

Study of Milk Production and Some Growth Traits of Local Goats: A Review

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Abstract

This study was conducted on some breeds of local goats bred in Iraq in order to assess the productivity of milk and its components (fat, protein, lactose and non-fat solids) and some growth characteristics represented by birth and weaning weight. It was noted that there are many breeds raised in Iraq, in addition to the local Iraqi black goats and the Marez, such as the Damascene, Cypriot, and Shami goats, the cross goats (Cypriot x local) and many other species, which are characterized by their high production of milk. The results of the study were also showed that there is a large discrepancy in these traits between studies, which may be due to the influence of genetic structures and environmental factors, especially nutrition, management style, animal age, season and year. This variation can be invested in the processes of genetic improvement of local breeds through selection or cross-breeding with foreign breeds and the dissemination of distinguished genetic structures among herds, as well as providing appropriate environmental conditions for breeding, which in turn will lead to improving the productivity of local goats of meat, milk and its products, which will contribute to increasing the level of production.

Key words: goat milk, components milk, growth goat kids.

Introduction

Goats are among the oldest animals that have been domesticated by humans and benefited from their meat, milk and hair. Goats are distinguished from other farm animals in that their food requirements are simple, their early sexual maturity, their high ability to benefit from low-quality feed sources such as shrubs and bushes compared to cows and sheep (Al-Dabbagh, 2011). Goats are characterized by their high ability to live in various environmental conditions to adapt to drought, lack of feed materials, low quality and difficulty in obtaining them, as they are considered among the animals of dry areas, which are difficult for the rest of the domesticated animals to live in. (Hoffmann, 2012). The importance of goats in Iraq shows that these animals are adapted to harsh environmental conditions and poor nutrition. Therefore, improving these animals is important because they have a wide scope for genetic improvement, which contributes to filling part of the deficit resulting from the lack of meat and milk and its high prices (Al-Hamdani, 2000). The number of goats in Iraq in the year 2020 was about 1,328,800 heads (AOAD, 2000), and it comes in the third place after sheep and cows.

Some local breeds, such as the mountain goats, are distinguished by long hair, the local goats with black color, in addition to their ability to walk long distances behind pastures and withstand harsh environmental conditions (Al-Sayegh and Al-Kass, 1992). The process of milk production is one of the functional characteristics of goats, and growth during the lactation stage is one of the

important stages in the life of the kids under any of the breeding systems due to its vital impact on productivity in the future (Shams al-dain, 2005). Goat milk is characterized by containing good quality of protein, minerals and vitamins, in addition to that it does not contain the allergenic Agglutinin protein found in cow's milk, and goat's milk is easier to digest compared to cow's milk despite the similar chemical composition of milk between goats and cows (Reynolds, 2009). The growth represented by the body weight of the kids at weaning reflects the true productivity of the mothers in terms of their production of meat and their ability to produce milk (Abdulrahman et al., 2006). Despite the advantages of goats, they have not received wide attention compared to the rest of other farm animals, and studies on them in the country are scarce. Therefore, this study aimed to review some of the available sources on milk production, its components, goats' weights at birth and weaning and weight gain until weaning age in some local goat breeds.

Review the References

Milk production

Goat's milk is characterized by containing essential nutrients that constitute a source of energy and animal protein. In addition, it contains fatty acids, essential amino acids, vitamins and minerals (Brito et al., 2011). Several studies have been conducted on goats in Iraq to estimate milk yield and shown in Table (1), Hermiz (2001) indicated in study on local goats and their crosses that the daily milk yield (DMY) and total milk yield (TMY) amounted to 456 g and 71.03 kg, respectively. Shams al-dain (2005) noted that the total and commercial milk yield of local Mariz goats of 2.5-4.5 years of age reached 104.82 and 24.58 kg, respectively, during a production season of 128.03 days. Ali (2010) showed that the TMY of local goats aged 2.5-5 years was 66.77 liters for a 140-day production season. In a study conducted by Al-Dabbagh et al. (2011) on Shami goats raised in Iraq, they found that the DMY and TMY was 913.77 g and 194.08 kg, respectively during 199.56 days. Al-Kudsi et al. (2011) observed that the DMY of Damascus goats raised in Iraq was 390, 930, 1010 and 1010 g during weeks 1, 2, 3 and 4, respectively. Al-Musodi (2011) mentioned in study on Black local goats at the age of 3-4 years that the TMY up to the sixth week was 17.65 kg. Dosky et al. (2012) found that the DMY of the local goats was 559.16 g. In another study on meriz goats during their first productive season, Khrofa (2013) noticed that the overall mean of DMY during weeks 2, 4, 6, 8, 10 and 12 of lactation was 365, 330, 345, 315, 310 and 325 g, respectively. Al-Dabbagh et al. (2014) obtained in study of Damascus goats raised in Iraq DMY was 949.99 g. Al-Azawi et al. (2015) showed that the overall mean of DMY of local goats was 405 g. In another study on local goats, Khadom et al. (2016) observed that the overall mean of daily, monthly and TMY was 978.90 g, 27.42 and 137.35 kg, respectively. In a study conducted by Al-Azzawi (2016) on local goats and Damascus goats raised in Iraq under semi-intensive breeding conditions, the overall mean of milk yield during 60 days was 55.60 and 61.77 kg, respectively, and during 120 days, it was 103.25 and 118.01 kg for both breeds, respectively. Al-Abbasy et al. (2017) conducted a study on Cypriot goats raised in Iraq and found that the overall mean of DMY during the months of June, July and August was 675.14, 539.28 and 446.04 g, respectively. In another study on Shami goats raised in Iraq, the overall mean of DMY and seasonal milk yield was 1.955 and 176.70 kg, respectively (Raoof et al., 2017). Abdel-Lattif (2017) explained in study on local goats that the overall mean of DMY during the lactation period was 540.56 g. In study on Black local goats, Al-Musodi (2018) indicated that the weekly milk yield was 2.92, 2.96, 3.08, 3.42, 3.36, and 3.00 kg during weeks 1, 2, 3, 4, 5, and 6, respectively. Ali (2018) showed in study on Damascus goats in Iraq that the overall mean of DMY during the 1, 2 and 3 months was 262.21, 342.35 and 357.43 g, respectively. Khalil and Jassim (2018) reported in study on local and Shami goats in central Iraq that the overall mean for TMY was 201.71 and 160.41 kg, respectively.

Al-Mallah et al. (2018) indicated in study on Damascus goats in Iraq that the overall mean of DMY was 959 g. In a study on Meriz goats which is two-year-old, Abdul-Rahman and Sultan (2019) found that the DMY during weeks 2, 4, 6, 8, 10 and 12 of the lactation period was 625.00, 661.42, 626.42, 562.14, 509.28 and 521.42 g, respectively. Awwad and Shwayel (2020) estimated milk yield on Black local goats at the age of 3 years, and found the overall mean of weekly milk yield from one to 11 week was 5.53 kg. Ahmed (2022) noted in his study on local goats that the average daily and total milk yield during the lactation period amounted to 486.75 kg and 27.2 g, respectively. This variation in milk yield between studies may be due to the influence of several genetic, nutritional and environmental factors (Al-Jumaily, 2001, Peana et al., 2007, Abdullah and Hassan, 2008), as well as the effect of sequence, type of birth, year and length of season (Bocquier and Caja, 1993).

Milk components

Knowing the chemical and physical composition of milk and the changes taking place in the ratios of its main components such as protein, fat and lactose contribute largely in determining the nutritional value of milk (Taher et al., 2011). Barnett and Fredrick (2000) reported that goat milk contains a higher percentage of fat and ash than cow's milk, in addition to containing a high quality of protein, minerals and vitamins (Al-Azawi et al., 2015). Several studies have been conducted to estimate milk components in some local goat breeds, which are shown in Table (2).

Table (1): Milk production in some local goat breeds and goats raised in Iraq.

Source and year	Breed	Overall mean of DMY (g)	Total Milk yield TMY (kg)
Hermiz (2001)	Local cross	456	71.03
Shams al-dain (2005)	Local al-mariz goats	819	104.82
Ali (2010)	Local goats	477	66.77
Al-Dabbagh et al. (2011)	Damascus goats	913.77	194.08
Al-Musodi (2011)	Black local goats	-----	17.65
Dosky et al. (2012)	Local al-mariz goats	559.16	-----
Al-Dabbagh et al. (2014)	Damascus goats	949.99	-----
Al-Azawi et al. (2015)	Local goats	405	-----
Khadom et al. (2016)	Local goats	978.90	137.35
Al-Azzawi (2016)	Local goats	-----	103.25
Al-Abbasy et al. (2017)	Damascus goats	-----	118.01
Raoof et al. (2017)	Cypriot goats	553.49	-----
Abdel-Latif (2017)	Shami goats	1.955	176.70
Al-Musodi (2018)	Local goats	540.56	-----
Ali (2018)	Black local goats	-----	18.74
Khalil and Jassim (2018)	Damascus goats	320.66	-----
Al-Mallah et al. (2018)	Local goats	-----	201.71
Abdul-Rahman and Sultan (2019)	Damascus goats	-----	160.41
	Damascus goats	959	-----
Ahmed (2022)	Al-mariz goats	584.28	-----
	Local goats	486.75	27.25

Shams al-dain (2005) indicated in study on local Mariz goats that the percentage of fat and protein in milk was 3.61% and 3.36%, respectively. Taher et al. (2011) observed that the percentage of fat, protein, lactose and solids non-fat in goat milk was 3.44%, 3.35%, 4.26% and 8.27%, respectively. Al-Dabbagh et al. (2011) showed in study on Damascus goats raised in Iraq that the overall mean of the percentage of fat, protein, lactose and solids non-fat in milk was 3.39%, 3.21%, 4.76% and 8.68%, respectively. In another study on the same breed, Al-Kudsi et al. (2011) that the percentage of fat in milk was 3.46%, 4.00%, 3.67%, 4.35%, and the percentage of protein 3.22%, 3.33%, 3.35% and

3.18% while the percentage of lactose was 4.56%, 5.07%, 4.72% and 4.71% during weeks 1, 2, 3 and 4, respectively. Dosky et al. (2012) conducted a study on local Mariz goats and obtained an overall mean of 3.32% and 4.59% of fat and protein in milk, respectively. In a study of the chemical composition of goat milk, Jassim et al. (2013) obtained higher values for fat and lower values for protein, which were 4.3, 3.5, 4.8, and 8.6% for the percentage of fat, protein, lactose and solids non-fat, respectively. Al-Dabbagh et al. (2014) found that the proportions of these four components in the milk of Damascus goats raised in Iraq, they were 3.00, 3.28, 4.89 and 8.95%, respectively.

Table (2): Milk Components in some local goat breeds and goats raised in Iraq.

Source and year	Breed	%Fat	%Protein	%Lactose	%SNF
Shams al-dain (2005)	Local al-mariz goats	3.61 3.44	3.36 3.35	---- 4.26	---- 8.27
Taher et al. (2011)	Local goats	3.39	3.21	4.76	8.68
Al-Dabbagh et al. (2011)	Damascus gouts	3.32 4.3	4.59 3.5	---- 4.8	---- 8.6
Dosky et al. (2012)	Local al-mariz goats	3.0 3.17	3.28 3.00	4.89 4.41	8.95 ----
Jassim et al.(2013)	Local goats	2.90	2.96	4.43	----
Al-Dabbagh et al. (2014)	Damascus	2.87	2.99	4.49	----
Al-Azawi et al. (2015)	gouts	3.19	3.32	----	----
	Cyprus gouts	3.91	3.39	4.60	8.84
	Local goats	3.85	3.12	4.32	8.04
	(Cyprus×Local)	3.54	3.57	----	----
Khadom et al. (2016)	Local goats	3.16	3.42	----	----
	Local al-mariz goats	3.94	3.26	4.89	8.68
Sharaf et al. (2017)	goats				
Ali (2018)	Damascus	3.03	2.44	3.74	----
Khalil and Jassim (2018)	gouts	2.93	2.51	3.82	----
	Local goats	3.02	2.95	3.35	----
	Damascus	3.04	2.84	3.76	----
Al-Mallah et al. (2018)	gouts	3.09	2.54	3.86	----
	Damascus				
Awwad and Shwayel (2020)	gouts	2.34	3.26	4.65	9.10
	Black local goats	2.34	3.22	4.75	9.01
Week 2		2.40	3.71	5.32	9.68
Week 4		2.86	3.40	5.13	9.32
Week 8					
Week 10					
Week 12					
Ahmed (2022)					
Week 2	Local goats				
Week 4					
Week 6					
Week 8					

Al-Azawi et al. (2015) showed that the percentage of fat in the milk of Cyprus, local and (Cyprus× local) goats was 3.17, 2.90 and 2.87%, respectively, and the percentage of protein was 3.00, 2.96, and 2.99%, respectively, while the percentage of lactose was 4.41%, 4.43% and 4.49%, respectively. Khadom et al. (2016) observed that the percentage of fat and protein in local goat milk was 3.19% and 3.32%, respectively. In a study of the chemical composition of milk of mountain goats (Al-Merize) Sharaf et al. (2017) showed that the percentage of fat, protein, lactose and solids non-fat amounted to 3.91%, 3.39%, 4.60% and 8.84%, respectively. While Ali (2018) indicated that the

percentage of these four components in the milk of the Damascus goat raised in Iraq was 3.85, 3.12, 4.32, and 8.04%, respectively. In a study on local and Damascus goats in central Iraq, Khalil and Jassim (2018) obtained similar values for the percentage of fat and protein, were 3.54%, 3.57% for local and 3.16%, 3.42% for Damascus, respectively. Also in Damascus goats and those raised in Iraq, Al-Mallah et al. (2018) reported that the percentage of fat, protein, lactose and solids non-fat was 3.94%, 3.26%, 4.89%

and 8.68%, respectively. Abdul-Rahman and Sultan (2019) reported in study on Al-Meriz goats that the percentage of fat in the milk were 3.30, 3.02%, 3.37%, 3.49%, 3.66% and 3.80% during weeks 2, 4, 6, 8, 10 and 12 of the lactation period, respectively. Awwad and Shwayel (2020) found in study on Black local goats that the percentage of fat in milk was 3.03%, 2.93%, 3.02%, 3.04% and 3.09%, the percentage of protein was 2.44%, 2.51%, 2.95%, 2.84% and 2.54%, while the percentage of lactose was 3.74%, 3.82%, 3.35%, 3.76%, and 3.86% during weeks 2, 4, 8, 10 and 12 after birth, respectively. Ahmed (2022) mentioned in his study on local goats that the fat percentage in milk was 2.34%, 2.34%, 2.40% and 2.86%, and the protein percentage was 3.26%, 3.22%, 3.71% and 3.40%, while the lactose percentage was 4.65%, 4.75%, 5.32% and 5.13%, and the percentage of solids non fat in milk was 9.10%, 9.01%, 9.68% and 9.32% during weeks 2, 4, 6 and 8 of lactation, respectively. The variation in milk components between studies may be attributed to the influence of genetic and environmental factors such as nutrition, production stage, animal age, season, climatic influences, milking regime, milking time, udder health, and others (Al-Juwari, 2021).

Birth weight

Birth weight is one of the important economic indicators due to its positive correlation with post-birth weights (Misra et al. 1985). Therefore, newborns with high birth weights have higher during later ages than low birth weights, In addition their close relationship with mortality rates. Body weight of kids at birth is affected by several factors, including genetics such as breed, and environmental ones such as nutrition, management, mother's age, mother's weight at birth, birth type, gender of the kids and season of birth (McManus et al. 2008).

Many studies have been conducted on the local goats and their crosses to find out the weights of the goats at birth (Table 3). Abd al-Rahman et al. (2006) showed in their study on local and Shami cross goats that the birth weights at birth were 3.10, 3.10, 3.03, 2.94 and 2.95 kg for newborns born from dam aged 2, 3, 4, 5 and 6 years, respectively. Al-Barzanji (2012) observed in his study on Al-Muraz goats that the goats born from mothers aged 2, 3, 4, 5 and 6 years old had weights of 1.22, 3.17, 3.89, 4.10 and 3.10 kg, respectively. Hermiz et al. (2014) noted in their study on Shami goats that the births obtained from mothers at 2 and 5 years of age were 3.47 and 4.64 kg, respectively. Manati et al. (2015) showed in their study of Cypriot and local goats and their crosses that the birth weights of dams aged 2, 3, 4, 5 and 6 years were 2.84, 2.93, 2.82, 2.93 and 3.35 kg, respectively. Al-Khazraji et al. (2016) showed in their study on Shami and local goats that the birth weight of newborns born to mothers aged 2, 3 and 4 years was 2.59, 2.46 and 2.30 kg, respectively. On the other hand, Al-Qasimi et al. (2016) showed in their study on 57 offspring of battered goats that the birth weights were 3.18, 3.31 and 3.35 kg, respectively, for the kids born to dams aged 2, 3 and 4 years, respectively. As for Hermiz and Baper (2019), they indicated in their study on domestic goats that the goats' weights at birth for dams aged 2.5, 3.5, 4.5 and 5.5 years were 2.71, 2.73, 2.61 and 2.55 kg, respectively. The reason for the different birth weights according to the ages of their dams may be attributed to the large size of the uterus affected by age, which leads to creating an environment and suitable conditions for the growth of the fetus. In addition, mature mothers provide a large part of their food for the fetus because they have passed the growth stage, while young mothers share their

fetuses in the food, they eat to complete their growth and development physiologically (Zaman et al. 2002). On the other hand, the lack of influence of the dam's age at birth on the birth weight may be due to the increase in twin births with the increase in the age of the mother and the limited size of the uterus during pregnancy, which negatively affects the weight of the offspring (Abd al-Rahman et al., 2006). While Hermiz et al. (2014) confirmed in their study on Shami goats raised in Iraq that the birth weights were 4.24 and 3.59 kg for goats born during the winter and autumn seasons, respectively. Manati et al. (2015) observed in their study that the birth weights of goats were 3.23, 3.13, 2.87 and 2.82 kg during the months of January, February, March and April, respectively. Al-Khazraji et al. (2016) showed in their study that the birth weights of goats were 2.76, 2.54, 2.36 and 2.59 kg for goats born during the summer, winter, spring and autumn seasons, respectively. Hermiz and Baber (2019) indicated that the weights of camels were 2.73 and 2.57 kg for camels born in spring and winter, respectively.

Table (3): Birth and weaning weight in Iraqi Goats for dams in different ages.

Source and year	Age of doe (years)	Birth weight (kg)	Weaning weight (kg)
Abdulrahman et al (2006)	2	3.10	11.92
	3	3.10	13.94
	4	3.03	13.37
	5	2.94	13.56
	6	2.95	13.30
	7 <	2.87	12.82
Khdyer (2009)	2	---	10.11
	3	---	11.27
	4	---	11.40
	5	---	15.92
Al-Barzinji (2012)	2	---	12.21
	3	---	12.35
	4	---	13.95
	5	---	15.49
	6 <	---	12.27
Hermiz et al (2014)	2	3.47	16.55
	3	3.59	16.12
	4	3.96	16.17
	5 <	4.64	17.60
Mnati et al (2015)	1	3.01	15.10
	2	2.84	15.23
	3	2.93	16.58
	4	2.82	15.12
	5	2.93	14.88
	6	3.35	16.63
	7	2.98	15.90
	8 <	2.84	14.80
Al-Qasimi et al (2016)	2	3.18	12.57
	3	3.31	12.97
	4	3.35	12.29
Al-Khazraji et al (2016)	2	2.59	15.97
	3	2.46	14.57
	4	2.30	14.16

Hermiz and Baper (2019)	2.5	2.71	14.04
	3.5	2.73	14.59
	4.5	2.61	14.63
	5.5	2.55	14.67

Perhaps this variance in birth weights at birth is due to the difference in environmental conditions, including temperatures, as well as the quality of available pastures and the amount of feed the mothers eat, especially in the last period of pregnancy (Jawasreh, 2003).

Weaning weight

Growth traits, including body weight at different ages, are of great importance to goat breeders in relation to the economic return from the herd. The differences in body weight are the result of the influence of several factors, including what is hereditary that the individual carries in her genetic makeup, and what is environmental. In this regard, a number of studies have confirmed that the sex of the newborn, the weight and age of the mother at birth, and the season of birth are among the most important factors affecting body weight after weaning (Leymaster et al. 2003 and Ruvuna et al. 1991). Abdulrahman et al. (2006) noticed that the difference in the weights of the kids at weaning according to the age of the mother was close, as the weaning weights ranged from 11.92 kg for the rams of two-year-old mothers to 13.94 kg for the ancestors of mothers at the age of 3 and then decreased to 12.82 kg for the mothers of the age 7 years. Al-Khazraji et al. (2016) showed that the weaning weight of newborns was 15.97, 14.57, and 14.16 kg resulting from mothers aged 2, 3 and 4 years, respectively. Khudair (2009) explained in his study that the weights of kids at weaning were 10.11 and 15.92 kg kids from mothers aged 2 and 5 years, respectively. Al-Barzanji (2012) indicated that the newborn from the mothers aged 2, 3, 4, 5, 6 < years gave weaning weights reached 12.21, 12.35, 13.95, 15.49 and 12.27 kg, respectively. Hermiz et al. (2014) observed that the kids of Shami goats born to mothers aged 2, 3, 4, 5 < years achieved weaning weights of 16.55, 16.12, 16.17 and 17.60 kg, respectively. Manati et al. (2015) showed that the weight at weaning of goats born from mothers whose ages ranged between 1 and 8 years were 15.10, 15.23, 16.58, 15.12, 14.88, 16.63, 15.90, and 14.80 kg, respectively.

Al-Qasimi et al. (2016) indicated that the goats born to mothers aged of 2, 3 and 4 years gave weaning weights of 12.57, 12.97 and 12.29 kg, respectively. The advancing females in age and their weight increases, accompanied by an increase in the size of the alimentary canal and an increase in the efficiency of utilizing the available feed materials, which is positively reflected on the weight of the newborns resulting from those mothers and their subsequent growth rates (Al-Hasnawi 1986). Hermiz and Baper (2019) confirmed that the weights at weaning were 14.04, 14.59, 14.63 and 14.67 kg for kids born to mothers aged 2.5, 3.5, 4.5 and 5.5 years, respectively.

Table (4): Birth and Weaning weight in Iraqi Goats at different season.

Source and year	Season of Kidding	Birth weight (kg)	Weaning weight (kg)
Al-Barzinji (2012)	Winter	---	10.44
	spring	---	16.08
Hermiz et al (2014)	Winter	4.24	16.85
	Autumn	3.59	16.40
Mnati et al (2015)	January	3.23	18.68
	March	2.87	16.23
	April	2.82	16.47
Al-Khazragi et al (2016)	Winter	2.54	15.32
	Spring	2.36	14.51
	Autumn	2.59	17.00
	Summer	2.70	13.50

Hermiz and Baper (2019)	Winter	2.57	15.00
	Spring	2.73	13.96

Table (4) shows the weights of goats born in different seasons. Al-Barzanji (2012) showed that the weaning weights were 16.08 and 10.44 kg for kids born during the spring and winter season, respectively. Hermiz et al. (2014) indicated that the weaning weights of the kids were 16.85 and 16.40 kg for winter and autumn deliveries, respectively. Manati et al. (2015) observed that the weaning weight was 18.68, 16.23 and 16.47 kg for goats born in January, March and April, respectively. Al-Khazraji et al. (2016) showed that the weaning weight was 17, 15.32, 14.51 and 13.50 kg for goats born in the winter, spring, summer and autumn seasons, respectively. Hermiz and Baper (2019) reported that kids born in winter and spring achieved weaning weights of 15.00 and 13.96 cfm, respectively. The differences in the weight of the goats at weaning may be attributed to the difference in temperatures, the amount of feed, the quality of pastures available, and the amount of feed the goats eat, which in turn affects the milk productivity of the mothers (Al-Azzawi, 2011).

Conclusion

It is concluded from this study that the local goats are characterized by their high ability to live in various environmental conditions to adapt to drought, and the lack of feed materials, as they are considered among the animals of dry areas, There is a discrepancy in its productive qualities, and selection, cross, and the provision of appropriate conditions and care will contribute to increasing its productivity of meat and milk.

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Conflicts of interest: Researchers confirm that this research does not harm the interests of others.

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دراسة إنتاج الحليب وبعض صفات النمو في الماعز المحلي: مراجعة

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الملخص

أجريت هذه الدراسة على بعض سلالات الماعز المحلي المربي في العراق بهدف تقييم قابليته الإنتاجية من الحليب ومكوناته (الدهن والبروتين اللاكتوز والمواد الصلبة اللادهنية)، وبعض صفات النمو المتمثلة بوزن الميلاد ووزن الفطام. ولوحظ وجود سلالات عديدة تربي في العراق إضافة إلى الماعز المحلي العراقي الأسود والمرعز كالماعز الدمشقي والقبرصي والشامي والماعز المضرب (قبرصي × محلي) والعديد من الأنواع الأخرى والتي تتميز بإنتاجها العالي من الحليب، وبينت نتائج الدراسة أيضاً وجود تباين كبير في هذه الصفات بين الدراسات والذي ربما قد يعود إلى تأثير التراكيب الوراثية والعوامل البيئية وخاصة التغذية وأسلوب الإدارة وعمر الحيوان والموسم والسنة وغيرها من العوامل البيئية الأخرى وبالإمكان استثمار هذا التباين في عمليات التحسين الوراثي للسلالات المحلية عن طريق الانتخاب أو التضريب مع السلالات الأجنبية ونشر التراكيب الوراثية المتميزة بين القطعان، فضلاً عن توفير الظروف البيئية الملائمة للتربية والتي بدورها ستؤدي إلى تحسين إنتاجية الماعز المحلي من اللحوم والحليب ومنتجاته والتي ستسهم في زيادة مستوى الإنتاج.

الكلمات المفتاحية: حليب الماعز، مكونات الحليب، نمو جداء الماعز.