

Effect of genetic group (Cyprus and Local Male Goats and Their Crosses)on Proximate analysis in LD,SM, and IS muscles

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Abstract

This study was conducted at the Ministry of Agriculture research station ruminants which are located in Akerkov / Abu Ghraib, 23 km west of Baghdad, during the period 01.20.2014 until 03.25.2014. And also conducted some tests in the laboratories of Biotechnology Research Center pertaining to the University of AL-Nahrain. The aim of the study is to have a comparison about the characteristics quality of goat meat, which date back to different genetic groups, namely, (Local, Cypriot and bred crosses). The study showed that there were significant differences ($P < 0.05$) between the different genetic groups regarding proximate analysis when conducting genetic comparisons between local groups and the Cypriot and bred crosses in muscles taken from different parts of the carcasses and all muscles represents a sample taken from that part of it which is the LD (Longissimus dorsi),SM(semimambanosus) and IS(infraspintus). Where it superior the second genetic group (Cypriot) ($P < 0.01$) , on the other genetic groups in protein percentage in muscles studied while, superior ($P < 0.01$) fourth genetic Group (Local with CY) in fat percentage in LD ,IS muscles and was superiority ($P < 0.01$) SM muscle in the third genetic Group (first generation output from the local crosses with Cypriot).As regards to the moisture content there was no differences mention of genetic groups regarding the studied muscle , There was a significant difference ($P < 0.05$) in LD muscle where superior in all three groups on the third genetic Group and the superiority ($P < 0.01$) the fourth genetic group in LD muscle of ash percentage while outperforming the third group of SM and IS muscles.

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تأثير المجاميع الوراثية لذكور الماعز (القبرصي والمحلي وتضريباتهما) على التحليل الكيميائي للعضلات
(LD ، SM و IS)

المستخلص

أجريت هذه الدراسة في محطة ابحاث المجترات التابعة لوزارة الزراعة والتي تقع في عرقوف / ابي غريب 23 كم غرب بغداد ، خلال الفترة 2014/1/20 ولغاية 2014/3/25 . وكذلك اجريت بعض التحاليل في مختبرات قسم التقانات الاحيائية التابعة لجامعة النهرين ، والهدف من هذه الدراسة هو اجراء مقارنة حول جودة خصائص لحم الماعز للمجاميع الوراثية المختلفة ،وهي (ذكور الماعز المحلية، القبرصية وتضريباتهما).

وأظهرت الدراسة أن هناك فروق ذات دلالة إحصائية ($P < 0.05$) بين مجموعات وراثية مختلفة بشأن التحليل الكيميائي للعضلات المدروسة عند إجراء المقارنات بين الجماعات المحلية والقبصلية وتضريباتهما في عضلات مأخوذة من مناطق مختلفة من الذبيحة وجميع العضلات يمثل عينة أخذت من ذلك الجزء والتي هي عضلات LD (Longissimus dorsi) IS (Infraspintus) SM (semimambanosus). فقد تفوقت معنويا المجموعة الوراثية الثانية والتي تمثل الماعز القبرصي ($P < 0.01$) على باقي المجاميع الوراثية في صفة نسبة البروتين في العضلات المدروسة ، في حين تفوقت معنويا ($P < 0.01$) المجموعة الوراثية الرابعة والتي تمثل الماعز المحلي مع القبرصي على باقي المجاميع في صفة نسبة الدهن في العضلات IS , LD في حين تفوقت معنويا ($P < 0.01$) المجموعة الوراثية الثالثة (الجيل الاول) على باقي المجاميع الوراثية في عضلة SM ، اما ما يخص صفة المحتوى الرطوبي لم يكن هناك اي فروقات معنوية تذكر بين المجاميع الوراثية في العضلات SM و IS المدروسة . في حين كان هناك فروقات معنوية ($P < 0.05$) في صفة نسبة الرطوبة في عضلة LD حيث تفوقت المجاميع الوراثية الاولى والثانية وارابعة جميعها على المجموعة الثالثة ، اما صفة نسبة الرماد فقد اوضحت الدراسة وجود فروقات معنوية ($P < 0.01$) حيث تفوقت المجموعة الوراثية الرابعة على باقي المجاميع الوراثية في العضلة LD ، في حين تفوقت المجموعة الوراثية الثانية على باقي المجاميع الوراثية في العضلات SM و IS .

Introduction

Human beings is increasing in demand to the red meat of good quality and have few cholesterol these qualities are present in meat goats over other(12).The goat meat is optimal health meat among as compared with other red meat, which provides more nutritional value and health benefits for the consumer, not only because it contains low fat and cholesterol. Meat goats has great importance lies in its containing the small percentage of saturated fat as compared to other red meat, as well as containing low sodium ratio offset by a high proportion of potassium, and goat meat characterized as containing calories Low heat, and own amino acids from goat meat are similar to that of meat sheep and cows. In statistics of the Arab Organization for Agricultural Development and for the period from 2005 to 2012 showed the last report in 2012 the that the number of goats in Iraq is 1612.00 (thousand heads), (4).

Therefore the objective of this study was : Studying the effect of different genetic groups on the quality characteristics of carcasses. Identify good genetic group or one of their bred crosses depending on the their quality characteristics of carcasses .

Materials and Methods

The study Conducted in the field of ruminants belonging to the Public Authority for Agricultural Research / Ministry of Agriculture Research Station, which is located in Akerkov / Abu Ghraib area (23 km) west of Baghdad for the period from 20/01/2014 until 25/3/2014.The study included 93 male goat age of (10) months ago of four genetic groups, 45 Cypriot and 25 Local and 18 first-generation local cross with Cypriot as follows:(Male Local X female Cypriot) and 5 local cross

with Cypriot , as follows:(Local Male 1/2 + 1/2 Cypriot X 1 / 2 Local + 1/2 Cypriot).the slaughter of animals and measuring the quality of the characteristics by Proximate analysis in LD,SM, and IS muscles.

Proximate analysis

1 Moisture content determination

Moisture content was determined in goat meat samples according to (5) by drying about 15 gm of the sample at 120°C until constant weight was recorded, then the weight difference was calculated , the moisture was determined by the difference weight before and after drying.

2 Protein determination

Total nitrogen was measured according to (5) procedures by using (micro-kjeldhal) procedures and conversion factor of 6.25 extract protein percent in meat sample was used.

3 Fat determination

The percentage of fat in meat was measured by using Soxhlet extraction units according to (5) procedures.

4 Ash determination

Ash is determined according to (5) procedures , 2 gm. of meat was weighted , put in a silica platinum dish , transferred to muffle furnace maintained at (500-600°C)for 6 hours untill grey ash was obtained .It is left to be cooled , then was weighted and then the ash percent to be calculated .

Statistical analysis

Use statistical program Statistical Analysis System -(14) in the data to study the effect of different factors analysis (genetic group - Genotype - Maternal age and the type of birth) in the studied traits according to a random design full (CRD) and by statistical model below, and compared the significant differences between the averages test (8) multi-ranges, as has been regression a number of economic characteristics on the weight of the cold carcass for prediction equations coefficient was calculated.

$$Y_{ijkl} = \mu + B_i + G_j + A_k + T_l + e_{ijklm}$$

As :

yijkl: the value of viewing m

μ : the overall mean

B_i: the effect of genetic group (the study included four genetic groups.

G_j: the effect of the genotype of the gene (MM and MN).

A_k: the effect of maternal age (2-6 years).

T_l: the effect of birth type (1, 2 and 3).

e_{ij}: random error which is distributed naturally equal to zero and an average variation of σ^2_e .

Results and Dissections

Effect of genetic group on proximate analysis in LD,SM, and IS muscles

The genetic variation in the animal's body components depends on the differences between the various animal breeds, which in turn affects the animals resulting from crossbreds of these breeds (16). The great influence of genetics in the meat quality of

the carcass of the animal where different of breeds affect on the chemical composition of the carcass and the tenderness of meat. (11). Table (1) showed the impact of genetic groups of goats on the percentage of protein content in LD muscle were significant differences ($P < 0.01$), where the second group was recorded higher percentage of protein (19.65%) as compared with other groups, while , the first genetic groups was recorded the lowest percentage of protein (14.78%) , and the other genetic groups third and fourth there were no significant differences with each other . As regards the percentage protein in SM muscle notes the existence of a higher percentage of protein in second genetic group ,was reaching 17.78%, it was superior significantly ($P < 0.01$) on the other genetic groups, while third group was recorded 17.13% of the fourth genetic Group 16.75%. The results showed first Group was recorded the lower percentage of protein 15.46% showed from Table (1) a higher percentage of protein appeared in the fourth genetic groups 17.74% ,while, 17.31% and 16.91% in the third and second genetic groups in IS muscle where the significant differences between these muscles did not showed respected but higher than the first genetic group 15.38% . As well as is shown in Table (3) differences ($P < 0.01$) in fat content of LD, SM and IS muscles among genetic groups were observed in table (1). It appears that fourth genetic groups were superior ($P < 0.01$) in fat content (1.26, 0.92%) in LD and IS muscles respectably as a compared to other groups . The third genetic groups founded agreed with both (2) and (3) that the effect of different genetic groups leads to differences between the chemical composition of meat carcasses in different breeds.

The results of this study are different from the results of (6), and who has studied the comparison between the proximate analysis LD,SM and IS muscles in three breeds of Indian goats where that no significant differences between these breeds , but the results agree with the percentage of moisture of the SM and IS muscles , as well as the results of this study do not agree included in the results of its study of goats kids barbari carried out by (1). The current study found a decrease in the percentage of fat in the fourth genetic group with the rest of the other genetic groups in LD muscle and were in line with (6) , but did not agreed with the searches included (13) where was stated that there were no differences between muscles in the percentage of fat, in differences of goat breeds. Results came with Search identical concerning the percentage of protein in the muscle as stated by (9) , who studied the differences between the barbari breed and was brought by(13) who has studied the local Indian breeds.

Table (2) was showed absence of significant differences in IS, SM muscle in percentage moisture % , while the significant differences ($P < 0.05$) in LD muscle where genetic groups fourth, first and second superiority on the third genetic group 81.75, 79.88 0.79, 48 % respectively. As related percentage of ash % in the muscle has superior, the fourth genetic group ($P < 0.01$) in LD muscle (3.13) on the other groups, while the third group is superior in SM and IS muscles (2.85% - 3.43%) respectively on the other genetic groups. significant differences in (percentage moisture % content of the LD muscle and protein, ash and fat %) in the three muscles which used in this study due to the difference in animal genetic groups,

where this study are consistent with a similar study carried out by the (7 and 10), while the current study did not agree in the moisture content of the SM and IS muscles . It is worth mentioning that the tables showed the existence of high moisture rate was in one of the genetic groups in LD muscle (81.75±0.40) while recorded the same muscle in the same genetic group reduction in the amount of fat where was (1.26±0.01) This is agree with (15), which pointed out that any accompanied by an increase in the moisture lead to low in fat at the same studied muscle.

Table (1)Effect of genetic group on Proximate analysis in LD,SM, and IS muscles (Mean ± SE)

Breed (Genetic group)	Mean ± SE					
	LD Protein	SM Protein	IS Protein	LD Fat%	SM Fat%	IS Fat%
Local	14.78±0.1 1 c	15.46±0.08 d	15.38±0.0 8 b	0.65±0.02 d	0.32±0.02 d	0.47±0.01 d
Syrups	19.65±0.0 7 a	17.78±0.08 a	16.91±0.23 a	0.92±0.01 c	0.40±0.00 c	0.60±0.00 c
first-generation	17.35±0.0 4 b	17.13±0.05 b	17.31±0.04 a	1.04±0.02 b	0.70±0.01 a	0.80±0.01 b
local cross with Cypriot	17.42±0.1 0 b	16.75±0.05 c	17.74±0.06 a	1.26±0.01 a	0.66±0.01 b	0.92±0.01 a
Level of significance	**	**	**	**	**	**

Means having different significant difference. ** (P<0.01).

Table (2) Effect of genetic group on proximate analysis in LD,SM and IS muscles (Mean ± SE)

Breed (Genetic group)	Mean ± SE					
	LD Moisture %	SM Moisture %	IS Moisture %	LD Ash	SM Ash	IS Ash
Local	79.88±0.3 2 ab	80.47±0.4 0 a	79.61±0.4 3 a	2.92±0.0 2 c	2.56±0.0 2 c	3.06±0.0 4 b
Syrups	79.48±0.5 0 ab	80.15±0.4 5 a	79.52±0.3 7 a	2.72±0.1 6 d	2.51±0.0 2 c	3.11±0.0 1 b
First-generation	78.06±0.7 7 b	79.70±0.5 9 a	79.47±1.5 0 a	3.02±0.0 2 b	2.85±0.0 1 a	3.43±0.0 4 a
local cross with Cypriot	81.75±0.4 0 ab	81.29±0.3 7 a	80.67±0.4 4 a	3.13±0.0 4 a	2.72±0.0 2 b	3.03±0.0 5 b
Level of significance	*	NS	NS	**	**	**

Means having different significant difference. * (P<0.05). ** (P<0.01).

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