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EVALUATION OF PROCESSED SAUSAGE WITH PASTRAMI COATING MIXTURE

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ABSTRACT

Consumption of pastrami had faced some problems such as microbial growth and shortage of the shelf life because of the cross-contamination during processing and handing. In this study pastrami coating mixture (PCM) was added to the sausage formula to produce a sausage with the pastrami flavour compared with the commercial pastrami. The results showed that the best percentage of PCM was 10%. The red colour degradation in pastrami during storage was more rapid than the other sausage samples. The total volatial nitrogen (TVN) content was more pronounced in commercial pastrami than sausage samples. Commercial pastrami had higher microbial count than the sausage samples at the beginning of storage and spoiled after only 15 days at 4°C, while the sausage samples spoiled after 30 days. Organoleptic evaluation showed that, the sausage with 50 ppm sodium nitrite had the best order of overall acceptability followed by the pastrami.

INTRODUCTION

Pastrami is a desirable meat product for a lot of consumers in Egypt for its special flavour, which depends on curing meat, and using of certain spices (powdered fenugreek, garlic and cayenne pepper). Consumption of pastrami had faced some problems, such as microbial growth because some processors don't follow accurate sanitation and the end product exposes to the air during dehydration leading up to the cross contamination by the flies, dust and other filth, as well as mishandling which lead to the shortage of the shelf-life.

Many tries were carried out to decrease numbers of microorganisms on the pastrami and to exten the shelf-life (Laleye *et al.*, 1984) as for packaged pastrami under vacuum and with nitrogen. These treatments increased the storage period while they found that, numbers of lactobacilli, psychrotrophic and anaerobic bacteria in either vacuum or nitrogen-packed pastrami increased significantly as storage temperature was increased above 4°C or duration extrended beyond 7 days at 0, 3 and 7°C. Holley and Mckeillar (1997) found that, numbers of bacteria on pastrami were significantly greater than on ham and bologna, with lactic acid bacteria dominating in all products. On the other hand, Holley *et al.*, (1997) noticed that, during storage, the bacterial growth, mainly of lactic acid bacteria was greatest in pastrami, followed by ham and then bologna for sliced and unsliced samples, growth occurred mainly on the surface of sliced and unsliced meat. Also, they found that, when slices were packaged in film of low O_2 permeability, then were stored under santitary conditions, all samples were acceptable for 21 days at 4°C and were not a threat to public health despite containing bacteria at levels greater than 10^7 cfu/g.

Hayman *et al.*, (2004) found that using high pressure at 600 Mpa and 20°C for 180 Sc. can extend the refrigerated shelf life of pasrami and reduced *Listeria monocytogenes* numbers by more than 4 log cfu /g in inoculated pastermi.

In this study, pastrami was processed as sausage formulation, provided that pastrami coating mixture (PCM) was added instead of the common spices used in the sausage to provide it the special pastrami flavour, and stuffed into natural casing as a try to decrease the cross-contamination that occurs in the commercial pastrami so as to elongate the shelf-life.

MATERIALS AND METHODS

Materials:

Meat from round portion of beef carcass was obtained within 6 hrs from slaughter. After removal of separable connective tissues, the meat was minced coarsely after adding some subcutaneous fat to adjust the fat content to about 15% (of total meat weight) then stored at 4°C even further processing.

Commercial pastrami was purchased from a local market after 5 days from the processing (initial aging) as the first day to put up in the market, and stored in the fridge at 4±1°C. Samples from this pastrami were analyzed for different criteria at 15 days interval during cold storage.

Laboratory grade sodium chloride, sodium pyrophosphate (SPP) and monosodium glutamate (MSG), starch, ascorbic acid and sodium nitrite were added to the minced meat according to the subsequently mentioned sausage formula, and then it was left overnight at 4°C. The pastrami coating mixture (PCM) was formulated as: finely powered fenugreek 50%, garlic 25%, cayenne pepper 20% and sodium chloride 5%.

Technological methods:

Sausage was prepared additing of (PCM) instead of the common spices used in the traditional sausage to obtain the special a pastrami flavour. The per cent of (PCM) was chosen as the best percentage according to the results of the organolyptical taste evaluation in (Table 1).

The sausage was formulated as follows:

Components	%
Minced meat	74.62
Pastrami coating mixture (PCM)	10.00
Water as ice flakes	10.00
Starch	3.00
Sodium chloride	2.00
Ascorbic acid	0.03
Mono-sodium glutamate (MSG)	0.05
Sodium pyrophosphate	0.30

This formula was divided into three portion where 0, 25 and 50 ppm. sodium nitrite were added to the first, second and third portions, respectively. Every portion was finely minced and homogenized individually and tightly stuffed into natural casing with 3 cm diameter using a manual stuffer.

All sausage samples were cooked in an oven maintained at 180°C until the internal temperature reached 75 °C. The internal temperature was measured by (Henna Check, temp. °C instrtument). All samples under investigation were stored in the fridge at 4 ± 1 °C. Samples were analyzed for different criteria at 15 days interval during cold storage. Samples were taken from both sausage without sodium nitrite and commercial pastrami for gross chemical composition analysis.

Analytical methods:

Determination of moisture, crude protein, fat and ash contents were carried out according to the methods of A.O.A.C. (1990). The pH value was measured according to the method of Aitken *et al.* (1962). Colour of the samples was measured using a spectrocolourimeter (Tristimulus colour Machine, with the CIE Lab Colour Scale). This colour assessment system is based on Hunter L, a and b coordinates according to Hunter (1975) where: "L" values indicate lightness on a scale ranging from 0 (black) to 100 (white), "a" values indicate greenness when the value is negative (-a) and redness when the value is positive (+a), "b" values indicate blueness when the value is negative (-b) and yellowness when the value is positive (+b). (Hunter, Lab Scan XE, Germany) calibrated with a white standard tile of Hunter Lab colour Standard (Lx No. 16379) X = 73.26, Y = 81.94 and Z = 88.14 (L = 92.46, a = -86, b = -0.16). Total volatile nitrogen (TVN) was estimated by the method of Winton and Winton (1999) and thiobarbituric acid value (TBA), as an indication for lipid oxidation, was determined (as mg malonaldhyde/100 g sample) according to Pearson *et al.*, (1991).

Microbiological evaluation:

Both total aerobic and psychrophilic bacterial counts were determined , yeast and mold counts were estimated (Harrigan and Margaret, 1966).

Sensory evaluation and statistical analysis:

Sensory evaluation of the sausages and pastrami was carried out. Firstly, twenty panel testers were employed to evaluate organoleptically flavour to choose the best percentage of (PCM) added to the sausage formula. Secondly, the panelists were employed to evaluate organoleptically the colour, odour, taste, texture and overall acceptability of all samples under investigation. Ranking method was used to find out the best product which had the lowest sum of ranks, according to Basker (1988). The critical values of differences among the sum of ranks were used for testing the significant differences between the products, where the significance is attained when the rank sum differences are greater than or equal to the critical differences (sorted from the table of critical values of differences between rank sums) (Basker, 1988).

RESULTS AND DISCUSSION

1- Evaluation of pastrami coating mixture in sausage formula:

Pastrami coating mixture (PCM) was added to sausage formula at 8, 10 and 12%, commercial pastrami used as control. The samples were

organoleptical evaluated for the flavour. From Table (1), it could be noticed that the best product which had the lowest sum of ranks was the pastrami followed by sausage with 10% (PCM) with non-significant difference, while there was very significant difference between above two samples and the others. Thus, the best percentage (10% PCM) was selected to be added to the sausage formula for further investigations.

Table 1: **Flavour evaluation of pastrami and sausage samples affected by different percentage of pastrami coating mixture (PCM) using rank method.**

Products*	A	B	C	D
Rank sum	28	66	36	70
Differences vs				
A	-	38	8	42
B		-	30	4
C			-	34
D				-
Significant level	P < 0.05		P < o.o1	
Critical difference	21.0		25.4	
Products rank **				
A	a		a	
B	a		a	
C	b		b	
D	b		b	

* Products A = Commercial pastrami.
B = Sausage with 8% PCM
C = Sausage with 10% PCM
D = Sausage with 12% PCM

** a,b, ... means the products that took the same letters are non-significantly different.

2-Evaluation of sausage formulated with 10% pastrami coating mixture (PCM) and different per cent of sodium nitrite.

2-1- Gross chemical composition:

Table (2) shows proximate gross chemical composition of cooked sausage and commercial pastrami. From the table, it could be noticed that the commercial pastrami was lower in moisture content than the sausage samples, this might be due to the dehydration which occurred in the pastrami during ageing period which had more effect than that occurred during sausage cooking.

Table 2: **Chemical composition* of cooked sausage and commercial pastrami.**

Components %	Cooked sausage	Commercial Pastrami
Moisture content	55.40	53.35
Protein content	18.52	27.08
Fat content	10.53	2.24
Ash content	4.81	6.91
Total carbohydrates**	10.74	10.42

* Values calculated on wet weight basis, at zero time of storage.

** Total carbohydrates were determined by differences, thereby values included the salt content.

Also, it could be noticed that, the commercial pastrami was higher in protein content as compared to the cooked sausage. This might be due to addition of some non-protein ingredient to the sausage formula such as starch as well as, the higher fat content in the sausage, while the lower fat content of the pastrami might be attributed to using lean meat cuts in the processing of pastrami.

2.2. Moisture content:

Table (3) illustrates the changes of moisture content that occurred in the sausage with (PCM) and commercial pastrami during cold storage at 4°C. From such data, no significant differences were found between different samples of sausage at zero time of storage which were ranged between 55.27 and 55.38%, while moisture content of pastrami was 53.35%. From the same table, it could be noticed that moisture content of pastrami was highly decreased specially at the 15 day of the storage period. On the other hand, the percentage decrease of the moisture contents at the end of cold-storage for sausage samples were lower (about 15%) as compared to the commercial pastrami (which was about 40%). This might be attributed to the casing effect on decreasing the moisture evaporation from the sausage.

Table (3): Changes in moisture content (%) of sausages with 0,25 and 50 ppm sodium nitrite and commercial pastrami during cold storage at 4°C.

Treatments	Storage period (days)			
	0	15	30	45
	Moisture contents (%)			
Sausage without $NaNO_2$	55.38	53.66	50.36	47.22
Sausage with 25 ppm $NaNO_2$	55.35	53.31	50.23	46.95
Sausage with 50 ppm $NaNO_2$	55.27	53.75	50.30	47.11
Commercial pastrami	53.35	48.86	36.45	31.87

2.3. pH value:

The pH values of sausage and pastrami samples were measured during cold-storage. Results obtained in table (4)showed that, slight differences were found between sausage samples in the beginning of storage, but the values of pH were decreased at the end of storage period.

Table (4): Changes in pH values of sausages with 0, 25 and 50 ppm sodium nitrite and commercial pastrami during cold storage at 4°C.

Treatments	Storage period (days)			
	0	15	30	45
	pH values			
Sausage without $NaNO_2$	5.9	5.9	5.3	4.7
Sausage with 25 ppm $NaNO_2$	6.0	6.0	5.7	5.3
Sausage with 50 ppm $NaNO_2$	6.0	5.9	5.9	5.5
Commercial pastrami	5.2	5.1	4.8	4.6

This might be ascribed to hydrolytic contaminant bacterial effect. Also it could be noticed that, pastrami samples recorded a rather lower values of pH than sausage ones during storage. The highest pH value at the end of storage period was recorded by the sausage with 50 ppm sodium nitrite (pH 5.5) this might be referred to higher nitrite concentration as an antimicrobial effect.

2.4. Colour:

Hunter colour values of the different sausage samples with or without sodium nitrite as well commercial pastrami were measured during cold-storage at 4°C as L, a and b values. Results are shown in table (5). From the obtained results, it could be noticed that, the Hunter " L " value of pastrami at zero time of storage (35.82) was higher than the other sausage samples followed by sausage sample with 50 ppm sodium nitrite (35.69). The difference between these two samples was not pronounced. Sausage sample without sodium nitrite, had the lowest "L" value (34.07). It could be also noticed that the "L" values increased during cold-storage of all sausage samples, while decreased for the pastrami sample.

From the same table, it could be observed that, the pastrami sample was the most reddish, as Hunter "+a" was (7.5) as compared to the sausage samples under investigation at 0 and 15 days storage. However, concerning sausage samples, it could be noticed that as the concentration of sodium nitrite increased the "+a" value increased. This might be due to the effect of sodium nitrite on the meat myoglobin.

Table (5): Changes in Hunter colour values* of sausages with 0,25 ans 50 ppm sodium nitrite and commercial pastrami during cold storage at 4°C.

Treatments	Storage period (days)			
	0	15	30	45
	Hunter colour values			
Sausage without $NaNO_2$				
L	34.08	34.22	35.13	37.30
a	+5.44	+5.33	+ 5.29	+5.09
b	± 15.60	+15.55	+15.41	+16.03
Sausage with 25 ppm $NaNO_2$				
L	34.95	35.36	35.62	39.05
a	+ 5.86	+5.84	+5.62	+5.43
b	± 14.66	+14.50	+14.79	+15.44
Sausage with 50 ppm $NaNO_2$				
L	35.69	35.89	35.80	40.51
a	+ 6.88	+6.14	+5.86	+5.52
b	± 14.94	+14.83	+14.29	+15.98
Commercial pastrami				
L	35.82	35.62	34.72	33.34
a	+ 7.50	+7.07	+5.43	+4.18
b	+ 13.52	+13.32	+12.11	+11.64

* **Hunter colour values: L = lightness from 0 (black) to 100 (white); – a green, + a = red and –b = blue, +b = yellow.**

Generally, the red colour ("+a" value) gradually decreased during storage in all tested samples, but the red colour degradation in pastrami was more than that of the sausage samples. From the same table, it could be noticed that, the Hunter yellowness values (+"b") increased during cold-storage of sausage samples, while on the contrary, the value of the pastrami decreased. It had the same trend of the lightness (+"L") values.

2.5 Total volatile nitrogen (TVN):

Table (6) indicates total volatile nitrogen (TVN) in cooked sausage with 10% (PCM) and 0, 25 and 50 ppm sodium nitrite as well as commercial pastrami during storage at 4°C. From this data, it could be noticed that, as a general observation, there was gradual increase of TVN during cold-storage in all samples. This might be attributed to protein hydrolytic activity of contaminating micro-organisms. The increase of TVN content was more pronounced in commercial pastrami than sausage samples.

These results might be due to the insanitary procedure during processing of commercial pastrami. From the same table, it could be observed that, the highest TVN content of sausage samples was in sample without sodium nitrite, followed by sample containing 25 ppm and 50 ppm sodium nitrite which were 38.4, 29.8 and 27.1 mg/100 g sample after storage for 45 days, respectively. This might be due to the antimicrobial effect of sodium nitrite.

Table (6): Total volatile nitrogen (TVN) contents (mg/100 g) of sausages with 0, 25 and 50 ppm sodium nitrite and commercial pastrami during cold storage at 4°C.

Treatments	Storage period (days)			
	0	15	30	45
	TVN content mg /100g samples			
Sausage without $NaNO_2$	14.0	14.5	25.9	38.4
Sausage with 25 ppm $NaNO_2$	13.5	14.0	21.0	29.8
Sausage with 50 ppm $NaNO_2$	12.8	13.4	18.9	27.1
Commercial pastrami	15.4	28.7	39.0	45.3

2.6. Thiobarbituric acid (TBA) value :

Thiobarbituric acid values (TBA) of the samples under investigation were illustrated in table (7). The values were gradually increased with the increment storage time for all samples. It might be attributed to the progressive lipids oxidation during cold storage. Commercial pastrami samples showed the lowest TBA values allover the storage period as compared with sausage samples. This might be due to the lower fat content of pastrami (2.24%) as shown in Table 2. After for storage 45 days the sample of sausage reached to the critical limit to object the samples (0.9 mg. malonaldhyde/1000 g. sample) according to Egyptian Standard (1042/1991).

Table (7): Thiobarbituric acid values (TBA) of sausages with 0, 25 and 50 ppm sodium nitrite and commercial pastrami during cold storage at 4°C (determined as mg malonaldhyde/1000 g sample).

Treatments	Storage period (days)			
	0	15	30	45
	TBA values			
Sausage without $NaNO_2$	0.64	0.75	0.82	0.95
Sausage with 25 ppm $NaNO_2$	0.65	0.78	0.83	0.89
Sausage with 50 ppm $NaNO_2$	0.50	0.53	0.61	0.85
Commercial pastrami	0.33	0.35	0.43	0.45

2-7- Microbial evaluation:

From Table (8) it is obvious that the microbial load was very low at 0 time on the sample without sodium nitrite, which was due to cooking until internal temperature of 75 °C (this killed vegetative cells, Brock, 1979). After 15 days in the fridge, the total count was 7.0×10^3 cfu/g [which was still in the range of allowance because it was less than 1.0×10^5 cfu/g (Speck, 1976)]. After 30-days storage, the sausage became spoiled because the total count was 70×10^5 , which coincided with results of Sadek (1963) . In addition, this count led to a pH of 5.3 (Table , 4) , TVN of 25.9 (Table 6), and TBA of 0.82 mg/1000 g (Table 7). After 45-days storage, the sausage was spoiled as the count was 5.5×10^7 which coincided with the pH of 4.7, TVN of 38.4 mg/100 g (surpassing the safe limit of 30 mg/1000 g sample) and TBA of 0.95 mg/1000 g (larger than the safe limit of 0.900 mg/kg sample).

However, after 30-days storage, the count increased due to the large microbial growth (table 8) which led to decreasing the pH to become 5.3. This pH favored the growth of yeasts and molds (Brock, 1979). Again, after 45-days storage the sausage was spoiled due to the high microbial growth (table 8) which led to decreasing the pH to become 4.7 (table 4), that encouraged fungi growth , so it became 85×10^5 cfu/g.

Sausage with 25 ppm of sodium nitrite had low count of microorganisms at 0-time then after 15-day storage, the total bacterial count became 6.0×10^3 which is within allowance (less than 1.0×10^5 cfu/g). This count was smaller than the count after 15-day without the addition of nitrite salt (7.0×10^3 cfu/g) which was due to the antimicrobial effect of nitrite (Azzatt, 1990). After 30-day storage, the count was 32×10^5 cfu/g, which led to the spoilage of sausage. This count coincided with the pH of 5.7, TVN of 21 mg/100 g and TBA of 0.83 mg/kg. In addition, after 45-day storage, the sausage was spoiled too as the count was 0.7×10^7 cfu/g, pH was 5.3, TVN was 29.8 mg/100 g and TBA was 0.89 mg/1000 g.

Sausage with 50 ppm of sodium nitrite had followed the same pattern as the sausage with 25 ppm of sodium nitrite. It had low count of microorganisms at 0-time, and after 15-day storage, it had a count of 5.5×10^3 cfu/g (which was within the safe limit). Then after 30-day storage, the sausage was spoiled because the count was 16×10^5 cfu/g, which coincided with results of TVN and TBA under the same condition. Furthermore, after

45-day storage, the count was 0.55 x 10^7 cfu / g, which led to the spoilage of the sausage.

Sausage with 25 and 50 ppm followed the same pattern as mentioned above with the count of fungi becoming lower for the concentration of 50 ppm than 25 ppm (both after 45-days storage).

Considering the pastrami, we could notice that it had a bacterial count of 5.0 x 10^4 cfu/g at 0 time, which was within the safe limit. However, pastrami was spoilede starting from 15-day storage which coincided with total aerobic bacteria of 20 x 10^5 cfu/g, pH of 5.1 and TVN of 28.7 mg/100 g. However, concerning TBA, pastrami, at all storing periods, might be edible as it had a TBA value always less than 0.90 mg/kg sample. This was because of the pastrami low content of fat.

Table (8): Total aerobic bacteria, yeast and molds, and psychrophilic bacteria counts (cfu/gm) in sausages with 0,25 and 50 ppm sodium nitrite and commercial pastrami during cold storage.

Treatments	Storage period (days)			
	0	15	30	45
	(cfu / g)			
Sausage without nitrite:				
Total aerobic bacterial count	$3.0x10^2$	$7x10^3$	$70x10^5$	$5.5x10^7$
Yeast and molds	$140x10^2$	$4.0x10^3$	$2x10^3$	$85x10^5$
Psychrophilic bacteria	$2.0x10^2$	$15x10^3$	$2900x10^3$	$85x10^5$
Sausage with + 25 ppm nitrite:				
Total aerobic bacterial count	$1.5x10^2$	$6x10^3$	$32x10^5$	$0.7x10^7$
Yeast and molds	$20x10^2$	$1.5x10^3$	$2.0x10^3$	$7.7x10^5$
Psychrophilic bacteria	$1.1x10^2$	$7x10^3$	$700x10^3$	$4.1x10^6$
Sausage with + 50 ppm nitrite:				
Total aerobic bacterial count	$0.6x10^2$	$5.5x10^3$	$16x10^5$	$0.55x10^7$
Yeast and molds	$2x10^2$	$1.0x10^3$	$1.1x10^3$	$2.0x10^5$
Psychrophilic bacteria	$0.4x10^2$	$3.2x10^3$	$33x10^3$	$25x10^5$
Commercial pastrami:				
Total aerobic bacterial count	$5.0x10^4$	$20x10^5$	$7.2x10^7$	$45x10^7$
Yeast and molds	$5.0x10^4$	$5.1x10^5$	$1.2x10^7$	$0.29x10^7$
Psychrophilic bacteria	$5.5x10^4$	$6.5x10^5$	$7.0x10^7$	$7.0x10^7$

Psychrophilles count followed the same pattern of total count as the sausage had very low growth (2.0 x 10^2 cfu/g) at 0-time and without nitrite. Furthermore, the zero time pastrami had a count of 5.5 x 10^4 cfu/g which was within the safe limit. After 15-day of storage, the pschrophilles count was increased but still was within allowance for sausage. However, after 30-day or 45-day of storage, the sausage was spoiled. Furthermore, the pastrami was spoiled starting from 15-days of storage.

2-8- Sensory evaluation :

The samples under investigation were sensorially evaluated for colour, odour, texture, taste and overall palatability and the results were statistically analyzed using rank method, according to Basker (1988). The results are shown in table (9). From these data, it could be noticed that, the

best colour was that of the commercial pastrami followed by the sausage with 50 ppm sodium nitrite but with non-significant differences. While the sausage without sodium nitrite was the seamy. This might be due to effect of the nitrite on the meat colour. The commercial pastrami had the best value of odour with significant difference as compared with the other samples. No significant differences were observed between all samples for the taste. On the other hand, the commercial pastrami had the seamy order for the texture with significant difference in comparison with the other samples.

Finally, the results of overall palatability showed that, the first order among all samples was for sausage with 50 ppm sodium nitrite and the second was for the commercial pastrami but the difference between both treatments was non-significant at 0.05 level.

Table (9):Rank method for organoleptic evaluation of the sausages with 0, 25 and 50 ppm sodium nitrite and commercial pastrami.

Products Characteristics	A	B	C	D*
	Rank of products as advantage**			
Colour	4c	3b	2a	1a
Odour	4b	3b	2b	1a
Taste	4a	3a	1a	2a
Texture	3a	2a	1a	4b
Overall accepatability	4b	3b	1a	2a

*** Products A = Sausage without sodium nitrite.**
B = Sausage with 25 ppm sodium nitrite.
C = Sausage with 50 ppm sodium nitrite.
D = Commercial pastrami.

**** The numbers mean rank, i.e. 1 = best and 4 = seamy**

a. b. c. ... means within a raw followed by the same letter are non-significantly different (P < 0.05).

CONCLUSION

From the above results, it could be produce sausage with pastrami flavour and increment the shelf life up to 30 days with added 10 % pastrami coating mixture and 50 ppm sodium nitrite instead of the common spices used in the suasage.

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تقييم السجق المصنع بخلطة التغطية للبسطرمة

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يواجه إستهلاك البسطرمة بعض المشاكل مثل النمو الميكروبى ، نقص فترة الصلاحية وذلك بسبب التلوث العارض أثناء التصنيع والتداول . فى هذه الدراسة تمت إضافة خلطة التغطية المستخدمة للبسطرمة الى مكونات السجق بغرض انتاج سجق يتميز بنكهة البسطرمة ، ومقارنتـــه بالبسطرمة التجارية . وقد وجد من النتائج أن أفضل نسبة من خلطة تغطية البسطرمة المضافة إلى مكونات السجق كانت ١٠% .ووجد أن تدهور اللون الأحمر للبسطرمة أثناء التخزين كان أســـرع منه فى السجق وايضا محتوى النتروجين الكلى المتطاير كان أكثر ارتفاعا فى البسطرمة التجارية مقارنا بعينات السجق . البسطرمة التجارية وقد أحتوت على أعداد ميكروبية أكثـــر مـــن عينـــات السجق فى بداية التخزين ، وفسدت بعد ١٥ يوم فقط من التخزين على درجة حرارة ٤°م بينمـــا فسد السجق بعد ٣٠ يوم .وقد أظهر التقييم الحسى أن السجق المحتوى على ٥٠ جزء فى المليون من نيتريت صوديوم حصل على أفضل درجة بالنسبة للتقبل العام ، تليه البسطرمة.