yogurt in the refrigerator for 30 days. the yogurt cooling it will get thick and solid structure.

4.4. ANTIMICROBIAL ACTIVITY:

The yogurt microorganisms were grown in MRS medium, TJA, Tryptone Glucose Yeast Agar (TGYA) and TGYA with 3% yogurt. Antimicrobial. Prepared yogurt culture media then spread on the agar plate, next kept in the incubator, after 4 days check the bacterial growth and identify the bacteria. activity of aloe vera yogurt is growth of bacteria on the yogurt culture plate, identify the unwanted bacterial growth but unwanted bacteria were not growth. The microorganisms obtained from the yogurt products cultured in with 3% yogurt produced colonies that were small, round, smooth, convex, white and moist. The Gram-stained smears showed both gram-positive cocci in pairs or long chains, and gram-positive, non-spore forming bacilli occurring singly, in short or long chains. These are consistent with the microscopic seen of *Streptococcus sp.* and *Lactobacillus sp.*, the microorganisms in yogurt.

4.5. Identify & isolate bacteria:

The growth of bacteria cultivated on the microscopic glass slide then fix the microscope next identify the bacteria. The probiotics obtained from the yogurt products cultured in with 3% yogurt produced colonies that were small, round, smooth, convex, white and moist. The Gram-stained smears showed both gram-positive cocci in pairs or long chains, and gram-positive, non-spore forming bacilli occurring singly, in short or long chains. These are consistent with the microscopic seen of *Streptococcus sp.* and *Lactobacillus sp.*, the microorganisms in yogurt.

5.RESULT & DISSCUSSION:

5.1. ALOE VERA YOGURT:

Aloe vera yogurt is a new flavor of yogurt, it's had maximum health benefits. The pH of the samples was measured at 4 days. Taste, color, smell, shelf life, total solids, total soluble solids, and contamination these are analyze the yogurt. Its new flavors of yogurt and it's had different health benefits. Aloe Vera is applied externally for skin care, but eating it provides a nutritional healthy complement and is considered to have more benefits than when applied overly: Aloe Vera is a liver detoxifier, it provides vitamins and minerals, is heart healthy and boosts the immune system. This aloe vera yogurt it sweetest taste, white color, fresh smell and thick creamy yogurt.

5.2. COLOUR AND APPERANCE:

This is white color yogurt because aloe vera jell has no color so yogurt has white color. That is color white and depends on the concentration. The leaves have greenish color but these are removed but inside part only cultivated. The color was good and appearance also good.

5.3. TASTE:

It is having sweetest taste & taste is good, not bitterness, many varieties of yogurt come adorned with additives ranging from honey to fruit preserves to balance out the flavor. But now added to the Aloe vera so it has new type of taste. Aloe vera have bitterness but that's removed, it is only sweetest thing. First added 20% of aloe vera extract that's had non much of taste then added 50% of aloe vera extract then its taste is good and great. It is new flavor of taste.

5.4. MOISTURE & SOLID:

Yogurt was prepared by using different levels of Aloe vera (20 and 50 per cent). ... The chemical composition of yogurt prepared by addition of 50% Aloe vera having maximum amount of moisture. This yogurt creamy and maximum solid soluble.

5.5. DETERMITION OF PH:

The PH was checked used to the PH paper that is blue yellow color so pH4- 4.6 at 26 °C.

5.6. SHELF LIFE OF DEVELOPED ALOE VERA INCORPORATED DRINKING YOGURT:

Shelf life of the developed drinking yoghurt was 30 days. According to the yogurt standard, pH value should not be more than 4.6 in yogurt value was not in acceptable range after 40 days of production and also titratable acidity was exceeded acceptable limit. According to the pH variation, product could be stored up to 30 days in refrigerator at 40°F.

5.7. CONTAMINATION:

This aloe vera yogurt product will be taking 3 days within contamination without refrigerator, it is kept in refrigerated at 40°F after 25 days it will be contaminated. The shelf life of yogurt is 10–21 days. For liquid yogurt, the shelf life is 4–10 days and for yogurt cheese the shelf life is 7–14 days when refrigerated at 40°F. Yogurt can also be frozen for several months, but this may alter its texture.

5.8. ANTIMICROBIAL ACTIVITY:

Antimicrobial activity of aloe vera yogurt is growth of bacteria on the yogurt culture plate, identify the unwanted bacterial growth but unwanted bacteria were not growth. The microorganisms obtained from the yogurt products cultured in with 3% yogurt produced colonies that were small, round, smooth, convex, white and moist. The Gram-stained smears showed both gram-positive cocci in pairs or long chains, and gram-positive, non-spore forming bacilli occurring singly, in short or long chains. These are consistent with the microscopic seen of *Streptococcus sp.* and *Lactobacillus sp.*, the microorganisms in yogurt.



Fig. 5.8.1 Antimicrobial activity of aloe vera yogurt

5.9. IDENTIFY and ISOLATE OF BACTERIA:

The microorganisms obtained from the yogurt products cultured in with 3% yogurt produced colonies that were small, round, smooth, convex, white and moist. The Gram-stained smears showed both gram-positive cocci in pairs or long chains, and gram-positive, non-spore forming bacilli occurring singly, in short or long chains. These are consistent with the microscopic seen of *Streptococcus sp.* and *Lactobacillus sp.*, the microorganisms in yogurt.

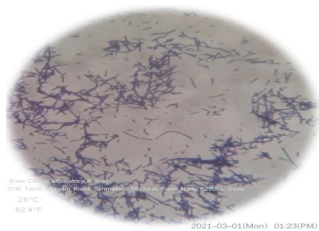


Fig.5.9.1. Streptococcus sp. and Lactobacillus sp.

Table 5.1: Aloe vera physical-chemical & microbial properties:

Aloe vera yogurt	Appearance	Quality
Taste	Sweetest	Good
Color	White	Good
PH	Blue-yellow	4.6
Contamination	Smell, taste and texture change after 30 days.	20-25 days (4°C/40°F) 3-5 days (room temperature)
Smell	Fresh	Good
Bacteria	<i>Streptococcus sp.</i> & <i>Lactobacillus sp.</i>	Present & Good bacteria for human
Fungi	No	No

5.10. BENEFITS OF ALOE VERA YOGURT:

- its benefits to skin,
- Aloe Vera Yogurt is also rich in vitamin D3 and calcium that help maintain a healthy body and good shape.
- Eating yogurt with fresh Aloe Vera every day is an easy yet efficient way to give good care to your skin and body from inside.
- Aloe Vera is a liver detoxifier,
- it provides vitamins and minerals, prevents constipation,
- It is heart healthy and boosts the immune system.
- A good source of protein and calcium
- For constipation
- For clear skin
- Nutritious boost
- Heartburn relief
- Digestive benefits
- Beauty hacks
- It's Rich in Important Nutrients. Yogurt contains some of nearly every nutrient that your body needs
- It's High in Protein
- Some Varieties May Benefit Digestive Health
- It May Strengthen Your Immune System
- It May Protect Against Osteoporosis
- It May Benefit Heart Health
- It May Promote Weight Management.



Fig.5.1. Aloe vera yogurt materials

Aloe vera yogurt process needs to all materials and work process materials. Milk, aloe vera, ice water, lemon & curd.



Fig.5.2. Aloe vera Extract

Extraction of Aloe vera juice from the Aloe vera. Cultivated of Aloe vera plant and remove and peel the skin, cut small pieces and wash into the cold-water then soak into the cold water and add 2ml of lemon juice after 2hrs, transfer another bowl then add sugar and kept in 30 mins. Then grind the pieces, extract the aloe vera juice.



Fig.5.3. Aloe vera yogurt before fermentation

Aloe vera extract, milk, curd & sugar these are after mix ready to the fermented process.



Fig.5.4. Aloe vera yogurt after 12hrs fermented

After fermented process at 12hrs, ready to the Aloe vera yogurt, next keep in the refrigerator at (4°C/40°F).



Fig.5.5. Aloe vera yogurt kept refrigerator at (4°C/40°F)

The Aloe vera yogurt kept in refrigerator at (4°C/40°F), every day check the contamination, smell, taste & texture.

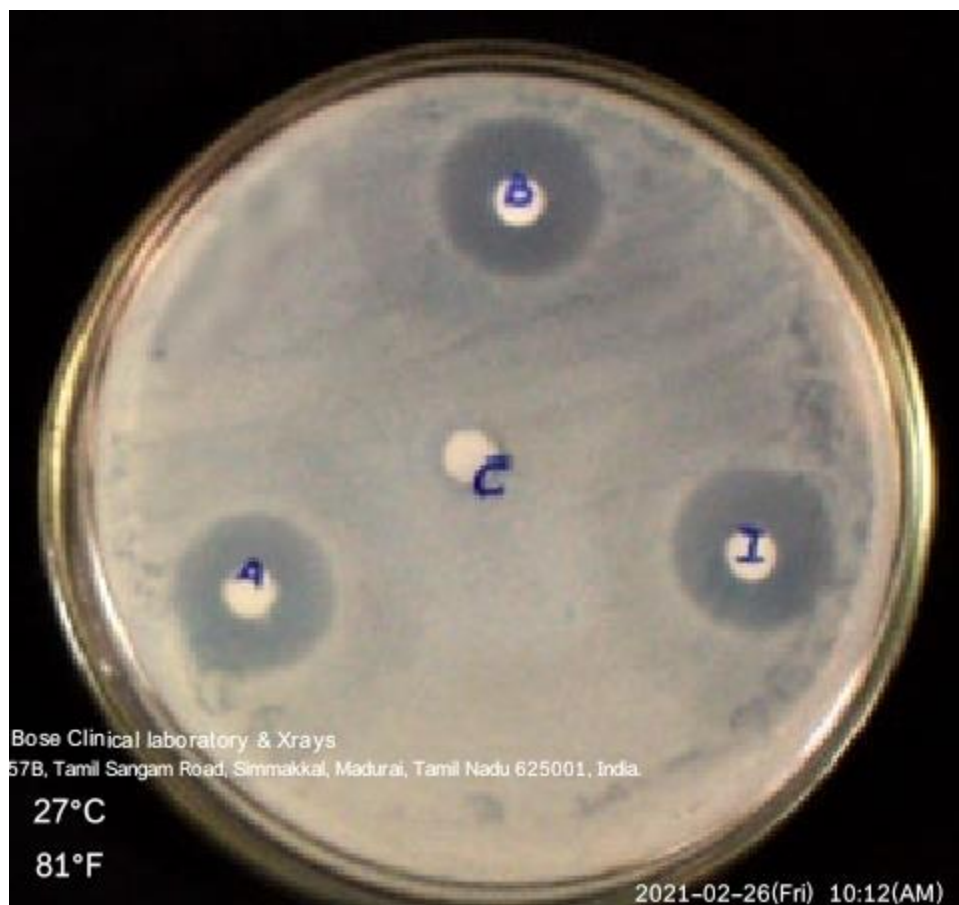


Fig.5.6. Antimicrobial Activity of Aloe vera yogurt

The probiotics obtained from the yogurt products cultured in with 3% yogurt produced colonies that were small, round, smooth, convex, white and moist. Around antibody area bacteria not growth.



Fig.5.7. Bacterial growth of culture plate

The microorganisms obtained from the yogurt products cultured in with 3% yogurt produced colonies that were small, round, smooth, convex, white and moist.

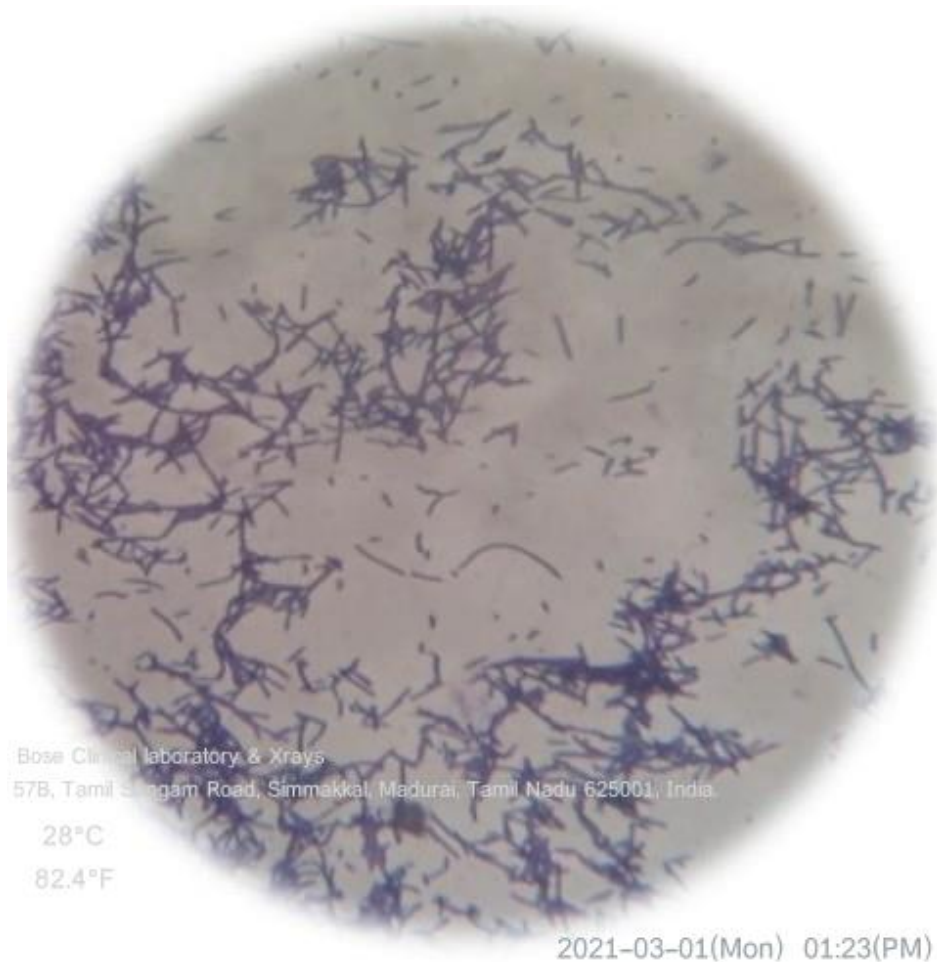


Fig.5.8. Identify & isolate of bacteria (*Streptococcus* sp. & *Lactobacillus* sp.)

The microorganisms obtained from the yogurt products cultured in with 3% yogurt produced colonies that were small, round, smooth, convex, white and moist. The Gram-stained smears showed both gram-positive cocci in pairs or long chains, and gram-positive, nonperforming bacilli occurring singly, in short or long chains. These are consistent with the microscopic seen of *Streptococcus* sp. and *Lactobacillus* sp., the microorganisms in yogurt.

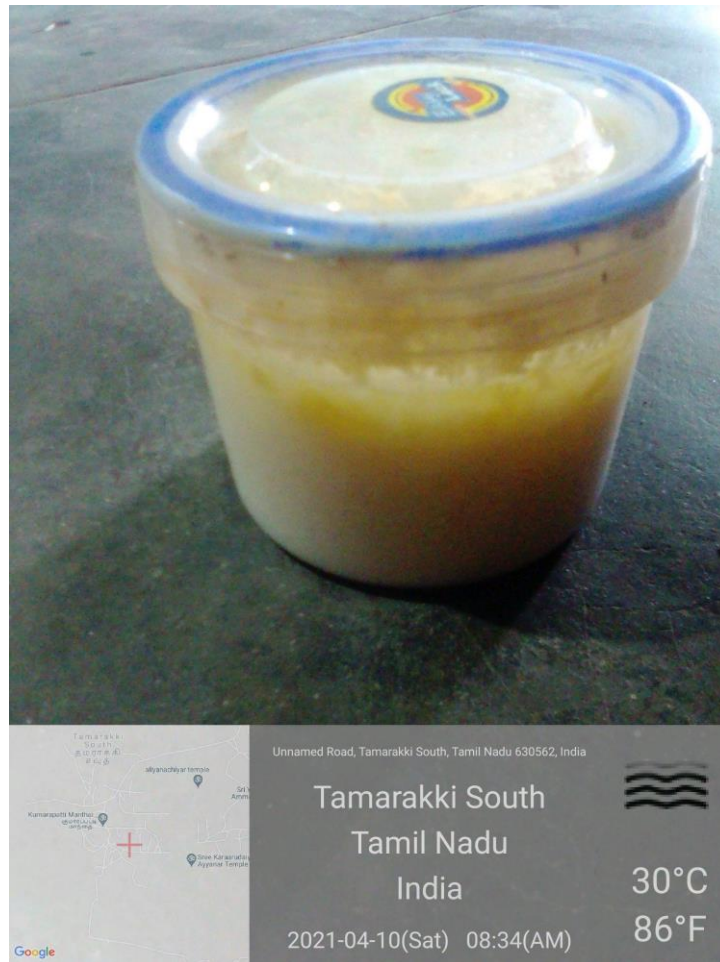


Fig.5.9. Contamination yogurt (after 2 months)

The contamination of aloe vera yogurt after 30-40 days, color was change, bad smell, texture change & growth fungi and Mould.

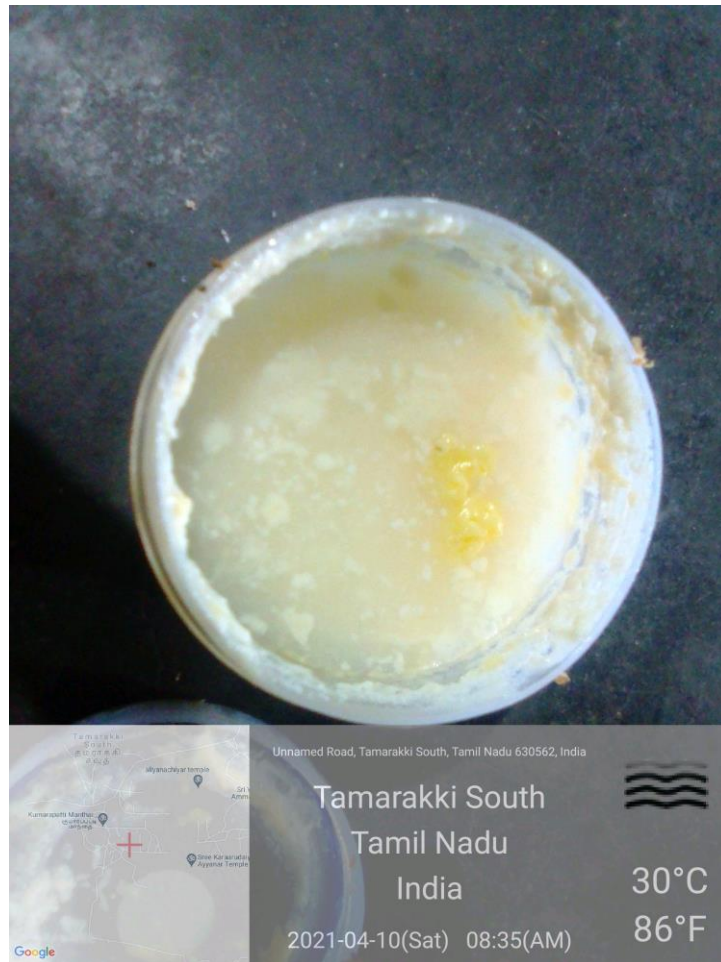


Fig.5.10. Fungi and Mould growth

Fungi and Mould growth in Contaminated aloe vera yogurt, the contamination of aloe vera yogurt after 30-40 days, color was change, bad smell, texture change & growth fungi and Mould.

CHAPTER-6. SUMMARY & CONCLUSIONS:

Preparation of fortified yogurt with Aloe Vera (Aloe Vera yogurt) is a natural and traditional method. Aloe vera has some health benefit, these are beta-carotene is a yellow-red pigment it's found in aloe vera. Eating milk product food daily, that specific yogurt, helps to nutritional benefits recommendations. Finally check the Antimicrobial activity and isolate and identify the microorganisms (*Streptococcus* sp. and *Lactobacillus* sp.). the yogurt products cultured in with 3% yogurt produced colonies that were small, round, smooth, convex, white and moist. The Gram-stained smears showed both gram-positive cocci in pairs or long chains, and gram-positive, nonperforming bacilli occurring singly, in short or long chains. These are consistent with the microscopic seen of *Streptococcus* sp. and *Lactobacillus* sp., the microorganisms in yogurt. This aloe vera yogurt product will be taking 3 days within contamination without refrigerator, it is kept in refrigerated at 40°F 30 days after it will be contaminated.

REFERENCES:

1. A.O.A.C. Official Methods of Analysis of the AOAC, 1995; 15th Ed. (Ed. S. Williams) Association of Official Analytical Chemists, Arlington
2. Abdel Moneim, E. S., Rania, M. A., & Zakaria, A. S. (2011). Effects of storage on quality of yoghurt prepared from cows' and goat's milk and pure strains of lactic acid bacteria. *Journal of Science of Technology*, 12(1), 136– 143.
3. Allgeyer LC, Miller MJ and Lee SY. Sensory and microbiological quality of yoghurt drinks with prebiotics and probiotics. *Journal of Dairy Science*.2010;93: 4471-4479.
4. Aryana, K. J., & McGrew, P. (2007). Quality attributes of yogurt with *Lactobacillus casei* and various prebiotics. *LWT-Food Science and Technology*, 40(10), 1808– 1814.
5. Awan, J. A., & Rahman, S. U. (2005). *Microbiology manual* (pp. 49– 51). Unitech Communications.
6. Abrahamsen RK, Rystad G. Fermentation of goat's milk with yoghurt starter bacteria "A review". *J. Cult. Dairy Prod*. 1991; 8: 20-26
7. Araya M, Morelli L, Reid G, Sanders ME, Stanton C, Pineiro M et al. Guidelines for the evaluation of probiotics in food, Joint FAO/WHO Working Group Report Drafting Guidelines Eval. Probiotics Food, London (Ontario, Canada). 2002; 0:1-11.
8. Bahrami, M., Hosseini Mazhari, S. Z., & Ebrahimzadeh Mousavi, Z. (2019). Effect of *Lactobacillus acidophilus* on the physicochemical and sensory properties of Aloe vera. *Journal of Food and Bioprocess Engineering*, 2(2), 133– 138.
9. Bruzantin, F. P., Daniel, J. L. P., Da Silva, P. P. M., & Spoto, M. H. F. (2016). Physicochemical and sensory characteristics of fat-free goat milk yogurt with added stabilizers and skim milk powder fortification. *Journal of Dairy Science*, 99(5), 3316– 3324.
10. Carpenter RH, McDaniel HR, McAnalley BH. Uses of Aloe Products in the Treatment of Chronic Respiratory Diseases, U.S. Patent, 1998; 5: 786 342.
11. Choudhary, S., Arora, S., Kumari, A., Narwal, V., & Singh, A. K. (2019). Effect of quality of milk on physico-chemical characteristics of buffalo milk concentrate (khoa) during storage. *Journal of Food Science and Technology*, 56(3), 1302– 1315.
12. Christopher MD, Reddy VP, Venkateswarlu K. Viability during Storage of Two *Bifidobacterium bifidum* Strains in Set and Stirred Flavoured Yoghurts Containing Whey Protein Concentrates. *Natural Product Radiance*. 2009; 8(1): 25-31.
13. Clark, S., Costello, M., Drake, M. A., & Bodyfelt, F. (2009). The sensory evaluation of dairy products, 2nd ed (pp. 167– 192). Springer Publishing Ltd.

14. Damunupola DAPR, Weerrathilake WADV, Sumanasekara GS. Evaluation of quality characteristics of goat milk yogurt incorporated with beetroot juice. *International journal of scientific and research publication*. 2014; 4(10):1-5
15. Dororkar MP, Gupta AK, Khanuja SP, Rajaram S, Rita R. Molecular Assessment of Germplasm Diversity in Aloe vera Species Using RAPD and AFLP Analysis. *Journal of Medicinal and Aromatic Plant Sciences*. 2003; 25: 354-361
16. Eissa, E. A., Ahmed, I. M., Yagoub, A. E. A., & Babiker, E. E. (2010). Physicochemical, microbiological and sensory characteristics of yoghurt produced from goat milk. *Livestock Research for Rural Development*, 22(8), 247– 253.
17. Fernandes CF, Shahani KM. Anticarcinogenic and Immunological Properties of Dietary Lactobacilli. *J. Food Protect.* 1990; 53(8): 704–10.
18. Fioramonti J, Theodorou V, Burano L. Probiotics: what are they. What are their effects on gut physiology? *Best Pract. Res. Clin. Gastroenterology*. 2003; 17(5): 711-724.
19. Gawade B, Desale RJ, Mukhekar A, Surwase M. Effect of lemongrass distillate on sensory and microbiological properties of yoghurt. *Multilogic in science*. 2018; 25(7):63-64.
20. Gunawardhana WA and DilrukshiHN. Development of Yoghurt Drink Enriched with Avocado Pulp (*Perseaamericana*). *International Journal of Advanced Scientific Research and Management*, 2016; 1:97-102.
21. Guo X and Mei N. Aloe vera: A review of toxicity and adverse clinical effects. *Journal of Environmental Science And Health*. 2016; 34(2):77-96.
22. Guzman-Gonzalez M, Moris F, Amigo L. Influence of skimmed milk concentrate replacement by dry dairy products in a low-fat set type yoghurt model system. Use of caseinates, co-precipitate and blended dairy powders. *J. Sci. Food Agric.* 79(8)1999; 80: 1117–1122.
23. Hamman JH. Composition and Applications of Aloe vera Leaf Gel. *Molecules*. 2008; 13:1599-1616.
24.] Heathcote J, Abbas Z, Alberti A, Benhamou Y, Chen C, Elewaut A, Ferenci P, Hui C, Isakov V and Janssen H. 2008. World gastroenterology organization practice guideline.
25. Hussain, M., Bakalis, S., Gouseti, O., Akhtar, S., Hameed, A., & Ismail, A. (2017). Microstructural and dynamic oscillatory aspects of yogurt as influenced by hydrolysed guar gum. *International Journal of Food Science & Technology*, 52(10), 2210– 2216.
26. Hutkins RW. *Microbiology and Technology of Fermented foods*. USA: Blackwell publishing, 2006, pp.1-49.
27. Kailasapathy K, Rybka S. Lactobacillus acidophilus and Bifidobacterium Species: Their Therapeutic Potential and Survival in Yoghurt. *Aust. J. Dairy Technol.* 1997; 52: 28- 35.
28. Katz F. Active Cultures Add Functions to Yogurt and Other foods. *Food Technol.* 2001; 55: 46-49
29. Kaur S, Kaur HP, Gupta P. Physico chemical analysis of Aloe vera fortified probiotic yoghurt. *Int. J of Adv. in Pharm, Bio and Chem.* 2015; 4(2):501-508.

30. Lee WJ, Lucey JA. Formation and physical properties of yogurt. *Asian-Aust. J Anim. Sci.* 2010; 23(9):1127-1136.
31. Marshal, R. T. (1993). *Standard Methods for Examination of Dairy Products*, 16th ed. (pp. 355– 358). American Public Health Association (APHA).
32. Mattila-Sandholm T, Myllarinen P, Crittenden R, Mogensen G, Fonden R, Saarela M. Technological challenges for future probiotic foods. *Int. Dairy J.* 2002; 12(2-3): 173-182
33. McKinley MC. The Nutrition and Health Benefits of Yoghurt. *Int. J. Dairy Technol.* 2005; 58(1): 1-12.
34. Mousavi, M., Heshmati, A., Daraei Garmakhany, A., Vahidinia, A., & Taheri, M. (2019). Texture and sensory characterization of functional yogurt supplemented with flaxseed during cold storage. *Food Science & Nutrition*, 7(3), 907– 917.
35. Najafi NM, Koochki A, Rezaii Z. Investigation of the effect of whey protein concentration on the properties of soft frozen yoghurt. *The international Hydrocolloid conference*, Singapore, 2008. 7.
36. Nazni P, Komathi K. Quality evaluation of the fruit pulp added yogurt. *International Journal of Nutrition and Agriculture Research*. 2014; 1(1):48-54. 8.
37. Neal MC. *In garden of Hawaii*. USA: Bishop Museum press, 1965.
38. Ouwehand AC, Salminen S, Isohawel E. Probiotics: an overview of beneficial effects. *A. Van Leeuw*. 2002; 82(1-4): 279-289.
39. Panesar PS, Shinde C. Effect of storage on Syneresis, pH, *Lactobacillus acidophilus* Count, *Bifidobacterium bifidum* Count of Aloe vera Fortified Probiotic Yoghurt. *Current Research in Dairy Sciences*. 2011; 4(1): 17- 23.
40. Penna ALB, Subbarao G, Barbosa-Canovas GV. High hydrostatic pressure processing on microstructure of probiotic low-fat yoghurt. *Food Res Int.* 2007; 40:510- 519.
41. . Rangana, S. *Handbook of Analysis and Quality Control for Fruit and Vegetable Products*, 1986; Tata Mc Graw Hill, India.
42. Rezazadeh-Bari, M., Najafi-Darmian, Y., Alizadeh, M., & Amiri, S. (2019). Numerical optimization of probiotic Ayran production based on whey containing transglutaminase and Aloe vera gel. *Journal of Food Science and Technology*, 56(7), 3502– 3512.
43. Roberfroid MB. Concepts and strategy of functional food science; the european perspective. *Ain. J. Clin. Nutri.* 2000; 71(6): 1660s-4s.
44. Salvador A, Fiszman SM. Textural and sensory characteristics of whole and skimmed flavoured set-type yoghurt during long storage. *J. Soc. Dairy Technol.* 87(12):4033- 41.
45. Salminen S, Ouwehand A, Benno Y, Lee YK. Probiotics: How should they be defined? *Trends Food Sci. Technol.* 1999; 10(3): 107– 110
46. Sakandar, H. A., Imran, M., Huma, N., Ahmad, S., Aslam, H. K. W., Azam, M., & Shoaib, M. (2014). Effects of polymerized whey proteins isolates on the quality of stirred yoghurt made from camel milk. *Journal of Food Processing & Technology*, 5(7), 1.

47. Shaaban M, Abd-El Fattah, Abosree, Yahia Hassan, Hala Bayoum M, Hesham Eissa. The Use of Lemongrass Extracts as Antimicrobial and Food Additive Potential in Yoghurt. *Journal of American Science*. 2010; 6(11). 11.
48. Tamime AY, Robinson RK. *Yogurt science and technology* Boca Raton, FL: CRC Press, 1999, 326-333
49. Tamime AY, Robinson RK. *Yoghurt: Science and Technology*, 2000; 2nd Ed., 19: 375-376.
50. Thomas TD, Mills OE. Proteolytic enzymes of dairy starter cultures. "A review". *J. Food Microbiol*. 1981; 46(3): 245-268.
51. Vahedi N, Tehrani MM, Shahidi F. Optimizing of Fruit Yoghurt Formulation and Evaluating Its Quality During Storage. *Amer-Eurasian J. Agri. Envir. Sci*. 2008;3 (6): 922-927.
52. Waller GR, Mangiafico S, Ritchey CR. A Chemical Investigation of Aloe Barbadensis. *Miller, Proc. Okla. Acad. Sci*. 1978; 58: 69- 76.
53. Wang, X., Kristo, E., & LaPointe, G. (2020). Adding apple pomace as a functional ingredient in stirred-type yogurt and yogurt drinks. *Food Hydrocolloids*, 100, 105453.
54. Yadav K, Shukla S. Microbiological, physicochemical analysis and sensory evaluation of herbal yogurt. *The Pharma Innovation Journal*. 2014; 3(10):01-04.
55. Yadav, A. K., Singh, A., & Yadav, K. C. (2018). Efficacy of flavored Aloe vera cubes in probiotic yogurt. *Journal of Pharmacognosy and Phytochemistry*, 7(4), 1609– 1614.