



ISSN (E): 2277-7695
 ISSN (P): 2349-8242
 NAAS Rating: 5.23
 TPI 2022; SP-11(12): 243-248
 © 2022 TPI
www.thepharmajournal.com
 Received: 16-09-2022
 Accepted: 19-10-2022

A Poorani
 Assistant Professor, Department of Livestock Products Technology-Dairy Science, Veterinary College and Research Institute, Namakkal, Tamil Nadu, India

C Pandiyan
 Professor, Department of Livestock Products Technology - Dairy Science, Veterinary College and Research Institute, Namakkal Tamil Nadu, India

G Kumaresan
 Professor and Head, Department of Livestock Products Technology -Dairy Science, Veterinary College and Research Institute, Namakkal, Tamil Nadu, India

P Selvaraj
 Professor and Head, Department of Veterinary Physiology, Veterinary College and Research Institute, Namakkal, Tamil Nadu, India

P Vasan
 Professor and Head, Department of Animal Nutrition, Veterinary College and Research Institute, Theni, Tamil Nadu, India

An analysis of consumer sensory perception towards fresh buffalo milk curd made with alteration in specific major milk constituents

A Poorani, C Pandiyan, G Kumaresan, P Selvaraj and P Vasan

Abstract

Buffalo milk curd is noted for its consistency, smooth texture, and pleasant aroma. An experiment was conducted on consumer sensory perception towards fresh buffalo milk curd made with alteration in specific major milk constituents mainly fat and SNF. The buffalo milk samples were fermented at 40 °C. Consumer sensory perception of curd samples mainly based on colour and appearance, body and texture, flavour, and overall acceptability were evaluated on a nine-point hedonic scale. In Statistical analysis significant ($p<0.01$) increase in the sensory score was also noticed in body and texture, and colour and appearance score of buffalo milk curd samples prepared from 5% fat and 9% Solids Not Fat at fermentation temperature 40 °C. Flavour, colour and appearance, body and texture, overall acceptability scores of curd samples prepared at incubation temperature 40 °C with 5% fat and 9% Solids Not combination was 8.71 ± 0.02 , 8.65 ± 0.01 , 8.75 ± 0.02 , 8.70 ± 0.02 respectively.

Keywords: Buffalo milk curd, consumer sensory perception- 9 point hedonic scale ratings, incubation temperature 40 °C- Flavour, colour and appearance, body and texture, overall acceptability scores

Introduction

Curd is an important fermented product used in India. It has mild pleasant flavour, with a clean acidic taste, a creamy white colour with a smooth, gloosy surface and cream layer on top. Curd produced commercially difference in Fat and SNF is often observed. With standardization of specific major milk constituents, fat and SNF in buffalo milk based on consumer sensory perception a defined product of consistent quality can be achieved. (Sahai, 1996)^[10]

A detailed study is needed to fine out the ways and means of producing best quality buffalo milk curd by altering major milk constituents mainly fat and SNF on the basis of consumer sensory perception without production of much acid formation. In this experiment, buffalo milk curd samples were prepared using different Fat, SNF combinations at fermentation temperature of 40 °C. Sensory evaluation was made to judge the good quality product.

Materials and methods

Buffalo milk was obtained fresh from the Livestock Farm Complex, Veterinary College Research Institute, Namakkal, and skim milk powder with 5 per cent moisture and 95 per cent solubility was purchased from Aavin, Salem were used in this study. Milk was adjusted to contain the desired fat and SNF levels using the Pearson square method (Bakke *et al.*, 2016)^[2]. Dahi culture NCDC 159 was obtained from the National Collection of Dairy Cultures (NCDC), Division of Dairy Microbiology, National Dairy Research Institute, Karnal (Haryana) was used in this study.

Different buffalo milk curd samples are prepared by altering specific major milk constituent's fat and SNF combinations at fermentation temperature 40 °C as shown in the following table: -

Species	Buffalo milk															
Trial	B1 (Control)			B2			B3			B4						
Fat%	5			5			5.5			6						
SNF%	9			10	11	12	8.5	9	10	11	12	8.5	9	10	11	12

Species	Buffalo milk																			
Trial	B5				B6				B7				B8							
Fat%	6.5				7				7.5				8							
SNF%	8.5	9	10	11	12	8.5	9	10	11	12	8.5	9	10	11	12	8.5	9	10	11	12

Corresponding Author:

A Poorani
 Assistant Professor, Department of Livestock Products Technology-Dairy Science, Veterinary College and Research Institute, Namakkal, Tamil Nadu, India

Sensory analysis of buffalo milk curd

Sensory attributes of curd samples mainly colour and appearance, body and texture, flavor, and overall acceptability were evaluated on a nine-point hedonic scale (9 for liking extremely and 1 for disliking extremely) by a panel of six discriminative and communicative judges. (Hussain *et al.*, 2016) [7]

Results and Discussion

On examination of data in table-1 shows that the buffalo milk curd prepared at constant incubation temperature of 40 °C from milk containing 5% fat and 9% SNF scored significantly ($p<0.01$) higher with higher sensory scores than the samples prepared from 11 and 12% SNF. In the same way, from table 1 and fig. 1-7, significant ($p<0.01$) increase in the score was also observed in body and texture, and colour and appearance score of curd samples prepared from 5% fat and 9% SNF. This combination was selected as best quality buffalo milk curd without acid development. All the increased scores on the physical attributes of curd have shown statistically high ($p<0.01$) differences.

Unique characteristics of buffalo milk, such as high total solid content, whiteness and viscosity, provides the opportunities for buffalo milk to process into inimitable dairy product. (Hong and Goh, 1979) [6] Wide variations have been reported in values for the heat stability of Buffalo milk due to the heating temperature as well as in the methods used to measure the heat stability. (Gono *et al.*, 1988) [5]; Ghadge *et al.*, 2008[3]; However, most studies agreed that Buffalo milk was less heat-stable and it is due to the high fat and Calcium contents. (Sahai, 1996) [10] Ghosh, and Rajorhia (1987) [4];

Khalifa and Zakaria, 2009 [8]. Taking this all into consideration, under incubation temperature of 40 °C, the buffalo milk curd prepared from milk containing 5% fat 10 and 9% SNF is the best combination of Fat and Solids Not Fat for the preparation of buffalo milk curd.

These findings are in agreement with Nahar *et al.* (2007) [9] who had recorded that fat and SNF improved the quality attributes of curd. The results also correlates well with the findings of Anema (2008)[11] that buffalo milk curd fermented at a higher temperature or left in storage is more susceptible to whey separation more sensitive to the external force indicated by the flow behaviour index and less able to recover to the original structure after fermentation, whereas buffalo milk curd fermented at the lower temperature of 40°C was longer, leading to a more consistent product and this temperature was recommended to improve the microstructure and syneresis of buffalo milk curd.(Hong and Goh, 1979) [6]

The experimental results are also found in concurrence with findings of Hussain *et al.*, (2016) [7]. who stated that lowering of body and texture scores upon increase of solids not fat till certain level could be ascribed to the faster growth of lactic acid bacteria resulted in higher acid production leading to oozing out of water from the protein matrix in dahi.

Conclusion

Based on this study of consumer sensory perception towards fresh buffalo milk curd at fermentation temperature 40 °C made with alteration in specific major milk constituents, it was concluded that buffalo milk curd sample with 5% fat and 9% Solids Not Fat (SNF) prepared under incubation temperature 40 °C was rated as the best.

Table 1: Mean (±SE) sensory evaluation score for the selection of acceptable buffalo milk curd samples prepared by incubation at 40°C by using various fat and SNF combinations

Treatments (n=6)	Buffalo milk curd samples based on the sensory scores with various fat and SNF combinations					
	Group 1*buffalo	B1A12	B2A12	B2A22	B2A32	
Flavour score	8.71 ^a ±0.02	8.60 ^a ±0.01	8.58 ^a ±0.02	8.58 ^a ±0.02		
Body and Texture	8.65 ^a ±0.01	8.35 ^b ±0.01	8.21 ^b ±0.02	8.21 ^b ±0.03		
Colour and appearance	8.75 ^a ±0.02	8.71 ^b ±0.01	8.66 ^b ±0.02	8.69 ^b ±0.03		
Overall acceptability	8.70 ^a ±0.02	8.40 ^b ±0.21	8.29 ^b ±0.01	8.29 ^b ±0.01		
Group 2*	B1A12	B3A12	B3A22	B3A32	B3A42	B3A52
Flavour score	8.71 ^a ±0.02	8.42 ^a ±0.11	8.59 ^a ±0.12	8.70 ^a ±0.02	8.68 ^a ±0.02	8.67 ^a ±0.01
Body and Texture	8.65 ^a ±0.01	8.68 ^a ±0.22	8.65 ^a ±0.22	8.31 ^b ±0.02	8.29 ^b ±0.02	8.21 ^b ±0.01
Colour and appearance	8.75 ^a ±0.02	8.74 ^a ±0.15	8.74 ^a ±0.15	8.69 ^b ±0.02	8.69 ^b ±0.02	8.69 ^b ±0.02
Overall acceptability	8.70 ^a ±0.02	8.69 ^a ±0.17	8.69 ^a ±0.17	8.29 ^b ±0.01	8.26 ^b ±0.01	8.22 ^b ±0.03
Group 3*	B1A12	B4A12	B4A22	B4A32	B4A42	B4A52
Flavour score	8.71 ^a ±0.02	8.60 ^b ±0.01	8.60 ^b ±0.01	8.59 ^b ±0.02	8.66 ^a ±0.01	8.65 ^a ±0.02
Body and Texture	8.65 ^a ±0.01	8.35 ^b ±0.01	8.35 ^b ±0.02	8.21 ^b ±0.03	8.28 ^b ±0.03	8.26 ^b ±0.03
Colour and appearance	8.75 ^a ±0.02	8.71 ^b ±0.01	8.71 ^b ±0.03	8.69 ^c ±0.02	8.74 ^b ±0.01	8.69 ^c ±0.02
Overall acceptability	8.70 ^a ±0.02	8.40 ^b ±0.01	8.40 ^b ±0.02	8.29 ^b ±0.03	8.27 ^b ±0.03	8.26 ^c ±0.04
Group 4*	B1A12	B5A12	B5A22	B5A32	B5A42	B5A52
Flavour score	8.71 ^a ±0.02	8.60 ^a ±0.21	8.70 ^a ±0.02	8.68 ^a ±0.01	8.67 ^a ±0.08	8.70 ^a ±0.02
Body and Texture	8.65 ^a ±0.01	8.35 ^b ±0.02	8.31 ^b ±0.18	8.29 ^b ±0.02	8.21 ^b ±0.21	8.26 ^b ±0.01
Colour and appearance	8.75 ^a ±0.02	8.71 ^b ±0.27	8.69 ^b ±0.11	8.69 ^b ±0.02	8.69 ^b ±0.11	8.69 ^b ±0.03
Overall acceptability	8.70 ^a ±0.02	8.40 ^b ±0.02	8.28 ^b ±0.22	8.26 ^b ±0.03	8.22 ^b ±0.22	8.26 ^c ±0.01
Group 5*	Control	B6A12	B6A22	B6A32	B6A42	B6A52
Flavour score	8.71 ^a ±0.02	8.70 ^a ±0.01	8.68 ^a ±0.08	8.67 ^a ±0.01	8.69 ^a ±0.08	8.70 ^a ±0.08
Body and Texture	8.65 ^a ±0.01	8.31 ^b ±0.04	8.21 ^b ±0.03	8.28 ^b ±0.03	8.26 ^b ±0.21	8.27 ^b ±0.21
Colour and appearance	8.75 ^a ±0.02	8.69 ^b ±0.04	8.69 ^b ±0.11	8.71 ^b ±0.27	8.69 ^b ±0.11	8.69 ^b ±0.12
Overall acceptability	8.70 ^a ±0.02	8.28 ^b ±0.01	8.29 ^b ±0.03	8.27 ^b ±0.01	8.26 ^c ±0.04	8.26 ^c ±0.22
Group 6*	Control	B7A12	B7A22	B7A32	B7A42	B7A52
Flavour score	8.71 ^a ±0.02	8.58 ^a ±0.04	8.68 ^a ±0.03	8.67 ^a ±0.02	8.69 ^a ±0.01	8.70 ^a ±0.03
Body and Texture	8.65 ^a ±0.01	8.21 ^b ±0.01	8.29 ^b ±0.02	8.21 ^b ±0.04	8.26 ^b ±0.03	8.27 ^b ±0.03
Colour and appearance	8.75 ^a ±0.02	8.69 ^b ±0.02	8.69 ^b ±0.12	8.69 ^b ±0.04	8.69 ^b ±0.02	8.69 ^b ±0.01
Overall acceptability	8.70 ^a ±0.02	8.29 ^b ±0.02	8.26 ^b ±0.04	8.22 ^b ±0.05	8.26 ^c ±0.03	8.26 ^c ±0.01

Group 7*	Control	B8A12	B8A22	B8A32	B8A42	B8A52
Flavour score	8.71 ^a ±0.02	8.68 ^a ±0.02	8.69 ^a ±0.08	8.67 ^a ±0.02	8.69 ^a ±0.01	8.70 ^a ±0.02
Body and Texture	8.65 ^a ±0.01	8.29 ^b ±0.03	8.25 ^b ±0.01	8.28 ^b ±0.01	8.26 ^b ±0.02	8.27 ^b ±0.02
Colour and appearance	8.75 ^a ±0.02	8.69 ^b ±0.01	8.75 ^b ±0.02	8.71 ^b ±0.02	8.69 ^b ±0.01	8.69 ^b ±0.01
Overall acceptability	8.70 ^a ±0.02	8.26 ^b ±0.03	8.32 ^b ±0.01	8.27 ^b ±0.03	8.26 ^c ±0.02	8.26 ^c ±0.02

*Means bearing superscript within the treatments differ significantly ($p < 0.01$) (n=6)

B1A12	-	Buffalo milk curd made with 5% fat and 9% SNF under incubation temperature 40 °C
B2A22	-	Buffalo milk curd made with 5% fat and 10% SNF under incubation temperature 40 °C
B2A22	-	Buffalo milk curd made with 5% fat and 11% SNF under incubation temperature 40 °C
B2A32	-	Buffalo milk curd made with 5% fat and 12% SNF under incubation temperature 40 °C
B3A12	-	Buffalo milk curd made with 5.5% fat and 8.5% SNF under incubation temperature 40 °C
B3A22	-	Buffalo milk curd made with 5.5% fat and 9% SNF under incubation temperature 40 °C
B3A32	-	Buffalo milk curd made with 5.5% fat and 10% SNF under incubation temperature 40 °C
B3A42	-	Buffalo milk curd made with 5.5% fat and 11% SNF under incubation temperature 40 °C
B3A52	-	Buffalo milk curd made with 5.5% fat and 12% SNF under incubation temperature 40 °C
B4A12	-	Buffalo milk curd made with 5.5% fat and 8.5% SNF under incubation temperature 40 °C
B4A22	-	Buffalo milk curd made with 5.5% fat and 9% SNF under incubation temperature 40 °C
B4A32	-	Buffalo milk curd made with 5.5% fat and 10% SNF under incubation temperature 40 °C
B4A42	-	Buffalo milk curd made with 5.5% fat and 11% SNF under incubation temperature 40 °C
B4A52	-	Buffalo milk curd made with 5.5% fat and 12% SNF under incubation temperature 40 °C
B5A12	-	Buffalo milk curd made with 5.5% fat and 8.5% SNF under incubation temperature 40 °C
B5A22	-	Buffalo milk curd made with 5.5% fat and 9% SNF under incubation temperature 40 °C
B5A32	-	Buffalo milk curd made with 5.5% fat and 10% SNF under incubation temperature 40 °C
B5A42	-	Buffalo milk curd made with 5.5% fat and 11% SNF under incubation temperature 40 °C
B5A52	-	Buffalo milk curd made with 5.5% fat and 12% SNF under incubation temperature 40 °C
B6A12	-	Buffalo milk curd made with 5.5% fat and 8.5% SNF under incubation temperature 40 °C
B6A22	-	Buffalo milk curd made with 5.5% fat and 9% SNF under incubation temperature 40 °C
B6A32	-	Buffalo milk curd made with 5.5% fat and 10% SNF under incubation temperature 40 °C
B6A42	-	Buffalo milk curd made with 5.5% fat and 11% SNF under incubation temperature 40 °C
B6A52	-	Buffalo milk curd made with 5.5% fat and 12% SNF under incubation temperature 40 °C
B7A12	-	Buffalo milk curd made with 5.5% fat and 8.5% SNF under incubation temperature 40 °C
B7A22	-	Buffalo milk curd made with 5.5% fat and 9% SNF under incubation temperature 40 °C
B7A32	-	Buffalo milk curd made with 5.5% fat and 10% SNF under incubation temperature 40 °C
B7A42	-	Buffalo milk curd made with 5.5% fat and 11% SNF under incubation temperature 40 °C
B7A52	-	Buffalo milk curd made with 5.5% fat and 12% SNF under incubation temperature 40 °C
B8A12	-	Buffalo milk curd made with 5.5% fat and 8.5% SNF under incubation temperature 40 °C
B8A22	-	Buffalo milk curd made with 5.5% fat and 9% SNF under incubation temperature 40 °C
B8A12	-	Buffalo milk curd made with 5.5% fat and 10% SNF under incubation temperature 40 °C
B8A42		Buffalo milk curd made with 5.5% fat and 11% SNF under incubation temperature 40 °C
B8A52		Buffalo milk curd made with 5.5% fat and 12% SNF under incubation temperature 40 °C

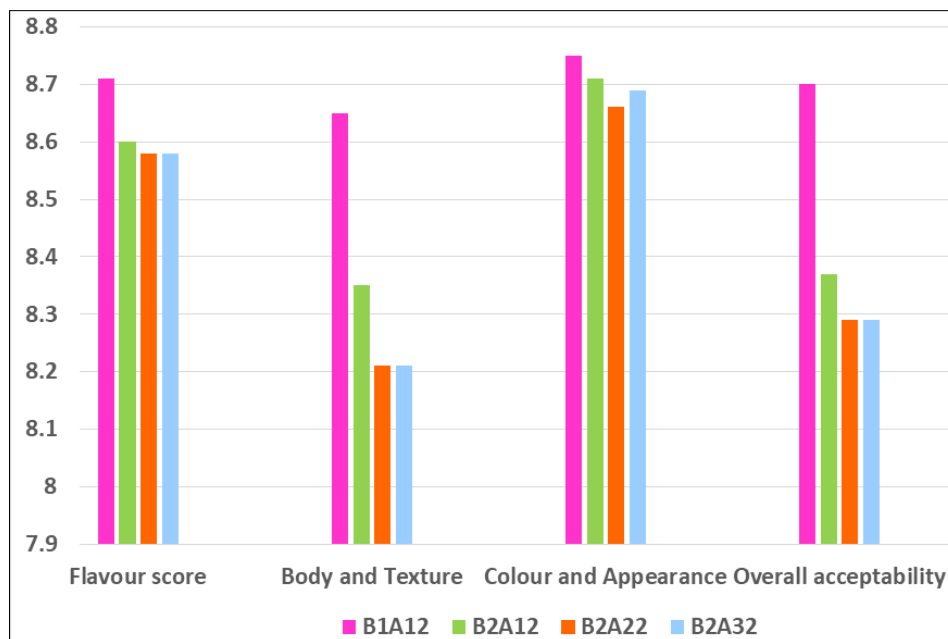


Fig 1: Sensory scores for Group1

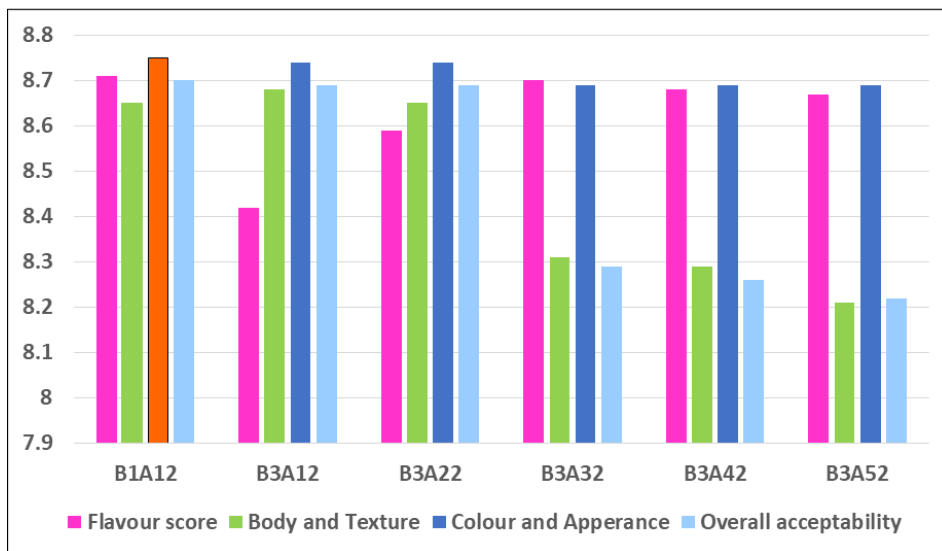


Fig 2: Sensory scores for Group 2

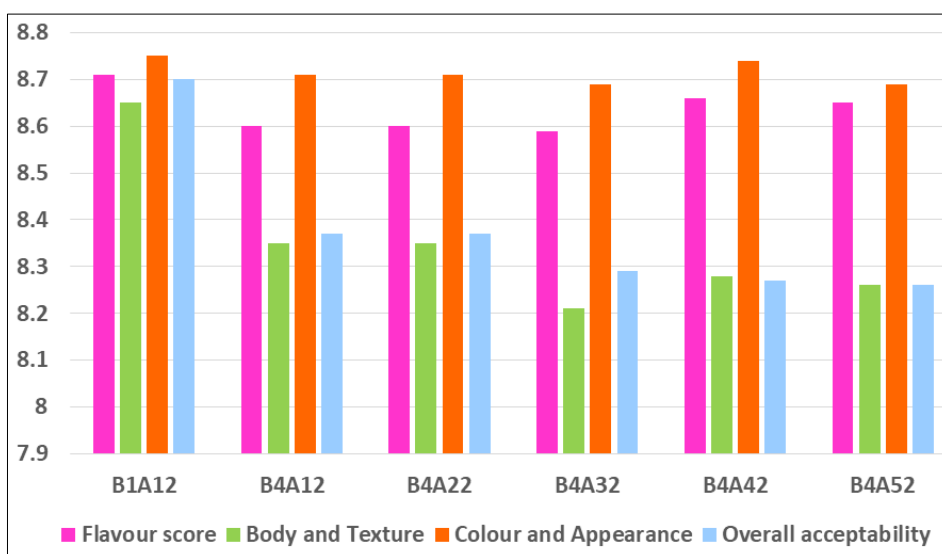


Fig 3: Sensory scores for Group 3

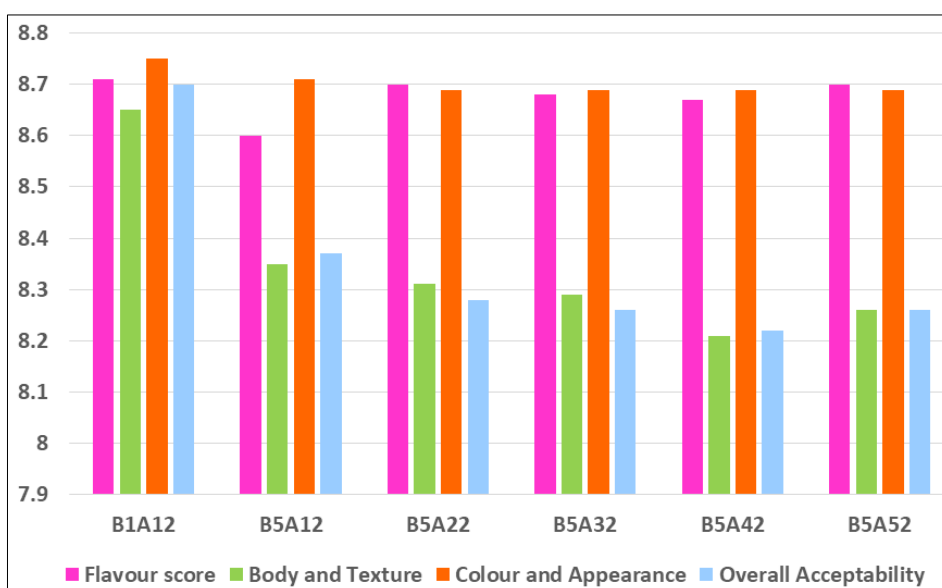


Fig 4: Sensory scores for Group 4

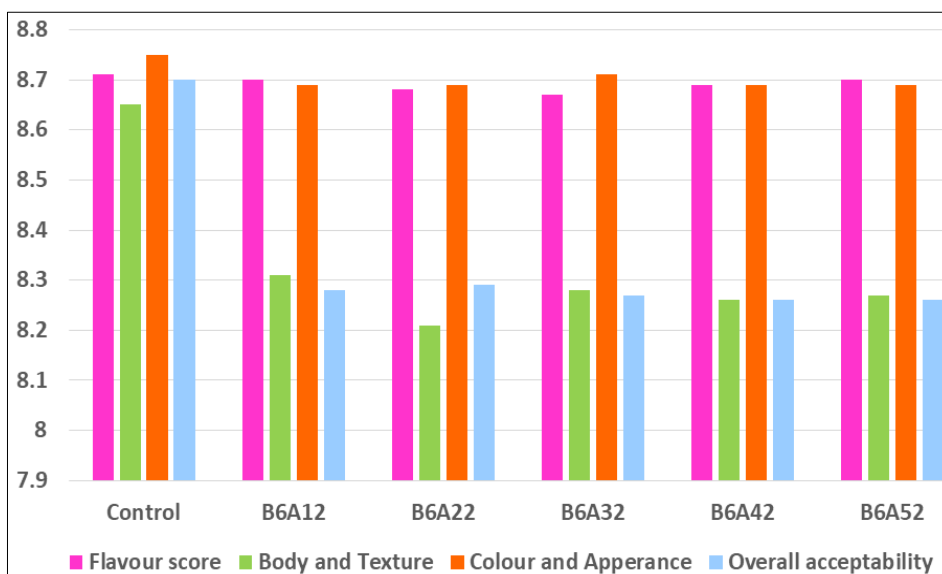


Fig 5: Sensory scores for Group 5

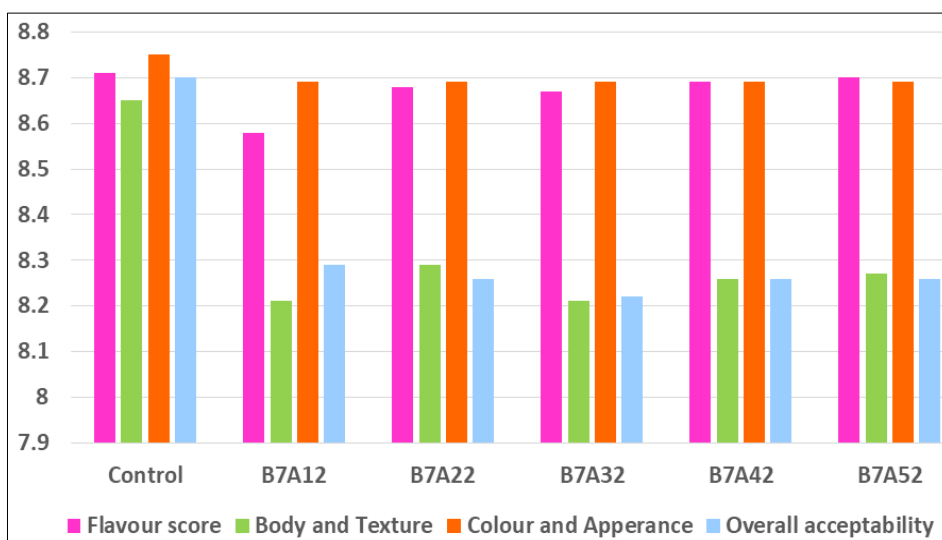


Fig 6: Sensory scores for Group 6

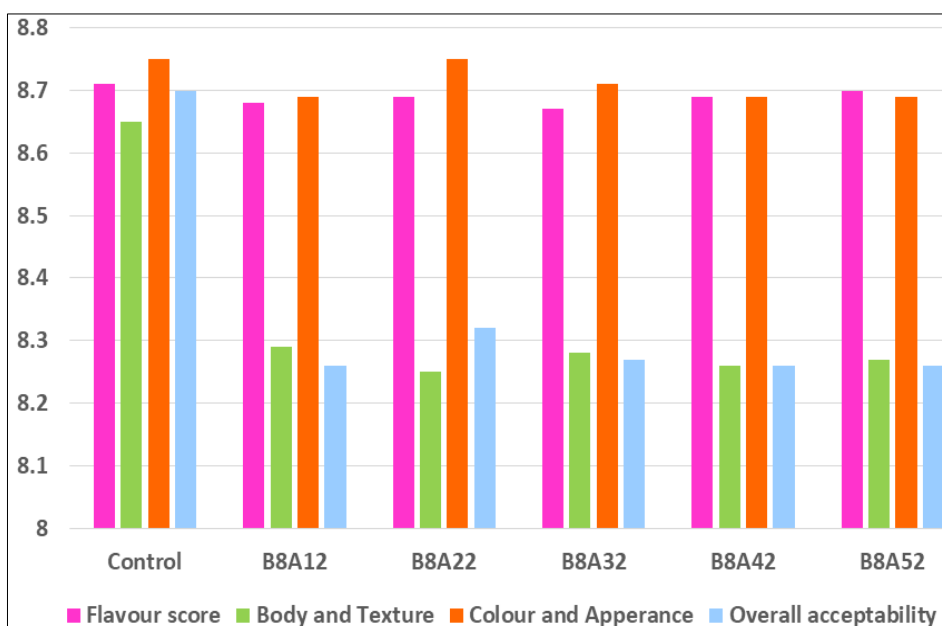


Fig 7: Sensory score for Group 7

References

1. Anema SG. Effect of temperature and rate of acidification on the rheological properties of acid skim milk gels. *Journal of Food Processing and Preservation*. 2008;32(6):1016-1033.
2. Bakke AJ, Shehan CV, Hayes JE. Type of milk typically consumed, and stated preference, but not health consciousness affect revealed preferences for fat in milk. *Food Quality and Preference*. 2016;49:92-99.
3. Ghadge PN, Prasad K, Kadam PS. Effect of fortification on the physico-chemical and sensory properties of buffalo milk yoghurt. *Electronic Journal of Environmental, Agricultural and Food Chemistry*. 2008;7(5):2890-2899.
4. Ghosh J, Rajorhia GS. Chemical microbiological and sensory properties of misti Dahi sold in Calcutta. *AISS Dairy Research*. 1987;6(1):11.
5. Gono S, Kilic S, Kinik O. Properties of yoghurt made with different amount of starter and different incubation temperatures. *Ege, Universites, Ziraat-Fakultesi Dergisi*. 1988;25(1):1-9.
6. Hong BJ, Goh JS. Effect of temperature and time on pasteurization and fermentation on quality of yoghurt. *Korean Journal of Dairy Science*. 1979;1(2):7-12.
7. Hussain SA, Patil GR, Yadav V, Singh RRB, Singh AK. Ingredient formulation effects on physico-chemical, sensory, textural properties and probiotic count of Aloe vera probiotic dahi. *Lwt. Food Science and Technology*. 2016;65:401-380.
8. Khalifa MI, Zakaria AM. Physiochemical, sensory characteristics and acceptability of a new set yogurt developed from camel and goat milk mixed with buffalo milk *Adv. Anim. Vet. Sci*. 2009;7(3):172-177.
9. Nahar AM, Al-Amin SMK, Alam A, Wadud A, Islam MN. A comparative study on the quality of dahi (Yoghurt) prepared from cow, goat and buffalo milk. *International Journal of Dairy Science* 2007;2:260-267.
10. Sahai D. Compositional profile of buffalo milk. In: *Buffalo Milk: Chemistry and Processing Technology*. Karnal, India: SI Publishers, c1996, p, 20-57.