Journal of Food Science and Technology (Iran)

Homepage: www.fsct.modares.ir

Scientific Research

Viability of *Lactobacillus paracasei*, *L. helveticus* and *Bifidobacterium lactis* in sour cream and considering their effects on textural and sensorial properties of the product

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ARTICLE INFO

Article History:
Received:2024/1/5
Accepted:2024/3/10

Keywords:

Cream,
Culture,
Dairy,
Milk,
Probiotic

DOI: **10.22034/FSCT.21.151.76.**

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ABSTRACT

In the present study the effects of probiotic bacteria on textural and sensorial attributes of sour cream was considered. The cream samples were incorporated by three probiotic bacteria including *Lactobacillus casei*, *L.helveticus* and *Bifidobacterium lactis* as single culture. The pH values, viability of probiotics, textural and sensorial features were evaluated at the time of 1, 15 and 30 days of storage. The mentioned parameters were compared to the control cream sample. The pH values, probiotic survival, textural (firmness, consistency and adhesiveness) and sensorial (off-note, cohesiveness, creaminess, odor, sourness, metallic after taste, taste) properties of cultured cream samples differed depending on the used cultures. Totally, incorporation of probiotic bacteria into sour cream can result in manufacturing of a new healthy product in the market of dairy products.

1- Introduction

Functional or functional food products contain compounds that may be considered as bioactive compounds and cause health-promoting properties [1]. Different dairy products can have good potential for functional food products [2]. Probiotic products are an important category of functional foods [3] which have different effects on human health due to the presence of probiotics [4]. Those dairy products that have a higher fat percentage have a higher protective effect to help the probiotics survive [5]. For example, in fermented buffalo milk, high fat content preserves the viability of *Lactobacillus acidophilus* and increases resistance to acidity during product storage [6]. For other products with high fat content, including ice cream and goat's milk yogurt containing 10% fat, longer survival of *L. acidophilus* has been seen [7]. Dairy drinks made from buffalo milk with a higher fat percentage than cow's milk fat increase the viability of *L. acidophilus* during 21 days of refrigerated storage [8]. It has also been reported that probiotics can survive in sufficient amounts in products with a higher fat percentage such as butter [9, 10]. Even the higher fat percentage in some cheeses compared to other dairy products has been reported as a factor for better survival of probiotics [11]. Apart from the aforementioned products, one of the products that can potentially be a good matrix for probiotics is sour cream, whose fat percentage is higher than products such as full-fat milk and less than products such as butter and spreads. Probiotics have been used in various creams [12-14]. A series of probiotics have also been used in analog confectionery creams [15]. Sour cream is produced from standardized, homogenized, heated and fermented cream by lactic acid bacteria, which produce lactic acid and other metabolites. Various names are used for this type of cream, including sour cream, cultured cream, fermented cream, ripened cream, acid cream, etc. It should be noted that a series of chemically acidified sour creams (not fermented) may be soured by adding acids such as lactic acid, acetic acid, and citric acid, or a mixture of these acids, or glucono-delta-lactone, instead of the fermentation process. Sometimes, combined methods are likely to be used. Among the different metabolites, citric acid can be fermented by some bacteria, but lactic acid can have bacteriostatic effects and stop the growth of bacteria. In fermented creams, lactic acid and microbial metabolites from fermentation can thicken the texture of the cream and improve its taste. The taste of sour cream is more favorable than that of sweet cream (normal/non-sour), and the possibility of contamination after the thermal process is less in sour cream than in sweet cream [16]. Although there is limited information regarding the effect of probiotics on the textural and sensory characteristics of sour cream and their viability in sour cream, in general, fermentation with probiotics can be a new approach to produce sour cream as a functional product and in this regard, dairy industries can produce such useful products. The purpose of this study is to investigate the effect of probiotic cultures on the textural and sensory characteristics of sour cream and their viability in this product.

2-Materials and methods

1.1.Production and inoculation of cream samples

The initial production of 30% fat cream samples was carried out in Solico Kalleh dairy products company. Pasteurization of cream at 80°C for 25 seconds and cooling to 42°C was done as the optimum average temperature for probiotic bacteria inoculation. Probiotic bacteria including *L. paracasei*, *L. helveticus* and *B. lactis* were obtained from Lallemand Health Solutions. Single culture of probiotic bacteria was used according to Table 1 and one sample was considered as a control sample. Probiotic cultures were directly inoculated at a concentration of 0.02 g per 100 g of cream sample. According to the initial inoculation and culture, the inoculation concentration in the cream samples was 107 CFU/g. Then, the cream samples were placed in an incubator at 42 °C for 12 hours until the pH dropped. After fermentation and pH drop, the samples were cooled to 4 °C and kept in the refrigerator for 30 days.

1.2.pH measurement

The pH of the samples was measured using a pH meter (Mettler Toledo) according to the Iranian national standard method No. 2852 during the storage period. Before measuring pH, the pH meter was calibrated with standard buffers (pH 7 and pH 4). It should be noted that due to the key importance of the pH of the samples in the interpretation of the results, the pH values shown in Table 2 were also reported in another similar research on the study of the fatty acids profile.

1.3. Enumeration of the viability of probiotic bacteria

After dilution in peptone water, counting of probiotic bacteria was done using MRS agar culture medium containing 0.15% ox bile and anaerobic incubation at 37 °C for 72 hours [17, 18].

1.4. Texture analysis

Texture analyzer model TA.XT plus was used to measure textural parameters. The P/25 probe was used and the initial test speed was 2 mm/s, the main test speed was 1 mm/s, the post-test speed was 2 mm/s, and the test distance was 30 mm. The hardness, consistency and adhesion parameters were measured and reported [19].

1.5. Statistical analysis

Different treatments were performed at different storage times and corresponding experiments were performed with a full factorial design. The results were analyzed by ANOVA method using SPSS 18.0 statistical program with Duncan's multi-range test at a significance level of 5%. In the results tables, the presence of significant differences with different lowercase letters was determined.

3-Results and Discussion

1.6. Results of the viability of probiotic bacteria

The viability of probiotic bacteria counted during days 1, 15 and 30 of the storage period is shown in Table 3. Despite the slight difference in the population of probiotic bacteria on the first day of storage, no significant difference was observed ($p<0.05$). Partially, the initial growth of *L.*

[DOI: 10.22034/FSCT.21.151.76]

helveticus was more than that of the other two bacteria. On the 15th day of the storage period, the surviving population of *B. lactis* is lower than those of the other two probiotic bacteria and the population of *L. paracasei* and *L. helveticus* had no significant difference. Unlike the first day, on the 15th day of storage the population of *L. paracasei* was slightly more than those of the other two probiotic bacteria. On the 30th day of storage, the population of *L. paracasei* was the highest and the population of *B. lactis* was significantly lower than those of the others (p>0.05). During the storage period, the population of *L. paracasei* and *L. helveticus* remained unchanged from day 1 to day 15 of storage, and decreased on day 30 of storage, while the population *B. lactis* was continuously decreasing (p<0.05). It should be noted that the population of *L. paracasei* showed insignificant slight growth from day 1 to 15 of storage (p>0.05). In general, the survival of *L. paracasei* was the most and survival *B. lactis* was the least among all the samples. The trend of population changes of any probiotic species and the trend of pH changes are reasonable. This two-way relationship can be explained in this way that whenever the microbial population increases due to the production of more acid, the pH level decreases, and this decrease in pH in the other period of storage causes a decrease in the viability of the probiotic.

Table 1. Probiotic bacteria used in each treatment

Treatments	Cultures
A	Control
B	*Lactobacillus paracasei* HA-196
C	*Bifidobacterium lactis* LAFTI® B94
D	*Lactobacillus helveticus* LAFTI® L10

Table 2. pH values of the cream samples during the storage

Treatments	pH values*			
	Control	*L. paracasei*	*B. lactis*	*L. helveticus*
1 d	6.75±0.05^{a}	4.43±0.04^{c}	5.18±0.01^{b}	4.2±0.04^{d}
15 d	6.۵9±0.04^{a}	4.28±0.03^{c}	4.99±0.01^{b}	4.09±0.03^{d}
30 d	6.۴5±0.03^{a}	4.18±0.01^{c}	4.52±0.02^{b}	3.95±0.03^{d}

*Different lowercase superscript in a same row indicate significant differences between treatments

Table 3. Survival of the probiotic bacteria in the cultured creams (CFU.g^{-1})

Treatments	Storage days*		
	1 d	15 d	30 d

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Control	---	---	---
L. paracasei	5.1×10^{8} aA	7.1×10^{8} aA	3.2×10^{7} aB
B. lactis	8.2×10^{8} aA	5.1×10^{7} bB	6.4×10^{5} cC
L. helveticus	9.3×10^{8} aA	8.4×10^{8} aA	4.2×10^{6} bB

*Different lowercase superscript in a same column indicate significant differences between treatments

*Different uppercase superscript in a same row indicate significant differences between storage days

The decrease in probiotic population can be due to other metabolites, such as fatty acids, regardless of the increase in acidity and decrease in pH. Considering that in sour cream, especially probiotic sour cream, different amounts of short-chain and long-chain fatty acids, as well as saturated and unsaturated are produced, the viability of probiotic bacteria can be affected by these fatty acids produced during fermentation. Therefore, one of the reasons for the decrease in the viability of probiotic bacteria during fermentation or storage can be due to the fatty acids produced. It has been reported that linoleic acid in filter paper agar diffusion method prevents the growth of *Lactobacillus* by destroying the cell membrane and affecting the normal metabolism of the cell [20]. The inhibitory effect of linoleic acids on bacteria can be due to the high permeability of the bacterial membrane due to its surfactant function [21]. It has also been shown that inhibition of the growth of *Lactobacillus* [22] and *Bifidobacterium* [23] by linoleic acid depends on the bacterial strain and does not depend on the bacterial species.

1.7. Results of the textural characteristics

In the current research, various textural characteristics including firmness, consistency and adhesiveness were investigated, which are shown in Table 4. In terms of firmness, in all three days of the storage period, the control sample had the least firmness, which was expected. A similar trend was observed for each treatment than the other treatments at each storage day. Sample inoculated with *L. helveticus* is the most firmness and the sample inoculated with *B. lactis* had the lowest firmness among the samples inoculated with probiotics on all three days 1, 15 and 30 of storage. In terms of consistency, the least consistency was observed in the control sample in all three days of the storage period. In all three days 1, 15 and 30 of the storage period, among the samples inoculated with probiotics, the highest consistency belongs to the sample inoculated with *L. helveticus* and the lowest consistency related to the sample inoculated with *B. lactis*. In terms of adhesiveness, the control sample had the lowest amount of adhesiveness during the storage period. The sample containing *L. helveticus* and *B. lactis* had the highest and lowest adhesiveness on day 1 and 30 of storage, respectively. The only unexpected textural altered trend was observed on day 15 for adhesiveness, in which the sample containing *B. lactis* had more

[DOI: 10.22034/FSCT.21.151.76]

adhesiveness than the sample containing *L. paracasei*. In general, in terms of textural characteristics including firmness, consistency and adhesiveness, the samples containing *L. helveticus* is firmer, more consistent and more adhesive than those of the other samples and samples inoculated with *B. lactis* totally had a lower score in terms of the mentioned textural characteristics compared to other samples inoculated with probiotics.

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Table 4. Textural characteristics of the cultured creams after 1, 15 and 30 days of storage*

Treatments	Firmness			Consistency			Adhesiveness		
	1 d	15 d	30 d	1 d	15 d	30 d	1 d	15 d	30 d
Control	21.29±1.2^{d}	41.58±2.1^{d}	55.82±2.3^{d}	473.42±4.6^{d}	512.155±4.4^{d}	1132.67±8.6^{d}	-52.05±4.3^{d}	-65.79±3.6^{d}	-77.22±3.8^{d}
L. paracasei	187.53±4.7^{b}	256.63±2.5^{b}	253.16±2.7^{b}	4045.56±8.5^{b}	6109.65±8.3^{b}	5722.05±8.7^{b}	-876.94±5.8^{b}	-1161.83±4.5^{c}	-949.55±4.7^{b}
B. lactis	56.99±7.4^{c}	199.36±5.7^{c}	184.81±5.9^{c}	1108.13±7.9^{c}	4568.04±7.7^{c}	3724.07±5.0^{c}	-203.23±3.6^{c}	-1457.59±4.6^{b}	-887.01±4.8^{c}
L. helveticus	359.89±6.4^{a}	431.22±3.7^{a}	387.88±3.9^{a}	8616.69±6.9^{a}	10600.88±6.7^{a}	9522.28±7.9^{a}	-1645.15±8.9^{a}	-2103.60±9.6^{a}	-1636.01±9.8^{a}

*Different lowercase superscript in a same column indicate significant differences between treatments

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3.3. Results of sensory properties

In the present research, various sensory characteristics including taste, metallic aftertaste, sourness, smell, creaminess, cohesiveness and bad taste were evaluated and are shown in tables 5, 6 and 7, which correspond to days 1, 15 and 30 of storage periods, respectively. On the first day of storage, the control sample had a lower score than all samples in terms of other characteristics, except for creaminess and taste. The sample containing *L. paracasei* had more scores than those of other samples in terms of smell, sourness, and metallic aftertaste. The sample contains *B. Lactis* had more scores than those of other samples in terms of cohesiveness, creaminess and taste. The sample containing *L. helveticus* had more scores in terms of bad taste than those of all other samples.

Table 5. Organoleptic characteristics of the cultured creams after 1 days of storage

Treatments	Off-note	Cohesiveness	Creaminess	Odor	Sourness	Metallic aftertaste	Taste
Control	0.5^{d}	0^{d}	4^{b}	2^{d}	0.5^{d}	0^{d}	4.25^{b}
L. paracasei	2^{b}	2.5^{b}	2.5^{c}	3.5^{a}	2^{a}	1.5^{a}	3^{c}
B. lactis	0.75^{c}	3.5^{a}	4.75^{a}	2.5^{c}	1.5^{b}	1^{b}	4.75^{a}
L. helveticus	2.5^{a}	2^{c}	2.25^{d}	3.25^{b}	1^{c}	0.5^{c}	2.5^{d}

*Different lowercase superscript in a same column indicate significant differences between treatments

On the 15th day of the storage period, the control sample had a higher score in terms of cohesiveness than the rest of the samples. The sample containing *L. paracasei* had a higher score in terms of sourness than that of the rest of the samples. The sample contains *B. lactis* had a higher score than those of the other samples in terms of creaminess and taste. The sample containing *L. helveticus* had a higher score than those of the other samples in terms of bad taste, smell and metallic aftertaste.

Table 6. Organoleptic characteristics of the cultured creams after 15 days of storage

Treatments	Off-note	Cohesiveness	Creaminess	Odor	Sourness	Metallic aftertaste	Taste
Control	2^{b}	4^{a}	2^{c}	1.5^{d}	0.5^{d}	0^{d}	2.25^{d}
L. paracasei	2^{b}	2.5^{c}	2.5^{b}	3^{b}	3.5^{a}	2^{b}	3^{b}
B. lactis	1^{c}	3.5^{b}	4.75^{a}	2.5^{c}	1.5^{c}	1^{c}	4.75^{a}
L. helveticus	2.5^{a}	3.5^{b}	2.5^{b}	3.5^{a}	2^{b}	2.5^{a}	2.5^{c}

*Different lowercase superscript in a same column indicate significant differences between treatments

On the 30th day of the storage period, the control sample had a higher score than that of the other samples in terms of bad taste and consistency. The sample containing *L. paracasei* had a higher score than that of the other samples in terms of smell and sourness. The sample contains *B. lactis* scored higher than other samples in terms

[DOI: 10.22034/FSCT.21.151.76]

of creaminess and taste. The sample containing *L. helveticus* had a higher score than that of the other samples in terms of metallic smell and aftertaste.

Table 7 Organoleptic characteristics of the cultured creams after 30 days of storage

Treatments	Off-note	Cohesiveness	Creaminess	Odor	Sourness	Metallic After taste	Taste
Control	3.5^{a}	4^{a}	1.75^{c}	2^{c}	0.5^{d}	0^{d}	2^{b}
L. paracasei	2.5^{c}	1.5^{d}	2^{b}	3^{a}	3^{a}	2^{b}	2^{b}
B. lactis	1^{d}	2.5^{b}	4^{a}	2.25^{b}	1.5^{c}	1^{c}	4.25^{a}
L. helveticus	3^{b}	2^{c}	1.5^{d}	3^{a}	2.5^{b}	2.5^{a}	1.5^{c}

*Different lowercase superscript in a same column indicate significant differences between treatments

In general, according to the different periods of storage and the different examined parameters as well as the scores given by the sensory evaluators, among the samples inoculated with probiotics, the sample containing *B. lactis* had better sensory characteristics than others, especially from the point of view of creaminess and taste and the sample containing *L. helveticus* had worse sensory characteristics, especially from the point of view of bad taste and metallic aftertaste compared to others.

4- Conclusion

The results of a recent study showed that the effect of probiotics on the textural and sensorial characteristics of sour cream depends on the strain used. In general, the survival of *L. paracasei* was the highest and survival *B. lactis* was the lowest of all. In terms of textural characteristics including firmness, consistency and adhesiveness, the samples containing L. *helveticus* is firmer, more consistent and more adhesive than other samples and samples inoculated with *B. lactis* totally had a lower score in terms of the mentioned textural characteristics compared to those of the other samples inoculated with probiotics. In terms of sensory characteristics, the sample contains *B. lactis* had better sensory characteristics, especially from the point of view of creaminess and taste, and the sample containing *L. helveticus* had worse sensory characteristics, especially from the point of view of bad taste and metallic aftertaste compared to the others. The inoculation of probiotic bacteria in sour cream can be important to produce a functional dairy product. Additional research is suggested in terms of investigating the effect of other probiotic strains on the change of textural and sensorial characteristics. Also, other probiotic species and strains with high viability potential during sour cream processing and storage can be evaluated.

5-Acknowledgement

This research is from a grant-alternative research plan of the Department of Food Science and Technology of University of Guilan with approval letter number of

[DOI: 10.22034/FSCT.21.151.76]

15P/14613 related to the date of 1401/2/20, which was carried out in cooperation with Solico Kalleh Dairy Company.

6-References

[1] J. De Dea Lindner, A. L. B. Penna, I. M. Demiate, C. T. Yamaguishi, M. R. M. Prado, and J. L. Parada, "Fermented Foods and Human Health Benefits of Fermented Functional Foods," in *Fermentation Processes Engineering in the Food Industry*, vol. 1, C. R. Soccol, A. Pandey, and C. Larroche Eds. Bosa Roca, FL, USA: CRC Press, 2013, pp. 263–297.

[2] R. Karimi, A. M. Mortazavian, and M. Karami, "Incorporation of Lactobacillus casei in Iranian ultrafiltered Feta cheese made by partial replacement of NaCl with KCl," *Journal of Dairy Science*, vol. 95 pp. 4209-4222, 2012.

[3] R. Karimi, S. Sohrabvandi, and A. M. Mortazavian, "Sensory Characteristics of Probiotic Cheese," *Comprehensive Reviews in Food Science and Food Safety*, vol. 11, pp. 437-452, 2012.

[4] M. R. Roudsari, R. Karimi, and A. M. Mortazavian, "Health effects of probiotics on the skin," *Critical Reviews in Food Science and Nutrition*, vol. 55, pp. 1219-1240, 2015.

[5] R. Karimi, A. M. Mortazavian, and A. G. Da Cruz, "Viability of probiotic microorganisms in cheese during production and storage: a review," *Dairy Science & Technology*, vol. 91, pp. 283–308 2011.

[6] S. Verruck, E. S. Prudêncio, C. R. W. Vieira, E. R. Amante, and R. D. M. C. Amboni, "The buffalo Minas Frescal cheese as a protective matrix of *Bifidobacterium* BB-12 under in vitro simulated gastrointestinal conditions," *LWT - Food Science and Technology*, vol. 63, pp. 1179-1183, 2015.

[7] C. S. Ranadheera, C. A. Evans, M. C. Adams, and S. K. Baines, "*In vitro* analysis of gastrointestinal tolerance and intestinal cell adhesion of probiotics in goat's milk ice cream and yogurt," *Food Research International*, vol. 49, pp. 619-625, 2012.

[8] T. M. S. da Silva *et al.*, "Buffalo milk increases viability and resistance of probiotic bacteria in dairy beverages under in vitro simulated gastrointestinal conditions," *Journal of Dairy Science*, vol. 103, pp. 7890-7897, 2020.

[9] T. Erkaya, B. Ürkek, Ü. Doğru, B. Çetin, and M. Sengül, "Probiotic butter: Stability, free fatty acid composition and some quality parameters during refrigerated storage," *International Dairy Journal*, vol. 49, pp. 102–110, 2015.

[10] L. Ferreira, A. Borges, D. Gomes, S. Dias, C. Pereira, and M. Henriques, "Adding value and innovation in dairy SMEs: From butter to probiotic butter and buttermilk," *Journal of Food Processing and Preservation*, vol. 46, p. e14867, 2020.

[11] R. Karimi, M. H. Azizi, M. Ghasemlou, and M. Vaziri, "Application of inulin in cheese as

prebiotic, fat replacer and texturizer: A review," *Carbohydrate Polymers,* vol. 119, pp. 85-100, 2015.

[12] J. Domagala, M. Sady, D. Najgebauer-Lejko, M. Czernicka, and I. Wieteska, "The content of conjugated linoleic acid (CLA) in cream fermented using different starter cultures," *Biotechnology in Animal Husbandry,* vol. 25, pp. 745-751, 2009.

[13] F. Y. Ekinci, O. D. Okur, B. Ertekin, and Z. Guzel-Seydim, "Effects of probiotic bacteria and oils on fatty acid profiles of cultured cream," *European Journal of Lipid Science and Technology,* vol. 110, pp. 216-224, 2008.

[14] L. Yilmaz-Ersan, "Fatty acid composition of cream fermented by probiotic bacteria," *Mljekarstvo* vol. 63, pp. 132-139, 2013.

[15] X. Jiang, E. Shekarforoush, M. K. Muhammed, K. A. Whitehead, N. Arneborg, and J. Risbo, "Lactic Acid Bacteria as Structural Building Blocks in Non-Fat Whipping Cream Analogues," *Food Hydrocolloids,* vol. 135, p. 108137, 2023.

[16] A. Y. Tamime, "Dairy fats and related products," *John Wiley & Sons,* vol. 344 2009.

[17] *Probiotic yogurt- Specifications and test methods- ICS:67.100.99,* ISIRI, 2018.

[18] R. Karimi, A. M. Mortazavian, and A. Amiri-Rigi, "Selective enumeration of probiotic microorganisms in cheese," *Food Microbiology,* vol. 29, pp. 1-9, 2012.

[19] D. Mudgil, S. Barak, and B. S. Khatkar, "Texture profile analysis of yogurt as influenced by partially hydrolyzed guar gum and process variables," *Journal of Food Science and Technology,* vol. 54, pp. 3810–3817, 2017.

[20] H. Lv, D. Ren, W. Yan, Y. Wang, H. Liu, and M. Shen, "Linoleic acid inhibits *Lactobacillus* activity by destroying cell membrane and affecting normal metabolism," *Journal of the Science of Food and Agriculture,* vol. 100, pp. 2057-2064, 2020.

[21] D. Greenway and K. Dyke, "Mechanism of the inhibitory action of linoleic acid on the growth of *Staphylococcus aureus*," *Journal of General Microbiology,* vol. 115, pp. 233–245, 1979.

[22] E. Renes, D. M. Linares, L. González, J. M. Fresno, M. E. Tornadijo, and C. Stanton, "Production of conjugated linoleic acid and gamma-aminobutyric acid by autochthonous lactic acid bacteria and detection of the genes involved," *Journal of Functional Foods,* vol. 34, pp. 340 –346, 2017.

[23] L. Gorissen *et al.*, "Production of conjugated linoleic acid and conjugated linolenic acid isomers by *Bifidobacterium* species," *Applied Microbiology and Biotechnology,* vol. 87, pp. 2257–2266, 2010.

[DOI: 10.22034/FSCT.21.151.76]

مجله علوم و صنایع غذایی ایران

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مقاله علمی_پژوهشی

زنده مانی *لاکتوباسیلوس پاراکازئی*، *ل. هلوتیکوس* و *بیفیدوباکتریوم لاکتیس* در خامه ترش و بررسی تاثیر آن ها بر ویژگی های بافتی و حسی محصول

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اطلاعات مقاله

تاریخ های مقاله :

تاریخ دریافت: ۱۴۰۲/۱۰/۱۵

تاریخ پذیرش: ۱۴۰۲/۱۲/۲۰

کلمات کلیدی:
پروبیوتیک،
لبنیات،
شیر،
خامه،
کشت

DOI:10.22034/FSCT.21.151.76.

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چکیده

در مطالعه اخیر تاثیر باکتری های پروبیوتیک بر ویژگی های بافتی و حسی خامه ترش بررسی شد. نمونه های خامه با سه باکتری پروبیوتیک شامل *لاکتوباسیلوس کازئی*، *ل. هلوتیکوس* و *بیفیدوباکتریوم لاکتیس* به صورت کشت منفرد تلقیح شدند. مقادیر pH، زنده مانی باکتری های پروبیوتیک، ویژگی های بافتی و حسی نمونه های خامه ترش در روزهای ۱، ۱۵ و ۳۰ نگهداری مورد ارزیابی قرار گرفتند. پارامترهای گفته شده با نمونه خامه شاهد مقایسه شدند. مقادیر pH، قابلیت زیستی پروبیوتیک ها، ویژگی های بافتی (سفتی، یکنواختی و چسبندگی) و ویژگی های حسی (طعم، پس طعم فلزی، ترشی، بو، حالت خامه ای، انسجام و بدطعمی) در نمونه های خامه بسته به نوع کشت مورد استفاده تغییر کردند. در مجموع، تلقیح باکتری های پروبیوتیک به خامه ترش می تواند باعث تولید یک محصول سلامتبخش جدید در بازار محصولات لبنی باشد.