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Scientific Research

Investigation on the Sensory and Microbial Characteristics of Functional Yogurt Containing Bell Pepper Extract

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ABSTRACT

The yoghurt fortification with bioactive-rich components is one of numerous approaches to prevent the diseases correlated with nutritional shortages. However, this method may alter product characteristics. Therefore, the aim of current research was to study the effect of bell pepper extract (BPE) with three different colors on the sensory and microbial properties of set yogurt. For yogurt preparation, 5% of concentrated BPE with the yellow, orange, or red colors were substituted with the milk used for yogurt production. Results showed that by using BPE in yogurt formulation, the count of starter bacteria increased meaningfully while for sensory attributes, except for yogurt texture and appearance, the scores of taste and color were significantly decreased ($p<0.01$). The mean viable counts of lactic acid bacteria (LAB) for control and yogurt samples containing yellow, orange and red BPE were determined as 9.62, 10.09, 10.08 and 10.10 Log CFU/g, respectively. The time of storage also had significant impact on the yogurt properties and as the time of storage increased, the count of LAB and sensory scores reduced notably. Results revealed that although addition of BPE with different colors into the yogurt production the sensory characteristics (taste and color scores) of yogurts decreased, all the yogurts containing BPE had acceptable sensory scores (mean scores>7, i.e. good mark). Consequently, with respect to the healthy components of bell pepper extracts, a yogurt with appropriate functionality could be produced. Therefore, the use of BPE with different colors (particularly orang BPE) in production of functional yogurt is recommended.

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1- Introduction

Today, yogurt has a special status among consumers due to its sensory characteristics (especially taste and texture) as well as many nutritional properties [1, 2]. Yogurt contains various antimicrobial substances, especially bioactive peptides, and the consumption of this product reduces blood serum cholesterol levels, improves lactose intolerance, regulates the body's immune responses, and balances the composition of intestinal microbiota [2]. Also, the presence of valuable serum proteins (whey proteins) significantly increases the biological value and functional properties of yogurt and other dairy products [3]. However, by adding health-giving compounds (such as probiotic bacteria and other additive compounds such as plants) to yogurt, more beneficial products can be produced [4]. Yogurt flavor is influenced by many factors, including milk source, processing parameters, chemicals, starter cultures, and food additives. Among these factors, the additives used play an important role in the quality of the final product, especially the flavor.

Despite its high nutritional value and health benefits, this product has low antioxidant properties [5]. Therefore, this feature can be improved by adding plant compounds containing polysaccharide compounds, phenolic substances and essential oils that have medicinal and antioxidant properties; meanwhile, it improved the functionality and antimicrobial properties of the product [6-9]. So far, various researches have been conducted in the field of producing functinal yogurt by using extracted compounds or different parts of plants, which in addition to the health effect on humans, often due to the presence of antioxidant and antimicrobial properties, it improves the keeping ability of the product. Raikos et al. (2019) in a study investigated the antioxidant properties of yogurt drink containing Salal berries and Blackcurrant pomace during 4 weeks of storage in refrigerator (4 ◦C) [10]. Yogurt drink enriched with Salal berries contains more phenolic compounds (more than 69.90 µg GAE/mL) and more anthocyanins (more than 19.12 mg C3G[1]/L) compared to the sample containing Blackcurrant pomace (contained 50.13 µg GAE/mL and 10.8 mg C3G/L, respectively). Although the storage time had no effect on the amount of total phenol of the samples, it caused a decrease in the stability of anthocyanins. These researchers attributed the higher antioxidant capacity of the yogurt drink sample containing Salal berries compared to Blackcurrant pomace to the free radicals scavenging activity of its bioactive compounds [10]. Hong et al. (2020) investigated the effect of adding paprika extract with different colors of yellow, orange and red (in zero, 2.5 and 5% concentrations) on the microbial and sensory characteristics of sweet flavored stirred yogurt [11]. The results of this research showed that paprika extract can be well used to produce functional yogurt. Adding paprika extract increased the number of starter bacteria and during 15 days of storage in the refrigerator (5◦C), slight changes in the values LAB count of yogurt samples was observed. Jooyandeh et al. (2022) also investigated the possibility of producing a functional semi-fat stirred yogurt containing Panirak (*Malva neglecta*) and lactulose (as a prebiotic compound) with acceptable sensory characteristics [12]. To produce semi-fat synbiotic stirred yogurt, *Malva neglecta* (in four levels of 0, 5, 10, 15%) and lactulose (in three levels of 0, 1 and 2%) were utilized. The results of this research showed that by using a concentration of 15% of *Malva neglecta* and 1% of lactulose, it is possible to produce a functional stirred yogurt with acceptable sensory and microbial properties.

Bell pepper with the scientific name *Capsicum annuum* L. is one of the most important identified species of the genus Capsicum and belongs to the potato family (Solanaceae). Among the 35 species that have been identified so far, 5 species include: *C. annuum*, *C. frutescens*, *C. chinense*, *C. baccatum* and *C. pubescens* are more important [13]. In addition to high antioxidant properties, this plant contains antimicrobial and antiviral compounds, so that it is able to inhibit the activity of *Streptococcus pyogenes* and prevent Fusarium infection. Due to the phytochemical compounds of bell pepper that have shown good antioxidant [14], anticancer [15], anti-inflammatory [16], anti-obesity [17]

[1] cyanidin-3-glucoside

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and anti-atherosclerotic [18] properties, the use of this plant has been considered as an additive for the production of functional foods.

As mentioned, bell pepper extract comprises significant health benefits and by adding the extract to yogurt formulation, a functional product can be produced. However, until present, no research has been done on the production of functional yogurt containing bell pepper extract according to Iranian preference. Therefore, in the current research, functional yogurt samples containing bell pepper extract or BPE with different colors of yellow, orange and red were produced, and their antimicrobial and sensory properties were investigated.

2-Materials and methods

2-1- Materials

In order to produce yogurt samples, fresh whole cow's milk containing 3.2% fat was used. Fresh bell pepper with 3 colors: yellow, red and orange was procured from the local market and after washing, it was completely crushed by a mixer and its extract was separated with a fine muslin cloth. Then, the extract was concentrated to 30% of the dry matter by a rotary evaporator under vacuum at a temperature of 65°C. Concentrated sweet pepper extract was prepared on the same day of production of yogurt samples and 5% of it was used in yogurt production. Yogurt starter culture YO-MIX 532 (Danisco Company, made in Germany) containing thermophilic strains of *Streptococcus thermophilus* and mesophilic *Lactobacillus delbruecki* subspecies *bulgaricus* was purchased and stored at -18◦C. All materials used in the research, including culture mediums and chemicals, had high purity and were purchased from Sigma Aldrich or Merck, Germany.

2-2- Yogurt production

Yoghurt samples were produced according to the method of Yademellat et al. [19]. After bringing the temperature of the milk to 90°C and keeping it for 10 minutes, the temperature of the milk was reduced to 65°C and 5% of bell pepper extract was added to it. Afterward, the temperature of the milk for inoculation was reduced to 44-45 degrees Celsius and the lyophilized powder of yogurt starter culture was added to the milk in the amount of 0.05% and the inoculated milk was filled in 100 g polyethylene containers. Next, the yogurt samples were kept in the incubator at a temperature of 42 degrees Celsius until the pH of the samples reached up to 4.6. Then, the samples were taken out of the incubator and transferred to the refrigerator at a temperature of 5 degrees Celsius. All experiments were performed during 21 days of storage (1, 11 and 21 days after yogurt production) at refrigerator temperature (5±1 °C). It should be noted that the amount of bell pepper extract used in this research (5%) was determined based on preliminary tests and according to the results of sensory properties, particularly the yogurt texture and taste.

2-3- Sensory evaluation

For sensory evaluation, the most important organoleptic characteristics of yogurt samples including: color, taste, appearance and texture were evaluated by 20 food engineering students of Agriculture and Natural Resources University of Khuzestan. Before evaluation, the yogurt samples were taken out of the refrigerator for 30 minutes and kept at ambient temperature (22±2°C) so that the temperature of all the samples during the test to be identical and does not affect the sensory results. Sensory evaluation based on the 9-point hedonic scale was performed on the first, 11^{th}, and 21^{st} days after storing the samples in the refrigerator [4].

2-4- Microbial evaluation

To determine the count of lactic acid bacteria (LAB), coliform and mold & yeast, the culture mediums of MRS agar, EMB and YGC were used, respectively. To determine microbial quality, pour plate method was used. Sample dilution was done with peptone water solution (Merck, Germany) up to 10^{-5} dilution. 10^{-3} and 10^{-5} dilutions were used for LAB, and mold & yeast tests, and 1^{-10} and 10^{-2} dilutions were used for coliform evaluation. For LAB test, the plates were placed in anaerobic jar condition and to determine the coliform, the plates were placed in aerobic condition in an incubator at 37 degrees Celsius for 48 hours. In order to determine mold & yeast, the plates were placed in aerobic conditions in an incubator at 25 degrees Celsius for 72 hours. Plates

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containing 30 to 300 colonies were used for counting [20-21].

2-5- Data analysis

In this research, 4 yogurt treatments including the control sample (without bell pepper extract) and 3 samples containing 5% concentrated extract of red, yellow and orange bell peppers were produced in 3 repetitions and the sensorial and microbial properties of the samples were assessed during 21 days of storage. In order to investigate the effect of the type of sweet pepper extract and storage time, the results were analyzed thru completely randomized design in factorial format by SPSS software (version 20) and the means of the results were compared with the help of Duncan's test at the 5% level.

3-Results and disscution

3-1- Effect of BPE on sensory properties of yogurt

The sensory evaluation results of yogurt samples containing 5% bell pepper extract or BPE with different colors during 21 days of storage in the refrigerator are shown in Table 1. The results showed that except the appearance and texture of yogurt, the type of yogurt and the storage time had a significant effect on other evaluated features ($p<0.01$). By adding 5% BPE in the yogurt formulation, the score of the color and taste characteristics of yogurt decreased significantly, but no difference was observed between different samples containing BPE with different colors. The color and taste scores of the control yogurt were determined as 8.18 and 8.29, respectively, which are significantly higher than the color and taste scores of yogurt samples containing yellow bell pepper extract (7.12 and 7.27), orange (7.68 and 7.31) and red (7.48 and 7.07). However, all yogurt samples containing BPE had an acceptable sensory score, and the panelists gave acceptable scores to the mentioned samples (higher than 7 or good).

In addition to the effect of adding BPE, the storage time also caused a significant decrease in the sensory scores of the samples, apart from the characteristics of yogurt appearance and texture; so that each of the average scores related to the characteristics of color and taste in different storage periods were statistically placed in separate groups. The average score of color of yogurt samples at the beginning, middle and at the end of 21 days of storage of the storage period were determined as 8.03, 7.72; and 7.09, respectively. For taste, the values during the storage periods were recorded as 7.95, 7.61 and 6.90, respectively. The score of appearance and texture of yogurt samples also decreased slightly during the storage period ($p>0.05$) and in storage periods of 1, 11 and 21 days it was determined as 8.84 8.40 and 8.30, respectively. The reduction of sensory score during the storage period has also been reported by other researchers [22-24].

Table 1. Effect of addition of Bell Pepper Extract (BPE) with different colors on the sensory characteristics of set yogurt samples during 21 days storage at 4 ˚C

Characteristics	Storage Time (Day)	Bell Pepper Extract (BPE)			
		Control (without BPE)	**Yellow**	**Orange**	**Red**
Color	1	8.43±0.21^{a}	7.76±0.19^{bc}	8.14±0.24^{ab}	7.80±0.20^{bc}
	11	8.23±0.30^{ab}	7.38±0.10^{cde}	7.70±0.17^{bcd}	7.57±0.19^{cde}
	21	7.88±0.21^{bc}	6.22±0.27^{f}	7.20±0.50^{de}	7.06±0.48^{e}

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Taste	1	8.70±0.27[a]	7.66±0.11 [b]	7.73±0.34 [b]	7.71±0.21 [b]
	11	8.45±0.28 [a]	7.35±0.12 [bc]	7.42±0.30 [bc]	7.21±0.11 [cd]
	21	7.72±0.39 [b]	6.81±0.32 [de]	6.77±0.10 [e]	6.29±0.15 [f]
Appearance and Texture	1	8.27±0.25[ab]	8.32±0.28 [ab]	8.66±0.29 [a]	8.68±0.10 [a]
	11	8.73±0.16 [a]	8.62±0.23 [ab]	8.05±0.50 [b]	8.19±0.29 [ab]
	21	8.55±0.33 [ab]	8.30±0.34 [ab]	8.11±0.49 [ab]	8.24±0.27 [ab]

Different small letters indicate significant differences ($p<0.05$) in each sensory attributes.

According to Table 1, with the passage of storage time, the color score of yogurt samples, especially yogurt samples containing BPE with different colors, decreased significantly. The reason for the significant decrease in the color of yogurt samples containing BPE during the storage period is probably due to the decomposition and oxidation of bell pepper pigment compounds such as carotenoids and anthocyanins [22 and 23]. Although weak non-covalent interactions between protein and anthocyanin cause the stability of these pigments [25], but due to the thermal denaturation of proteins during the relatively intense thermal processing of milk used in yogurt production, this effect is unimportant [22 and 24]. On the other hand, the oxidation of these compounds in the presence of oxygen and especially their decomposition due to hydrogen peroxide produced by yogurt starter bacteria has a greater effect on their instability. Due to the fact that LAB bacteria are catalase-negative, they can produce significant amounts of hydrogen peroxide [26]. Also, although the hydrolysis of glycosidic compounds by microbial glucosidase enzymes can cause the decomposition of pigments, the presence of reducing sugars such as glucose and fructose in plant extracts prevents the activity of these enzyme [24]. In fact, the decrease in yogurt color score is due to its decrease in brightness, and the decomposition of the mentioned pigments has no effect on it. The decrease in brightness in yogurt samples during the storage time, as mentioned before, can be due to the decrease in light scattering due to the formation of larger clusters of casein micelles, as well as the increase in the hydration of proteins and, as a result, the decrease in whey voids form in the product. [27]. As can be seen in Table 1, at the beginning and in the middle of the storage period, there was no significant difference between the sample containing orange BPE and the control yogurt, but at the end of the storage period, this difference became significant. Among the samples containing BPE, the panelists assigned a lower color score to the sample containing yellow bell pepper, so that the color score of this sample at the end of the storage time was significantly lower than other samples. Despite the fact that the color score of the yogurt samples containing BPE at the end of the storage period is lower than the control sample, except for the sample containing yellow BPE (with a score of 6.22), the yogurt samples containing orange and red (respectively with the score 7.20 and 7.06), had relatively acceptable color quality.

Like color, the panelists gave more taste score to the control sample and no significant difference was observed between the samples of yogurt containing BPE except at the end of storage time. At the end of 21 days of storage period, the taste score of the yogurt sample containing red BPE (6.29) was significantly lower than other samples. The reduction of the taste score as a result of adding extracts or plant compounds to yogurt has been reported by other researchers. The decrease in taste score due to the addition of hot green or red pepper to yogurt by Kang et al. [28] and the addition of pigments extracted from peanuts, yellow onion peel, and sour tea flower to yogurt drink has been reported by Khalifa and Gomaa [29]. The reason for the lower taste score of the samples containing BPE compared

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to the control sample, in addition to the BPE compounds effective in taste, is probably due to the higher acidity or lower pH of these samples. As mentioned before, the decrease in pH can be due to the increase in the metabolism of yogurt starter bacteria as a result of the addition of vegetables or medicinal plants [30]. A decrease in the pH of yogurt has been reported when bell pepper [11] and blackberry [31] extracts are used. Contrary to the results of this research, Amadou et al. [32] and Jooyandeh et al. [33] reported a reduction in product acidity when ginger extract and eggplant puree were added to yogurt, respectively. Ścibisz et al. [24] also stated that the amount of lactic acid produced in fruit yogurt with fruit pieces at the bottom of the container reduced compared to sample containing fruit pieces well mixed with yogurt, and the reason attributed to the higher metabolic activity of starter bacteria in natural yogurt (without fruit).

3-2- Effect of BPE on the counts of mold & yeast, coliform and LAB

The results of this research indicated that the addition of different bell pepper extracts or BPE had no significant effect on the number of mold & yeast and coliforms in yogurt samples. Also, although the number of mold & yeast, and coliforms in yogurt increased with the passage of storage time, the amount of these microorganisms was lower than the standard levels for yogurt in the all storage periods (results not shown).

Contrary to the results of coliform and mold & yeast, the results showed that the addition of bell pepper extract or BPE, storage time and also the interaction between these variables had a significant effect on the LAB count. As shown in Figure 1, although there was no significant difference in this regard between the yogurt samples containing different bell pepper extracts, the LAB count of all these samples was higher than the control sample ($p< 0.01$). The amounts of LAB bacteria in control and yogurt samples containing yellow, orange and red bell pepper extracts were determined as 9.62, 10.09, 10.08 and 10.10 Log CFU/g, respectively.

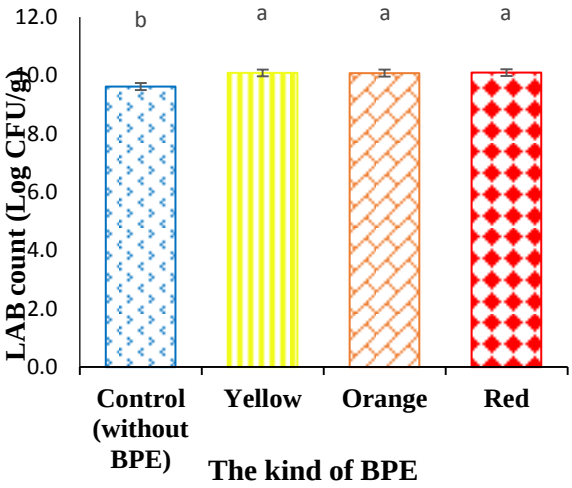

FIG 1. Effect of addition of 5% Bell Pepper Extract (BPE) on the viable LAB count of set yogurt samples

Acidity, concentration of bile substances, oxygen concentration and amount of water activity are among the most important stressful and hindering factors that affect the activity of lactic acid bacteria [2]. Considering the high antioxidant activity of yogurt samples containing bell pepper extract, it is obvious that LAB bacteria can continue their activity in more appropriate conditions. Xin-Huai and Dan [34] showed that by removing oxidative stress from the environment with the help of adding antioxidants such as vitamin C, the number of *Lactobacillus bulgaricus* and *La. heloticus* bacteria by 150 to 220% and *Bifidobacterium animalis* and *B. infantis* bacteria to by 150 to 190% increased. In similar results, Kang et al. [28] reported that by adding 5% of the fermented extract of green or red hot peppers to the milk used in the preparation of stirred yogurt, the count of LAB bacteria was about 0.03 Log CFU/g increased. Similar to the results of the present study, these researchers reported the number of LAB bacteria more than 9 Log CFU/g. Jeong et al. [5] also reported a higher number of yogurt starter bacteria and probiotics as a result of adding 1-3% of green tea powder to yogurt despite the presence of antimicrobial compounds in green tea such as catechin. Catechin prevents the activity and growth of bacteria by destroying the cell membrane, preventing enzyme activity and reducing the synthesis of fatty acids [35]. Considering the higher number of tested bacteria at the end of the incubation and their higher survival at the

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end of 21 days of storage at 4°C, these researchers attributed this effect to the prebiotic properties of green tea powder [5]. Despite this, Alirezalu et al. [31] showed that the count of starter bacteria in blackberry and carrot yogurts were significantly lower than the control yogurt during the storage period. These researchers attributed the cause of this incidence to the lower pH of yogurt and the high amount of phenolic compounds in the fruits used. Bueno et al. [36] also showed that in yogurt containing strawberry, raspberry and pitanga pulp, the count of starter bacteria and probiotic bacteria were lower than the control yogurt. However, different results are reported regarding to the effect of phenolic compounds on starter or probiotic bacteria. For example, Amirdivani and Baba [37] showed that the number of probiotic Lactobacillus bacteria in yogurt containing green tea extract is almost twice as much as the control yogurt due to the presence of phenolic compounds. In addition, the reason for the increase in the number of LAB bacteria can be related to the increase in reducing sugars as a result of adding plant extracts or plant parts to yogurt [38]. Therefore, in general, it can be stated that the reason for the increase in yogurt starter bacteria as a result of adding bell pepper extract can be explained by: 1) increase in antioxidant activity, 2) the presence of prebiotic compounds, and 3) increase in reducing sugars.

In addition to the variable of BPE addition, storage time also caused a significant difference in the count of LAB bacteria. According to Figure 2, the number of LAB bacteria increased significantly until the middle of the storage period and then decreased at the end of 21 days of storage. The increase and then decrease in the number of LAB bacteria during the cold storage period of yogurt has been reported by many researchers [28 and 39]. Although at the beginning of the storage period, the number of bacteria in yogurt and fermented products increases due to the consumption of milk compounds, especially lactose, and their conversion into lactic acid and other production metabolites, but later due to the decrease of these compounds and increasing acidity, their growth decreases [2 and 40].

With a brief view at Figure 3, it can be seen that the number of LAB bacteria in the control yogurt (8.85 Log CFU/g) at the end of 21 days of storage is significantly lower than the yogurt sample containing BPE (9.56-9.7 Log CFU/g). Therefore, it can be said that the addition of BPE, regardless of its type or color, can effectively survive the yogurt starter bacteria. In similar results, Jeong et al. [5] also reported that at the end of 21 days of storage at 4 °C, the survival of yogurt starter bacteria and probiotics were higher in yogurt samples containing green tea powder than control yogurt. Zahid et al. [41] also reported that the number of LAB bacteria and probiotics in yogurt samples containing mango and banana peel powder was much higher than control yogurt, and the reason attributed to the prebiotic effect of the phenolic compounds present in the fruit skins and their effect on the survival of the mentioned bacteria.

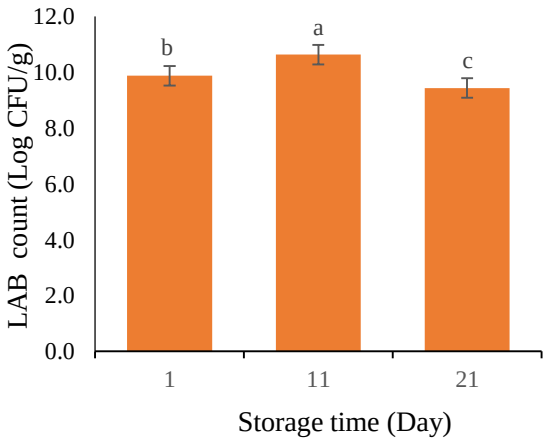

FIG 2. Effect of storage time on the viable LAB count of set yogurt samples during 21 days of storage at 4 ℃

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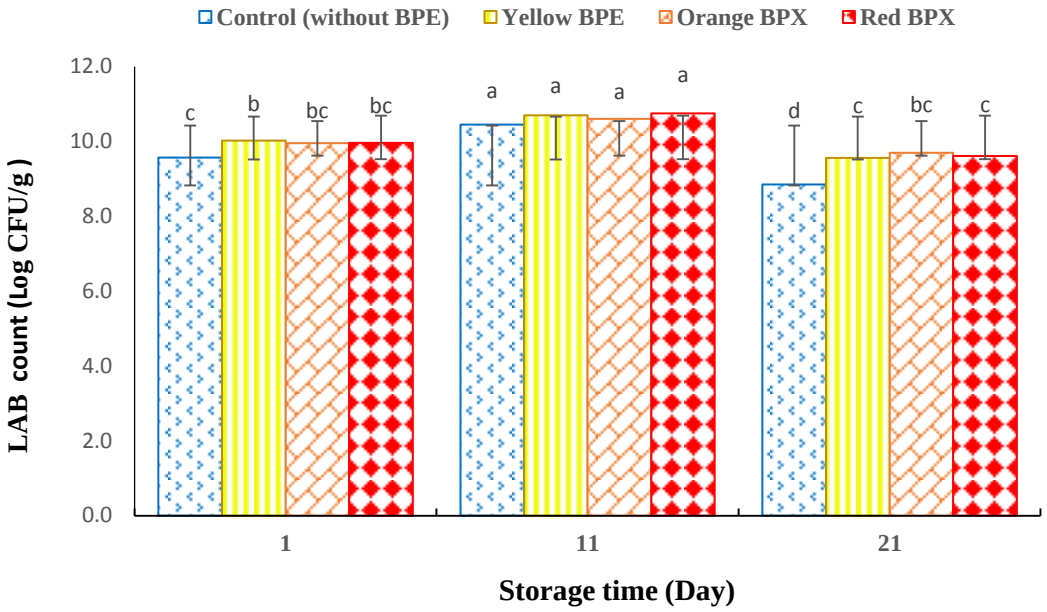

FIG 3. The intraction effect of treatment (addition of 5% Bell Pepper Extract (BPE) with different colors) and storage time on the viable LAB count of set yogurt samples during 21 days of storage at 4 ℃

4- Conclusion

This research was conducted to investigate the effect of adding concentrated bell pepper extract (BPE) in the formulation of set yogurt on the sensory and microbial characteristics of the product during 21 days of storage at 4°C. The results of this research showed that the yogurt samples containing LAB bacteria had a higher number than the control sample (without BPE). Acidity, concentration of bile substances, oxygen concentration and amount of water activity are among the most important stressful and hindering factors that affect the activity of lactic acid bacteria. Therefore, due to the high antioxidant activity of yogurt samples containing bell pepper extract, it is obvious that LAB bacteria can continue their activity in more suitable conditions. Also, the results showed that the type of yogurt and the storage time had a significant effect on other evaluated characteristics ($p<0.01$) except for the characteristics of appearance and texture of yogurt, and the score of sensory characteristics of yogurt samples containing BPE with color Different values were significantly less than the control sample. However, all yogurt samples containing BPE had an acceptable sensory score, and the panelists gave an acceptable average score to the mentioned samples (higher than 7 or good). Therefore, since today the relationship between nutrition and health is well established and by producing functional foods, we try to reduce the incidence of disease and increase the health of people in the society, to achieve this goal, the use of BPE with color Different types (especially orange) are suggested in yogurt production.

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بررسی ویژگی‌های حسی و میکروبی ماست عملگرا حاوی عصاره فلفل دلمه‌ای

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چکیده

غنی‌سازی ماست با مواد سرشار از ترکیبات زیست‌فعال، یکی از روش‌های کارآمد جهت مقابله با بروز بیماری-های مرتبط با کمبودهای تغذیه‌ای است. درهرحال، به‌کارگیری این روش ممکن است سبب تغییر ویژگی‌های محصول گردد. بنابراین این تحقیق به منظور بررسی تأثیر عصاره فلفل دلمه‌ای (BPE) با سه رنگ مختلف بر ویژگی‌های حسی و میکروبی ماست قالبی انجام شد. برای تهیه ماست، مقدار ۵٪ از عصاره‌های تغلیظ شده فلفل دلمه‌ای با رنگ‌های زرد، نارنجی یا قرمز جایگزین شیر مورد استفاده در تولید ماست گردید. نتایج این تحقیق نشان داد که با به‌کارگیری BPE در تولید ماست، شمارش باکتری‌های آغازگر به‌شکل معنی‌داری افزایش یافت، اما در مورد ویژگی حسی، به غیر از بافت، امتیاز طعم و رنگ محصول کاهش یافت ($p<0/01$). مقدار میانگین باکتری‌های اسید لاکتیک (LAB) ماست شاهد و حاوی عصاره‌های فلفل دلمه‌ای زرد، نارنجی و قرمز به‌ترتیب ۹/۶۲، ۱۰/۰۹، ۱۰/۰۸ و ۱۰/۱۰ Log CFU/g تعیین شد. زمان نگهداری نیز اثر معنی‌داری بر ویژگی‌های مورد بررسی داشت و باگذشت زمان نگهداری، شمارش باکتری‌های آغازگر و ویژگی‌های حسی کاهش یافت. نتایج این تحقیق نشان داد هرچند افزودن BPE با رنگ‌های متفاوت در فرمولاسیون تولید ماست سبب کاهش امتیاز ویژگی‌های حسی طعم و رنگ می‌گردید، اما تمامی نمونه‌های ماست حاوی BPE از امتیازات حسی قابل قبولی برخوردار بودند (میانگین امتیاز > ۷ یا خوب). درنتیجه باتوجه به ترکیبات عملگرای موجود در فلفل دلمه‌ای، می‌توان ماستی با خواص عملگرایی مطلوب تولید نمود. بنابراین، استفاده از BPE با رنگ‌های مختلف (به‌ویژه نارنجی) جهت تولید ماست فراسودمند پیشنهاد می‌شود.

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