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RESEARCH ARTICLE

Determination of microbiological, chemical, and sensory characteristics of hosmerim desserts derived from sheep, goat, and cow cheese

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Keçi, koyun ve inek peynirlerinden üretilen höşmerim tatlılarının mikrobiyolojik, kimyasal ve duyusal özelliklerinin belirlenmesi

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Öz

Amaç: Keçi, koyun ve inek peynirleri kullanılarak üretilen höşmerim tatlılarının muhafaza süresince kalite özelliklerini tespit etmek amaçlanmıştır.

Gereç ve Yöntem: Kontrollü şartlar altında üretim yapan çiftliklerden temin edilen keçi, koyun ve inek sütlerinden peynirler üretilmiştir. Bu sütlerden elde edilen peynirler kullanılarak 3 grup höşmerim tatlısının üretimi 3 tekrar olarak gerçekleştirilmiştir. Höşmerim tatlılarının 0. 7. ve 14. günlerde mikrobiyolojik, kimyasal ve duyusal analizleri yapılmıştır.

Bulgular: Höşmerim tatlılarının, kuru madde, kül ve asitlik değerlerinde farklılık ($p>0,05$) tespit edilmemiştir. Höşmerim numunelerin pH değerlerinde 0. günde farklılık tespit edilemezken ($p>0,05$) 7. ve 14. günlerde önemli derecede farklılık ($p<0,01$; $p<0,001$) olduğu belirlenmiştir. Numunelerin yağ, renk, tekstür ve duyusal analiz değerlerinde 0. 7 ve 14. günlerde farklılıklar görülmüştür. Höşmerim tatlılarında mikroorganizma tespit edilmemiştir.

Öneri: Höşmerim tatlılarının, standart şartlarda üretimi yapıldıktan ve uygun materyallerle paketlenmesiyle mikrobiyolojik ve kimyasal olarak 14 gün, duyusal bakımdan 7 gün kalitesini koruyabileceği görülmüştür. Tüketicinin korunması açısından peynirli tatlı üretiminde kullanılan peynirin hangi sütten üretildiğinin etikette belirtilmesi gerektiği düşünülmektedir.

Anahtar kelimeler: Höşmerim, kimyasal, mikrobiyolojik, peynir helvası

Abstract

Aim: It is aimed to determine the quality characteristics of the hosmerim desserts produced by using goat, sheep and cow cheeses during storage.

Materials and Methods: The cheeses have been produced from goat, sheep and cow milk obtained from farms producing under controlled conditions. The three groups production of the hosmerim was carried out in 3 replicates. Analyzes of microbiological, chemical, physicochemical and sensory properties were made and statistical analyzes were made on days 7 and 14 after the production of the Hosmerim desserts.

Results: There were no differences in dry matter, ash and acidity values ($p> 0,05$) of Hosmerim desserts. It was determined that there were significant differences ($p <0.01$, $p <0.001$) at 7th and 14th days when the pH values of the hosmerim samples could not be determined at 0 day ($p> 0,05$). There were differences in the fat, color, textural and sensory analysis values of the samples at days of storage 0,7 and 14. No microorganisms were found in Hosmerim desserts.

Conclusion: It has been observed that Höşmerim desserts produced using standard method and packaged with apropriate materials can be microbiologically and chemically preserved for 14 days and sensory properties maintenance for 7 days after production under standard conditions and packaging with appropriate materials. It is thought that which milk is used in the production of cheese used in the production of cheese dessert should be stated in a certain way.

Keywords: Cheese dessert, chemical, hosmerim, microbiological

Introduction

Desserts produced from milk and dairy products play significant roles in reducing the risk of bone diseases, such as osteoporosis, due to the rich nutrients they contain. Rice pudding, pudding with the caramel base, keskul, profiterol and rice waffers stuffed with nuts (gullac) are the examples of the most prominent desserts made by using milk. On the other hand, there is a number of desserts derived from cheeses that are consumed on a large scale. Some of the most famous desserts derived from cheeses that are being produced in Turkey are kunafa (kunafah), cheese dessert (hosmerim) and cheese halva. Besides the aforementioned desserts, cheese desserts that originated in areas outside of Turkey such as Cheesecake and Tiramisu are produced in great number (Rapaillle and Vanhamelrijck 1992, Mleko 1997, De wijk et al 2003, Tarrega et al 2004, Cengiz 2006).

Hosmerim is a type of cheese dessert that was produced since the period of the Ottoman Empire up to this day. It is estimated that the Anatolian nomads coming from Central Asia through immigrations are the original producers of hosmerim. Hosmerim dessert is produced in many areas of Turkey, especially in Aegean, Black Sea and Central Anatolia regions. More specifically, the provinces that produce hosmerim more are Balıkesir, Bursa, Çanakkale, Tekirdağ, Kırklareli and Izmit (Unsal 2003). Hosmerim is among the most important traditional Turkish desserts. Due to the fact that hosmerim is produced in many different places, significant differences occur in the production methods (Şahan et al 2006). For example, hosmerim is produced in Konya province by adding clotted cream (kaymak) instead of cheese (Taş 2004, Halıcı 2014). Generally speaking, the ingredients for producing hosmerim are fresh unsalted cheese, sugar, semolina and eggs. However, in specific areas, such as Tekirdağ region, unsalted fresh cheese, sugar and flour are used. In both methods, the common raw materials for making hosmerim are fresh unsalted cheese and sugar (Evyapan 1995). In addition, these differences in terms of production techniques and materials used to produce hosmerim result in the rich diversity and wide range of its quality (Cengiz 2006). The industrial production of the dessert started in Balıkesir province in 1985-1990 (Taş 2004). In a study conducted by Can (2007) on hosmerim, the microbiological, chemical and sensory qualities of soft and unsalted cheese were determined. In another study investigating of chemicals and microbiological quality of hosmerim samples gathered in Bursa and Balıkesir by Şahan and his friends (2006), the number of maldyeast was found around 5,8x101 ile 1,8x101. The report also concluded that Staphylacoccus aureus was not detected. Kurultay et al (2008) conducted an analysis of the pH and fat content of unsalted fresh cheeses used in the production of hosmerim in Tekirdağ province. Şanlıer et al (2008) conducted a questionnaire to university students on the recognition of traditional desserts and candies in Turkish cuisine. Todd et al (1983) investigated the chemical quality of cheesecake dessert. Apart from the a fore mentioned researches, there is a great number of researches conducted both in Turkey and worldwide on the topic of desserts derived from the cheese such as tiramisu, cheesecake, cheese halva and kunafah It is clear that the common point of these researches is that there is not a single recipe to make the previously mentioned desserts, therefore many microbiological, chemical and sensory differences occur as the result (Can 2007).

Materials and Methods

Cheese has been produced according to the Tekinşen (2000) from goat, sheep and cow milk obtained from farms. Furthermore, the cheese produced in this process was used to produce hosmerim desserts samples three times in the controlled conditions.

The production steps of hosmerim are; firstly, the milk was heated to the fermentation temperature (25-30 °C) and then 2 table spoons of rennet (cheese yeast) was added to the 5 kilograms of milk to complete the fermentation process. After waiting for 1-1,5 hours to obtain curdling, , the egg was added by wire brush when the curd gets like custard. Having started the cooking process, the mixture was stirred continuously until boiling, and then sugar was added (Evyapan 1995, (Unal 2011).

After starting to cook, it was stirred continuously until boiling and sugar was added. When the temperature reached 85-90 °C, semolina was added and stirred and cooking process continued until thickening. When the process of cooking was over, the product was placed in packages and left to cool down. The dry matter content of the samples was determined by gravimetric method. (AOAC International 1995). Likewise, ash determination was determined by gravimetric method (Cemeroğlu 2013). The pH values of the samples were determined with an electronic pH meter (inolab-series wtw 7310) (Lambooij et al 1999). The color analysis was done by a Minolta brand chroiiometer having D65 illumination, 2° observers and 8 mm illumination range in Diffuse / O mode (CR-400 model, Konica Minolta, Osaka, Japonya) (Röhrle et al 2011). Texture values were determined with TA XT plus Texture analyzer brand texture analyzer. The sensory evaluation concerned the appearance, structure, color, taste and smell properties of the products were evaluated by 6 panelists who graded the products on the scale of points from one to five (Cengiz 2006).

The samples brought to the laboratory in aseptic conditions under the cold chain and were analyzed microbiologically to investigate coagulase positive Staphylococcus aureus, yeast-mold, coliform group microorganism, total aerobic mesophilic microorganism, *Escherichia coli*, Salmonella spp, Listeria monocytogenes. Total viable microorganism counts were

made according to the Food Drug Administration Bacteriological Analytical Manual (FDA 2001). The number of coliform bacteria were analyzed according to the Hitchins et al (1992). The yeast-mold count was made according to ISO 21527-1:

Table 1. Chemical, physicochemical and textural analysis values of hosmerim

		Type			
Property	Days	Goat	Sheep	Cow	P
	0. day	59,30±0,87	59,63±1,10	58,12±2,50	0,530
Dry matter	7th day	59,08±0,52	58,15±2,60	58,90±1,10	0,770
(%)	14th day	60,25±0,35	59,33±1,40	57,57±2,70	0,240
p		0,120	0,600	0,760	
	0. day	23,67±1,53^{ab}	25,00±1,00a	21,00±1,00^{b}	0,020*
Fats (%)	7th day	24,00±1,00^{a}	24,67±1,53^{ab}	21,67±0,58^{b}	0,040*
	14th day	23,67±1,53^{ab}	24,67±1,53^{a}	21,00±0,83^{b}	0,040*
p		0,940	0,940	0,600	
	0. day	1,11±0,05^{x}	1,11±0,08^{x}	1,10±0,03^{x}	0,930
Ash	7th day	0,87±0,10^{y}	0,90±0,04^{y}	0,96±0,08^{y}	0,380
(%)	14th day	0,62±0,03^{z}	0,64±0,01^{z}	0,60±0,02^{z}	0,120
p		0,000***	0,000***	0,000***	
	0. day	0,61±0,00	0,52±0,04^{x}	0,79±0,19	0,060
Acidity	7th day	0,68±0,19	0,47±0,00^{xy}	0,68±0,19	0,220
	14th day	0,49±0,10	0,44±0,02^{y}	0,52±0,10	0,600
p		0,240	0,040*	0,200	
	0. day	5,45±0,33	5,02±0,09	4,97±0,05	0,051
pH	7th day	5,48±0,15^{a}	5,07±0,09^{b}	4,98±0,01^{b}	0,002**
	14th day	5,61±0,10a	5,07±0,10^{b}	5,02±0,06^{b}	0,000***
p		0,670	0,720	0,360	
Color	0. day	76,56±0,50^{xa}	64,45±0,23^{yc}	69,50±0,23^{yb}	0,000***
L* values	7th day	70,64±0,16^{ya}	65,64±0,47^{xc}	69,68±0,18^{yb}	0,000***
	14th day	69,59±0,51^{yb}	66,13±0,19^{xc}	70,47±0,09^{xa}	0,000***
p		0,000***	0,002**	0,001**	
	0. day	-2,74±0,13^{xa}	-6,38±0,08^{b}	-6,48±0,12^{b}	0,000***
a* values	7th day	-9,67±0,14^{yb}	-6,35±0,11^{a}	-6,60±0,07^{a}	0,000***
	14th day	-10,20±0,61^{yb}	-6,36±0,04^{a}	-6,54±0,09^{a}	0,000***
p		0,000***	0,910	0,410	
	0. day	11,99±0,08^{yc}	25,06±0,11^{yb}	27,23±0,25^{a}	0,000***
b* values	7th day	34,40±0,44^{xa}	26,20±0,57^{xb}	27,23±0,08^{b}	0,000***
	14th.day	34,35±0,04^{xa}	26,28±0,19^{xc}	27,55±0,07^{b}	0,000***
p		0,000***	0,010**	0,071	
	0. day	13,39±0,77^{yc}	61,06±0,06^{xa}	31,33±1,79^{yb}	0,000***
Texture	7th day	14,95±1,85^{xyc}	58,23±0,93^{xya}	37, 26±2,24^{xb}	0,000***
	14th day	18,06±2,03^{xc}	58,06±1,83^{ya}	37,18±0,49^{xb}	0,000***
p		0,034*	0,036*	0,008**	

The differences are shown in the same column x, y, z; The differences are shown in the same row $^{a, b, c}$
p<0,05*, p<0,01**, p<0,001***

Table 2. Sensory analysis values of hosmerim

		Type			
	Days	Goat	Sheep	Cow	P
	0. day	20,60±0,92^{xb}	19,20±0.60^{xb}	23,53±0,23^{xa}	0,000***
Sensory	7th day	18,60±0,53^{yb}	17,80±0.60^{yb}	21,27±0,42^{ya}	0,000***
Analysis	14th day	0,00^{z}	0,00z	0,00z	1,000
	p	0,000***	0,000***	0,000***	

The differences are shown in the same column in x, y, z; The differences are shown in the same row in ^{a}, ^{b}, ^{c}
p<0,05*, p<0,01**, p<0,001***

2008. Coagulase positive S. aureus counts were determined according to the ISO Method (ISO 2001). The samples were utilized in testing to find the E.coli, according to the method from the source AOAC (1995). The determination of Salmonella existence was made according to TS EN 6579 (ISO 2005). Furthermore, the determination of the presence of L. monocytogenes was made according to TS EN (ISO 2004).
Statistical analyzes
The results obtained from the research were analyzed statistically by applying Anova Test Using SPSS 20 version.

Results

The results of the chemical, textural an color analysis of hosmerim samples are showe in the Table 1, the sensory analysis values are showed in the Table 2.

As the final conclusion based on the microbiological results, TMAB, Coagulase (+) S aureus, coliform group bacteria, yeast-mold, *E. coli*, Salmonella Spp. and Lmonocytogenes, have not been found in any of the samples.

Once the obtained findings in the study were examined, significant pH differences were found between the samples of Hosmerim at the 7th day (p <0,01) and the 14th day (p <0,001) (Table 1). As of the last day of storage, the Hosmerim samples were found to have acceptable pH values.

There were no significant differences between the dry matter values of hosmerim samples in days 0,7 and 14 (p>0,05) (Table 1). From the begining and the last day of storage, the percentages of dry matter in the samples were found to be on an acceptable level.

Significant differences were found in the values of ash in desserts derived from goat, sheep and cow cheese between days 7 and 14 (p <0.001) (Table 1). At the last day of the storing, it was determined that the ash percentages of the samples were acceptable.

In the study, the fat values of Hosmerim samples during the 14 days of storage were found to be different (p <0,05) according to the days 0, 7 (Table 1). On the last day of the storage process, it was determined that the the values of fat of Hosmerim samples are at levels suitable to be offered on the market.

The acidity values of the Hosmerim samples were similar at days 0, 7 and 14 (p>0.05) (Table 1). On the last day of storage, it was determined that the standardized acidity values of Hosmerim samples are at suitable levels offered on the market.

The textural values of the hosmerim samples were found to vary significantly between days 0, 7 and 14. It was observed that there was a difference between dessert groups produced from goat, sheep and cow cheese on days 7 and 14 (Table 1) (p<0.05, p<0.01, p<0.001). Even though texture values of samples are suitable for presentation in the first few days, they were changed in other days and some dessert samples did not have texture values worth to present in market.

The Hosmerim desserts produced from goat, sheep and cow cheese were statistically different between days 0 and 7 (p<0.001) and between days 7 and 14 (p<0.001). There were no significant differences between groups at day 14 (Table 2).

Color is an important quality criterion for consumers. L *, a *, b * values, which are indicators of color changes in cheese desserts, can be measured instrumentally. Color coordinates L * (brightness), a * (red, +60, red, -60, green) and b * (yellowness, +60, yellow, -60, blue) were determined by the CIE L *, a *, b * system. As a result of evaluating the color values of the samples that were stored, L * values of Hosmerim were found to be statistically significant in the desserts produced with sheep group of cheeses (p <0,01) and cow group of cheeses (p <0,001). There was a statistically significant difference between groups at days 7 and 14 (p <0.001). The a * values of hosmerim desserts differed on days 0, 7 and 14 in desserts produced from goat cheese (p <0.001), while there was no statistically significant difference in the samples produced from sheep and cow cheeses (p> 0,05). Differences were found between dessert groups at days 7 and 14 (p

<0.001). The b * value of samples differed between desserts produced from goat (p <0,001) and sheep (p <0,01) on days 7 and 14, however there was no difference was found in desserts produced from cow cheese.

Discussion

The analysis of the pH values shows significant differences in the groups of the hosmerim desserts on the day 7 (p<0,01) and on the day 14 (p<0,001) (Table 1). As of the last day of storage, the pH values of the samples were found to be acceptable. The analysis of the pH value of the samples in this study was determined to be higher than the pH value found by Can (2007), and lower than the values reported by Aydın et al (2008) and Şahan et al (2006). The results obtained by analysis of hosmerim samples produced from goat cheese done on the 14th day were consistent with the values found by Kurultay et al (2008). The main reason for the differences between the results of the studies is that the analyzed samples were collected from different areas, not from a predetermined single region. The differences in the pH values of the samples may stem from the fact that hosmerim samples examined had no definite method of production. Additional reasons behind the differences in the results of the study could be not reporting the type and the origin of milk used for the cheese production, not ensuring necessary conditions for the desserts production and using the different starter cultures in the manufacturing process.

Furthermore, the analysis conducted on the 0. 7th and 14th day did not show important differences in the values of the dry matter (p>0,05) (Table 1). As of the last day of storage, the dry matter values of the samples were found to be acceptable. The dry matter in the hosmerim samples in this study was lower than the dry matter values found in other studies, such as in the studies of Balıkçı et al (2006), Can (2007) and Aydın et al (2008). The dry matter values in this study were similar to the values found in the studies of Şahan et al. (2006) and Kurultay et al (2008). The value obtained in this study was similar to the value of the study conducted by Evyapan (1995) on the day 7, for the dessert samples produced from goat cheese. The similarities can be seen among the obtained values of this study with the values obtained by Savaş (2011) on the day 7 in the desserts produced from cow cheese, and the values obtained on the day 14 in the desserts produced from sheep cheese. That the samples of hosmerim desserts examined in research were produced by different methods and that methods of production were not reported are considered to be the main causes of the differences in the results. The fact that there was no information about the percentage of fat in the cheeses examined in different studies may explain the difference between the dry matter values in other studies and the dry matter values in this study. Another reasons behind the differences are that the amount of raw materials such as semolina or flour, that have the property of absorbing fat, is not reported in the production of samples, and that the cooking time of the samples is not specified.

The analysis conducted on the 0, 7th and 14th day of the hosmerim samples manufactured from goat, sheep and cow cheese show significant differences in the values of ash (p<0,001) (Table 1). As of the last day of storage, the ash values of the samples were found to be acceptable. While comparing the similar studies done on the same topic, the values of ash found in this study were higher than those found by Şahan et al (2006), and Aydin et al (2008).

However, the ash value of this study was lower than the one found by Can (2007). The values of ash in this study are the same as the values of ash in the studies of Kurultay et al (2008), and Savaş (2011). The values on the day 7 for dessert samples produced from goat, cow and sheep cheeses in this study were almost the same. The main reasons behind the differences and similarities are that there was no definite method on production and that there was no emphasis on cooking time. Storing period is the important factor accounting for the differences and similarities as well.

The results of the fat analysis conducted on the 0, 7th and the 14th day showed differences (p>0,05) (Table 1). As of the last day of storage, the values of fat of the samples were found to be acceptable for release on the market. In the similar studies on hosmerim, the fat values were found to be the following; in the Evyapan's (1995) study it was 0,50, in Kurultay et al (2005) study it was between 12,13 and 16,25, in Şahan et al (2006) study it was 1,23, in Can's (2007) study it was 14,9 in Aydin et al (2008) it was 0,46, and in Savaş et al (2009) study it was between 11,3 and 11,5. The values of fat in this study were higher than the values of fat in all of the previous studies. The most probable reason behind the high values of fat in the samples is that the milk used for manufacturing the desserts was not analyzed and standardized. As far as the similar studies are concerned, it stands concluded that either now knowing the origin of the milk or using unprocessed milk or cheese in the desserts' production process caused the differences in evaluation.

The analysis conducted on the 0, 7th and the 14th day showed similarities in the values of acidity of the samples (p>0,05) (Table 1). As of the last day of storage, the values of acidity of the samples were found to be acceptable for consuming on the market. When compared with other studies, the acidity values of the samples were lower compared to the results of studies conducted by Kurultay et al (2008), 0,22;0,28, Şahan et al (2006) 0,14 and Savaş (2011) 0,21;0,23. The acidity value of this study was similar to the value obtained by Can (2007). The reasons behind the differences and similarities are that the amount of semolina used to manufacture desserts varied and that the origin of the starter cultures was unknown.

There were meaningful differences in the textural values of hosmerim samples on days 0, 7th and 14th. The desserts produced from goat, sheep, and cow showed differences between the groups of desserts (Table 1 p<0,05; p<0,01; p<0,001). As of the last day of storage, it was concluded that despite the fact that textural values of the samples were satisfactory in the first days for submitting on the market, in the subsequent days the samples did not have satisfactory textural values for the market. The values obtained in this study are similar to the values obtained by Savaş (2011) on the days 7 and 14 of the storage, Although the exact time of analysis was not reported, that the samples in the study of Savaş (2011) might be analyzed on the days 7 and 14. The textural values of the cheese halva desserts made by Ünal (2011) over cheese halva desserts showed values between 4,22 and 12,02. Compared with this study, Ünal's (2011) obtained values on the day 0 for the dessert samples produced from sheep cheese and the values obtained on the day 7 for the dessert samples produced from goat and sheep cheese were similar. In addition to that, the obtained values on the day 14 for the dessert samples produced from goat and sheep cheeses were similar with this study.

The panel evaluated the sensory properties of the hosmerim produced from goat, sheep and cow cheeses, this research concluded that there were differences on the days 0, 7 and 14 (p<0,001) within the groups, and no differences from statistical stand point among the groups on days 0 and 7 (p<0,001) No differences in the sensory values were detected on day 14 (Table 2). It can be understood from the results that the hosmerim desserts produced from cow cheese have the highest average points, the hosmerim desserts produced from goat cheese have slightly lower average points, while the hosmerim desserts produced from the sheep have the lowest average points. The most significant factor for this outcome is that the cow milk is used widely in the society, consequently, people are more used to it compared to the other types of milk. Can (2007) has found the average value of 16,94 in the hosmerim desserts that were produced using the cheeses made by using the different starter culture. This study's results were very low overall and showed no similarities to the previously mentioned values.

Savaş (2011) - used 10 panelists to analyze the sensory properties of the hosmerim desserts, evaluating the color, smell, taste, and presentation on the scale from 1-9. At the end of the study, the maximum value was determined to be 31,43 whereas the minimum value has been 26,21. If we compare these values with our study, we can see the similarities between the results. The differences may stem from the fact that the researchers might have used different ingredients. In a similar study conducted over cheese halva desserts, Demir (2005) evaluated the properties of smell and taste of desserts stored in the room temperature and in the refrigerator. As for the desserts stored in the room temperature, the aforementioned average values ranged between 4,71 and 6,35 whereas the average values of desserts stored in the refrigerator ranged between 4,40 and 6,40. The result of the study stated that semolina should be used in the cheese halva desserts that will be consumed in short period, while flour should be used if the desserts will have the long duration. Besides, it stated that it should be mandatory that either sheep or cow cheese are used in manufacturing process of the dessert. Ünal (2011) - used 6 panelists were analyzing the properties of the hosmerim desserts, evaluating the structure, color, taste, and smell on the scale from 1-5 points. The average values of the evaluation ranged between 14,10 and 19,30. If the values are compared, a partial similarity could be seen. However, it was detected that the cheese halva dessert had unusually high values. The reason behind this is that the society is consuming cow cheese more compared to the others, therefore people are more accustomed to it.

According to the microbiological aspect of the hosmerim desserts it was obderved that there were no microorganisms present in the Hosmerim desserts. It has been noticed that there are insufficient amount of studies on microbiological quality of hosmerim desserts such as *E. coli*, Salmonella spp. and Listeria monocytogenes.

The desserts samples were analyzed with regards to total mesophilic aerobic bacteria, Coagulase (+) Staphylococcus, coliform group bacteria, yeast-mold, *E. coli*, Salmonella spp. and Listeria monocytogenes. The results of the microbiological analysis showed no presence of in hosmerim desserts. If the previously studies are considered, only a few researches were done with regards to S. aureus *E. coli*, Salmonella spp. and Listeria monocytogenes.

Çokal et al (2012) have reported that 64% out of the 200 samples were exposed to the contamination by S. aureus. The level of contamination was from 1.0 to 3.3 log 10 kob/g. They claimed that the contamination of the samples by S. aureus in certain time periods are tools, equipment, workers and the environment. Evyapan (1995) determined the number of microorganisms in the coliform group as 5.2x101 log10 kob/g and that of yeast-mold as Kurultay et al. (1999) 1.8x103 and Demirel et al (2005) 2.8x103 log10 kob/g.

Çokal et al (2012)reported that L. monocytogenes were detected in 6 of 200 hosmerim desserts samples. They claimed that contamination by L. monocytogenes might be occurred both during the processes of obtaining cheese from milk and the processing of cheese.

Aydın et al (2008) reported that Salmonella spp was not detected in any of the examined samples in their studies. Likewise, Çokal et al (2012) did not found any contamination by Salmonella spp. in any of examined samples in their study.

The results of this study are the same as the results of the aforementioned studies. In general, the analysis was able to identify microorganisms at certain levels in the large majority of the samples which were collected from the markets by researchers. The contamination of *E. coli* was not detected as well. The TMAB evaluation conducted by Şahan et al (2006) had the values 1.8x102 and 3.2x103 kob Microorganisms in hosmerim samples is mainly linked to the failure to comply with hygiene rules during the production of desserts and the exposure to contamination during the storing and selling processes.

Conclusions

As it is clear from this research, the hosmerim desserts can be preserved microbiologically and chemically for 14 days and sensorially for 7 days after production, if the production is performed under standard conditions and packaging is done with appropriate materials. Since there is no specific standard of hosmerim sweetness today, regional differences seen arise from the production method. Provided that the original taste and appearance of the desserts are maintained, a lot of researches that would attempt to standardize the hygienic quality and the method of production would be done/documented and would certainly be valuable contribution. The most important factor for the recognition of a product in the world is that it has a standardized recipe and method of production. Hosmerim is not a very diverse product, so using different presentation techniques would expand its (has standard quality characteristics) marketing potential tremendously.

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References

AOAC 1995. Official Methods of Analysis of the Association of Official Analytical Chemistry.

16th Edn, Washington/USA, 1141.

Aydın, A, Aksu H, Gunsen U, Mercan T, Taskanal N, 2008. Occurrence of aflatoxins in Turkishdesserts: cheese helva and hosmerim. NCBI, 59, 16-19.

Balıkçı U, Korel F, Ömeroglu S. 2004. Hosmerim, traditional turkish dessert. International Dairy Symposium Proceedings, 24-28 Mayıs, Isparta, 327-329.

Can S, 2007. Farklı starter kültürlerin ilavesi ile elde edilen telemenin höşmerim kalitesine olan etkisinin belirlenmesi üzerine bir araştırma. Yüksek Lisans Tezi. Trakya Üniversitesi Gıda Mühendisliği Bölümü, Tekirdağ.

Cemeroğlu BS, 2013. Gıda analizleri, 3. Baskı, Ankara, Bizim Grup Basımevi, ISBN: 978-605-63419, 3-9.

Cengiz Ö, 2006. Farklı oranlarda lor peyniri ve eritme tuzu ilavesiyle hazırlanan tekirdağ peynir helvalarının çeşitli özelliklerinin belirlenmesi üzerine bir araştırma. Yüksek Lisans Tezi. Trakya Üniversitesi Gıda Mühendisliği Bölümü, Tekirdağ.

Çokal Y, Dağdelen A, Cenet O, GunsenU, 2012. Presence of L. monocytogenes and some bacterial pathogens in two Turkish traditional foods, mihalic cheese and höşmerim dessert. EFFOST, 26, 337-340.

De Wijk RA, VanGemert LJ, Terpstra MEJ, Wilkinson CL, 2003. Texture of semi-solids; sensory and instrumental measurements on vanilla custard desserts. NCBI, 14, 305-317.

Demir H, 2005. Peynir helvası üretiminde reçete geliştirilmesi üzerine araştırmalar. Doktora Tezi, Çanakkale Onsekiz Mart Üniversitesi Fen Bilimleri Enstitüsü, Çanakkale

Demirel N, Doyuran DS, Gultekin M, Guven S, 2005. Microbiological and chemical properties of cheese helva sold in Canakkale. InProceedings of 1st International Food and Nutrition Congress, p. 19, 15-16 June, Istanbul/Turkey.

Ertaş N,Gönülalan Z, Yıldırım Y, Kum E, 2010. Detection of staphylococcus aureus enterotoxins in sheep cheese and dairy dessert by multiplex PCR tecnique. ICFMH, 142, 74-77.

Evyapan Ö, 1995. Balıkesir yöresi höşmerimleri ile Tekirdağ yöresi peynir helvalarının fiziksel kimyasal ve mikrobiyolojik özellikleri üzerine biraraştırma. Yüksek Lisans Tezi, Tekirdağ Üniversitesi Gıda Mühendisliği Bölümü, Tekirdağ.

Food and Drug Administration (FDA) BAM, 2001. Bacteriological analytical manual, Aerobic plate count, Chapter 3, January 2001 edition.

Halıcı N, 2014. Mevlevi mutfağı, 1. Baskı, İstanbul, Metro Kültür Yayınları-1.

Hitchins AD, Hartman PA, Todd ECD, 1992. Coliforms-Escherichа Coli and its toxins In: compendium of the methods fort microbiological examinations of foods. APHA, 325-367.

ISO International Organization for Standardization 21527-1:2008, 2008. Microbiology of food and animal feding stuffs-Horizontal method for the enumeration of yeast sand moulds-Part 1: Colony count technique in products with water activity greater than 0.95.

ISO International Organization for Standardization 6582-1 6888-1, 2001. ''Microbiological of food and animal feding stuffs-Horizontal method fort heenumeration of coagulase Positive staphylococci (Staphylococcus aureus and other species) Part 1: Technique using Baird-Parker agar medium'', 90.93:11.

ISO International Organization for Standardization11290-1, 2004. Gıda ve yem maddelerinin mikrobiyolojisi- Listeria monocytogenes'in aranması ve sayımı metodu, bölüm 1: arama metodu.

ISO International OrganizationforStandardization6579, 2005. Gıda ve yem maddelerinin mikrobiyolojisi- Salmonella türlerinin belirlenmesi için yatay yöntem.

Kurultay S, 2005. Tekirdağ peynir helvası (Höşmerim) üretiminde eritme tuzu kullanım olanaklarının araştırılması.

Trakya Üniversitesi Bilimsel Araştırma Projeleri (TÜBAP 485), Edirne.

Kurultay Ş, Öksüz Ö, Kaptan B, 2008. Proving of cheese halva (Hosmerim) manufacturing process. International Journal of DairyTechnology, 62, 63-67.

Lambooij E, Potgieter CM, Britz CM, Nortjé GL, Pieterse C, 1999. Effects of electrical and mechanical stunning methods on meat quality in ostriches. Meat Science, 52, 331-337.

Mleko S, 1997. Rheological properties of milk and whey protein desserts. Milch wissen schaft, 52, 262-265.

Rapaille A,Vanhemelrijck J, 1992. Milk based desserts. In: The technology of dairy products, R. Early, Ed., Glascow, Blackie and Son Ltd, p. 221-246.

Röhrle FT, Moloney AP, Osorio MT, Luciano G, Priolo A, Caplan P, Monahan FJ, 2011. Carotenoid, colour and reflectance measurements in bovineadipo set issue to discriminate between beef from different feeding system. Meat Science, 88, 347-353.

Savas E, Tavşanlı H, Gökgözoğlu İ, 2009. Ticari höşmerim üretiminde tekstürel yapının iyileştirilmesi. Pamukkale Süt ve Süt Ürünleri Sempozyumu, 21-23 Mayıs, Denizli.

Savas E, 2011. The Effects of Hydrocolloid and Emulsifier Usage on Chemical Composition and Sensory Quality of Turkish Cheese Dessert: Hosmerim. Journal of Food Science and Engineering, 1, 207-213.

Şahan Y, Yiğit A, İrkin R, Korukoğlu M, 2006. Höşmerim tatlısının kimyasal ve mikrobiyolojik özelliklerinin belirlenmesi. Türkiye 9. Gıda Kongresi, 24-25 Mayıs, Bolu.

Şanlıer N, Cömert M, Özkaya Durlu F, 2008. Türk Mutfagındaki Geleneksel Tatlı ve Helvaları Gençlerin Tanıma Durumu. Türkiye 10. Gıda Kongresi; 21-23 Mayıs 2008, Erzurum.

Tarrega A, Duran L, Costell E, 2004. Flow behaviour of semi-solid dairy desserts effect of temperature. Int. Dairy J., 14, 345-353.

Taş M, 2004. Farklı ph ve yağ oranlarına sahip telemeden yapılan höşmerimin fiziksel, kimyasal ve mikrobiyolojik özelliklerinin belirlenmesi üzerine bir araştırma. Yüksek Lisans Tezi, Tekirdağ Üniversitesi Fen Bilimleri Enstitüsü Gıda Mühendisliği Anabilim Dalı, Edirne.

Tekinşen OC, 2000. Süt ürünleri teknolojisi, üçüncü baskı, Konya, Selçuk Üniversitesi Basımevi.

Tekinşen OC, Atasever M, Keleş A, Tekinşen KK, 2002. Süt, yoğurt, tereyağı, peynir üretim kontrol, birinci baskı, Konya, Selçuk Üniversitesi Basımevi, ISBN: 975-448-123-3.

Todd ECD, Jarvıs GA, Weıss KF, Rıedel GF, 1983. Microbiological Quality of Frozen Cream-Type Pies Sold in Canada. Journal of Food Protection, 46, 34-40.

Ünal D, 2011. Farklı oranlarda laktitol ve sakkaroz ilavesiyle hazırlanan tekidağ peynir helvalarının bazı özelliklerinin belirlenmesi. Yüksek Lisans Tezi, Tekirdağ Üniversitesi gıda mühendisliği anabilim dalı, Tekirdağ.

Ünsal A, 2003. Süt uyuyunca Türkiye peynirleri, Birinci Basım, İstanbul,. Yapı Kredi Yayınları, s.221.