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THE USE OF MACRO LAMENT OF ALGINATE AND ROSEMARY IN MONTEREY CHEESE COATING

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Abstract

Five-layer nanoparticles were prepared using layer by layer-LBL technique using two solvents, the sodium alginate and the other antimicrobial agent, the rosemary extract, to estimate the effectiveness of the antimicrobial extract. The halo diameter was estimated on a petri dish containing on the positive or the negative bacteria and *Aspergillus niger* and *Fusarium*. The results showed that the concentration of 0.2% of the rosemary extract showed an inhibitory effect against these microorganisms. The thickness of the alginate and rosemary coating was 26.02 microns, zeta potent ion for the alginate solution was 28.49 mV at pH 7 and for the rosemary extract was 24.53 mV at pH = 3.8, the WVP permeability values for the charged PET were 29,091 g.m^2/24h) and for the PET charged and coated by alginate and rosemary extract 58.182 g.m^2/24h). The OTR for the charged PET was 14.78 ml / m^2.day) and for the charged PET and coated with alginate and rosemary extract 23.64ml / m^2.day). Three treatments were made of Monterey cheese, the first treatment was coated with paraffin wax (M1), the second was coated with gelatin (M2) and the third was coated with sodium alginate and rosemary extract (M3). The results showed a significant decrease in lost moisture content and corrective acidity for the M3 and evolution in ADV values with the duration of repining. The presence of the rosemary extract was determined from the microbiological growth of the treatment (M3), making it superior in the sensory characteristics of the comparison treatments.

Introduction

The Layer by Layer (LBL) technique, consisting of electrostatic self-assembled layers on the surface of the material, is the technology used in the manufacture of nanoparticles and microcircuits and has been applied in diverse fields such as biomedicine and food processing. Bertuzzi and Salvutsky (2017), the microcosm consists of two or more layers of materials with nanoparticles or microspheres with some chemical or physical bonds that improve the water retention properties of an embryo that enters the manufacture of edible coatings to protect food against microbial damage, taking into account the functional properties of the functional envelope Water content LBL layer is applied as a suitable method for obtaining a thin film of natural polymers. The material is used for the consumption of packaging used in food packaging, which must be electrostatic charged with important functional properties such as antibiotics, antioxidants, functional gas loading properties (Medrios *et al*., 2010), the use of micro coatings for food packaging was tested on fruits (Medrios *et al*., 2012). It was never used on processed cheese, which is a complex food product consisting mainly of water, wide consumption, and recently Ka One of the challenges in the field of edible packaging is the use of layer-by-layer technology to overcome some problems related to the permeability of high water vapor and the poor mechanical properties of the edible coatings compared to those manufactured from synthetic materials. Some of the benefits of using these thin sheets are that they are stable high on the material surface and low concentration of required materials (Neethirajan and Jayasa, 2011).

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Materials and Methods

PET: Poly Ethylene Terephthalate (PET) was obtained from Sigma Aldrich, a German Company with a thickness of 0.005 mm, as a supporting membrane for the solution of its packaging solutions when studying its properties.

Preparation of solutions

Preparation of the rosemary extract: The extraction

process was carried out according to Harbone (1973) and the Korean version (2000).

Preparation of the packaging solutions used in the Monterey cheese packaging: I attended the packaging solutions used in the cheese packaging according to the method described by Carneiro-da-Cunha *et al*., (2010) and modified by us included.

Sodium Alginate Solution: Prepare 0.2% (weight/ volume) to dissolve the sodium gene (equipped with Hi Media Lab) in distilled water and using a magnetic mixer at 200 rpm for two hours at 70°C, then at 20°C for 22 hours, pH of the alginate solution was adjusted to 7 using a NaOH solution (1 molar) and performed with a ultrasonic ultrasonic homogenizer with 80 pulses for 4 minutes and stored in the refrigerator until use.

Solution of plant extract of rosemary: Attended the same method as preparation of the sodium gene solution, but adjusted the pH to 3.8 using lactic acid 1 molar.

Gelatin Solution Solution: Prepare the gelatin solution with a concentration of 10% according to the method mentioned by Al-Janabi (2008).

Measuring the Effectiveness of the Flavonoid Extract of Antibacterial Mountain Hysteria. The Hammer *et al*., (2003).

Measuring the efficacy of flavonoid extract for rosemary antacid by estimating the value of peroxide value in sunflower oil: The process of estimation according to the steps mentioned by Mohammad *et al*., (2015). By adding different concentrations of the ethylene extract of the rosemary 50, 100 (ppm) to 20 ml of the sun flower oil supplied from the local markets, in the air oven at 85°C for 1 day.

Preparation of the coatting: The c was poatting repared for the purpose of describing it in two phases. The first phase included the loading of polymer polyethylene (PET) polyethylene as a supporting membrane for the solution of the packaging solutions when studying its properties. The method was carried out as described by Fu *et al*., (2005) (1:1) for 3 hours, then rinse with distilled water and blow at 30°C for 24 hours and then cover with 0.06g of 1.6 hexandiamine. Propanol at 37°C for 4 hours and after the specified wash period with distilled water to dispose of the above material and dry at 37°C for 24 hours, the charged packaging was treated with 0.1 mL HCl for 3 hours at a temperature of (2×1cm) and immersed in the alginate solution for 15 minutes, then washed with ions-free water and then washed with a large amount of distilled water and dried at 30°C for 24 hours. pH 7 and similar to the pH of the alginate solution and left until dry and then dipped with the solution of the plant extract of the rosemary and for 15 minutes after it was washed with acidic acid water of pH 3.8 and similar to the pH of the flavonoid extract. The process was repeated five times to form five alternating layers (genes-gene extract-gene extract) at 20°C and 50% relative humidity.

Characterization of the envelopes

Fourier Transform spectroscopy (FTIR): The FTIR measurement was carried out at wave lengths of 4000-650 cm -1 to examine the active aggregates of the charged and unpacked PET surfaces of the rosemary plant extract and placed on the lens of the sensitive apparatus at room temperature.

Zeta Potential: Zeta Potential for alginate solutions and the rosemary extract was calculated at the Nanotechnology Research Center at the University of Technology using the Nano book Zeta plus zeta potential analyzer (Bajelan *et al*., 2012).

UV-visible spectrometer: The absorption of UV spectrometry was measured using the optical spectrometer and was used for multi-prepared and absorbent coatings at a wavelength of 260 nm (Sinkowska, 2006).

Water vapor permeability measurement (WVP): WVTR was measured according to the US classification ASTM-E96 (2010) at the Industrial Research and Development Center / National Center for Packaging and Packaging.

OTR (OTR): The oxygen permeability rate of the packaging was tested using the OTR device at the Industrial Research and Development Center / National Packaging and Packaging .

Scanning electron microscopy (SEM): The examined envelope was examined on the 5-layer charged PET surface as well as the non-charged PET surface of the scanner electron microscope at the Nanotechnology Research Center at the University of Technology.

The applied

First: Manufacturing Monterey Cheese: The method mentioned by ALdhan (1983) was adopted in the manufacture of all Monterey cheese.

Second: Coating of Cheeses: The method of dipping was followed to coating the cheeses as follows:

To prepare the treatment 3M, cut the cheese (the weight of the piece 75g) with distilled water and leave to dry for 20 minutes at 25°C, then submerge in the gene solution. The sodium is 15 minutes cold and left to dry for 20 minutes. Which is the same as the pH of the sodium gene solution. It was then submerged with the rosemary solution of pH=3.8. The process was repeated with the

sodium gene solution and the rosemary solution. In the previous conditions, Compared to T1, T2, T1 treatment was used in wrapping paraffin-equipped wax to the dairy company, Abu Ghraib, Baghdad, where the cheese was immersed in dissolved molten wax solution at 118°C for 5 seconds and then removed to dry. Treatment of T2 was wrapped in gelatin envelope. After drying the cheese pieces, the gelatin solution was mixed with stirring between time and time. After the packaging process was completed, the samples were placed in sealed, sterile plastic containers and stored in the refrigerator at 10±2°C for 2 months for the.

Cheese tests

Determination the percentage of moisture lost:

$$\text{Percentage of moisture lost} = \frac{\text{Moisture ratio lost from uncoated cheese - Moisture ratio lost from coated cheese}}{\text{Percentage of moisture lost from uncoated cheese}} \times 100$$

Monterey cheese for chemical, microbial and sensory tests: The method, mentioned by Joslyn (1970) and modified by Egan *et al*., (1985), was used to estimate the percentage of humidity. The percentage of ash was estimated by burning the samples at the Muffle furnace at 550°C for 6 hours or until the weight was stable. (Eckles *et al*., 1997), the pH according to the method described in AOAC (2008) was estimated as the total nitrogen count according to the method described by Joslyn (1970), the soluble nitrogen and non-protein nitrogen (NPN) according to the method described in Ling (1956), the Acid Degree Value (ADV) was estimated in the Bureau of Dairy Industry (BDI) cited by Deeth and Fitz-Gerald 1976).

6-3- Microbiological tests: The method used in APHA (1978), using the Pour plate method, was used to estimate the total count of microorganisms, the number of psycrophilic bacteria, Ecoli. bacteria and the number of molds. To estimate the number of *Staphylococcus aureus*, the method was used in the Blatimore Biological Laboratory (BBL) (1973), the method used in Harrigan and McCence (1976) was used to estimate the count of pritolicatic bacteria. When estimating the count of lipid bacteria, the method used in Harrigan and McCence (1976) was used.

Sensory evaluation of cheese : The sensory evaluation of the Monterey cheese samples from professional evaluators based on the sensory assessment forms derived from the proposals for edible endotracheal applications proposed by Krochta and Johnston-DeMulder (1997) compared to the standard model coated with paraffin wax and gelatin-coated cheese, Notes for paint condition and other qualities.

Statistical Analysis: The Statistical Analysis System (SAS) (2012).

Results and Discussion

Study of some bio activities of plant extract

Effectiveness of antimicrobial antigen: The results showed in table 1, that rosemary had a clear inhibitory effect for all bacteria tested. The diameter of the inhibition halogenated diameter of *E. coli* was 22 mm and for *Enterococcus* ssp. 35 mm, *Staphylococcus aureus* 20 mm, *Pseudomonas aeuroginosa* 13 mm and *Bacillus subtilis* 30 mm. This effect is due to the rosemary extract for containing active compounds such as flavonoids, sapphones, alkaloids and phenols that inhibit the growth of bacteria. The effect of the extract was on the Gram-negative bacteria more than on the Gram-positive bacteria and this is consistent with what it found Weckesser *et al*., (2007) and Celiktas (2007) found that the extract of the rosemary extract had a disincentive effect on the growth of positive and negative Gram-bacteria, but its effect was more pronounced on the Gram-negative bacteria. Based on the above, a concentration of 0.2% for each plant extract was used in the preparation of micronized wrappers by combining them with the same concentration of alginate and using them in the Monterey cheese packaging.

Study of the physical properties of the coating and the polycarbonate solutions of the coating: Table 2 and fig. 1 show the FTIR spectra of the charged PET film only and without addition. The peaks of its position on 1719 and 1249 cm^{-1} and 1103, which are related to the groups of carboxylic ring, the summit, whose location is

Table 1: Effect of rosemary extract on the effectiveness of microorganisms.

LSD	*E. coli*	*Ent. Ssp*	*Ps. aeuro-ginosa*	*S. aur-eus*	*B. sub-tillis*	Peroxide values (mM / kg) Concentration of the extract (ppm)		extract
						50	100	
0.403 NS	22	35	13	20	30	4.75	4.7	rosemary
-	3.79 *	*4.52	*2.00	*4.57	*4.61	*0.773	*0.694	LSD

* P<0.05, (NS)

Table 2: Shows the effort of zeta potential (MV) for plant extracts for rosemary*

Zeta Potential (mV)	Type of solution or extract
-28.49	Alginate solution
24.53	Rosemary extract

* Measurements represent a rate of three readings.

Table 3: The percentage of moisture, fat, protein and pH in the monterey cheese coated with the a thin coating of rosemary extract and alginate during the ripening period of 8 weeks and at 10°C±2.*

%	Storage period (weeks)	Treatments			LSD
		M1	M2	M3	
moisture	0	47.99	47.66	47.41	2.26 NS
	4	44.31	45.00	46.91	2.33 *
	8	42.90	42.04	43.65	2.17 NS
LSD		3.29 *	2.97 *	3.14 *	
fat	0	23.00	24.00	23.50	2.14 NS
	4	25.00	26.00	25.00	1.96 NS
	8	26.50	27.00	27.50	1.63 NS
LSD		2.17 *	2.46 *	2.61 *	
protein	0	25.16	24.00	23.20	1.77 *
	4	26.09	24.39	23.39	1.94 *
	8	26.79	24.50	24.00	1.88 *
LSD		1.74 NS	1.27 NS	1.52 NS	
pH	0	5.17	5.30	5.32	0.673 NS
	4	5.00	5.10	5.10	0.598 NS
	8	5.32	5.20	5.23	0.482 NS

727 cm^{-1}, returns to the aromatic (CH) aroma (Fu and others, 2005 and Mederois and others, 2012). And the extract of rosemary there are two peaks in the site 1246 and 1097 cm^{-1} and the summit, which was designated in 1715 cm^{-1} in the extract of rosemary belonging to the C=O, which is located in the carboxylic group and the top of its location 719 cm1, as well as the appearance of the summit in 1246 cm^{-1} of the bending pattern in O-H in the structure of the hydrogen bonds of the internal molecules and the appearance of two peaks at 2855 and 2923 cm1-indicating the presence of hydroxyl groups (Fig. 2). These results are consistent with those of Anthony *et al*., (2009) and Carneiro-da-Cunha *et al*., (2010). The results are also identical to Alhamd (2015). It is stated that the IR package at 1666.7 cm1 is back to the OH group, C=O and the package at 1000 cm1. Li C-OH The

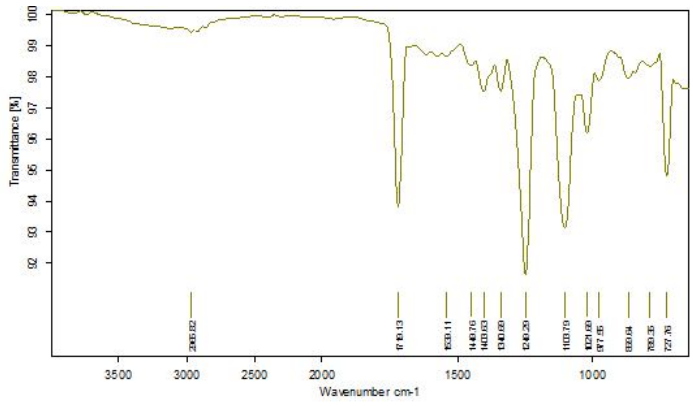

Fig. 1: Analysis of the FTIR infrared spectra of the charged PET.

Table 4: Acid degree value in monterey cheese coated with the a thin coating of rosemary extract and alginate during the ripening period of 8 weeks and at 10°C±2*.

Treatment	ADV			LSD
	0	4	8	
M1	0.71	1.79	2.79	0.844 *
M2	0.80	1.89	3.81	0.793 *
M3	0.70	1.19	1.50	0.694 *
LSD Value	0.398 NS	0.623 *	0.856 *	-

* (P<0.05) NS

package 1600 Sm^{1-} goes back to the C=O group and the package on the 1580 Sm^{1-} back to the amide group.

Determination of Zeta Potential: The zeta potential of the alginate solution was 28.49 mV on pH 7 and for the rosemary extract 24.53 mV at pH = 3.8. The negative zeta potential value through the free carboxyl groups (COOH). The water-loving surfaces depend on the nature of the outer layer and not on the cover of the base material. Usually sedimentation of the layers causes some effect on certain physical properties as well as changes in pH that can significantly affect hydrophilic surface characteristics. These changes can also affect the composition of the membrane itself. The alginate prepared with pH values are high. The results were consistent in terms of charge with what Carneiro-da-Cunha *et al*., (2010) found, table 2.

UV-Vis Absorption: To follow up the combination of the plant-made coating layers with the rosemary on the charged PET surface, the optical spectrometer analysis was performed at a wavelength of 260 nm after each deposition. As the absorption value increases by depositing layer after layer, this confirms successful deposition. As shown in fig. 3, an increase in absorbance is obtained at a wave length of 260 nm by depositing the five layers of alginate and icing on the surface of the supporting charged PET. This increase in absorbance is due to deposition of layers, which allows for more characterization and characterization of these materials (Fu and others, 2005). This is consistent with Carneiro-da-Cunha *et al*., (2010) also Wang (2007) also reported that the increase in the number of layers of the casing caused a significant increase in optical absorption values.

Water vapor permeability WVTR: Fig. 4, shows that the WVP values indicate that the water vapor permeability of the charged PET only (Treatment 1) is 29.091 $g.m^2/24h$) and for the charged PET and coated with alginate and rosemary extract (Treatment 2) 58.182 $g.m^2/24h$), these results are good for a multilayered casing that can depend on self-

Table 5: Percentage of soluble nitrogen and non-protein nitrogen in Monterey cheese coated with micro coating during 8 - week repining period and 10°C±2.

Treatment	Cheese age (week)	SN (%)	SN/TN (%)	NPN (%)	NPN/TN (%)
M1	0	0.263	6.67	0.560	14.21
	4	0.762	18.67	0.63	15.44
	8	0.857	20.40	0.84	20.00
M2	0	0.281	7.47	0.57	15.15
	4	0.781	20.44	0.63	16.49
	8	0.986	25.67	0.77	20.05
M6	0	0.271	7.46	0.72	19.83
	4	0.857	23.41	0.87	23.77
	8	1.014	26.96	0.94	25.00
LSD		0.592*	6.31*	0.338*	3.783*

* (P<0.05)

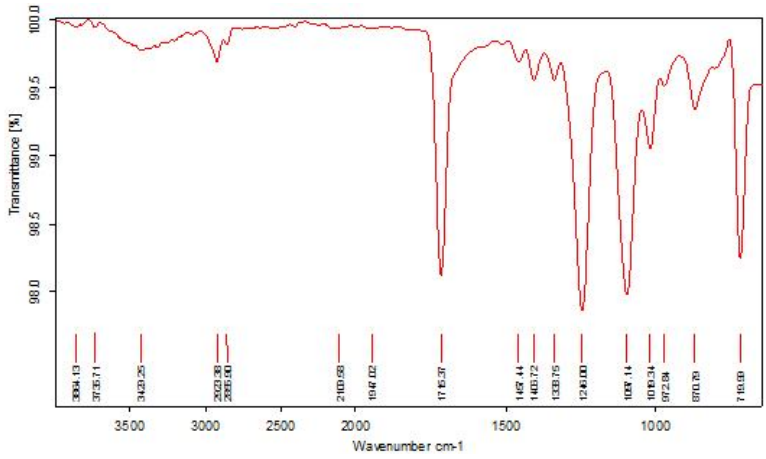

Fig. 2: Analysis of the FTIR spectrum of the PET coating charged and encapsulated with alginate and rosemary

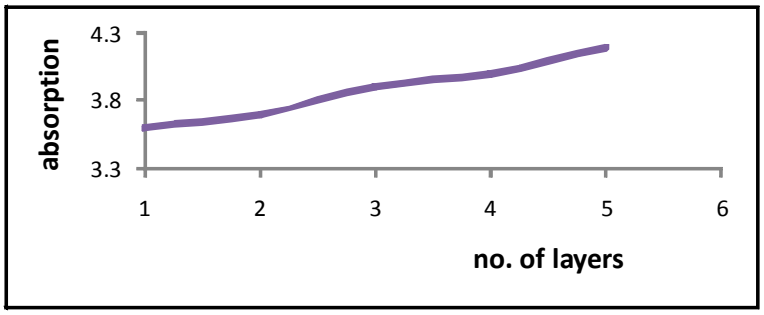

Fig. 3: Spectral absorption of visible UV rays of the rosemary extract.

interference and which is between alginates and layers of solutions that inhibit the growth of microorganisms. Water permeability increases as the atmosphere becomes more correlated to water (Genndios and Weller, 1990), which increases the permeability of water vapor. These values are in agreement with Medeiros *et al*., (2013) as 2.46 × 10-12 and Carneiro-da-Cunha *et al*., (2010).

Treatment 1 = PET only charged.

Treatment 2 = PET charged and coated with alginate and rosemary extract.

Oxygen transfer rate: OTR was obtained for the exact microprocessor as shown in fig. 5, where the charged PET (T1) was 14.78 ml/m^2.day) and for the PET packed and coated with the alginate and the rosemary extract (23.64 ml/m^2.day).

Treatment 1 = PET only charged.

Treatment 2 = PET charged and coated with alginate and rosemary extract.

Microscopic Scanning (SEM): Fig. 6, shows the images of the microscopic electronic survey (SEM) of different spectra of the multi-layer processed films on the surface of the PET by layer-layer (LBL). The envelope consisted of five layers and the rosemary alternately, noting that the layer of genes, which represent the upper surface layer was soft and crystalline as shown in fig. 6, it is also noted from the same form that the atmosphere composed of alginates and rosemary the total fish was 26.02 microns and the results agree with what he found Hui Li *et al*., (2017) and with what Wu and Farnood (2014).

Chemical composition of Monterey cheese

Loss of moisture during storage: Loss of weight through loss of milk cheese resulting in low moisture in cheese (Olivas and Barbosa-Canovas, 2005). Samples of cheese coated with alginate and rosemary extract showed a decrease in weight loss at P<0.05 level from zero to 2 months of Monterey cheese. The results shown in fig. 7, showed a significant decrease in the moisture content lost from cheese models coated with flour (Treated M1) and gelatin (M2). This is due to the fact that edible coatings using multiple sugars and/or proteins reduce the loss of mass of cheese (Medeiros *et al*., 2013) whose results showed a significant decrease weight loss in the samples of the Brazilian 'coalho' cheese and with Martins *et al*., (2010).

- M1= Monterey cheese coated with wax.

- M2= Monterey cheese coated with gelatin envelope.

- M3= Monterey cheese coated by the alginate and rosemary.

Moisture content: The results shown in table 3,

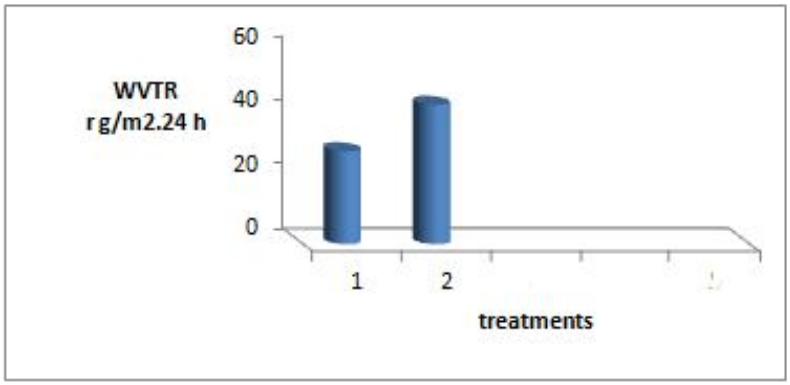

Fig. 4: Water vapor permeability of processed casings (g / m^2.24h)

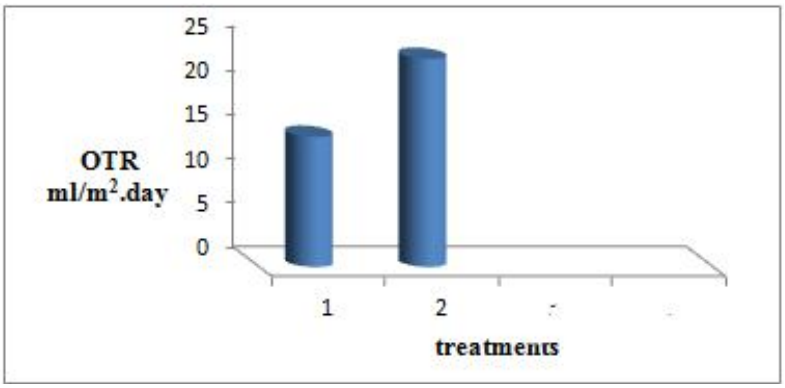

Fig. 5: Oxygen permeability of processed coatings (ml / m^2.day)

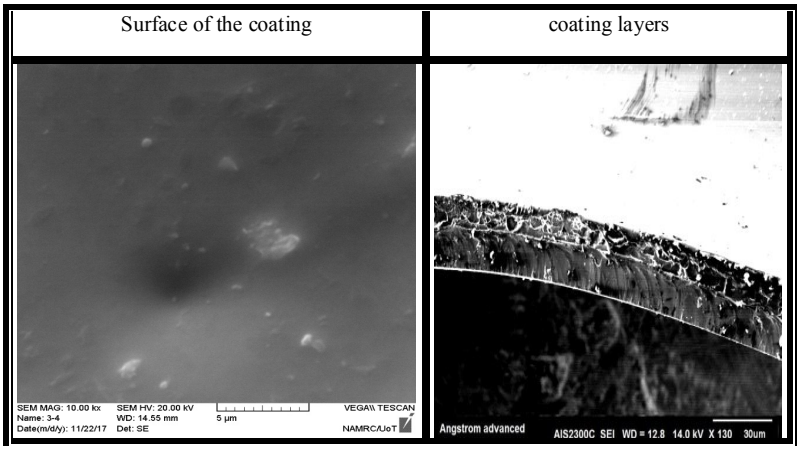

Fig. 6: Scanner electron microscope of PET coated with alginate and rosemary extract.

show the moisture content of the Monterey cheese. The values at the beginning of repining were within the limits of the moisture content set by the Iraqi Standard for Semi-Dry cheeses (1988), between 40-50%. The results showed a decrease in the moisture content values of all the models with the age of ripening. The reason for this decrease is due to evaporation and loss of moisture from the cheese. The relative humidity in the comparison cheese Coated with paraffin wrap and coated with gelatin.

Fat ratio: The readings in table 3, show that the fat ratio in the Monterey cheese treatments was close after the end of the manufacturing process. Increase in the percentage of fat in all the treatments with the progress of the period of repining and this increase is due to the low humidity and when compared with the results of these other researchers found that they are consistent with what found Watkinson *et al.,* (1997), who said that the percentage of fat rose progress. The repining period which is accompanied with a low ratio Moisture in the cheese. It is also noticed that the increase in fat ratio by the repining period of the coated by alginalt and rosemary was less compared to the paraffin-coated and gelatin-coated comparators. This difference may be due to variations in the moisture content values between these treatments and the constituents of the packaging used, Amount of fat lost.

Protein ratio: The results of protein percentages in monterey cheese show a difference in these percentages (Table 3). This difference between the treatments may be due to differences in the values of the moisture content between them and the chemical composition of the micro-organisms used in cheese packaging in terms of their ability to retain. This increase may be attributed to the loss of moisture in the cheese processes during storage and to protein degradation by protease enzymes derived from the starter bacteria and rennet.

pH value: Table 3, indicates that there is a decrease in pH in the monterey monohydrate in the first stage during the storage period. This is due to the role of the starter bacteria in the conversion of lactose to lactic acid, this effect is most pronounced in high moisture content. It can be noted that the multiple packaging used to encapsulate these factors indirectly contributes to the development of repining by increasing the retention of higher moisture to create a more favorable environment for the activity of the initiator bacteria.

Fatty acidity (ADV): Table 4, shows that the values of the ADV of the Monterey cheese models coated with the multilayered of alginate with the rosemary ranged from 0.71 to 0.80mm / 100g lipid, indicating that there were no significant differences between them. This was confirmed by the

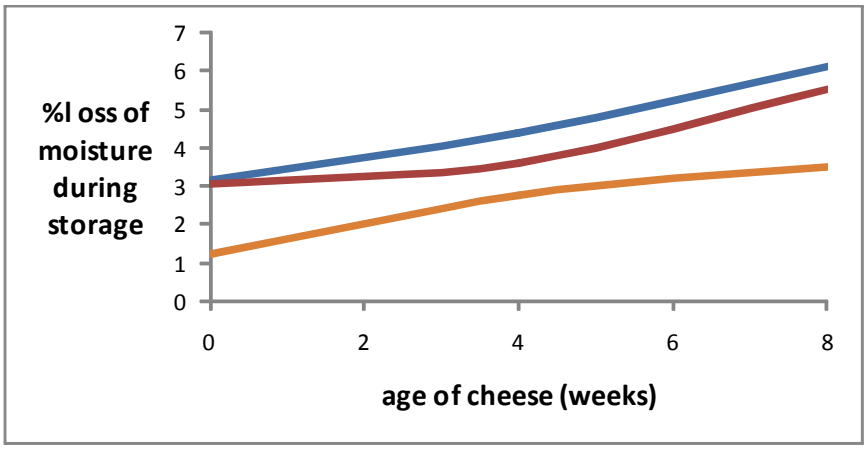

Fig. 7: Moisture loss during storage in the monterey cheese coated with the a thin coating of rosemary extract and alginate during the ripening period of 8 weeks and at 10°C±2 (at the beginning and end of ripening).

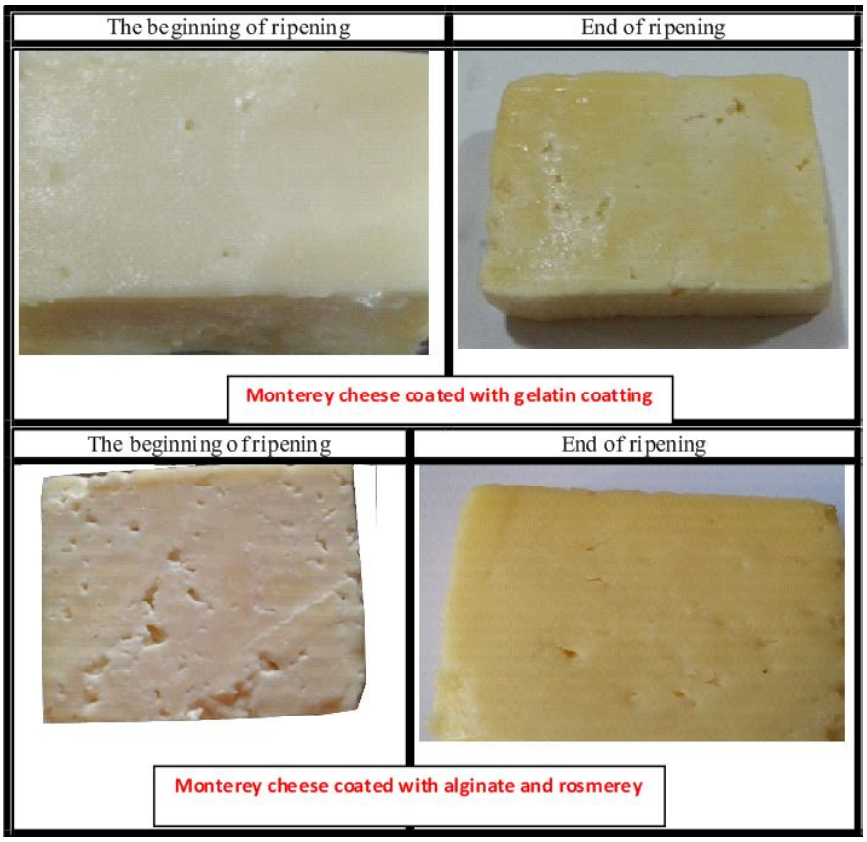

Fig. 8: Monterey cheese coating of alginate and rosemary at the beginning and end of the maturity period of 8 weeks.

results of the statistical analysis. After the storage of the treatments at 10°C for 8 weeks, the ADV of all the coefficients increased with the age of ripening. This increase is due to the lipid degradation factors caused by the lipid-producing enzymes and others. With what Abdle Baky *et al*., (1982) reported ADV of fat increases the progress of a period of ripening where the source as well as the decomposition of fat by Lipases enzymes analyst fat produced by bacteria and other initiator and lactose fermentation mainly in charge of the basic composition of acetic acid and propionic.

Table 5, shows increase in the ratio of dissolved nitrogen to total nitrogen in the three treatments of Monterey cheese. It is noted that the ratio of dissolved nitrogen to total nitrogen was higher especially in the final stages of ripening in the treatment using the multi layer coating (M3) compared to the samples Monterey cheese coated with paraffin (M1) and the Monterey cheese coated with gelatin (M2). The same table also shows increase in NPN ratios in three treatments. This is due to the properties of the coatings and there components involved in moisture retention, thus providing a good environment with a good content of Wa Especially protein-neutral bacteria.

Microbiological tests: The results showed that there was no significant difference between all monterey cheese treatments in total bacterial counts at the beginning of the storage phase and with the progress of the storage period to 8 weeks, these total counts of bacteria began to decrease gradually. The table shows that it decreased by almost two logarithmic cycles in the M3 treatment compared with the M1 and M2 comparison trials after 8 weeks of storage.

The microbial structure of the microbial-coated treatment may be due to the combined effect of both antimicrobial agents on the one hand and the packaging process on the other. When the count of lipid and protein-containing bacteria, including initiatory bacteria, were observed, they were not affected by inhibitory activity.

Staphylococcus aureus was observed to decrease the rate of increase in microbial counts of these organisms and in treatment M3 compared to non-microbial agents. The low counts of these bacteria may be due to the new environmental conditions created by the (Torres *et al.*, 1985) or the cause of inhibition may

Table 6: The results of the microbiological tests of the monterey cheese coated with the a thin coating of rosemary extract and alginate during the ripening period of 8 weeks and at 10°C±2 (at the beginning and end of ripening)*.

Total Count	*E. coli*	Molds	*Staphylococcu aureus*	Lipolytic	Protolytic	Psychro philic	age (week)	Tret.
4.0×10^4	1.7×10^1	Nill	4.5×10^2	0.2×10^2	1.2×10^2	6.78×10^2	0	M1
7.5×10^7	7.1×10^1	Nill	2.7×10^3	4.1×10^2	1.3×10^3	7.72×10^2	4	
2.1×10^8	8.1×10^1	3.1×10^2	3.9×10^3	8.6×10^2	5.0×10^3	9.23×10^2	8	
3.7×10^3	1.8×10^1	Nill	2.0×10^2	7.5×10^1	8.5×10^1	6.81×10^2	0	M2
8.9×10^6	5.8×10^1	Nill	6.5×10^2	2.5×10^2	9.1×10^2	7.70×10^2	4	
1.4×10^8	9.0×10^1	2.0×10^2	1.2×10^3	5.1×10^2	7.5×10^3	9.0×10^2	8	
2.1×10^3	Nill	Nill	4.0×10^2	2.3×10^2	1.0×10^2	6.92×10^2	0	M3
5.1×10^6	Nill	Nill	2.9×10^2	9.3×10^1	8.0×10^1	6.29×10^2	4	
7.9×10^6	Nill	Nill	1.2×10^2	7.3×10^1	4.9×10^1	5.27×10^2	8	
139.53 *	5.29 *	9.33 *	26.84 *	22.63 *	14.75 *	3.08 *	LSD	

Table 7: Sensory evaluation in the monterey cheese coated with the a thin coating of rosemary extract and alginate during the ripening period of 8 weeks and at 10°C±2 (at the beginning and end of ripening)*.

Treat-ment	Cheese age (week)	The appea-rance	Cohesion and adhesion	Textures	Taste and flavor	Separa -tion of fat	Growth of the mould
M1	0	9	9	10	9	10	s
	4	9	10	10	10	10	10
	8	8	6	7	6	8	8
M2	0	9	9	10	9	10	10
	4	9	10	10	9	10	10
	8	9	9	9	8	10	8
M3	0	10	10	10	10	10	10
	4	10	9	9	8	10	10
	8	8	9	9	8	10	10
LSD		2.287 NS	2.761 *	2.089 NS	2.367 NS	0.00 NS	0.00 NS

* ($P<0.05$) NS

be due to the bacterium that produces the types of bacteriocyanates capable of to influence the growth and activity of *Staphylococcus aureus* (Chen and Hoover, 2003).

All of these causes may be involved in inhibiting or inhibiting the growth of *Staphylococcus aureus*. These results agree with what Proctor and Cunningham (1998) (Table 6) indicating that the use of antimicrobial agents with this coating contributed to the reduction of growth of the fungi compared to the treatments with which these factors were not used (Table 6). The same table showed a reduction in psychrophilic bacteria after two months of storage of M3, the results were identical to those of Gammariello *et al*., (2009), which observed a decrease in microcellular contamination in the Italian Starcciatella cheese and was consistent with Mediros *et al*., (2013). The results (Table 6) indicate that the differences in the number of abandoned organisms between the samples of Monterey cheese coated with the micro coating and added to the antimicrobial agents were somewhat minor and are within the permissible limits of this type of cheese indicating the possibility of using these wrappers in the cheese industry are acceptable and safe in terms of nutrition and health.

Sensory Evaluation: The results of the sensory evaluation of the Monterey cheese treatments are shown in table 7. These results indicate that the coating of alginate and rosemary was better and thus the possibility of using macro lament of alginate and rosemary that prepare by Using Layer By Layer Layer (LBL) technique in cheese packaging as well as the anaerobic conditions provided by the coatings, which also contribute to preventing the growth of the mold on the cheese Surface as a microbiological microorganism.

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