



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(7): 735-739
© 2022 TPI
www.thepharmajournal.com
Received: 18-04-2022
Accepted: 24-05-2022

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

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

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

Impacts of constant incubation temperature over the Sensory evaluation of Buffalo milk curd samples prepared using different Fat, SNF combinations

Arunachalam Poorani, Ganesan Kumaresan and Chinnusamy Pandiyan

Abstract

Performance of buffalo milk curd prepared with different fat and Solids Not Fat combinations at constant incubation temperature of 37 °C was evaluated. There is no literature available on the impact of milk fat and Solids Not Fat combinations on the quality of Buffalo milk curd. Hence, the effects of buffalo milk curd prepared with different fat and Solids Not Fat combinations at constant incubation temperature of 37°C reduction was studied on the sensory properties of buffalo milk curd. Fresh raw buffalo milk was divided into thirty four batches and was standardized to three different levels of milk fat and using fresh raw skimmed buffalo milk, and the total milk solids (TMS) content was adjusted using condensed buffalo milk. At constant incubation temperature of 37 °C, buffalo milk samples were incubated after inoculation. In buffalo milk curd under sensory evaluation revealed that 5% fat and 9% Solids Not Fat combination significantly ($p < 0.05$) differs from other buffalo milk curd samples. Flavour and Texture, Colour and Appearance, Body and Texture, Overall acceptability scores of buffalo milk curd samples prepared at incubation temperature 37 °C with 5% fat and 9 % Solids Not combination was 8.67 ± 0.21 , 8.67 ± 0.21 , 8 ± 0.26 , 8.44 ± 0.11 respectively.

Keywords: Buffalo milk curd-Sensory evaluation- constant incubation temperature-Sensory score

Introduction

Curd is an important fermented product used in our country since time immemorial as an article of diet, as a refreshing beverage and as an intermediary in the manufacture of butter and ghee. Curd shall have the minimum percentage of milk fat and milk solids not the fats as the milk from which it is prepared.

Currently there are no reports available on the performance of buffalo milk curd under different starter cultures of curd either alone or in combination with probiotic bacteria, in cow and buffalo milk. (Vijayendra and Gupta 2012) [11]. This experiment is carrying significance sine it provides valuable information on best combination fat and Solids Not Fat suitable for the preparation of buffalo milk curd. (Dastur, 1956) [1].

Sensory appeal is determined by appearance, texture and flavour. (Sindhu, 1999) [10]. When assessed by trained panellists it may be considered to be the ultimate tool for measurement. (Labigne *et al.*, 2007) [8]. Trained sensory panellists evaluate the samples and provide guidance in improvement of the product This type of testing is termed as sensory evaluation or subjective evaluation, because the scores are determined by individual decisions based on the use of the sense organs and do not rely on mechanical devices. (Kanawjia., 1998) [6].

Material and Methods

Different buffalo milk curd samples are prepared by altering fat and SNF combinations at incubation temperature 37 °C as shown in the following table:-

Corresponding Author
Arunachalam Poorani
Assistant Professor,
Department of Livestock
Products Technology, (Dairy
Science) Veterinary College and
Research Institute, Namakkal,
Tamil Nadu, India

Buffalo milk	B1 (FSSR, 2016) (FSSR, 2011)	5.0	9.0
	B2	5	10.0 11.0 12.0
	B3	5.5	8.5 9.0 10.0 11.0 12.0
	B4	6	8.5 9.0 10.0 11.0 12.0
	B5	6.5	8.5 9.0 10.0 11.0 12.0
	B6	7	8.5 9.0 10.0 11.0 12.0
	B7	7.5	8.5 9.0 10.0 11.0 12.0
	B8	8	8.5 9.0 10.0 11.0 12.0

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-1.0 shows that the buffalo milk curd prepared at constant incubation temperature of 37 °C from milk containing 5% fat and 9% SNF scored significantly ($P < 0.05$) higher with higher sensory scores than the samples prepared from 11 and 12 % SNF. In the same way, significant ($P < 0.05$) 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. (Garg, 1988)^[3] All the increased scores on the physical attributes of curd have shown statistically high ($P < 0.05$) 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 *et al.*, 1979)^[5] 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)^[4] However, most studies agreed that Buffalo milk was less heat-stable and it is due to the high fat and Calcium contents. (Sahai, 1996)^[9] Taking this all into consideration, under incubation temperature of 37°C, the buffalo milk curd prepared from milk containing 5% fat and 9% SNF is the best combination of Fat and Solids Not Fat for the preparation of buffalo milk curd.

Table 1: Buffalo milk curd milk samples prepared under incubation temperature of 37°C with different Fat and SNF combinations –Sensory assessment scores are as follows: -

S. No.	Flavour and taste	Body and texture	Colour and appearance	Overall Acceptability
B1A11	8.67 ± 0.21 ^b	8.67 ± 0.21 ^d	8 ± 0.26 ^c	8.44 ± 0.11 ^c
B2A21	8.17 ± 0.17 ^b	8.17 ± 0.17 ^d	8.33 ± 0.21 ^c	8.22 ± 0.07 ^c
B2A21	7 ± 0.37 ^a	7.33 ± 0.33 ^c	7.33 ± 0.21 ^b	7.22 ± 0.14 ^b
B2A31	7 ± 0.26 ^a	7 ± 0.26 ^{bc}	7.33 ± 0.21 ^b	7.11 ± 0.14 ^b
B3A11	6.5 ± 0.22 ^a	6.67 ± 0.21 ^{abc}	6.67 ± 0.21 ^{ab}	6.61 ± 0.18 ^a
B3A21	6.5 ± 0.22 ^a	6.17 ± 0.17 ^a	6.67 ± 0.21 ^{ab}	6.44 ± 0.14 ^a
B3A31	6.67 ± 0.21 ^a	6.67 ± 0.21 ^{abc}	6.5 ± 0.22 ^a	6.61 ± 0.13 ^a
B3A41	6.67 ± 0.21 ^a	6.67 ± 0.21 ^{abc}	6.67 ± 0.21 ^{ab}	6.67 ± 0.09 ^a
B3A51	6.5 ± 0.22 ^a	6.33 ± 0.21 ^{ab}	6.5 ± 0.22 ^a	6.44 ± 0.14 ^a
B4A11	6.5 ± 0.22 ^a	6.83 ± 0.17 ^{abc}	6.67 ± 0.21 ^{ab}	6.67 ± 0.15 ^a
B4A21	6.5 ± 0.22 ^a	6.83 ± 0.17 ^{abc}	6.67 ± 0.21 ^{ab}	6.67 ± 0.12 ^a
B4A31	6.33 ± 0.21 ^a	6.33 ± 0.21 ^{ab}	6.17 ± 0.17 ^a	6.28 ± 0.1 ^a
B4A41	6.67 ± 0.21 ^a	6.67 ± 0.21 ^{abc}	6.67 ± 0.21 ^{ab}	6.67 ± 0.17 ^a
B4A51	6.67 ± 0.21 ^a	6.67 ± 0.21 ^{abc}	6.67 ± 0.21 ^{ab}	6.67 ± 0.12 ^a
B5A11	6.83 ± 0.17 ^a	6.5 ± 0.22 ^{ab}	6.33 ± 0.21 ^a	6.56 ± 0.11 ^a
B5A21	6.67 ± 0.21 ^a	6.5 ± 0.22 ^{ab}	6.5 ± 0.22 ^a	6.56 ± 0.14 ^a
B5A31	6.67 ± 0.21 ^a	6.5 ± 0.22 ^{ab}	6.5 ± 0.22 ^a	6.56 ± 0.11 ^a
B5A41	6.67 ± 0.21 ^a	6.67 ± 0.21 ^{abc}	6.5 ± 0.22 ^a	6.61 ± 0.1 ^a
B5A51	6.67 ± 0.21 ^a	6.5 ± 0.22 ^{ab}	6.5 ± 0.22 ^a	6.56 ± 0.14 ^a
B6A11	6.5 ± 0.22 ^a	6.67 ± 0.21 ^{abc}	6.33 ± 0.21 ^a	6.5 ± 0.14 ^a
B6A21	6.67 ± 0.21 ^a	6.33 ± 0.21 ^{ab}	6.5 ± 0.22 ^a	6.5 ± 0.11 ^a
B6A31	6.83 ± 0.31 ^a	6.67 ± 0.21 ^{abc}	6.5 ± 0.22 ^a	6.67 ± 0.12 ^a
B6A41	6.83 ± 0.17 ^a	6.33 ± 0.21 ^{ab}	6.5 ± 0.22 ^a	6.56 ± 0.14 ^a
B6A51	6.33 ± 0.21 ^a	6.67 ± 0.21 ^{abc}	6.33 ± 0.21 ^a	6.44 ± 0.11 ^a
B7A11	6.5 ± 0.22 ^a	6.33 ± 0.21 ^{ab}	6.83 ± 0.17 ^{ab}	6.56 ± 0.11 ^a
B7A21	6.5 ± 0.22 ^a	6.67 ± 0.21 ^{abc}	6.33 ± 0.21 ^a	6.5 ± 0.11 ^a
B7A31	6.5 ± 0.22 ^a	6.33 ± 0.21 ^{ab}	6.33 ± 0.21 ^a	6.39 ± 0.1 ^a
B7A41	6.83 ± 0.31	6.33 ± 0.21 ^{ab}	6.83 ± 0.17 ^{ab}	6.67 ± 0.15 ^a

B7A51	6.67 ± 0.21 ^a	7 ± 0b ^c	6.33 ± 0.21 ^a	6.67 ± 0.12 ^a
B8A11	6.5 ± 0.22 ^a	6.17 ± 0.17 ^a	6.5 ± 0.22 ^a	6.39 ± 0.13 ^a
B8A21	6.67 ± 0.21 ^a	6.5 ± 0.22 ^{ab}	6.5 ± 0.22 ^a	6.56 ± 0.07 ^a
B8A31	6.67 ± 0.21 ^a	6.67 ± 0.21 ^{abc}	6.5 ± 0.22 ^a	6.61 ± 0.1 ^a
B8A41	6.5 ± 0.22 ^a	6.33 ± 0.21 ^{ab}	6.5 ± 0.22 ^a	6.44 ± 0.16 ^a
B8A51	6.71 ± 0.18 ^a	6.57 ± 0.2 ^{ab}	6.43 ± 0.2 ^a	6.57 ± 0.1 ^a
F Value	4.416 ^{***}	5.824 ^{***}	4.521 ^{***}	12.8 ^{***}

* Mean ± Standard error values from six trials. Mean values bearing different superscripts in a column differs

*** significant (P ≤ 0.05)

B1A11	-	Buffalo milk curd made with 5 % fat and 9 % SNF under incubation temperature 37°C
B2A21	-	Buffalo milk curd made with 5% fat and 10 % SNF under incubation temperature 37 °C
B2A21	-	Buffalo milk curd made with 5% fat and 11 % SNF under incubation temperature 37 °C
B2A31	-	Buffalo milk curd made with 5% fat and 12 % SNF under incubation temperature 37 °C
B3A11	-	Buffalo milk curd made with 5.5% fat and 8.5 % SNF under incubation temperature 37 °C
B3A21	-	Buffalo milk curd made with 5.5 % fat and 9 % SNF under incubation temperature 37 °C
B3A31	-	Buffalo milk curd made with 5.5 % fat and 10 % SNF under incubation temperature 37 °C
B3A41	-	Buffalo milk curd made with 5.5 % fat and 11 % SNF under incubation temperature 37 °C
B3A51	-	Buffalo milk curd made with 5.5 % fat and 12 % SNF under incubation temperature 37 °C
B4A11	-	Buffalo milk curd made with 5.5% fat and 8.5 % SNF under incubation temperature 37 °C
B4A21	-	Buffalo milk curd made with 5.5 % fat and 9 % SNF under incubation temperature 37 °C
B4A31	-	Buffalo milk curd made with 5.5 % fat and 10 % SNF under incubation temperature 37 °C
B4A41	-	Buffalo milk curd made with 5.5 % fat and 11 % SNF under incubation temperature 37 °C
B4A51	-	Buffalo milk curd made with 5.5 % fat and 12 % SNF under incubation temperature 37 °C
B5A11	-	Buffalo milk curd made with 5.5% fat and 8.5 % SNF under incubation temperature 37 °C
B5A21	-	Buffalo milk curd made with 5.5 % fat and 9 % SNF under incubation temperature 37 °C
B5A31	-	Buffalo milk curd made with 5.5 % fat and 10 % SNF under incubation temperature 37 °C
B5A41	-	Buffalo milk curd made with 5.5 % fat and 11 % SNF under incubation temperature 37 °C
B5A51	-	Buffalo milk curd made with 5.5 % fat and 12 % SNF under incubation temperature 37 °C
B6A11	-	Buffalo milk curd made with 5.5% fat and 8.5 % SNF under incubation temperature 37 °C
B6A21	-	Buffalo milk curd made with 5.5 % fat and 9 % SNF under incubation temperature 37 °C
B6A31	-	Buffalo milk curd made with 5.5 % fat and 10 % SNF under incubation temperature 37 °C
B6A41	-	Buffalo milk curd made with 5.5 % fat and 11 % SNF under incubation temperature 37 °C
B6A51	-	Buffalo milk curd made with 5.5 % fat and 12 % SNF under incubation temperature 37 °C
B7A11	-	Buffalo milk curd made with 5.5% fat and 8.5 % SNF under incubation temperature 37 °C
B7A21	-	Buffalo milk curd made with 5.5 % fat and 9 % SNF under incubation temperature 37 °C
B7A31	-	Buffalo milk curd made with 5.5 % fat and 10 % SNF under incubation temperature 37 °C
B7A41	-	Buffalo milk curd made with 5.5 % fat and 11 % SNF under incubation temperature 37 °C
B7A51	-	Buffalo milk curd made with 5.5 % fat and 12 % SNF under incubation temperature 37 °C
B8A11	-	Buffalo milk curd made with 5.5% fat and 8.5 % SNF under incubation temperature 37 °C
B8A21	-	Buffalo milk curd made with 5.5 % fat and 9 % SNF under incubation temperature 37 °C
B8A11	-	Buffalo milk curd made with 5.5 % fat and 10 % SNF under incubation temperature 37 °C
B8A41		Buffalo milk curd made with 5.5 % fat and 11 % SNF under incubation temperature 37 °C
B8A51		Buffalo milk curd made with 5.5 % fat and 12 % SNF under incubation temperature 37 °C

* Mean ± Standard error values from six trials. Mean values bearing different superscripts in a column differs

*** Significant (P ≤ 0.05)

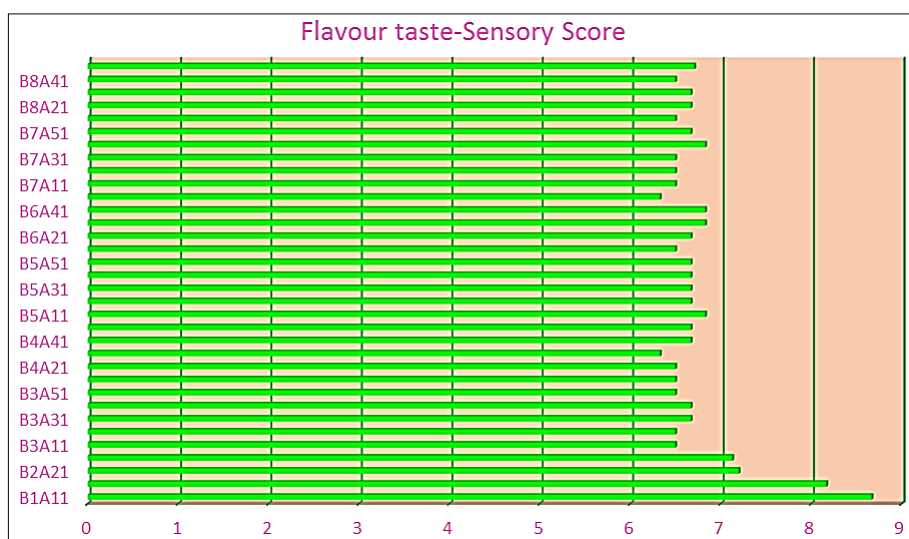


Fig 1: Flavour and Taste Sensory score of Buffalo milk curd samples prepared under incubation temperature of 37°C with different Fat and SNF combinations

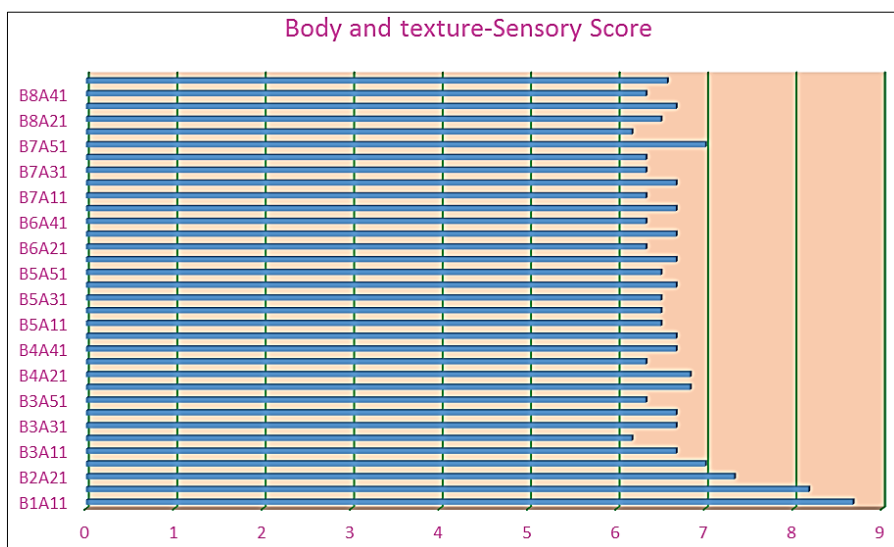


Fig 2: Body and Texture Sensory score of Buffalo milk curd milk samples prepared under incubation temperature of 37 °C with different Fat and SNF combinations

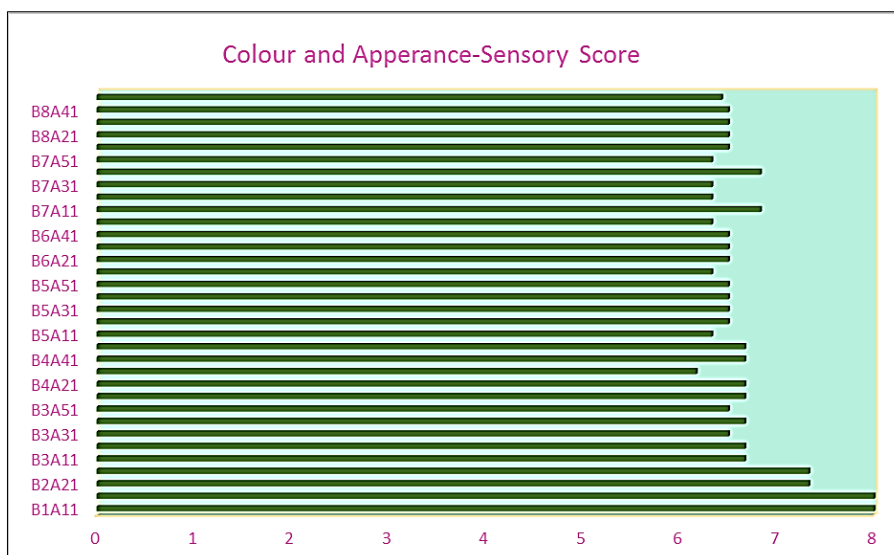


Fig 3: Colour and Appearance Sensory score of Buffalo curd milk samples prepared under incubation temperature of 37 °C with different Fat and SNF combinations

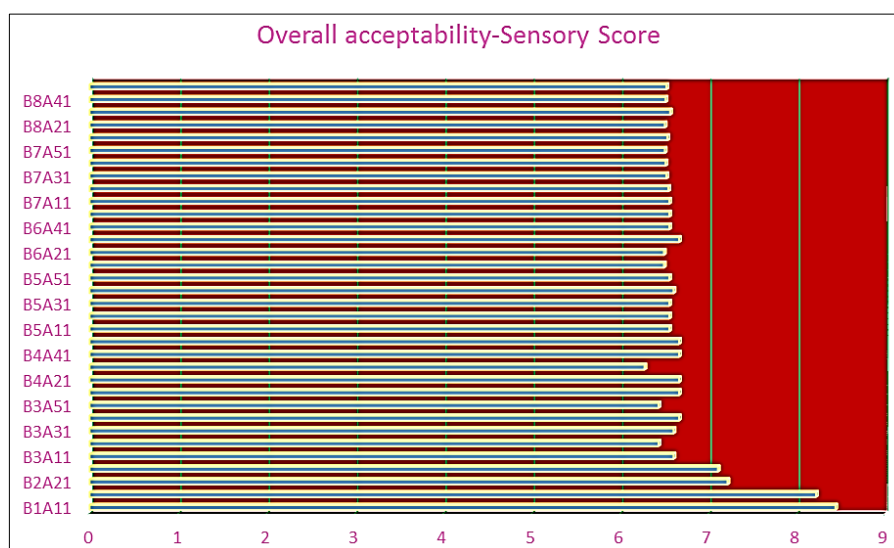


Fig 4: Overall acceptability score of Buffalo milk curd samples prepared under incubation temperature of 37 °C with different Fat and SNF combinations

Conclusion

Based on the sensory score, body and texture, and colour and appearance score, Overall acceptability scores of various fat and Solids Not Fat combinations of Buffalo curd samples prepared at incubation temperature 37 °C, it was concluded that Buffalo milk curd sample with 5% fat and 9% Solids Not Fat (SNF) prepared under incubation temperature 37 °C was rated as the best by the sensory panel.

References

1. Dastur NN. Buffalo milk and milk products. *Journal of Dairy Science*. 1956;1(2):9-12.
2. Dutta SM, Kuila RK, Ranganatham B. Effect of incubation temperature on acid and flavour production in milk by lactic acid bacteria. *Journal of Milk Food and Technology*. 1972;35:242.
3. Garg SK. Dahi - a fermented indigenous milk product. *Indian Dairyman*. 1988;40(2):57-60.
4. Gono S, Kilic S, Kinik O. Properties of yoghurt made with different amount of starter and different incubation temps. *Ege, Universites, Ziraat-Fakultesi Dergisi*. 1988;25(1):1-9.
5. 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.
6. Kanawjia SK. Modified practices for Cheddar cheese making from buffalo milk. In: *Advances in Cheese and Fermented Milk Products: A Compendium of Short Term Course Notes*, Karnal, India: National Dairy Research Institute, 1998, pp. 54-59.
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;65:371-380.
8. Labigne L, Kumar R. Overview of thermophilic cultures brand for the fresh fermented market. In: Sumit Arora S, Singh AK, Singh RRB, Sabhiki L (eds) *Proceedings of International conference on traditional dairy foods*. Dairy Technology Society of India, Karnal, 2007, pp19-20.
9. Sahai D. Compositional profile of buffalo milk. In: *Buffalo Milk: Chemistry and Processing Technology*. Karnal, India: SI Publishers, 1996, pp20-57.
10. Sindhu JS. Physico-chemical properties of cow and buffalo milk in relation to milk processing. In: *Advances in Processing and Preservation of Milk: A Compendium of Short Term Course Notes*,. Karnal, India: National Dairy Research Institute, 1999, pp. 97-103.
11. Vijayendra SVN, Gupta RC. Associative growth behaviour of dahi and yoghurt starter cultures with *Bifidobacterium bifidum* and *Lactobacillus acidophilus* in buffalo skim milk. *Annals of Microbiology*. 2012;31(3):17-30.