

MICROBIOLOGICAL QUALITY ASSESSMENT AND SAFETY OF LOCAL SHOP YOGURT (DAHI) IN SAVAR AREA OF DHAKA, BANGLADESH



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ABSTRACT

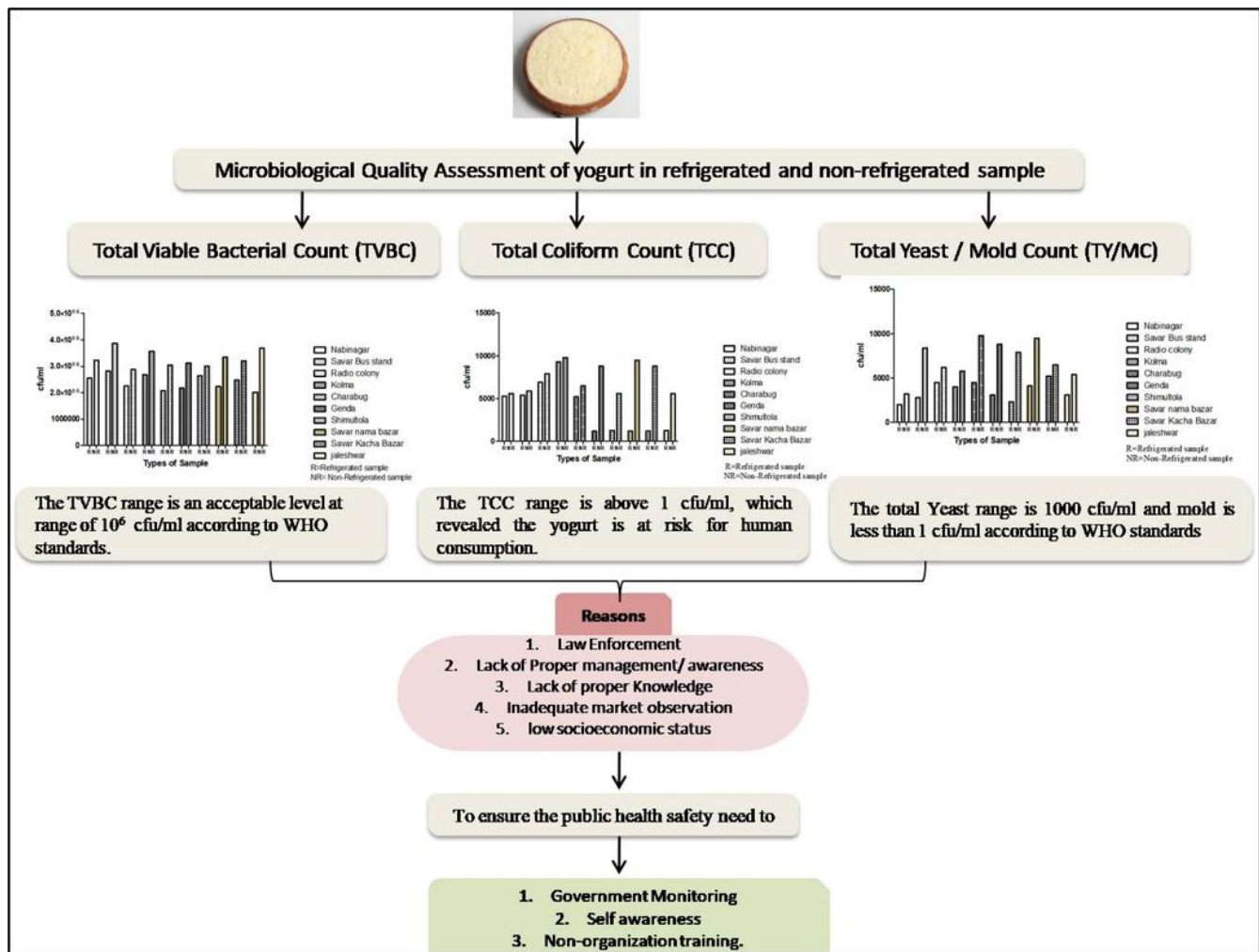
Dahi, or yogurt, is a popular fermented dairy food in Bangladesh. Its broad use emphasizes the significance of ensuring microbiological safety, especially as it is frequently marketed under various storage conditions. Consumers may be at risk if cleanliness and storage standards are lacking. The purpose of this study was to evaluate the microbiological purity and safety of yogurt samples, both refrigerated and non-refrigerated, gathered from 10 different locations in Dhaka's Savar neighborhood. A total of twenty yogurt samples were examined, consisting of ten samples at room temperature and ten samples refrigerated. Microbiological tests were performed in accordance with World Health Organization (WHO) guidelines, with an emphasis on total viable bacterial counts, coliforms, and fungal contamination (including yeast and mold). Total viable bacterial counts in refrigerated samples were between 2.02×10^6 and 2.82×10^6 CFU/ml. Non-refrigerated samples had significantly higher counts, ranging from 3.01×10^6 to 3.87×10^6 CFU/ml. Coliform contamination of up to 10 CFU/ml was found in non-refrigerated samples, which could pose health hazards. Furthermore, fungal contamination (yeast and mold) was substantially greater in non-refrigerated samples. Even in the lack of microbiological requirements established by the Bangladesh Standards and Testing Institution (BSTI), these findings highlight the importance of stricter handling, storage, and hygiene procedures. Adopting Good Manufacturing Practices (GMP) and Good Hygiene Practices (GHP) is necessary to assure the safety and quality of yogurt products in regional markets.

KEYWORDS: Dahi, microbiological quality, coliform contamination, food hygiene, food safety

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Graphical Abstract

Microbiological Quality and Safety Assessment of locally prepared yogurt (Dahi) in different areas in Savar, Bangladesh. These findings suggest that government monitoring, self-awareness, and health consciousness could ensure public health safety. The overall result can help the Bangladesh Standard Testing Institute (BSTI) establish a microbiological standard for refrigerated and non-refrigerated fermented milk and milk products.

Introduction

Yogurt, as the English name and the Bengali name “Dahi,” is the most popular fermented milk product in Bangladesh, which is usually used as a dessert served after Bangladeshi polao dishes, as well as a crucial element in a variety of traditional cuisine (Harun-ur-Rashid & Miyamoto, 2005; Rahman et al., 2020). It is very well known that yogurt is a very good source of probiotics and has valuable therapeutic roles in curing gastrointestinal uncomfortable disorders, including constipation and lactose intolerance (Erickson & Hubbard, 2000; Islam et al., 2025). Studies also suggested that yogurt may reduce cholesterol levels and colon cancer (Erickson & Hubbard, 2000). Due to its nutritional and health benefits, physicians and nutritionists also highly recommend taking it as a source of protein, calcium, phosphorus, magnesium, potassium, and fats, along with remarkable amounts of several vitamins, such as riboflavin and vitamin B6 (Dave & Shah, 1997). Since people are now health-conscious and aware of

their gut microbiome, it is also becoming more desirable to consume yogurt as a regular, digestible diet and nutritional source (El Kholly et al., 2014; Mckinley, 2005). There are two types of yogurts prepared in local markets and commercial brands in Bangladesh: sweetened or mistidahi (with sugar) and sour yogurt (no sugar) (Hasan et al., 2021). In the commercial sector, Aarong Dairy, Pran, Shakti+Misthi, along with several famous brands, have now started providing yogurt drinks and flavored drinks as per the demand of consumers in Bangladesh. According to the study, it is reported that about 4% of the milk produced in Bangladesh is used for Yoghurt preparation (Dey et al., 2011; Hasan et al., 2021). Most of the local shops selling yogurt are produced on a small scale, either in the consumer’s household or in the sweetmeat shops in urban areas, as customers’ demand (Hasan et al., 2021). Traditionally, the yogurt is prepared by using previously made dahi (used as a starter) or a small amount of natural yogurt, which is made by

lemon (5%), and chili to make the starter(Bhat et al., 2016; Dey et al., 2011; Hasan et al., 2021; Kiranawati et al., 2021). Sometimes sugars or jaggery are added for sweetening yogurt

purposes(Harun-ur-Rashid & Miyamoto, 2005). The traditional way of production process of yogurt is shown in Figure 1.

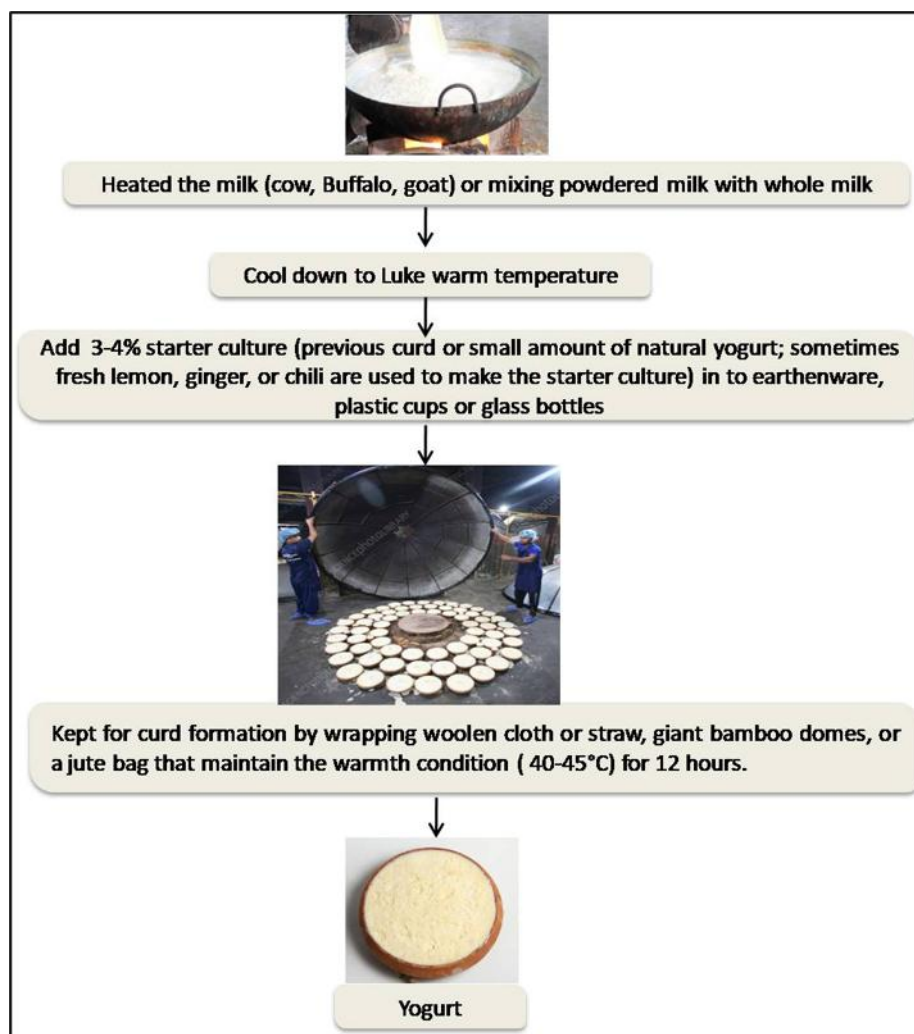


Figure 1. The traditional production process of Yogurt in Bangladesh.

However, sweet yogurt is the most popular and commercially sold product in Bangladesh. It is sold in the open market and stored at ambient temperature without any covering on the yogurt (Rahman et al., 2020). While in urban areas, it is stored in refrigerators for a long time, others, such as those in suburban or rural areas, still keep it at room temperature, sometimes refrigerated, depending on their economic situation, and are sold within 1 or 2 days before the deterioration of Dahi (Harun-ur-Rashid & Miyamoto, 2005). Due to the variation of proper storing temperature and unhygienic preparation, improper handling, inadequate transportation, as well as processing, are responsible for the putrefaction of both chemical and microbial quality of yogurt (Rahman et al., 2020). Other factors associated with low quality of Dahi production are the use of poor-quality milk(Sarkar et al., 2012). Therefore, it is a vital part to assess the microbiological quality that reflects the yogurt quality and acceptability(Harun-ur-Rashid & Miyamoto, 2005). Although *Lactobacillus bulgaricus* and *Streptococcus thermophilus* are the key contributors to the formation of yogurt

(Dave & Shah, 1997). Yogurt is an ideal and excellent medium for the growth of most common foodborne pathogenic bacteria, including *Escherichia coli*, *Listeria monocytogenes*, *Staphylococcus aureus*, *Bacillus cereus*, *Campylobacter jejuni*, *Clostridium botulinum*, *C. perfringens*, *Cronobacter sakazakii*, *Salmonella* spp., *Shigella* spp., *Vibrio* spp., and *Yersinia enterocolitica*(Bintsis, 2017). Several studies have reported that *Staphylococcus aureus*, *Escherichia coli*, coliform bacteria, and fungi cause yogurt-borne infections(Al-Tahiri, 2005; Belli et al., 2013; Ifeanyi et al., 2013; Okonkwo, 2011). The bacteria secrete enterotoxins, which are associated with food poisoning(Bristone et al., 2015; Organization, 2012; Uzeh et al., 2006). The product shelf-life and customer health safety depend on the microbiological quality assessment of yogurt. According to International Standards for Yoghurt by the Codex Alimentarius Commission of the Food and Agriculture Organization (FAO) and WHO. In the Codex Standards for Fermented Milks (2003) the acceptable level of microbes is 10^6 cfu/ml, coliform less than 1 cfu/ml and fungi less than 10

CFU/ml (Gómez-Gallego et al., 2018; Organization, 2012). However, research has already documented that the acceptable limit of microbes in yogurt is less than 10^8 CFU/ml (Chowdhury et al., 2011; Hossain et al., 2017; Uddin et al., 2011; Worku et al., 2015). Although Bangladesh Standard Testing Institute (BSTI) is still working to standardize the acceptable limit of yogurt in Bangladesh but there is no clear documentation yet (Hossain et al., 2017). Even though there has not been any study conducted on a stored (Refrigerated) and non-stored (non-refrigerated) microbiological quality assessment research of yogurt in Bangladesh. Therefore, we have aimed to evaluate the microbiological quality of refrigerated and non-refrigerated yogurts from different selected areas in Savar, Dhaka of Bangladesh.

Materials and Methods

This study was conducted in the microbiology laboratory of the Department of Microbiology, Gono Bishwabidyalay (Gono University), Savar, Dhaka-1344, Bangladesh. The research work was carried out from January 2024 to December 2024. The sampling period was from March 2024 to May 2024.

Twenty earthenware yogurt brands were randomly purchased from ten different areas of Savar, named as Nabinagar, Savar bus stand, Radio colony, Kolma, Charabug, Genda, Shimultola, Savar nama bazaar, Savar kacha Bazaar, and Jaleswar. The map of the study area is shown in Figure 2, created by QGIS software. The refrigerated and non-refrigerated samples were collected after 12 to 20 hours of curd formation. To maintain

the refrigerated sample temperature and minimize contamination, the samples were carried out using an icebox to the laboratory without delay.

Microbiological analysis of the collected yoghurt samples was done by using the Standard Plate Count (SPC), Total Coliform Count (TCC), and Total Fungal Count (TFC) methods as described by APHA (Wehr & Frank, 2004). In brief, each yogurt sample was serially diluted using a sterile ten-fold serial dilution technique. One milliliter (1 mL) of each yogurt sample was introduced into a 9 mL sterile pipette. This was shaken for even distribution of the sample. The first test tube (10^{-1}) dilution was further diluted from test tube to test tube up to a 10^{-6} dilution factor (Cheesbrough, 2000; Mbaeyi-Nwaoha & Egbuche, 2012). Using the Spread plate method, 0.1 mL of each diluent was poured on each agar media plate and spread using a sterile glass rod spreader for the assessment of the microbiological quality of the yogurt sample. All the microbiological experiments were done in aseptic conditions using Laminar Air Flow. The plates were then incubated at 37°C for 24 hours. Bacterial colonies were formed, and colonies containing > 30 to < 300 colonies in the petri dishes were enumerated carefully. Colonies are expressed as the number of colony-forming units per ml (CFU/ml).

All microbiological data were expressed as mean \pm SD. Differences between refrigerated and non-refrigerated samples were analyzed using independent t-tests, with $p < 0.05$ considered statistically significant. Analyses were performed using GraphPad Prism.

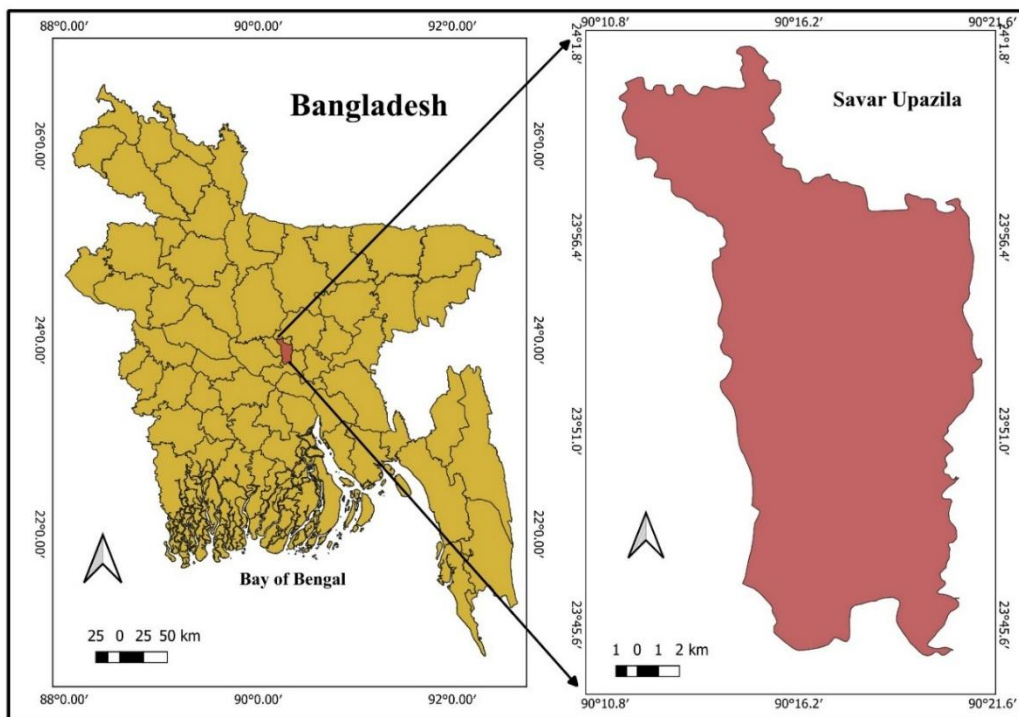


Figure 2. Map of the study area (Savar)

Results

In the present study, the microbiological qualities of refrigerated and non-refrigerated yogurt in different areas of Savar were assessed. The results showed that the range of total viable bacterial count (TVBC) from the non-refrigerated sample was slightly higher than the refrigerated sample, as shown in Table 1, but not significantly. Comparatively, for the refrigerated sample, the range of TVBC in the areas of Charabug (2.08×10^6 CFU/ml) and Jaleshwar (2.02×10^6 CFU/ml) was significantly lower than in other areas. On the other hand, the range of TVBC in Radio colony (2.87×10^6 CFU/ml) for non-refrigerated samples was much lower than that of the areas' non-refrigerated samples (Figure-3).

In our study, results showed that the non-refrigerated yogurt had the highest coliform value in all areas, where the refrigerated sample showed the highest value in Nabinagar (5.3×10^3 CFU/ml), Savar Bus Stand (5.4×10^3 CFU/ml), Radio colony (6.9×10^3 CFU/ml), Kolma (9.3×10^3 CFU/ml), and Charabug (5.2×10^3 CFU/ml), respectively (Figure-4). Furthermore, Table 2 shows that the Kolma area has the highest TCC in both refrigerated and non-refrigerated samples.

Results showed that refrigerated and non-refrigerated yoghurt samples had 1000 per CFU/ml yeasts and molds < 1 per CFU/ml. Table -3 shows that Savar bus stand (8.4×10^3 CFU/ml), Charabug (9.8×10^3 CFU/ml), Genda (8.8×10^3 cfu/ml), Shimultola (7.9×10^3 CFU/ml), and Savar Nama bazaar (9.5×10^3 CFU/ml) have the highest yeast and mold count (Figure 5).

An overall analysis of this study revealed that the dahi produced by the traditional method and collected from different areas in Savar were of acceptable quality in terms of total viable bacterial count and Total Fungal count. Refrigerated and unrefrigerated samples showed higher coliform due to either transportation or uncontrolled storing temperature and unhygienic practices during production. Therefore, it is necessary to follow the hygienic practice and maintain the storage temperature to avoid coliform contamination. Our next step will be observing the effects of yogurt production due to the contamination of coliform and fungi, and the chemical changes of yogurt.

Table 1. Microbiological assessment of yoghurt samples from different areas of Savar

Sl no	Sampling area	Refrigerate d Samples	Non-Refrigerate d Samples	Refrigerate d Samples	Non-Refrigerate d Samples	Refrigerate d Samples	Non-Refrigerate d Samples
		TBC (CFU/ml)	TBC (CFU/ml)	TCC (CFU/ml)	TCC (CFU/ml)	TFC (CFU/ml)	TFC (CFU/ml)
1.	Nabinagar	2.55×10^6	3.23×10^6	5.3×10^3	5.6×10^3	2.0×10^3	3.2×10^3
2.	Savar Bus Stand	2.82×10^6	3.87×10^6	5.4×10^3	5.9×10^3	2.8×10^3	8.4×10^3
3.	Radio Colony	2.25×10^6	2.87×10^6	6.9×10^3	7.9×10^3	4.5×10^3	6.2×10^3
4.	Kolma	2.67×10^6	3.56×10^6	9.3×10^3	9.8×10^3	4.0×10^3	5.8×10^3
5.	Charabag	2.08×10^6	3.05×10^6	5.2×10^3	6.5×10^3	4.5×10^3	9.8×10^3
6.	Genda	2.18×10^6	3.12×10^6	1.2×10^3	8.8×10^3	3.1×10^3	8.8×10^3
7.	Shimultola	2.64×10^6	3.01×10^6	1.3×10^3	5.6×10^3	2.3×10^3	7.9×10^3
8.	Savar Nama Bazar	2.24×10^6	3.34×10^6	1.2×10^3	9.5×10^3	4.1×10^3	9.5×10^3
9.	Savar Kacha Bazar	2.47×10^6	3.21×10^6	1.2×10^3	8.8×10^3	5.2×10^3	6.5×10^3
10	Jaleshwar	2.02×10^6	3.68×10^6	1.3×10^3	5.6×10^3	3.1×10^3	5.4×10^3

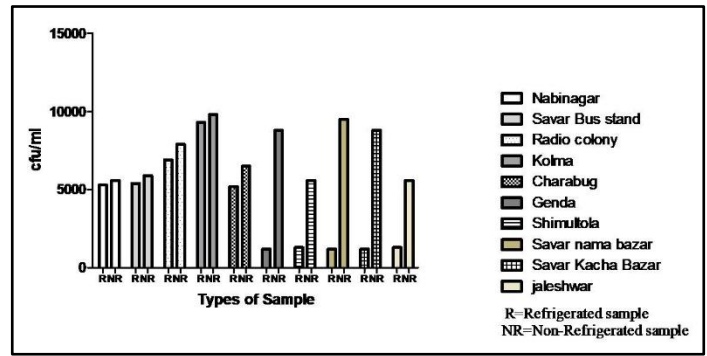
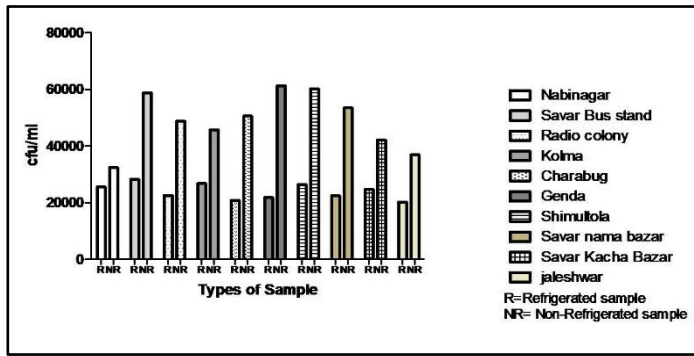


Figure 3: The Total viable bacterial count (TVBC) in refrigerated and unrefrigerated yogurt samples

Figure 4: The Total Coliform count (TCC) in refrigerated and unrefrigerated yogurt samples

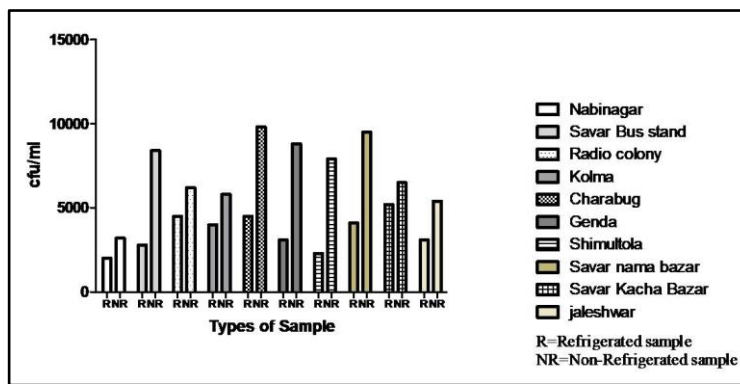


Figure 5: The Total Yeast and Mold Count in refrigerated and unrefrigerated yogurt samples

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Conflict of Interest

All authors declare that no conflict of this study.

Author's Contribution

Rahima Begum: Conceptualization, Writing original draft, Data Curation, Supervision. **Md. Ahsanul Haque:** Review and Editing. **Sharmin Sultana Akhi:** Review and Editing. **Suma Akter:** Review and Editing. **Shahad Saif Khandker:** Review and Editing. **Asifuzzaman Zisan:** Review and Editing.

References

- Bhat, A. A., Choudhary, S., Ahmed, A., Para, P. A., Dar, M. A., Farooq, J., Choudhary, Y., Sharma, N., & Ganguly, S. (2016). Studies on Development of Curd by Using Lemon Juice as Starter Culture. *Indian Journal of Nutrition and Dietetics*, 53, 1.
- Bintsis, T. (2017). Foodborne pathogens. *AIMS microbiology*, 3(3), 529.
- Bristone, C., Badau, M. H., Igwebuike, J. U., & Igwegbe, A. O. (2015). Production and evaluation of yoghurt from mixtures of cow milk, milk extract from soybean and tiger nut. *World Journal of Dairy & Food Sciences*, 10(2), 159-169.

4. Cheesbrough, M. (2000). District Laboratory Practice Manual in Tropical Countries, part 2 Cambridge University Press, New York.
5. Chowdhury, N., Kamruzzaman Paramanik, K. P., & Zaman, W. (2011). Study on the quality assessment of curd (dahi), locally available in Bangladeshi market.
6. Dave, R. I., & Shah, N. P. (1997). Viability of yoghurt and probiotic bacteria in yoghurts made from commercial starter cultures. *International Dairy Journal*, 7(1), 31-41.
7. Dey, S., Iqbal, A., Ara, A., & Rashid, M. (2011). Evaluation of the quality of Dahi available in Sylhet Metropolitan City. *Journal of the Bangladesh Agricultural University*, 9(1), 79-84.
8. El Kholly, M., EL SHINAWY, S., Meshref, A., & Korny, A. (2014). Screening of antagonistic activity of probiotic bacteria against some food-borne pathogens.
9. Erickson, K., & Hubbard, N. (2000). Probiotic Bacteria: Implications for Human Health. *J. Nutr*, 130(2), 403-409.
10. Gómez-Gallego, C., Gueimonde, M., & Salminen, S. (2018). The role of yogurt in food-based dietary guidelines. *Nutrition reviews*, 76(Supplement_1), 29-39.
11. Harun-ur-Rashid, M., & Miyamoto, T. (2005). Quality evaluation of traditional fermented milk" dahi" in Bangladesh.
12. Hasan, G. A., Satter, M. A., & Das, A. K. (2021). Potential human health risks assessment through determination of heavy metal contents in regularly consumed yogurts in Bangladesh. *Biosciences Biotechnology Research Asia*, 18(3), 603-610.
13. Hossain, M. N., Humayun, S., Haque, M. Z., & Ahmed, M. M. (2017). Microbiological quality assessment and acceptance of dairy products in Dhaka city. *Asian-Australasian Journal of Food Safety and Security*, 1(1), 58-64.
14. Kiranawati, T. M., Soekopitojo, S., & Pambudi, S. J. P. (2021). The effect of adding a large red chili puree (*Capsicum annum L.*) on the physicochemical characteristics of yogurt. *Bulletin of Culinary Art and Hospitality*, 1(2), 3.
15. Mbaeyi-Nwaoha, I., & Egbuche, N. (2012). Microbiological evaluation of sachet water and street-vended yoghurt and "Zobo" drinks sold in Nsukka metropolis. *International Journal of Biological and Chemical Sciences*, 6(4), 1703-1717.
16. Mckinley, M. C. (2005). The nutrition and health benefits of yoghurt. *International journal of dairy technology*, 58(1), 1-12.
17. Organization, W. H. (2012). General information related to microbiological risks in food. <http://www.who.int/foodsafety/micro/general/en/index.html> Accessed on, 19, 12.
18. Rahman, M. A., Hossain, A., Islam, M., Hussain, M. S., & Huque, R. (2020). Microbial features and qualitative detection of adulteration along with physicochemical characteristics of sweetened yoghurt. *Eur J Nutr Food Saf*, 12(4), 9-16.
19. Sarkar, M., Nahar, T., Alam, M., Rahman, M., Rashid, M., & Islam, M. (2012). Chemical and bacteriological quality of popular Dahi available in some selected areas of Bangladesh. *Bangladesh Journal of Animal Science*, 41(1), 47-51.
20. Uddin, M. A., Motazzim-ul-Haque, H. M., & Noor, R. (2011). Isolation and identification of pathogenic *Escherichia coli*, *Klebsiella* spp. and *Staphylococcus* spp. in raw milk samples collected from different areas of Dhaka City, Bangladesh. *Stamford Journal of Microbiology*, 1(1), 19-23.
21. Uzeh, R. E., Ohenhen, R. E., & Rojgbokan, A. K. (2006). Microbiological and nutritional qualities of dairy products: Nono and Wara. *Nature and science*, 4(3), 37-40.
22. Wehr, H. M., & Frank, J. F. (2004). *Standard methods for the examination of dairy products*. American Public Health Association.
23. Worku, K. F., Tefera, A. T., & Tuji, F. A. (2015). Comparative analysis of microbial load of commercially prepared and traditionally homemade yoghurt (Ergo) retailed in Addis Ababa. *Advances in Life Sciences*, 5(3), 58-63.