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Comparative Evaluation on the Physicochemical, Proximate and Probiotic Status of Some Commercially Produced Yoghurt Stored Under Ambient Conditions

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Abstract: *Not all yoghurts produced and sold can be considered as probiotic yoghurts, simply because probiotic yoghurts should conform to standards in terms of the proximate, physicochemical and probiotic Lactic Acid Bacteria count. The aim of this study is to conduct comparative evaluation on the physicochemical, probiotic status and proximate composition of some commercially produced yoghurt stored under ambient condition. Five commercially sold brands of yoghurts were purchased, three (A,B,C) from large scale manufacturers, two (D, E) from small scale manufacturers, while a control sample (F) was produced in the laboratory using commercial starter cultures. Enumeration of Lactic acid bacteria (LAB) and determination of physicochemical parameters, proximate analysis and organoleptic properties of the samples was carried out in triplicate on a daily basis for six days. The raw milk used in yoghurt production (sample F) had pH, titratable acidity, temperature and viscosity of 6.63, 0.17%, 30^{o}C and 12Cp respectively. The LAB count of the samples increased from 24 - 48hours with a rapid decrease from 72hours up to the end of the storage period across the whole samples, however, samples C and F maintained LAB count of 10^{6} for 72hours. Sample D only lasted for 48hours as a probiotic yoghurt, while, sample E did not meet up with the required 10^{6} of probiotic LAB presence in the yoghurt during the six days storage period. The pH decreased with corresponding increase in titratable acidity and the nutritional content of the samples also decrease with prolonged storage. Based on the organoleptic properties of the samples, the whole samples were accepted within a day with the exception of sample F which was accepted up to 24hours. It is advisable to consume unrefrigerated yoghurt from the time of production within a day. Samples C and F are the best products in terms of proximate, physicochemical, organoleptic and lactic acid bacteria (probiotic) count.*

Keywords: *Lactic acid bacteria, Probiotics, Organoleptic, Storage*

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I. INTRODUCTION

Yogurt also spelled yoghurt or yoghourt is considered by most regulatory agencies Worldwide to be a fermented milk product that provides digested lactose and specifically defined, viable bacterial strains typically *Streptococous thermophilus* and *Lactobacillus bulgaricus*. The word "Yoghurt" comes from the Turkish word "Yogurmak", meaning to thicken, coagulate or curdle (Mauro and Rachel, 2015). The microorganisms in the final products must be viable and abundant (FAO/WHO, 1977). Yoghurt is an ancient food that has gone by many names over the millennia. It is also believed that yoghurt was originated in Mesopotamia now in Iraq thousands of years ago. It is believed that milk products were incorporated into the human diet around 10000-5000BC,with the domestication of milk producing animals(cows, sheep, and goats as well as horses, buffalo and camels).However, milk spoiled easily, making it difficult to use at that time. Herdsmen in the Middle East carried milk in bags made of intestinal gut, it was discovered that contact with intestinal juices caused the milk to curdle and sour, preserving it and allowing for conservation of a diary product for extended periods of time. The partial digestion of the milk caused by the fermentation of the starter culture makes yoghurt easily digested, even by people who cannot tolerate milk. It is a rich source of protein and calcium, and the fermentation process makes these nutrients easier to absorb. The milk from these animals was store and in a warm climate where is naturally formed a curd, which was an early form of yoghurt (Omola *et al.*, 2014).

The demand for probiotics foods is growing rapidly due to increased consumer awareness regarding the health benefits of probiotics foods. (Tripathi and Giri, 2014). Yoghurt is a well- known, popular food that contains probiotics (Tamine and robinson, 1999; Shiby and Mishra, 2013; Najgebauer-lejko, 2014). Probiotics also provide antioxidative properties and stimulate the immune system, which are strain-dependent effects that have been the subject of maAany recent studies (Santiago-Lopez *et al*., 2015). To capitalize on the potential

health benefits of probiotics, they must be delivered at high doses through foods such as yoghurt (Ng *et al.,* 2011). The foremost challenge is maintaining appropriate probiotic numbers during processing and storage, as insufficient doses at the time of consumption will not provide the intended health benefits (Tripathi and Giri, 2014). The number of probiotic bacteria needed to provide health benefits is unclear however, to achieve the desired therapeutic effects, probiotics should be consumed regularly, and the product should contain at least 10^6–10^8cfu/ml during shelf life (Abadıa-Garcıa *et al*., 2013). Enough probiotic should reach and colonize the intestines *in vivo* (Kailasapathy *et al*., 2008; Turgut and Cakmakci, 2009; Cakmakci *et al*., 2012). Probiotic foods are supplemented with other active components to provide additional functional properties. Fresh and dried fruit mixes improve yoghurt's nutritional value and taste, and fruit enhancement plays a considerable role in yoghurt consumption and sales (Kailasapathy *et al.,* 2008; Cakmakci *et al*., 2012). These probiotics are defined as Live Microorganisms which when administered in adequate amounts confer a health benefit on the host (FAO/WHO, 2002), one of the most accepted approaches through which the gut microbiota composition can be influenced through the use of probiotics, which are life microbial dietary addictives. Besides the nutritional values, ingestion of lactic acid bacteria (LAB) and their fermented food has been suggested to confer a range of health benefits including immune system modulation, increased resistances to malignancy and infection illness (Soccol *et al*., 2010).

In the food industry in general and in the dairy industry specifically, microorganisms are of great importance. One specific group of relevance is the lactic acid bacteria. LABS are characterized by their capacity to ferment lactose to lactic acid and they are naturally present in raw milk (Salminem *et al*., 2004).LAB are used as starter cultures in the production of fermented dairy products such as yoghurt, cheese, and buttermilk. They are also used in fermented nondairy products such as fermented meat, bakery products such as sourdough bread, malolactic fermentations in wine, and fermented vegetable products such as dill pickles and sauerkraut (Marth and Steele, 1998).Therefore special attention is given to the selection and balancing of LAB to obtain food and dairy products with desirable texture, flavor and nutritional value characteristics. Furthermore organoleptic quality of the final dairy product is directly related to the initial composition of the starter culture and milk flora (Ahmed and Kanwal, 2004).This work is aimed at comparing and evaluating the probiotics status, physiochemical parameters and proximate composition of different commercial yoghurt stored under different ambient conditions. The broad objectives include; determination of physicochemical parameters of fresh raw milk and yoghurt, production of yoghurt using fresh raw milk and commercial starter culture, enumeration of lactic acid bacteria from yoghurt and evaluation of proximate composition and organoleptic properties of yoghurt

II. MATERIALS AND METHODS

Sample collection

Fresh cow milk was purchased from Kasuwan Shanu area of Maiduguri, Borno state. Five liters (5L) was aseptically collected in a sterile plastic container which was place immediately in an ice box container and was transported to NAFDAC Area Laboratory Maiduguri Borno State. Five different brand of yoghurts were purchased from different retail outlets, three from large scale manufacturers and two from small scale manufacturers. Manufacturing details such as production date, expiry date, NAFDAC Reg. No., address and nutritional content of each sample was recorded. Samples were collected from different companies after production and immediately place in an ice box for transportation to NAFDAC area laboratory Maiduguri for analysis.

Determination of Physicochemical Parameters of Raw Milk and Yoghurt

This analysis was carried out in triplicate determination according to the Methods of Official Analytical Chemists (AOAC, 2012).

Determination of Temperature

The temperature was measured using mercury thermometer. The thermometer was standardized in sterilized cold water. It was then inserted appropriately in the sample with the aid of string and allowed to stabilize before taking reading. It was repeated three times and average reading was calculated.

Determination of Viscosity

Viscometer (DV-E) was used to determine the viscosity of the samples. The spindle (size 6) was dropped in100ml of sample and the rotator was set for 100 resolutions per minutes. The rotator was allowed to swing for 15seconds. Viscosity was expressed as centipoises (Cp).

Determination of pH

The pH of each sample was measured using a digital pH meter. The pH meter was calibrated with buffer standards of pH 4.0 prior to use. Readings were recorded by immersing the probe in the sample until the reading stabilized.

Determination of Titratable Acidity (T.A)

This was determined using alkaline titrimetric method. Ten milliliter (10ml) of the sample was dispensed into conical flask and 3drops of phenolphthalein indicator was added, it was titrated against diluents standard alkaline solution of (0.1M NAOH solution). Titration was done until a persistent faint pink coloration is obtained. The total titratable acidity was calculated using the formula below

Titratable acidity (T.A) % $= \frac{ml \ x \ N \ x \ 90 \ x \ 100}{V \ x \ 1000}$

Where;

T =Titre value, N =Normality of titrant, W =Weight of sample used

Experimental Design

Total of six different types of yoghurt samples were used in this research. Five Samples were sourced from different retail outlets and one sample was produced in the laboratory and served as control. The samples were collected, and immediately after quality assurance assay from the company, though effort was made to collect the samples immediately after production but was not successful rather each sample was collected between 24-48hours of production. Each samples was labeled with alphabetical code: A(Farm fresh yoghurt), B(L & Z yoghurt), C(Habib yoghurt), D(Courage yoghurt), E(Sheriff yoghurt) and F(control). A, B and C are large scale manufacturers; D and E are from small scale manufacturer and F control (yoghurt produced in the laboratory).

Preparation of samples

Twenty (20ml) of each bought sample was poured into a sterile plastic container. Twelve (12) sterile containers were obtained for each sample and kept under ambient temperature. Analysis was carried out on daily basis for six days.

Laboratory Production of Local Yoghurt

One litre (1litre) of fresh whole cow milk in a sterile plastic container was placed in water bath and heated at a temperature of 85^0C for 30minutes. It was allowed to cool down to 42^0C to bring the yoghurt to the ideal growth temperature for the addition of starter culture. Five gram (5g) of Yoghurmet was added to the pasteurized milk and stirred continuously using a sterile spatula until a homogenous solution was formed. It was then covered with aluminum foil and incubated at 37^0C for 6hours (Obi *et al.,* 2016). Twenty (20ml) of the yoghurt was poured into twelve (12) sterile plastic containers and kept under ambient temperature.

Enumeration of Lactic Acid Bacteria from Samples

Pour plate technique was used to estimate the lactic acid bacteria in the samples labeled A-F.

Ten milliliter (10ml) of sample was serially diluted in 90ml of sterile peptone water designated as 10^{-1}.One milliliter (1ml) was removed aseptically and added into 9ml of sterile peptone water in a test tube, designated as 10^{-2} further serial dilutions was carried out up 10^{-4}A 1 milliliter (1ml) from 10^{-3} dilution was plated in empty triplicate sterile Petri dishes. Molten MRS (de Man Rogosa Sharp) agar was then added and allowed to solidify (Omafuvbe and Enyioha, 2011). The plates were incubated in an anaerobic jar at 37^0C for 48 hours. The colonies developed were counted, multiplied by inverse of dilution factor and expressed as logarithm of colony forming unit per milliliter (log cfu/ml). It was carried out in triplicate determination.

Determination of Proximate Composition of the Yoghurt samples

Moisture, Ash (minerals), Protein, Carbohydrate and Fat (lipids) contents of the samples were determined as by Association of Official Analytical Chemists (AOAC 2012) in triplicate for 6days with interval of 48hours.

Evaluation of Organoleptic properties of Samples

Organoleptic evaluations of samples were carried out using 9 point hedonic scale. The appearance, taste, aroma, texture and general acceptability were scored by 5 panelists who are regular consumers of yoghurt, the panelists who were sourced from industrial training fund student and staff of NAFDAC Area laboratory. The judges were instructed to taste the samples and express their views by scoring organoleptic attributes using the nine hedonic scales;9(like extremely), 8(like very much), 7(like moderately), 6(like slightly), 5(neither like nor dislike), 4(dislike slightly), 3(dislike moderately), 2(dislike very much), and 1(dislike extremely)(David,2005). Mouth rinsing with clean water was carried out organoleptic assessment of two different yoghurt samples.

Statistical Analysis

Statistical differences and Similarities in probiotics status, physicochemical parameters, proximate composition and scores based on the assessment of judges using the hedonic scale of samples were analyzed

using one way-Analysis of variance (ANOVA) at 5% probability level of significant using SPSS version 20. The mean separation was carried out using Least Significant Difference (LSD).

III. RESULTS AND DISCUSSION

The information sourced from the different brand on yoghurt used indicate that the brands (A, B and C) from large sale manufacturer have large quantity than the small scale manufacturers (D and E).Only brand A contains Nutritional value and other parameter labeled from the product among the large scale products while, small scale product do not contain expiry date and nutritional content (Table 1). All brands have an expiration period of about three weeks with the exception of small scale manufacturers. The manufacturers' brands, production date, Expiry date ingredients, quantity, NAFDAC Registration number, Address of yoghurts products were obtained from the labels on the products and recorded. The results of the physicochemical parameters of raw milk showed that the pH, Titratable acidity, temperature and viscosity were 6.63, 0.17%, 30^0C, 12cp respectively (Table 2).

The pH value (Figure 1) of the samples decreased at the end of storage time of 120hours.the highest pH value at the end of storage time was observed in sample F while D and E(small scale) had the lowest pH value compared to sample A and C.(large scale manufacturers). This could be attributed to the starter culture activity such as post acidification due to formation of lactic acid or growth of the bacteria during fermentation. (Osundahunsi *et al.*, 2007, Murevanhema, 2012).The low pH could limit microbial activity thereby extending the shelf life of the products. Conversely, it may cause the product to taste sour thereby causing it to be rejected (Peter, 2016). Lactic acids strains have the ability to ferment lactose into lactic acid with an increase of acidity and decrease in pH of yoghurt. (Fatiha *et al*., 2017), which causes coagulation of yoghurt mixture during fermentation. (Niamsiri and Batt 2009). This result is in agreement with the work of Sokolinska *et al*., (2004) who studied role of the proportion of yoghurt bacterial strains in milk souring and the formation of curd qualitative characteristics

And found out that pH decrease during 21days of storage from 4.34 to 4.11. This result is in line with the finding of Amin *et al.,* (2012).Similarly decrease in pH observed in this work is in agreement with the report of Osman and Razig (2010) when they studied the quality attributes of soy yoghurt during storage period. The titratable acidity of the samples increased across the whole samples at the end of storage time. (Fig 2) Sample A, B and C have close range of value with F compared to small scale products (D and E). This variation among the samples might be as a result of the quantity of starter culture used by different company. Fermentation of lactose took place quickly at ambient temperature and as a result more lactic acid are produced at this storage condition. Increase in titratable acidity has been attributed to production of lactic acid from lactose by fermenting microorganisms (Oyeyola 1990, Vargas *et al.*, 2008, Owusu- Kwarteng *et al.*, 2010). Osman and Razig (2010) also reported an increase in titratable acidity with storage time. Similarly Chukuemeka and Ibe (2013) also reported increase in titratable acidity of yoghurt like product from soybean (Glycine Max) at storage condition of 27 ± 3^0C and 7 ± 2^0C. CII (2006) stated that the percentage (%) of lactic acid in yoghurt should be within (0.8-1.2%) by weight as lactic acid. Large scale manufacturers (A, B and C) were within the acceptable range of %lactic acid for 48hours only. Sample D and E were within the acceptable range up to the end of storage time while, sample F meet up with the requirement up to 72hrs.The viscosities of samples A, B and C were higher compared to sample D and E. (Fig. 3). At 0hours, there was slight decrease for samples A, B, and C (large scale manufacturers) from 24hours to 120hours of storage. Sample D and E (small scale manufacturers) remained stable from 24-48hours and slight increase after 72hours and the viscosity remained stable to the end of storage period. Sample F increase after 24hours and subsequent decrease up to the end of storage time. These decrease in viscosity of sample during storage with Sample D and E having low viscosity value up to the end of storage time could be as a result of the proliferation of protease producing organism which act on the yoghurt protein matrix over time, resulting in lower viscosities. (Kosikowski, 1982).This might lead to disruption of a portion of the relatively rigid gel structure. The results of this study are in agreement with the finding of Gassem and Frank (1991) who reported a decrease in viscosity of yoghurt with increase in storage time All the samples with the exception of sample F at 0hours had 30^0C.The temperature ranged from 28-32^0C throughout the storage period (Fig.4).

The mean Lactic acid bacteria counts (log/cfu/ml) of samples during six days of storage were presented in (Fig.5) .At 0hour, the mean Lactic acid bacteria count were 6.20logcfu/ml, 5.97logcfu/mI, 6.41logcfu/mI ,5.60logcfu/ml, 5.72logcfu/ml and 5.40logcfu/ml for samples A , B , C , D, E and F respectively. Samples showed increase from 24-48hours.while at 72hours rapid decreased was observed for the whole sample with the exception of sample F which shows slight increase in Lactic acid bacteria counts. Sample C had the highest LAB count at 0hours and still maintained slight growth of lactic bacteria at the end of storage time while sample D had the lowest LAB count at 0hours and no visible colony was seen after 72hours of storage. Sample C and F maintained their probiotic status up to 72hours while samples A, B and D lasted for 48hours.sample E did not meet up with the required 10^6 of probiotic LAB presence in the yoghurt during six days of storage. This

increase can be as a result of favorable temperature reached for their growth at the time of storage, while decreased was observed across the samples from period of 72-120hrs. This decrease in LAB counts could be attributed to the fact that pH and temperature favors the growth of yeasts which the LAB cannot compete with for a longer period of time. Previous studies have shown that yeasts were the primary contaminants of yoghurts due to the low pH and high sugar content. Moreira *et al.,* (2001).At the end of 96hours of storage sample D and E reached death phase. This might be due to the quality and quantity of starter culture used in the production and the production procedure employed. Sample A and B reached death phase after 120hours of storage while sample C and F were still at stationary phase at the end of storage period of 120hours.This differences might be attributed to the different manufacturing process, starter culture and even preservatives used in the manufacturing of the different yoghurt. Similar results were obtained by Samson and Attah (2018) who studied effect of temperature on the shelf of Nono (locally fermented Milk) and yoghurt showed that decreased in microbial load of yoghurt stored under room temperature for period of 3month. Similarly Green and Raziq (1987) reported an initial increase in the counts of LAB before a decline when they studied Yeasts as primary contaminants in yoghurts produced commercially in Lagos.

The proximate composition of change in Moisture, protein, Ash, carbohydrate and fat content of samples are presented in Table 3. At 0hours moisture content of samples were 80.1±0.58, 80.5±0.58, 72.5± 0.15, 90.4±0.15, 97.2±0.08 and 84.3±0.05 for samples A, B, C, D, E and F, indicating that sample D and E(small scale manufactured yoghurt) to have the highest moisture contents of 90.4% and 96.9%. After 72hours of storage at ambient temperature there was increase in moisture content across the samples. These increased in moisture content of the whole sample is as a result of decrease in Carbohydrate, protein and fat contents. Sample D and E recorded the highest increase in moisture than sample C which had the lowest increase. This could be attributed to the facts that the spoilage organisms metabolized these components to produce water and also from the curdling of the yoghurt. (Chukuemeka and Ibe 2013). These results concurred with the finding of Nayla *et al.,* (2008) who reported increase in moisture content of two different yoghurt samples during storage.

The protein content at 0hours were 3.7±0.03, 3.3±0.33, 5.7±0.01, 2.3±0.01, 1.4±0.01 and 6.4± 0.03 for samples A, B, C, D, E, and F respectively. Decrease was observed after 72hours of storage. Highest protein content was observed in sample F while Sample E had the lowest protein content. The protein content of whole samples decrease as the storage progresses. This decrease could be attributed to proteolysis, breaking of proteins into simple peptides which were decreasing the protein content. Similar finding was reported by Nebedum and Obiakor (2007) who reported decreased in protein in both preserved and unpreserved Nunu.Sample A ,B and F were within the acceptable value of 3.2% of protein by weight CII(2006) while, sample D and E didn't meet up with the standard.

The carbohydrate content were 13.0±0.55, 12.4±0.06, 15.0±0.09, 7.9±0.12, 0.8±0.30 and 4.1±0.12 for samples A, B, C, D, E and F respectively. There was decrease in carbohydrate content of samples. This decrease in carbohydrate (lactose) may be attributed to breakdown of carbohydrate into fermentable sugars by the fermenting microorganisms and their enzymes. It has been reported that amylase activity increases the level of fermentable and reducing sugars in foods (Gorsaert *et al*., 2006).Sample A, B and C had the highest carbohydrate content and this might be due to the preservatives added to the product during production. Sample E had the lowest carbohydrate content.

The fat content of the whole samples decrease aftern48hours of storage. Sample D and E fat content decrease completely with prolonged storage, the low fat content of the yoghurt might be attributed to the low oil content of the milk which was the major substrate of the yoghurt produced. According to U.S.D.A. (2001), yoghurt with less than 0.5% fat content should be labeled, as non - fat yoghurt; those with fat content within the range of 0.5 – 2.0 % should be labeled low fat yoghurt and those with fat content above 3.25 % should be labeled whole milk yoghurt. Therefore, sample C and F are considered whole milk yoghurt while, sample D and E are considered as non-fat yoghurt due to their low fat content at different storage.

There is a slight decrease in ash content and this shows no variation in the percentage of ash contents of samples stored at both storage conditions. Ash content could be the residue after water and organic matter have been removed by heating in the presence of oxidizing agents which provides a measure of the total amount of minerals present in a food (McClements, 2003).Milk is rich in mineral which justifies the low variation in the ash content at both storage conditions. This result is in agreement with the findings of Muhammad *et al.,* (2009) who also reported no difference in the ash content of yoghurt stored under three different conditions. (freezer, refrigeration and room temperature).

The results of organoleptic properties (overall acceptability) of samples stored at ambient conditions shows decreased across the whole yoghurt as storage progressed. Samples were only acceptable at 1st and 2nd day for some samples. This could be attributed to the decreased in pH and soluble solids of sample during storage. Salwa *et al.,* (2005) also reported a decrease in score of appearance of yoghurts during storage period. All samples were accepted just for a day with the exception of sample F which was accepted up to 24hours.

Table 1: Physicochemical Properties of Raw Milk before Fermentation

	Values	Standard(FAO)
PH	6.63	6.6-6.8
Titratable acidity (%)	0.17	0.14-0.16
Temperature (^{O}C)	30^{o}C	Nil
Viscosity (Cp)	12cp	Nil

Key: the values are mean of triplicate determination
Nil-Absent

Table 2: Manufacturing Details of Sample Collected from Different Producing Company's

Sample	Ingredient	Date of Production	Date of Expiry	NAFDAC Reg No.	Quantity	Nutritional Value	Address
A	Partly slammed cow's milk sugar, stabilizer, natural vanilla flavor, LA culture, Natural Colour E100	**15/09/2018**	05/10/2018	01-5864	500ml	Energy – 355.8kg/84.91ccal Milk fat – 3.0g max Protein – 2.8gmn Carbohydrate – 11.6g Minerals – 0.8g	Ingredients limited No. 9 Fresh Land Road P.O. Box 97, Vom Jos, Plateau State
B	Fresh milk, sugar, DVS	**15/09/2018**	07/10/2018	A1-2107L	500ml	Nil	No. 22B Alu Avenue Nassarawa G.R.A Kano
C	Treated water, whole milk, sugar syrup, DVS culture	**15/09/2018**	06/10/2018	01-3110L	550ml	Nil	No. 3 Emir Road, Gaskia, Zaria Kaduna
D	Pasteurized and homogenized powdered milk, treated water, sugar and DVS culture	**15/09/2018**	Nil	08-0567L	200ml	Nil	No. 4 Dama close Baga Road Industrial Layout Maiduguri Borno State.
E	Treated water, powder milk sugar, DVS Culture.	**15/09/2018**	Nil	08-0672L	200ml	Nil	Opposite Teaching Hospital Maiduguri, Borno State

Key: Nil = Not available

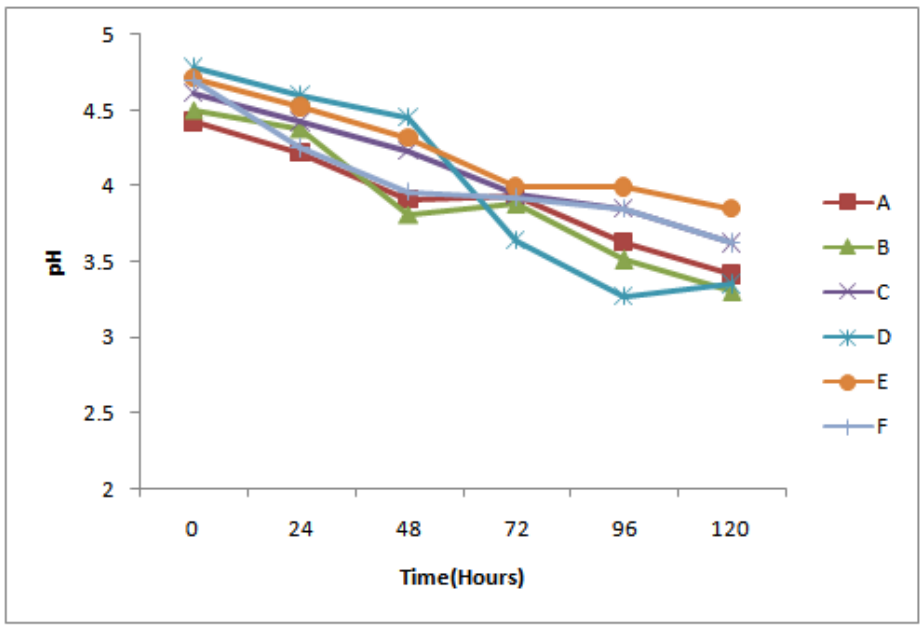

Figure 1 Mean of Change in pH of samples with Storage Interval of 24hrs.

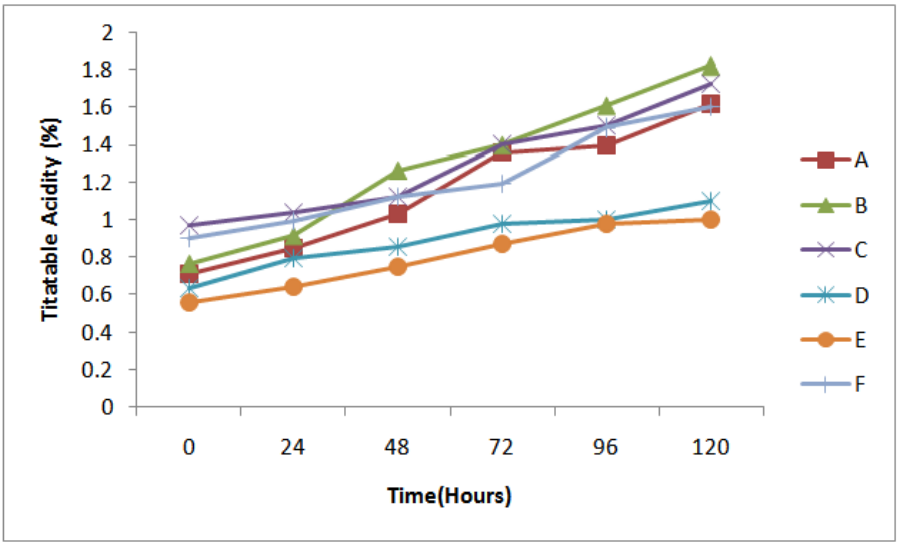

Figure 2 Mean of Change in Titratable acidity of samples with Storage Interval of 24hrs.

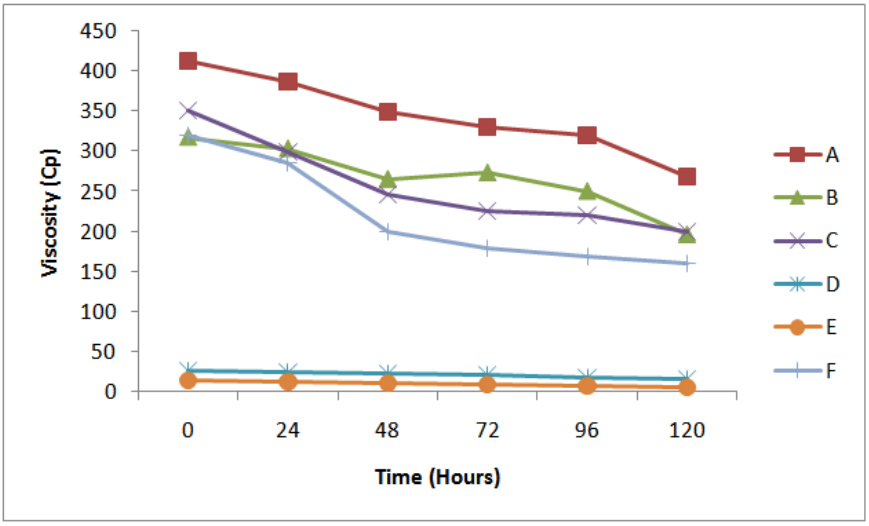

Figure 3 Mean of Change in Viscosity of samples with Storage Interval of 24hrs.

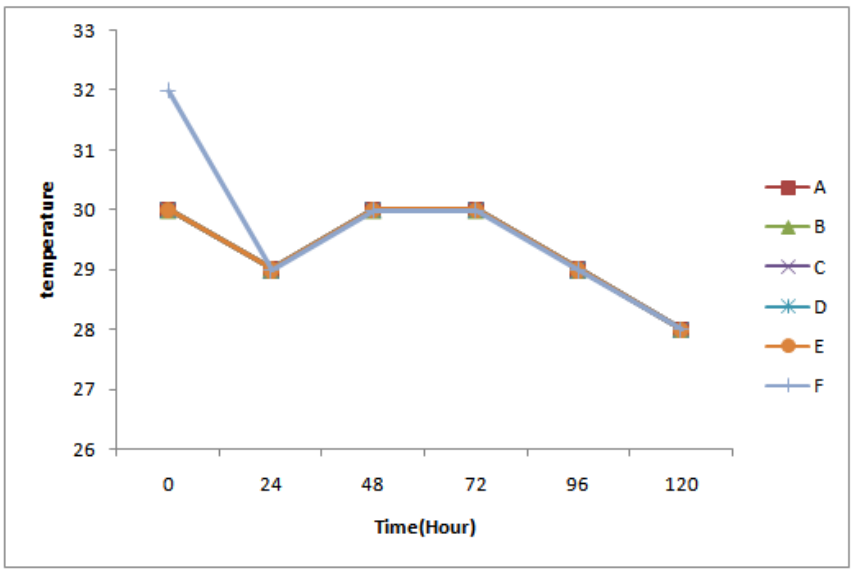

Figure 4 Mean of Change in temperature of samples with Storage Interval of 24hrs.

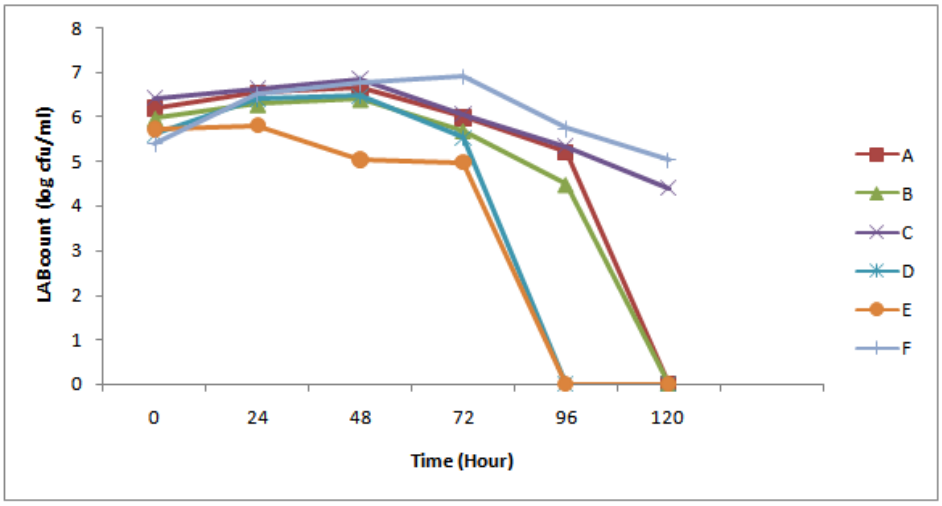

Figure 5: Mean of Lactic Acid Bacteria Count (log cfu/ml) of Samples at Different Storage Interval

Table 3: change in proximate Analysis of different Yoghurt brands

Sample	Duration	Moisture	Protein	Fat	Ash	Carbohydrate
A	0hrs	80.1± 0.58^{a}	3.7±0.03^{a}	3.0±0.03^{a}	0.8±0.01^{a}	13.0±0.55^{a}
	72hrs	82.2±0.12^{b}	3.4±0.01^{b}	2.3±0.12^{b}	0.7±0.00^{a}	10.3±0.12^{b}
B	0hrs	80.5±0.58^{a}	3.3±0.33^{a}	3.3±0.05^{a}	0.7±0.02^{a}	12.4±0.04^{a}
	72hrs	82.0±0.10^{b}	2.3±0.00^{b}	3.2±0.06^{a}	0.6±0.05^{a}	10.1±0.06^{b}
C	0hrs	72.5±0.15^{a}	5.7±0.01^{a}	4.5±0.03^{a}	0.9±0.07^{a}	15.0±0.09^{a}
	72hrs	77.6±0.06^{b}	5.5±0.01^{a}	4.3±0.05^{a}	0.8±0.00^{a}	12.4±0.02^{b}
D	0hrs	90.4±0.15^{a}	1.4±0.01^{a}	0.1±0.01^{a}	0.2±0.01^{a}	7.9±0.12^{a}
	72hrs	92.7±0.12^{b}	1.2±0.01^{b}	0.0±0.00^{a}	0.2±0.00^{a}	4.4±0.17^{b}
E	0hrs	96.9±0.08^{a}	2.3±0.01^{a}	0.4±0.37^{a}	0.5±0.33^{a}	0.8±0.30^{a}
	72hrs	97.3±0.08^{a}	1.4±0.01^{b}	0.0±0.00^{b}	0.2±0.00^{b}	0.2±0.30^{b}
F	0hrs	84.3±0.05^{a}	6.4±0.03^{a}	4.5±0.01 ^{a}	0.7±0.01^{a}	4.1±0.12^{a}
	72hrs	85.2±0.08^{a}	4.1±0.00^{b}	2.0±0.00 ^{b}	0.6±0.00^{a}	3.7±0.24^{a}

Means with different superscript are significantly ($p<0.05$) different the same column

Table 4: The Mean of Sensory Scores (Overall Acceptability) of Samples at Different Storage Interval

Storage	**A**	**B**	**C**	**D**	**E**	**F**
0hrs	9.0 ±0.00	8.2±0.37	9.0±0.00	8.0±0.32	6.8±0.37	9.0±0.00
24hrs	4.2±0.20	3.2±0.73	3.6±0.40	3.8±0.66	2.8±0.58	6.6±1.21
48hrs	2.4±0.75	2.2±0.58	3.2±4.57	1.8±4.39	1.8±0.37	4.0±0.71
72hrs	2.0±0.77	1.0±0.58	2.6±0.24	1.0±0.00	1.0±0.00	1.8±0.80
96hrs	1.0±0.10	1.0±0.00	1.8±0.37	1.0±0.00	1.0±0.00	1.2±0.20

Key: A = Farm fresh Yoghurt, B = L and Z Yoghurt, C = Habib Yoghurt, D = Courage Yoghurt, E = Sheriff Yoghurt, F = Laboratory product (control).

The values are means of five determinations. Significant different at $p<0.05$

Scale: 9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like or dislike, 4 = dislike slightly, 3 = dislike moderately, 2 = dislike very much and 1 = dislike extremely.

IV. CONCLUSION

Based on this study, it is observed that the probiotics status of samples C (large scale) and F (Control) were maintained up to 72hours while sample (A, B, and D) only last for 48hours .Sample E(small scale) didn't meet up with the standard of 10^{6} of Live active bacteria at the time of consumption since from collection..Nutritional value of yoghurt decreases with prolonged storage. Based on the organoleptic scores, it is advisable to consume unrefrigerated yoghurt from the time of production within a day. Sample C and F are the best products in terms of proximate, physiochemical, organoleptic and lactic acid bacteria (probiotic) count.

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