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Investigation of crossbreeding breeds Romanov and arabic on meat quality of sheep during storage

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ABSTRACT

Among the types of foods that are consumed to meet the physiological needs of humans, animal protein is more valuable than other nutrients in terms of nutritional value and nutrients. Today, consumers are looking for healthy and quality foods. Therefore, knowledge of the qualitative characteristics of meat is considered to be important. In this study, the quality and durability characteristics of Arabia and *Arabia* -Romanov meat were studied during 7 days of ageing period under commercial conditions at 4 °C. Samples were taken from the top round section including Semimembranosus muscles. This research was conducted as a randomized complete design. One-way ANOVA and Fisher test were used at 5% statistical level to study the differences between treatments. Finally, the results were analyzed using Minitab version 16 software. The pH value for Arabia meat decreased from 6.33 immediately after slaughter to 5.7 and for the Arabic-Romanian meat, the mean of 6.36 immediately after slaughter, decreased to 6.05 after 168 hours. The mean value of pH indicating that there was no statistically significant difference between treatments. The results showed that there were significant differences between the two treatment in characteristics of texture, sensory and cooking loss ($P < 0.05$). In general, Arabia-Romanov meat has a higher overall acceptance rating and desirable texture characteristics.

1- Introduction

Among the types of food that are consumed to meet the physiological needs of humans, animal protein is more valuable in terms of nutritional value and nutrients than other edibles [1]. Being rich in valuable proteins containing essential amino acids for the body, minerals, especially iron and zinc, various vitamins, and sufficient energy makes meat one of the most complete foods [2]. Energy and essential nutrients, such as essential fatty acids and fat-soluble vitamins, are provided by meat fat. The amount of fat in meat plays an important role in cooking features, being delicious, and overall sensory features. Therefore, red meat consumption greatly benefits human health. According to the statistics of the Food and Agriculture Organization, the total amount of meat produced in 2021 was 900 million tons, of which 95 thousand million tons are related to red meat. Per capita consumption of red meat in Iran is reported to be approximately 11 kg [3]. The statistics provided show that the global production of sheep meat has grown by 1.26% between 2000 and 2021, and its global average production during this period was 12.3 million tons [4]. Today, consumers are looking for healthy and good quality foods. Meat crispiness is one of the most important quality features and is influenced by pH, temperature, amount of connective tissue, muscle shortening, and myofibril protein proteolysis during cooking [5]. Color is also an important physical feature of meat and is usually recognized as a quality indicator by buyers. Consumer satisfaction is an important and effective factor in repeating the purchase of any product. Appearance and general quality of eating are the two main factors that influence the user's choice to buy red meat again. In fact, the outcome of buying meat is influenced more by color than by any other factors. Color changing is an indicator of the freshness and health of the meat [6].

Huidobro et al., (2003) studied the physicochemical changes of beef in two commercial groups (heifer and bull) during 6 days of storage. On the first day, the bull meat was firmer and more elastic. The pH of meat decreased during the first 24 hours after slaughter in both groups and reached amount of 5.5 and did not change during the next 5 days. The water holding capacity in the beef heifer increased. Texture profile assessment (TPA) showed a decrease in firmness and elasticity of raw bull meat. Sensory evaluation also showed that the evaluators detected a decrease in firmness and flexibility in bull meat and a decrease in juiciness and chewiness in heifer meat. During the first 3 days, the heifer meat was juicier and this meat was more desirable on the sixth day. Both meats did not differ from each other for most of the qualitative parameters studied in this research [7]. Iian et al., (2004) investigated the relationship between meat crispiness, myofibril separation, and calpain autolysis during post-mortem storage. The obtained results showed that calpain 1 or 3 may play an important role in postmortem tenderness through proteolysis of specific muscle structural proteins such as nebulin. The result of this study linked calpain 3 to the breakdown of myofibrillar proteins in skeletal muscle after cadaver immobilization [8]. Martinez-Cerezo et al., (2005) investigated the effect of breed, slaughter weight and delivery period on the physicochemical features of meat of three important Spanish breeds. 75 lambs of each breed were slaughtered in different weights (10-12, 20-22, 30-32 kg) and the aging period was 1, 2, 4, 8, or 16 days. Meat pH, color, amount of heme pigments, muscle fat, moisture content, hydroxyproline content and sarcomere length were measured in 24 hours after post mortem. The meat tissue compression test was measured after each aging period. The pH of the samples varied from 5.50 to 5.85. The color of the meat was different according to the aging period and weight at the time of slaughter. For heavier lambs, intramuscular fat increased and moisture decreased. Collagen differences were related to breed and sarcomere length was influenced by slaughter weight. The aging period was also strongly affected by myofibril fragility [9]. Abdullah and Qudsieh (2009) evaluated the effects of weight and aging process on the quality features of Semitendinosus, Semimembranosus, Longissimus and Biceps femoris muscles of 30 Awassi lambs. The weight of the lambs was 20, 30, and 40 kg, and the cycle of the muscles aging of the lamb

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carcass was 24 hours to 7 days. The results of this research showed that the Warner– Bretzler shear force increased with increasing weight and decreased with increasing time. In addition, the Lightness index of all four muscles decreased with increasing weight, but it was not affected by time of aging. The aging time Increased redness index. The cooking loss of Semitendinosus and Longissimus muscles decreased with increasing aging time. The values of pH of Semimembranosus and Biceps femoris were significantly affected and decreased with increasing weight. Aging did not affect the pH In general, the meat quality of lambs slaughtered at 30 kg was better than that of lambs slaughtered at 40 kg, which improved with increasing aging time [10]. Angood et al., (2008) investigated the quality of muscle of sheep with regard to fatty acid composition of conventional and organic feed. The organic treatment had better nutritional quality in terms of hydration, taste, and overall acceptance. The difference in water content was due to the content of fat inside the muscle and the difference in taste was due to fatty acid compounds. The conventional treatment contained a higher percentage of linoleic acid [11]. Zapletal et al., (2010) investigated the effect of the Suffolk-sired genotype on the chemical composition and fatty acid profile of femoris muscle in lambs fed under organic conditions. The results of this research showed that the genotype had no effect on age at slaughter, average daily increase or decrease in carcass percentage. However, genotype affected carcass weight, muscle protein content, saturated and unsaturated fatty acids [12].

Arabian sheep is one of the native sheep resistant to environmental conditions. This breed is also known as awassi. This breed has a short height and a muscular body, so it is a suitable strain for fattening [13]. The Romanov breed is famous all over the world for multiple births and higher fertility, heavier ewes. On the other hand, one of the typical features of this breed is a relatively low growth rate and poor carcass quality compared to traditional meat breeds. The fastest and easiest way to improve growth and carcass quality in Romanov lambs is to mix them with other breeds [14]. The purpose of this study was to investigate the physicochemical, textural, and sensory features of Romanov-Arab breed during storage.

2-Materials and methods

Meat samples Preparation

After the production of the Arabic-Romanov breed by artificial insemination, the number of 6 male sheep from the Arabian breed and 6 male sheep from the Arabic-Romanov breed were fattened under the same conditions during a period of 75 days (10 days of habituation and 60 days of fattening). After performing a health inspection by the veterinary team, the animals were slaughtered in the Islamic way. Then, blood was exited, skin was removed, and stomach contents were emptied. Then, the carcasses were kept for 24 hours in a cool room above zero (temperature 7 °C) for the rigor mortis stage. In the next step, semimembranosus muscles were isolated, coded, and transferred to the laboratory and were kept at 4 °C.

Meat quality Evaluation

Changes after slaughter

In order to evaluate the changes after the slaughter and especially the firmness of the carcass, the pH of the samples was determined by an electric pH meter of the rigor mortis model during ۱۶۸ hours of storage after the slaughter [15].

Sensory features

In order to evaluate the sensory features including color, juiciness, taste, firmness and overall acceptability, using 16 trained evaluators with the five-point hedonic method (number ۵ represents the highest score and number ۱ represents the lowest score) by completing the evaluation form. In this test, each person was given a piece of the samples cooked in a bain-marie at 90°C for half an hour [16] in disposable transparent containers with different codes for evaluation. To prevent the interference of flavors, the evaluators rinsed their mouths with tepid water before each taste test.

Cooking loss

To perform the cooking loss test, a certain weight of the raw meat sample was placed in a seamless plastic bag in a Bain-Marie at 90 °C for half an hour. Then the cooked meat was cooled and weighed, and cooking loss was calculated based on the following formula [16]:

Cooking loss= Weight of the cooked sample - Weight of the raw sample

Color measurement

In this research, in order to analyze the color of raw meat samples (three indices b*, a*, L*), Konica Minolta colorimeter (model CR-۴۰۰, Japan) was used at different time intervals after slaughter. Before the test, the device was calibrated using a white standard screen (43.94 =L*, 0.25 = a*, 2.04 = b*). The L* index represents the brightness of the sample and its range varies from zero (pure black) to 100 (pure white), a* index shows the closeness of the color of the sample to green and red colors and its range varies from -120 (pure green) to +120 (pure red), and b* index shows the proximity of the color of the sample to blue and yellow colors and its range varies from -120 (pure blue) to +120 (pure yellow) [17].

Pictorial features

In order to evaluate the structural features of the samples, the image processing technique was used. For this purpose, a section of sample was prepared in 2 *2 cm. At first, the images were taken using a Canon digital imaging camera at a fixed distance of 30 cm from the samples in a black box (with approximate dimensions of 100 x 100 x 100 cm) and illuminated at an angle of 45 degrees by fluorescent lamps. Then the images taken were transferred to the Image J software environment and with this software, the features of the meat structure, including contrast, porosity, number of cells, homogeneity, entropy and average area were measured [17].

Texture features

Texture profile analysis was done by texture measuring device model TA-XT-PLUS (Micro stable system, made in England) during seven days of storage. In order to perform texture profile test, cubed pieces (1*1 *1.5 cm) were separated from cooked meat and subjected to two-step compression test. The probe diameter of the device was 6 mm, the pre-test speed was 5 mm/s, and the post-test speed was 5 mm/s [13, 15, 18]. Texture analysis includes several factors such as firmness, consistency, gumminess and chewiness. According to the data obtained from the device, various factors related to the texture were calculated. Firmness was considered as the maximum force required compressing the sample and the ratio of the area of the second positive peak to the first positive peak as continuity. Ability to chew is the energy required for oral digestion and chewing of solid food, which is obtained from the product of elasticity and gumminess. Chewiness refers to the energy required to grind semi-solid food to obtain a ready-to-swallow product, and it is obtained from the product of stiffness in consistency [19].

Statistical method

This research was conducted as a completely randomized design. Experiments were performed in three repetitions, and then the mean and standard deviation were calculated. To study the differences between different treatments, one-way analysis of variance and Fisher's test were used at the statistical level of ۵٪, and finally, the results were analyzed using the statistical program Minitab version 16 , and shown in Table 1.

3-Results and discussion

Meat quality Evaluation

Changes after slaughter

During the first hours after slaughter, a significant decrease in the pH value of the samples was observed. The pH value for Arabic meat decreased from an average of 6.33 immediately after slaughter to 5.7 and for Arab-Romanov meat from an average of 6.36 immediately after slaughter to 6.05 after 168 hours. The difference between pH values in two breeds was not statistically significant and the trend of pH changes in two breeds was similar to each other (Figure 1). The decrease in pH during the storage period after slaughter is caused by the accumulation of lactic acid in the pH of the glycolysis process. Due to the decrease in glycogen content in muscle after slaughtering, the rate of pH lowering, decreased. Similar results have been reported by other researchers [20, 21].

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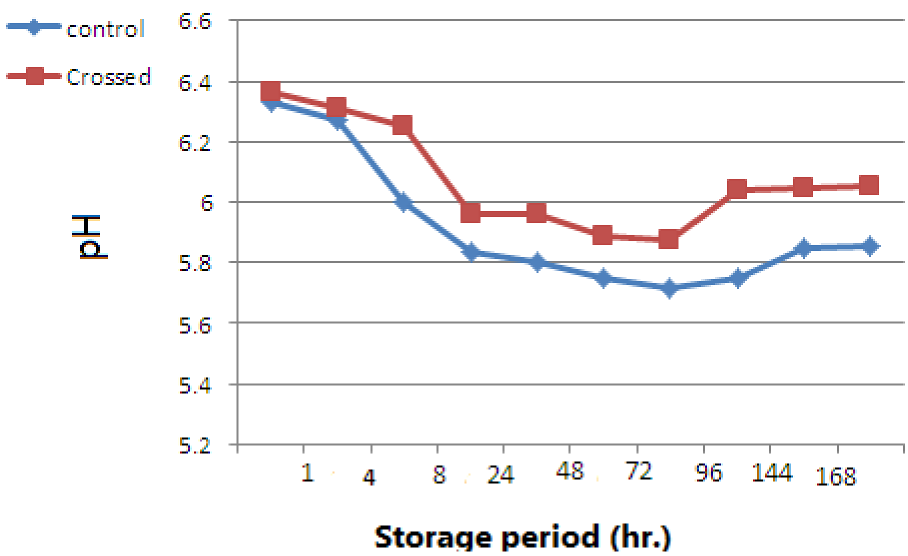

Figure 1. Lamb meat pH during 168 Hours' post-slaughter

Sensory features

The sensory evaluation results of the meat samples are shown in Table 2. All the sensory features of the two treatments showed a significant difference (P<0.05) from each other. The meat of the Arab-Romanov breed was darker, juicier, tastier and firmer. In terms of overall acceptance, the evaluators gave the highest score to the Arabic-Romanov meat treatment.

Table 1. Analysis of variance of the results of Texture, Cooking Loss and Sensory Evaluation of meat

	CV	R^2(adj)	R^2	F	P
Cooking Loss(gr)	15	97.10	97.68	168.45	0.000
Color	15	93.42	94.74	72	0.001
Juicy	0.371	88.72	90.98	40.33	0.003
Hardness(N)	0.517	91.45	93.16	54.45	0.002
Taste	0.999	90.74	92.59	50	0.002
O. A*	0.617	92.86	94.29	66.04	0.001
Contrast	0.273	77.31	81.84	18.03	0.013
Homogeneity	0.617	93.96	95.17	78.73	0.001
Entropy	0.617	85.32	88.26	30.07	0.005
Count	0.617	99.30	99.44	714.2	0.000
Mean area	0.273	98.29	98.63	288.8	0.000
Area fraction	0.618	85.70	88.56	30.97	0.005

*: Overall Acceptance

The breakdown of cytoskeletal proteins has been reported as the main factor in increasing crispness during aging. Also, textural properties or crispness have been mentioned as the most important sensory features of red meat. The hydration of meat also plays a key role in the textural properties of meat. In general, the quality of food is evaluated based on the three features of crispness, juiciness and taste [22]. Shortening of the length during rigor mortis occurs as a result of the development of isometric tension. The shortening is reduced at temperatures below 10°C that called cold shortening and most of the hardening in commercial conditions is related to it [23]. Recent studies have shown that high temperatures in the rigor stage limit crispness of beef, through a reduction in calpain activity and reduced aging potential [24].

Table 2 Results of mean comparison Sensory Evaluation of meat

Treatment	Overall Acceptance	Hardness	Taste	juicy	Color

Control	0.1 ^{B}± 3.4	0.07 ^{B}± 4.3	^{B} 0.28±3.16	0.17 ^{B}± 4.08	0.14 ^{B}± 3.91
Crossed	0.28 ^{A}± 4.82	0.1 ^{A}± 4.88	^{A} 0.28±4.83	0.14 ^{A}± 4.91	0.14 ^{A} ±4.91

Different letters in each column represent statistical difference (P < 0.05)

Cooking loss

The average cooking loss of two treatments had a significant difference (P<۰/۰۵) from each other (Table ۳).The Romanov-Arabian meat treatment showed a cooking loss of ۲/۱۳and the Arabic meat treatment showed a rate of ۱/۲۲. The denaturation of myosin at temperature of ۴۰to ۵۳°C causes transverse contractions in myofibrils and their water is slowly lost. At a temperature of 60 °C, the rapid loss of water from the myofibrils occurs due to the contraction of the wall collagen. At temperatures higher than 64°C, the network of endomysium and perimysium contract and exert more pressure on water. This causes the water to escape quickly from the cooked meat. These events in total cause a decrease in the weight of the meat sample after cooking [25]. This factor is related to the change in the amount of fat, the degree of obesity and the final pH [26]. According to the report of Ricordeau et al., (1990) compared to other meat breeds, the meat of the Romanov breed has a lower proportion of bone, a higher proportion of internal fat and more beta fiber in the muscles, which has an effect on the loss caused by cooking [27]. Bertram et al., (2004) found that the increase in cooking loss depends on the change of water properties in cooked meat [28]. They also stated that the morphology of macromolecules, which is an important factor in water binding, changes during the delivery period and this phenomenon affects the properties of water retention in cooked meat. One of the important events after slaughter is the reduction of muscle pH, that the muscle proteins are denatured, which reduces the binding power of these proteins with water. Also, myofibrillar proteins, myosin and actin, reach their isoelectric point and lose the binding water. In total, these phenomena lead to the outflow of fluids from muscle fibers [29]. Gonzales et al., (2008) the increase in cooking loss to proteolysis and the subsequent decrease in ionic strength [30].

Table3 Results of mean comparison cooking Loss and surface texture of meat

Treatment	Homogeneity	Mean area	Count	Area fraction	Contrast	Entropy	Cooking Loss
Control	^{A} 0.02±0.89	35.4 ^{B}± 711.4	3.61 ^{B}± 109	^{B} 0.63±1.96	0.97 ^{B}± 5.54	0.34 ^{B}± 4.4	0.08 ^{B}± 1.22
Crossed	0.02 ^{B}± 0.7	102.8 ^{A}± 1777.7	3.79 ^{A}± 189.67	1.87 ^{A}± 8.33	0.07 ^{A}± 7.94	0.19 ^{A}± 5.66	0.09 ^{A}± 2.13

Different letters in each column represent statistical difference (P < 0.05)

Color features

The results of the evaluation of the color of the meat samples during the storage period are shown in Table 4. L, a and b indexes of two treatments showed a significant difference (p>0.5). The L index represents the lightness of the sample and during seven days for both treatments, there was an increasing trend and with the passage of time the samples became brighter. Index a increased from the first day to the third day for both treatments, and then a decrease of this index was observed until the seventh day. The b index decreased with time during storage for both samples. Romanov-Arab breed meat had lower a and b index than Arab breed meat. The color of sheep meat is one of the most important factors in the marketability of meat. In general, consumers prefer a pale and pink color. L, a and b values of meat are influenced by nutrition [31-32], production method, weight, breed, sex and type of muscle. In addition, meat has a limited shelf life after partial preparation, and this is a significant economic issue for the meat industry. The color changes over time from oxymyoglobin to metmyoglobin. The non-acceptance of brown meat by consumers is due to the high level of metmyoglobin. The change in meat color can be related to the formation of metmyoglobin. Another factor that has been suggested to have an effect on color stability is the temperature during post mortem [33]. Jacob and Thomson (2012) found that the rapid rate of initial temperature decrease leads to a decrease in color stability [34].

Table 4 Results of mean comparison of the colorimetric durability characteristics during storage

Day	B		A		L	
	Crossed	Control	Crossed	Control	Crossed	Control
1	9.34±0.36 [Ab]	11.22±0.38 [Aa]	12.77±0.05 [Ab]	13.31±0.22 [Aa]	27.27±0.63 [Aa]	25.12±0.43 [Ab]
3	9.63± 0.42 [Ab]	10.91±0.1 [Aa]	9.72±0.38 [Bb]	15.15±0.44 [Ba]	30.94±0.39 [Bb]	34.79±0.55 [Ba]
7	8.10±0.05 [Bb]	10.05± 0.009 [Ba]	10.55± 0.11 [Cb]	12.40±0.23 [Ca]	37.94±0.26 [Cb]	42.69±0.2 [Ca]

Different Capital letters in each column and Lowercase letter in each Line represent statistical difference ($P < 0.05$)

Pictorial features

In this research, the evaluation of the texture image was done with the Gray Level Coherence Matrix (GLCM) method, which is the most widely used among different methods [35]. In this matrix, the number of rows and columns is equal to the number of gray levels, G, in the image. The co-occurrence matrix P (i, j|△x, △y) counts the number of occurrences of a pixel pair in a matrix element separated by pixel distance (△x, △y), with intensities i and j. The matrix element P (i, j| ϴ, h) including the second order shows the statistical probability value of changes between the gray levels i and j at a certain spatial distance (d) and at a certain angle (ϴ) [36]. In the present study, after transferring the images to Image J software, comparison, inverse difference moment (image homogeneity evaluation), entropy (statistical random measurement), indicators of the number of cells, average area of cells and porosity were obtained. In all the above features, the two treatments had significant differences ($P<0.05$). The high values of R2 and R_2 (adj) of the model indicated the adequacy of the model (Table 1). The results of the responses of surface texture features show in table 3, that Arabic-Romanov meat treatment had more contrast, porosity, cell number and average area, but less homogeneity than Arabic meat treatment. Porosity is the ratio of the area of cells to the total area. It is obvious that the higher this ratio represent the greater the number of holes in the tissue [17]. Contrast expresses the intensity of contrast between a pixel and its neighbor in the whole image and indicates the local changes of gray levels. Images with higher contrast mean more heterogeneous points [37]. The decrease in contrast indicates the softer texture of the product and less homogeneity, which is consistent with the higher hardness of Arabic-Romanov meat [38]. The inverse difference moment shows the degree of local homogeneity. Its value is high when the level of the gray position is uniform [35]. Entropy shows the amount of image information that is dependent on the number of pixels on the image [39]. According to the findings of this research, Arabic-Romanov meat has a higher entropy level. The results of the comparison of the mean values of meat surface texture descriptors are reported in Table 3.

Texture features

The average results of tissue evaluation during seven days of storage are shown in Table 5. Examining the results of the texture features of the two treatments during the first to seventh days of storage showed a significant difference. During this period, the hardness, consistency, chewiness and stickiness of the samples were evaluated. The degree of hardness of the samples showed a significant difference ($P<0.05$) during seven days and a decrease in hardness was observed in two treatments. The degree of hardness on the first day reached from 5.18 for Arab breed meat and from 2.55 for Arab-Romanov meat to 1.82 and 1.51 respectively on the seventh day of storage. The reduction of hardness in the meat of the Arab breed has been more frequent and in fact this treatment has become softer and the quality has decreased more than the fresh sample. Also, the cohesiveness, gumminess and chewiness of both treatments decreased during storage. During the entire storage period, the amount of chewiness and gumminess of Arab meat was

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higher. During the storage period, the qualitative and textural features of the samples changed. Meat texture is one of the most important features that affects its quality and consumption. Two main structural components of meat, myofibrillar tissue and connective tissue, are involved in the development of meat quality due to physicochemical effects. Similar results are reported by Heydari et al. [40], who stated that the hardness of Buffalo meat samples decreased during the storage time. In general, the results of the texture evaluation showed that the Arabic-Romanov meat had a higher firmness, consistency, chew ability and a lower stickiness as compare to Arabic muscle sample.

Table 5 Results of mean comparison of the texture durability characteristics during storage

Day	Gumminess (N.s)		Chewiness(N)		Cohesiveness (N.s)		Hardness (N)	
	Crossed	Control	Crossed	Control	Crossed	Control	Crossed	Control
1	1.29±0.07 Ab	2.82±0.1 Aa	1.29±0.07 Ab	2.82±0.1 Aa	0.82±0.01 Aa	0.6±0.01 Ab	2.55±0.11 Ab	5.18± 0.66 Aa
3	0.83±0.04 Ba	1.24±0.1 Ba	0.83±0.04 Ba	1.24±0.1 Ba	0.54±0.02 Ba	0.52±0.02 Ba	1.72±0.14 Bb	3.22±0.45 Ba
7	0.67±0.01 Ca	0.59±0.02 Ca	0.67±0.01 Ca	0.59±0.02 Ca	0.45± 0.03 C a	0.42±0.008 Ca	1.51±0.05 Ba	1.82±0.66 Ca

Different capital letters in each column and lowercase letter in each line represent statistical difference ($P < 0.05$)

4-Conclusion

The results of this research showed that the pH value for Arabic breed meat decreased from an average of 6.33 immediately after slaughter to 5.7 and for the Romanov- Arabic breed meat from an average of 6.36 immediately after slaughter to 6.05 after 168 hours. In general, the meat of Arab-Romanov breed had a higher overall acceptance score and a higher cooking loss. The L index represents the brightness of the sample and it had an increasing trend during the storage of seven days for both treatments. Index a increased from the first day to the third day for both treatments, and then a decrease of this index was observed until the seventh day. But b index decreased during shelf life for both samples. Romanov-Arab breed meat had lower a and b index than Arab breed meat. The results of the responses of the surface texture features show that the Romanov-Arabian meat treatment had more contrast, porosity, cell number and average area but less homogeneity than the Arabic meat treatment. During seven days of storage, the hardness level was observed to decrease in two treatments. The reduction of hardness in the meat of the Arab breed has a greater trend, and in fact, this treatment made the meat softer than the fresh sample and has had a greater loss of quality**.** Also, the gumminess, cohesiveness and chew ability of both treatments decreased during storage. During the entire storage period, the amount of chew ability and gumminess of Arab meat was higher. In general, the meat of the Romanov-Arab breed had a higher overall acceptance score and was also favorable in terms of textural features**.**

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بررسی تاثیر تلقیح نژاد عربی و رومانوف بر ویژگی‌های کیفی گوشت بره طی ماندگاری

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چکیده

در بین انواع مواد غذایی که جهت رفع نیاز فیزیولوژیک انسان به مصرف می‌رسد، پروتئین حیوانی از لحاظ ارزش غذایی و مواد مغذی نسبت به سایر مواد خوردنی با ارزش‌تر است. امروزه مصرف‌کنندگان در جستجوی غذاهای سالم و با کیفیت مطلوب هستند. بنابراین اطلاع از ویژگی‌های کیفی گوشت امری مهم تلقی می‌گردد. در بررسی حاضر خواص کیفی و ماندگاری گوشت دو نژاد عربی و عربی- رومانوف طی یک دوره رسانیدن هفت روزه به صورت طرح کاملاً تصادفی مورد بررسی قرار گرفت. نمونه‌ها از ناحیه فوقانی ران شامل ماهیچه تهیه شد. جهت مطالعه اختلافات بین تیمارها، از روش آنالیز واریانس یک طرفه و آزمون فیشر در سطح آماری ۵٪ استفاده شد و در نهایت تجزیه و تحلیل نتایج با استفاده از برنامه آماری مینی تب نسخه ۱۶ انجام گردید. مقدار pH برای گوشت نژاد عربی از میانگین ۶/۳۳ بلافاصله پس از کشتار به ۵/۷ و برای گوشت نژاد عربی – رومانوف از میانگین ۶/۳۶ بلافاصله پس از کشتار به ۶/۰۵ پس از ۱۶۸ ساعت کاهش پیدا کرد. اختلاف میان مقدار pH در دو نژاد از نظر آماری معنی‌دار نبود. نتایج حاصل از این پژوهش نشان داد که دو نژاد مورد بررسی از نظر ویژگی‌های بافتی، حسی و افت پخت اختلاف معنی‌داری (P<۰/۰۵) داشتند. به طور کلی گوشت نژاد عربی – رومانوف امتیاز پذیرش کلی بیشتری داشته و از نظر ویژگی‌های بافت‌سنجی نیز مطلوب بود.