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Determining the Effectiveness of Some Plant Extracts in Prolonging the Storage Life of Soft Cheese

ABSTRACT

The current study aims to manufacture edible gelatin membranes with added vegetable alcohol extracts of thyme and green tea, noting the inhibition of negative e bacteria. Escherichia Coli and the positive pigment of staphylococcus aureus at concentration (0.100, 0.250, 0.500, 0.750, 1.000 mg). In addition to determining the effect of alcoholic plant extracts on the micro-content of soft cheese stored for 14 days and at a temperature of 7°C. Where microbial changes were observed through which 4 transactions of soft cheese were used and the treatment (T1) soft cheese was treated (T2) soft cheese wrapped in gelato membranes (T3) soft cheese coated with gluten membranes added to the green alcohol extract (T4) Soft cheese coated with gelatin membranes added to it alcohol thyme extract, the results of the experiment indicated changes where the total number of bacteria reached the end of the storage period of the treatment T1 55×10^5 T2 76×10^5 T3 77×10^5 T4 79×10^5, while the preparation of proteolytic bacteria to the end of the storage period was for the treatment T1 44×10^5 T3 40×10^5 and T4 32×10^5 while T2 gave low results The lipolytic bacteria gave low results for T1and T3 transactions compared to T2 and T4 transactions, while yeasts and rot to the end of the storage period for the T1 and T3 transactions gave low results compared to T2 and T4 transactions. Cheese packaging transactions have prolonged the storage life and reflected the results of the sensory evaluation of the packaged transactions compared to the uncoated transaction and we observed the superiority of the coated cheese by obtaining higher grades during the storage period.

INTRODUCTION

A medical plant is one or more of its parts that contain one or more chemicals, with fewer or more concentrations, and can treat a disease or more or reduce the symptoms of infection if it is based on this plant either in its natural form or through chemicals. The researcher Dragendroff has explained in his definition of the medicinal plant that everything of a plant origin is used medically, it is a medical plant and this refractory includes the kingdom of the prophet and does not exclude the lowest species to the most sophisticated and complex (Parra, 2006). He also explained (Hayaloglu and Farkye, 2011) There are many plants added to the product either softly or dryly or extracts for those plants for the purpose of adding the desired flavor to the product as well as its inhibition effectiveness towards microbiology and giving distinctive colors to the product to attract the consumer. Fadel (2013) explained the use of many medicinal plants such as mint, thyme, scholars and pond bead for the purpose of prolonging the storage period and reducing the number of microscopic neighborhoods found in cheese and giving a distinctive flavor to cheese, he found the

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ability to inhibit the total number of bacteria found in cheese, including colon bacteria, and the addition of plants in the form of water extracts to milk prepared for cheese.

Thyme is one of the medicinal plants it is an herbal plant used as a drink instead of tea or with tea and added to some foods to give it an acceptable flavor (Delwing et al , 2016). The thyme plant has been used since ancient times to add flavor to cheese (Akarca et al., 2016).

Camellia sinensis is an antioxidant herbal plant with abundant health benefits and is also considered one of the most popular beverages in the world mostly due to potential health care (Delwing et al, 2016). Green tea extract has recently been used as a natural additive for food, especially cheese (Senanayake, 2013).

Materials and Ways of Working

Preparation of Alcoholic Extracts

The alcoholic extract of thyme and green tea was prepared according to the method mentioned (Chan et al., 2007) by weighing 100 gm of powder for each of the thyme and green tea vegetables were and soaked in 250 ml of ethyl alcohol in a 500 ml volumetric flask. Then the mixture was continuously shaked for 24 hours, then filtered using an eight-layer scourer cloth, the extract was centrifuged at 5,000 rpm for 10 minutes, and the resulting filtrate was collected in a glass flask. The solvent was then evaporated at room temperature to obtain the extracts for both plants. The mixture was filtered and centrifuged, then evaporated using a water bath at a temperature of 60 ° C to obtain the extracted powder for both plants.

Preparation of Gelatin Membranes

Attended the gelatin membrane according to the method (Carvalho and Grosso , 2004) by dissolving 10 g of gelatin in 80 ml distilled water , then mixing for 5 min and the solution was shaked to the extent of the dissolving using the magneting stirrer with the hot plate for a period of 15 minutes and then heat the mixture at 60°C for 15 minutes with stirring and then add the glycerol by 3% of the dry weight of the gelatin and complete the volume to 100 ml by distilled water and adjust the pH to 7. The plant extracts were then added with the desired concentration to the solution prepared from gelatin membrane powder.

Making Iraqi Soft Cheeses

The soft cheese was made using the steps according to the method mentioned (Fox et al., 2017). The cow milk obtained from one of the milk suppliers in Salah El-Din Governorate was pasteurized at 63 ° C for 30 minutes and after cooling to 35 degrees ± 1 ° C, rennet was added to it and left for a period 45 minutes until the stage cowardice was reached, after which the curd was cut to get rid of the whey and add 2.5% salt and put the curd in a damp cloth to get rid of the largest amount of whey. The curd was packed in special molds for each sample. Then the samples were labeled and kept in the refrigerator for microbial testing after 1, 7and 14 days of storage.

Packaging Soft Cheese with Membranes

The cheese samples were cut in a rectangular shape with a weight of 50 g for the sample to ensure that the cheese were completely contained and encapsulated with gelatin films. The treatments T2 were cheese treatment coated with gelatin and T3 cheese coated with gelatin and supported with alcoholic green tea extract, T4 cheese treatment coated with gelatin supplemented with alcoholic thyme extract, while T1 was the control sample which was not coated, samples were left at a refrigerator temperature of 7 ° C ± 1 until the coating hardened on the cheese surface after turning occasionally. Then it was stored by refrigeration at 7°C±1 until tests were conducted on it and according to the suggested time period.

Conducting Macro-genetic Tests of Soft Cheese

The total number of developing bacteria as well as the number of yeasts and fodder were calculated according to the method (Frank and Yousef, 2004). While the protein-analyzed bacteria and fat-analyzed were estimated using the method mentioned in (Harrigan, and McCance, 1976).

Statistical Analysis

The data were statistically analyzed through the testing system within the ready statistical program (sas , 2012) and using the full random design system CRD as the averages were selected

by the Duncan test (Dancan, 1955)multi-range to determine the moral differences between the averages of factors affecting the factors studied at the level(P<0.05).

Results and Discussion

Estimating Total Bacterial Numbers Contaminated with Cheese:

The results are illustrated in table (1) microbial tests that included the preparation of total bacteria, these tests were carried out for a period of 14 days and at a temperature of (5±2)ºC on samples of soft cheese coated with gelatin membranes or gelatin membranes added to the extract alcoholic plants and compare them with the control sample of soft, uncoated cheese, the results indicate the high number of total bacteria of cheese due to the nature of cheese manufacturing, as it depends on the use of the initiator for the purpose of obtaining acid cheese, which in turn raises the total number of bacteria (Al-Bayer, 1980) . The results indicated that the preparation of bacteria at the beginning of the storage period for the treatment T1 at the time of zero was at 100×10^5 which is the highest percentage in the number of bacteria compared to the rest of the transactions coated with gelatin membranes and supported by the alcoholic plant extracts T2, T3, T4 where the number of bacteria was 27×10^5, 14×10^5 and 8×10^5 respectively. As the storage process continued for the 14th day, we noticed a gradual increase in total bacterial numbers of T2, T3, T4, 76×10^5, 77×10^5 and 79×10^5 compared to the T1 control sample, where there was a decrease in bacterial content at 55×10^5.

Table (1) The Effect of Different Transactions on The Total Number of Bacterium Coated with Gelatin Membranes

Transactions	Storage time at 5±2 ℃		
	1 day	7 days	14 days
T1	$100\ cfu \times 10^5$	$43\ cfu \times 10^5$	$55\ cfu \times 10^5$
T2	$27\ cfu \times 10^5$	$40\ cfu \times 10^5$	$76 cfu \times 10^5$
T3	$14 cfu \times 10^5$	$21 cfu \times 10^5$	$77\ cfu \times 10^5$
T4	$8\ cfu \times 10^5$	$80\ cfu \times 10^5$	$79 cfu \times 10^5$

T1 soft, unwrapped cheese, T2 cheese + gelatin, T3 gelatin + green tea extract, T4 cheese + thyme extract.

Proteolytic bacteria

The results in the table showed growth in all transactions and a rise in the number of bacteria analyzed protein at zero time, it was found that the proteolytic bacteria for T2, T3, T4 were 85×10^5, 105×10^5, 17×10^5 it was less than its number in the non-laminated T1 treatment at 240×10^5 due to the low number of bacteria analyzed for protein to new environmental conditions that were formed by the process of packaging and the effect of anti-organism factors. (Ramos et al., 2012) Also, the gelatin covers treatment of anti-microbiology substances was also the effect of the air microbiology on the surface of the cheese, i.e. the protein-analyzed bacteria have continued to be active due to anti-organisms that are unable to migrate within the cheese mold and remain confined to the organisms on the surface of the cheese and thus prevent the development of these organisms, thus preventing the survival of the activity of internal micro-organisms based on the internal conditions of water and oxygen activity, for this increased activity of the organisms analyzed by the air compared to the bacteria (Silveira et al ., 2007) As the storage process continued to 7 days, it was found that the protein-analyzed bacteria in transactions, T3, T2, T1, began to decline at growth rates of 122×10^5, 70×10^5 and 33×10^5, while the T4 transaction gave an increase in the growth rate and was at $2\ 2 \times 10^5$ a bacterial cell respectively, and with the continuation of the process storage process for the 14 days we note the decrease of bacteria growth for T1, T2and by a rate of 44×10^5 , 6×10^5, unlike T3, T4 gave an increased growth of protein-analyzed bacteria. Henriques et al. (2003) also confirmed that the bacteria analyzed by the protein negative of the pigment of gram were higher resistance than the rest of the types of bacteria pathological and positive to the dye of gram because the difference of resistance to these two groups of bacteria is due to the different composition and construction of the cellular walls for them.

Table (2) The Effect of Different Transactions on The Preparation of proteolytic bacteria for Cheese Samples Coated with gelatin

Transactions	Storage time at 5±2℃		
	1 day	7 days	14 days
T1	$240cfu \times 10^5$	$122cfu \times 10^5$	$44cfu \times 10^5$
T2	$85cfu \times 10^5$	$70\ cfu \times 10^5$	$6\ cfu \times 10^5$
T3	$105\ cfu \times 10^5$	$33cfu \times 10^5$	$40\ cfu \times 10^5$
T4	$17\ cfu \times 10^5$	$22\ cfu \times 10^5$	$32cfu \times 10^5$

T1 soft, unwrapped cheese, T2 cheese + gelatin, T3 gelatin + green tea extract, T4 cheese + thyme extract.

lipolytic bacteria

The results in table (3) showed that the bacteria analyzed fat did not notice their growth in the transactions T2, T3at the beginning of the zero storage time, the treatment T1 showed an increase in the number of bacteria analyzed for fat and was at $21 \times 10^5$the treatment T4 was at 2 ×, 10^5 and the decrease in the number of bacteria analyzed in fat for coated cheeses is due to the process of living in the micro-micro-multiplication (Ramos et al., 2012) As the storage continued at the time of 7 days, the growth of bacteria was observed at the same transactions and was at 4× 10^5. 2× 10^5 respectively, and with the storage continued at the time of 14 days the number of lipolytic bacteria for the treatment T1 increased and was 10× 10^5, T3 also increased and was at 4× 10^5,while the T2,T4 treated gave zero results respectively. The reason for the presence of a number of fat-analyzing bacteria can be due to the high lipid content resulting from the low moisture content as well as the change in cheese samples during storage.

Table (3) The Effect of Different Transactions on The Preparation of lipolytic bacteria for Cheese Samples Coated with gelatin

Transactions	Storage time at 5±2℃		
	1 day	7 days	14 days
T1	$21\ cfu \times 10^5$	$4cfu \times 10^5$	$10cfu \times 10^5$
T2	0	0	0
T3	0	0	$4\ cfu \times 10^5$
T4	$2cfu \times 10^5$	$2cfu \times 10^5$	0

T1 soft, unwrapped cheese, T2 cheese + gelatin, T3 gelatin + green tea extract, T4 cheese + thyme extract

Yeasts and Rot

It is possible to be found in dairy products by pollution, especially after the pasteurization process because the procedure of pasteurization itself is a determinant of the presence of this type of microbiology, and that this group of organisms, which can lead to the degradation of protein and paint, which is usually accompanied by the production of substances affecting the taste and flavor of soft cheese, which is from the tests, which is from the tests The results of table 4 showed that there was no growth of yeasts and rot in all transactions at the beginning of the zero-time storage period except for the T3 transaction, which gave growth of 1 C.F.U/g. Also, at the time of 7 days no growth of yeasts and rot was observed in all transactions, and with the continuation of the process of storing cheese samples up to the end of the storage period 14 days it was observed that there was growth of yeasts and rot for each of the samples T1, T3 with the number of 1 C.F.U/ g for each of the two transactions, while the T2, T4 did not give any growth throughout the storage period. The difference in the number of yeasts and fodder is due to the fact that the packaging process contributes to preventing the proliferation of fodder and yeasts by preventing the entry of oxygen, which has a significant effect on the breathing process on the one hand and the appropriate water activity of these neighborhoods on the other, leading to prolonged adaptation. (Torres et al., 1985) These results are a close approach to Hamid, (2004) which indicated that the number of fodder and yeasts for soft cheese added to a preservative on the seventh day reached 2.3*10^2colony formation units /gram.

Table (4) The Effect of Different Transactions on The Preparation of Yeasts and Fodder for Cheese Samples Coated with gelatin

Transactions	Storage time at 5±2℃		
	1 day	7 days	14 days
T1	0	0	$1\ cfu \times 10^5$
T2	0	0	0
T3	$1\ cfu \times 10^5$	0	$1cfu \times 10^5$
T4	0	0	0

T1 soft, unwrapped cheese, T2 cheese + gelatin, T3 gelatin + green tea extract, T4 cheese + thyme extract

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تحديد فاعلية بعض المستخلصات النباتية في اطالة العمر الخزني للجبن الطري

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الكلمات المفتاحية:
مستخلصات نباتية كحولية من الزعتر والشاي الاخضر , اغشية جيلاتينية قابلة للاكل , جبن طري , محتوى مايكروبي

الخلاصة

هدفت دراسة البحث الحالي الى تصنيع اغشية جيلاتينية قابلة للأكل مضاف لها مستخلصات نباتية كحولية من الزعتر والشاي الاخضر مع ملاحظة تثبيط البكتريا السالبة *E. Coli* والموجبة لصبغة كرام *Staphylococcus aureus* عند تركيز(0.100 , 0.250 , 0.500 , 0.750 ملغم , 1.000 ملغم) . بالإضافة الى تحديد تأثير المستخلصات النباتية الكحولية على المحتوى المايكروبي للجبن الطري المخزون لمدة 14 يوم وبدرجة حرارة 7 °م . حيث تمت ملاحظة التغيرات الميكروبية والتي تم من خلالها استعمال 4 معاملات من الجبن الطري وكانت المعاملة (T1) جبن طري غير مغلف ومعاملة (T2) جبن طري مغلف بأغشية الجيلاتين (T3) جبن طري مغلف بأغشية الجلاتين مضاف له مستخلص الشاي الاخضر الكحولي (T4) جبن طري مغلف بأغشية الجيلاتين مضاف له مستخلص الزعتر الكحولي ,اشارت نتائج التجربة الى وجود تغيرات حيث بلغ العدد الكلي للبكتريا الى نهاية فترة الخزن للمعاملة T1 55 × 10^5 T2 76 × 10^5 T3 77 × 10^5 T4 79 × 10^5, بينما كانت اعداد البكتريا المحللة للبروتين الى نهاية فترة الخزن بلغت للمعاملة T1 44× 10^5 و T3 40 × 10^5 و T4 32 × 10^5 بينما T2 اعطت نتائج منخفضة , , اما البكتريا المحللة للدهن اعطت نتائج منخفضة للمعاملات T1 و T3 مقارنة بالمعاملتين T2 و T4 لم تعطي اي نتائج الى نهاية فترة الخزن , , بينما اعطت الخمائر والاعفان الى نهاية فترة الخزن للمعاملة T1 و T3 نتائج منخفضة مقارنة مع المعاملتين T2 و T4 لم تعطي اي نتائج. قد ادت معاملات تغليف الجبن الى اطالة العمر الخزني وعكست نتائج التقييم الحسي للمعاملات المغلفة مقارنة مع المعاملة غير المغلفة ولاحظنا تفوق الجبن المغلف بحصوله على درجات اعلى خلال مدة الخزن .