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The Colostrum Content Comparison of Awassi and Çukurova Meat Type Sheep Breeds in Mediternean Conditions

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Abstract: ***The aim of this study to compare colostrum content of awassi and çukurova meat type sheep breeds in mediternean conditions. Colostrum quality and content is very important factor for lamb mortality rate. The colostrum composition (protein, fat, moisture, ash, pH and fatty acid content) is influenced by many factors such as calving season, lactation number, dry period length, maternal diseases, age and breed. Awassi is the most important and common breed in the semi - arid regions. Çukurova meat type sheep is also a result of improved meat type sheep quest to meet the needs red meat demand in Turkey. In this study, the chemical and fatty acid composition of colostrums of two sheep genotype as local Awassi (AW, n = 6) and Çukurova Meat Type Sheep breed (CMTS, n = 6), raised in city of Adana, where the Mediterranean conditions. Animal material of the research were kept under semi - intensive conditions in subtropical Mediterranean climate. As a result, it was determined that, the protein ratio was lower ofCMTS (10.90 %) than local AW (18, 60 %) while fat ratio ofCMTS (12, 93 ± 1, 04) higher thanAW (10.91 %). According to results of the analysis of fatty acids contents, it has been determined that∑SFA rate was higher in CMTS (54.70) while ∑MUFA (38.92) and ∑PUFA (3.67) rates were higher inAW.***

Keywords: Mediterranean Region, sheep, colostrum, chemical composition, fatty acid ratios

1. Introduction

The importance of red meat and milk in healthy human nutrition is indisputable. However, it requires a worldwide effort to meet this need. One of the most frequently used methods for increasing productivity in sheep farming is the studies of crossbreeding the genotype. It can be said that sheep breeding studies in Turkey started with the establishment of the Republic. First studies have come to the fore with merinoization in order to produce quality fleece. later on, breeding studies of domestic breeds in the direction of lamb, meat and milk yield have intensified. However, it is concluded that the domestic sheep breeds are at a level that cannot respond to selection and crossbreeding programs were emphasized in the researches. In breeding studies, on the one hand, crossbreedingprograms are carried out, on the other hand, basic genetic material is used in these crosses and ure breeding and selection of the yields of domestic sheep breeds used asappears to have been demonstrated by many studies. In order to meet the increasing need for red meat, many studies have been conducted to improve meat yield in sheep and to prevent lamb losses. Turkey Cukurova meat type sheep is also a result of improved meat type sheep quest to meet the needs red meat of Turkey red meat demand. Çukurova Meat Type Sheep (CMTS) was developed by Çukurova University Faculty of Agriculture in a study carried out to improve the meat yield of local Awassi sheep (AW). CMTS has an average of 3/8 Rambouillet, 3/8 Ile de France, 1/8 Awassi and 1/8 Sakız blood. The high twinning rate in meat type sheep requires that these types produce milk with the quality and quantity to feed the offspring. Comparing to improved genotype with Awassi sheep, the native gene source and has high milk performance, is important in terms of determining the characteristics of the breed. Information about the colostrum quality of CMTS is very limited. Since the composition of colostrum varies from breed to breed (Loste et al.2008, Godden, 2008), information on the chemical content and immunological composition of the colostrum in CMTS and Awassi sheep breeds will play an important role in assessing whether it is sufficient for the health of the newborn. Colostrum quality and content is very important factor for lamb mortality rate. Colostrum, is very rich in terms of the nutrients it contains, is an important nutrient for newborn lambs and which contains many biological active substances that are also effective on specific functions (Kıvrak, 2012). The importance of colostrum in the nutrition of lambs is due to the fact that it contains protein, carbohydrates, fat, vitamins and minerals as well as some biological active molecules necessary for the body's immune and growth functions (Bayarer et al., 2006). The concentration of these components in colostrum, the season of offspring, the number of lactations, the length of the dry period, the diseases of the mother suffered, the volume of colostrum produced, age, breed, etc.

Therefore, the study was carried out to compare the characteristics of crossbred types with native ones by comparing the chemical and immunological quality of the colostrums of the two genotypes.

2. Material and Method

In the study, six CMTS and sixlocal Awassisheep were selected with the same age, healthy and similar characteristics in Çukurova University Agriculture Faculty Research and Application Farm Sheep Enterprise in Adana province were used. Çukurova Beef Sheep used in the research; It carries an average of 3/8 Rambouillet, 3/8 Ile de France, 1/8 Awassi and 1/8 Sakız sheep blood. Colostrum samples were collected in 16 hours after birth. Before collecting the colostrum samples, the nipple of each animal was washed several times with water and dried using a paper towel. The colostrum samples were first poured into a

container, the samples taken by mixing were transferred to clean and dry sterile tubes and stored under appropriate cooling conditions until analyzed in the laboratory. The pH, protein, oil, moisture, ash and fatty acid profile of colostrum samples were analysed in the Fishery and Processing Technology Laboratory of the Faculty of Fisheries of Çukurova University.

Biochemical Analysis

Lipid analysis was performed according to the method applied by Bligh and Dyer (1959).15 g of homogenized sample is added to 120 ml of methanol / chloroform (1/2) and mixed in the homogenizer. Then, 20 ml of 0.4% $CaCl_2$ solution was added to these samples and filtered through filter paper (Scleicher & Schuell, 5951/2 185 mm). After the samples were kept in the oven for 1 hour at 105°C, the tared flask was filtered. These balloons were closed in an airtight place, kept in a dark environment for 1 night, and the next day the upper layer consisting of methanol - water was removed with the help of a separatory funnel. Chloroform was blown from the chloroform - lipid part remaining in the balloons using an evaporator in a water bath at 60°C. Afterwards, the balloons were left in the oven for 1 hour at 90°C and all of the chloroform in it was allowed to fly, and it was cooled to room temperature in a desiccator and weighed on a sensitive sensitivity scale of 0.1 mg.

Lipid samples were converted to their constituent fatty acid methyl esters by the method of Ichihara et al. (1996), by using 2 M KOH in methanol and n - heptane with minor modifications. Twenty mg of extracted oil was dissolved in 2 ml n - heptane followed by 4 ml of 2 M methanolic KOH. The tube was then vortexed for 2 min at room temperature. After centrifugation at 4, 000 rpm for 10 min, the n - heptane layer was taken for gas chromatography analyses.

Gas chromatographic condition

The fatty acid composition was analysed by a GC Clarus 500 with an autosampler (Perkin Elmer, Shelton, CT, USA) equipped with a flame ionization detector and a fused silica capillary SGE column (30 m 3 0.32 mm ID 3 0.25 mm BP20 0.25 UM, USA). The oven temperature was 140 °C held for 5 min, raised to 200°C at a rate of 4°C/min and then to 220°C at a rate of 1°C/min, while the injector and detector temperatures were set at 220 and 280°C, respectively. The sample size was 1 ml and the carrier gas was controlled at 16 ps. The split used was 1: 100.

pH analysis was measured using a digital pH meter (WTW 315i pHMeter; Weilheim, Germany).5 ml of colostrum was taken and mixed for 5 minutes in 50 ml of pure water (1/10). The pH of the colostrum was measured by immersing the pH meter in this solution.

Total crude protein analysis was performed according to the Kjeldahl method (AOAC, 1984). On 1 g homogenized sample in Kjeldahl tubes, 2 Kjeldahl Tablets (Merck, TP826558) and 20 mlH_2SO_4 were added and the samples were burned in the incinerator for 2 - 3 hours until they turned green. After reaching room temperature, 75 ml of water was added to the tube in which the sample was found. Distillation was performed for 6 minutes with 40% NaOH by placing 25 ml of 40% boric acid (H_3BO_3) solution in the erlen, by placing the kjeldahl tubes on the kjeldahl device. The solution in the flask taken from the Kjeldahl device was titrated with 0.1 M HCl until the color was transparent.

Crude ash analysis was performed according to the AOAC (920.153., 2002) method. The porcelain crucibles used in the analysis were first dried in the oven at 103ºC for 2 hours, and after cooling in the desiccator, the tare was taken on a sensitive scale of 0.1 mg. Weighed 3.3 - 5 g of the sample homogenized into the crucibles. These samples were burned at +550ºC for 4 hours until the color was light gray and then cooled to room temperature in the desiccator and weighed on a sensitive scale.

Moisture analysis was performed on the basis of the AOAC (950.46., 2002) method. Crucibles were survived for 1 hour at 105°C in the oven and after cooling for 30 minutes in the desiccator, it was tared in a sensitive balance of 0.1mg. Approximately 4 - 5g of homogenized sample was weighed to crucibles and dried at 105°C (24 hours). After this procedure, they were placed in the desiccator to cool down to room temperature and the results were recorded by weighing on a sensitive scale of 0.1mg.

Statistical analyses

All experiments were carried out in triplicate and the results were reported as the mean and standard deviation of these measurements. A one - way analysis of variance (ANOVA) was run using the SPSS version 19 software (SPSS, Chicago, IL, USA). p value of <0.05 were run to determine significant differences.

3. Results and Discussion

The protein, fat, moisture, ash and pH profile of colostrums taken from Awassi and CMTS ewes, 16 hours after birth were given in Table 1.

Table 1: Mean and standart errors of chemical composition, of Awassi and CMTS ewes colostrums.

Traits	CMTS	Awassi	Significance
Protein (%)	10, 90±3, 16	18, 60±0, 31	0.001*
Yağ (%)	12, 93±1, 04	10, 91±0, 92	0.012*
Nem (%)	67, 86±0, 22	61, 87±0, 30	0.000*
Kül (%)	1, 19±0, 22	1, 81±0, 15	0.000*
pH	6, 26±0, 05	6, 12±0, 01	0.001*

*p<0.05

The role of proteins in colostrum, lambs' growth, development and protection from diseases arises from the amino acid and glycoprotein in its structure. These amino acids and glycoproteins in protein structure; Serum albumin (regulates osmotic pressure in the blood), α - lactalbumin (acts in the synthesis of lactose), β - lactoglobulin (vital for calves due to the methionone element it contains), Immunoglobulin G (supports the immune system of lambs), α, β and κ - casein (provides calcium and phosphate to newborn mammals), lactoferrin (plays an important role in absorbing iron from the mucous membrane of the intestine, has an important effect on the immune response of the organism), lysozyme (causes bacteria to degenerate by penetrating into the outer cell wall) and lactoperoxidase (shows bactericidal properties against Gram - positive bacteria and bacteriostatic properties against Gram negative

bacteria) (Pecka - Kiełb, 2018) explains the importance of protein content in colostrum.

Protein content in colostrum was found to be 10.90% in CMTS sheep and 18.60% in Awassi sheep. When Table 1 was examined, it was seen that the protein ratios of two breeds' colostrums were statistically significant ($p < 0.05$). Considering these rates, it was seen that the protein ratio was higher in Awassi sheep. Potočnik et al. (2011) found the protein ratio in sheep to be 20% in their studies. It is seen that this rate is higher than the protein ratios as given in Table 1. Ciuryk et al. (2004) calculated the protein ratio as 6.6% in their studies. Also it is seen that this value is lower than the rates in Table 1. Kessler et al. (2019) determined protein ratios as Merino 22.49%, Valais Blacknose 21.93%, Swiss White Alpine 21.80%, Brown - Headed Breef breed 20.30%, Gray Horned Heath 19.29%, Swiss Charollais 17.55%, Black - Headed German 20.27%. When Table 1 was examined, it was seen that the protein ratios of CMTS and Awassi sheep have a lower rate than other breeds, were stated previous studies, except Swiss Charollais.

The pH of colostrum was lower than normal milk. Some authors also reported that the pH of the colostrum was initially low and increased over time after delivery (Madsen et al., 2004; Tsioulpas et al., 2007; Jeong et al., 2009). The exact cause of low colostrum pH is unknown. In the prenatal period, the permeability of the mammary gland increases and thus more blood components join the structure of the milk. Given that colostrum contains much more blood components than milk, it was highly likely that there was a pH closer to the blood (pH 7.35 to 7.45). Sebela and Klicnik (1977) reported that low colostrum pH value was caused by an increase in protein, dihydrogen phosphate, citrate and carbon dioxide concentration.

McCarthy and Singh (2009) reported that colostrum pH varied between 6.0 and 6.61 at birth and calculated an average of 6.32, and this value increased over time and the pH reached 6.5 after 2 weeks. In Table 1, colostrum pH was found to be 6.26 in CMTS sheep and 6.12 inAwassi sheep. These rates were similar to other studies. Differences between two breeds' colostrum pH ratios were found to be statistically significant ($p<0.05$).

In animal colostrum, besides proteins, fats serve as an important energy source, as well. Studies have indicated that the colostrum fat content is higher than that of milk (Foley and Otterby 1978; Marnila and Korohnen 2002). Ciuryk et al. (2004) collected colostrum samples from Polish Merino sheep 12 hours after birth and found that fat rates as 10.8%. This ratio was higher in Awassi and CMTS sheep.

Abd El - fattah et al. (2012) reported that the colostrum fat content of Holstein cows decreased from 8.04%. to 3.9%, in 5 days after birth. In Table 1, the fat ratio of CMTS Sheep was calculated as 12.93% while Awassi sheep's as 10.91%. In addition, it was seen that the fat ratio of CMTS sheep is higher than local Awassi. Kessler et al. (2019) found fat rates in Merino 7.44%, Valais Blacknose 6.93%, Swiss White Alpine 12.16%, Brown - Headed Beef13.64%, Gray Horned Heath 6.47%, Swiss Charollais 8.05%, Black - Headed German 10.42%, respectively. The fat ratios of CMTS and Awassi sheep were determined higher than Merinos, Valais Blacknose, Gray Horned Heath, Swiss Charollais and Black Headed German breeds. The differences in the fat ratios of colostrums between breeds were found to be significant ($p <0.05$).

It is seen that the moisture rate of CMTS sheep colostrum (67.86%) was higher than that of Awassi sheep (61.87%), and the colostrum ash rate (1.81%) of Awassi sheep was higher than CMTS sheep (1.19%). The difference between colostrums moisture and ash ratios were found to be significant ($p<0.05$).

The fatty acids in colostrum play a role in the regulation of many physiological events. Some of these events are changes made in the gene expression of lipogenic and lipolytic enzymes and proteins (Clarke, 2001), regulation of energy metabolism (Kremmyda et al., 2011; Skiba et al., 2015), and it could protect the health of the offspring. Therefore, the consumption of fatty acids provides the potential to increase productivity and production in animals by regulating the above events. The rates of colostrum fatty acids of two genotypes were given in Table 2.

Table 2: Fatty acids ratios inAwassi and CMTS sheep colostrums

Name of fatty acids	Formula	Awassi (%)	CMTS (%)	Significance
Butyric acid	C4: 0	1, 37±0, 00	2, 27±0, 00	0, 751
Caproic acid	C6: 0	0, 70±0, 38	0, 61±0, 00	0, 596
Caprylic acid	C8: 0	0, 62±0, 05	0, 50±0, 04	0, 404
Capric acid	C10: 0	1, 95±1, 06	1, 61±0, 021	0, 464
Myristic acid	C14: 0	9, 16±0, 35	10, 46±1, 79	0, 302
Myristoleic acid	C14: 1	0, 24±0, 14	0, 46±0, 10	0, 100
Pentadecanoic acid	C15: 0	0, 58±0, 21	0, 45±0, 05	0, 235
Methylpentadecanoate	C15: 1	0, 24±0, 08	0, 17±0, 01	0, 091
Palmitic acid	C16: 0	26, 95±0, 63	27, 78±2, 63	0, 782
Palmitoleic acid	C16: 1	1, 15±0, 20	1, 48±0, 01	0, 024*
Margaric acid	C17: 0	1, 09±0, 03	1, 13±0, 10	0, 576
Heptadecenoic acid	C17: 1	0, 76±0, 02	0, 59±0, 07	0, 002*
Stearic acid	C18: 0	8, 81±1, 34	8, 88±1, 32	0, 959
Oleic acid	C18: 1n9	35, 11±3, 92	32, 41±4, 25	0, 343
Vaccenic acid	C18: 1n7	1, 26±0, 19	0, 95±0, 17	0, 067
Linoleic acid	C18: 2n6	2, 61±0, 35	2, 60±0, 03	0, 819
Alfa Linolenic acid	C18.3n3	0, 43±0, 00	0, 42±0, 01	0, 137

Gama Linolenic acid	C18: 3n6	0, 35±0, 06	0, 18±0, 02	0, 004*
Arachidic acid	C20: 0	0, 96±0, 08	0, 83±0, 06	0, 014*
Eicosanoic acid	C20: 1n9	0, 11±0, 00	0, 10±0, 01	0, 016*
Eicosadienoic acid	C20: 2n6	0, 06±0, 00	0, 06±0, 01	0, 374
Erucic acid	C22: 1n9		0, 33±0, 08	
Behenic acid	C22: 0	0, 10±0, 04	0, 06±0, 00	0, 065
Docosahexaenoic acid	C22: 6n3	0, 13±0, 01	0, 08±0, 03	0, 028*
Homo - γ –Linolenic acid	C20: 3n6	0, 09±0, 01	0, 08±0, 01	0, 101
Nervonic acid	C24: 1n9	0, 05±0, 01	0, 16±0, 04	0, 008*
Lignoceric acid	C24: 0	0, 21±0, 05	0, 12±0, 01	0, 014*

*p<0.05

As seen in Table 2, palmitoleic acid, heptadecenoic acid, gamma linolenic acid, arachidic acid, eicosanoic acid, nervonic acid and lignoceric acid, differences between breeds were significant (p <0.05) according to the results ofcolostrum fatty acidsanalysis.

It is understood that butyric acid, myristic acid, myristoleic acid, palmitic acid, palmitoleic acid, margaric acid, stearic acid and nervonic acid ratios were higher in CMTS Sheeps. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) were bioactive fatty acids and increase the use of fatty acids from nutrients by increasing the transcription of lipolytic genes and reducing the transcription of lipogenic genes and this event provides more energy production (Clarke, 2001). In Table 2, it was seen that the docosahexaenoic acid ratio was higher in Awassi Sheep.

Fatty acids	*Awassi (%)*	*CMTS (%)*
C4: 0	1, 37±0, 00	2, 27±0, 00
C6: 0	0, 70±0, 38	0, 61±0, 00
C8: 0	0, 62±0, 05	0, 50±0, 04
C10: 0	1, 95±1, 06	1, 61±0, 021
C14: 0	9, 16±0, 35	10, 46±1, 79
C15: 0	0, 58±0, 21	0, 45±0, 05
C16: 0	26, 95±0, 63	27, 78±2, 63
C17: 0	1, 09±0, 03	1, 13±0, 10
C18: 0	8, 81±1, 34	8, 88±1, 32
C20: 0	0, 96±0, 08	0, 83±0, 06
C22: 0	0, 10±0, 04	0, 06±0, 00
C24: 0	0, 21±0, 05	0, 12±0, 01
∑ SFA	**52.50**	**54, 70**
C14: 1	0, 24±0, 14	0, 46±0, 10
C15: 1	0, 24±0, 08	0, 17±0, 01
C16: 1	1, 15±0, 20	1, 48±0, 01
C17: 1	0, 76±0, 02	0, 59±0, 07
C18: 1n7	1, 26±0, 19	0, 95±0, 17
C18: 1n9	35, 11±3, 92	32, 41±4, 25
C20: 1n9	0, 11±0, 00	0, 10±0, 01
C22: 1n9		0, 33±0, 08
C24: 1n9	0, 05±0, 01	0, 16±0, 04
∑ MUFA	**38, 92**	**36, 65**
C18: 2n6	2, 61±0, 35	2, 60±0, 03
C18: 3n6	0, 35±0, 06	0, 18±0, 02
C18: 3n3	0, 43±0, 00	0, 42±0, 01
C20: 2n6	0, 06±0, 00	0, 06±0, 01
C20: 3n6	0, 09±0, 01	0, 08±0, 01
C22: 6 n3	0, 13±0, 01	0, 08±0, 03
∑ PUFA	**3, 67**	**3, 42**
MUFA/SFA	0, 74	0, 67
PUFA/SFA	0, 07	0, 06
PUFA/MUFA	0, 09	0, 09
∑n6	2, 76	2, 92
∑n3	0, 56	0, 50
n6/n3	4, 93	5, 84

It is seen in Table 2 that nervonic acid, which has important duties, had a higher rate in ÇBS Sheep. It was stated that nervonic acid (C24: 1n9) was an essential component of the neuronal membrane (Amminger et al., 2012) and also played a very important role in problems such as early myelination (Kinney et al., 1988), peroxisomal disorders (Moser et al., 1999) and malnutrition (Yeh, 1998). The ability of the offspring to synthesize fatty acids after birth was weak and the ratios in their bodies were insufficient to support brain development (Gibson et al., 1994). After birth, the offspring continue to take nervonic acid from the colostrum for optimal development of the brain.

Table 3. ∑SFA, ∑MUFA and ∑PUFA ratios of colostrum fatty acids

Or - Rashid et al. (2010) in their study C6: 0, C8: 0, C10: 0, C14: 0, C14: 1, C15: 0, C16: 0, C18.3n3 fatty acid ratios (respectively; 1.58%, 1.39%, 4.01%, 14.93%, 0.69%, 0.74%, 33.96%, 1.15%) found higher rates than the fatty acids, of which mentioned in Table 2.

Ciuryk et al. (2004) found the C6: 0, C8: 0, C10: 0, C17: 1, C18: 0, C18: 2 fatty acids in the colostrum samples, were taken 12 hours after birth, as 0.97%, 0.79%, 2.23%, 1.02%, 8.01%, 0.95%, respectively. When Table 2 was examined, it was seen that C6: 0, C8: 0, C10: 0, C17: 1 fatty acid ratios were lower, while C18: 0 and C18: 2 ratios were higher.

Massouras et al. (2015) stated that colostrum fatty acid ratiosof two Greek sheep breeds were differed. Considering the colostrum fatty acid rates taken on the 1st day of birth, C4: 0, C6: 0, C8: 0, C10: 0, C14: 0, C16: 1, C18: 2n6 (3.48%, 1.18%, 1.67%, 3.34%, 12.90%, 1.81%, 2.85% respectively) rate higher than the rate stated in Table 2. In their study also they found C17: 0, C18: 0, C18: 1n9 (5.81%, 0.28%, 28.56% respectively) fatty acid ratios lower than the rate indicated in Table 2. In addition, Massouras et al. (2015) indicated that, as the C12: 0 ratio as 3.30%, but the fatty acid was not detected in either breed as indicated in Table 2.

Pavlíková et al. (2010) calculated the fatty acid ratios of C4: 0, C6: 0, C8: 0, C10: 0, C14: 0, C16: 0, which they detected in the colostrum on the first day of birth, respectively, as 1.90%, 0.94%, 0.75%, 2.37%, 12.51%, 29.46%. These fatty acids were detected lower rate. The rates of colostrum fatty acids of two genotypes were given in Table 2. .

It is seen in Table 3 that the fatty acid ratios are different between reeds. It is seen that ∑SFA rate is higher in CMTS sheep and ∑MUFA and ∑PUFA rates were higher in Awassi sheep.

In their study, Boure (2005) showed that n3 - PUFA, a long - chain fatty acid, plays an important role in the development and preservation of brain, retina and nerve tissue in ruminants. Table 3 showed that the rate of n3 - PUFA was higher in Awassi sheep. In addition, in vitro studies, it had been reported that PUFA (CLA; linoleic acid, LA; a - linolenic acid, ALA; arachidonic acid, AA; and eicosapentaenoic acid, EPA) positively affect the health of the offspring (Shingfield et al., 2008).

Or - Rashid et al. (2010) calculated ∑SFA rate as 68.69%, ∑MUFA rate as 26.15% and ∑PUFA rate as 4.38%. When Table 3 is examined, ∑SFA and ∑PUFA rates were lower and ∑MUFA rate is higherthat the findings stated above. In addition, Or - Rashid et al. (2010) stated that ∑n6: 2.69, ∑n3: 1.69 and n6 / n3: 1.59. It was seen that ∑n6 and ∑n3 rates were higher while n6 / n3 ratios were lower.

In the study of colostrum fatty acids of two breeds in our study, different from Greek sheep, Massouras et al. (2015) found ∑SFA rates of breeds 62.69% and 57.22%, ∑MUFA 31.22% and 38.67%, ∑PUFA 4.02% and 5.06%. When Table 3 was analyzed, it was seen that ∑SFA and ∑PUFA ratios were lower while ∑MUFA ratios were similar.

Ciuryk et al. (2004) Polish Merino sheep found colostrum ∑SFA rates 54.3%, ∑MUFA rates 33.8% and ∑PUFA rates 4.3%. Additionally, ∑SFA rates were lower in Awassi sheep (52.50) and higher in CMTS Sheep (54, 70), ∑MUFA rates were higher in both breeds, on contrary ∑PUFA rates were lower in both breeds.

4. Conclusion

One of the most frequently used methods for increasing productivity in sheep farming is the studies of crossbreeding the genotype. Çukurova Meat Type Sheep (CMTS) was developed by Çukurova University Faculty of Agriculture in a study carried out to improve the meat yield of local Awassi sheep (AW). CMTS has an average of 3/8 Rambouillet, 3/8 Ile de France, 1/8 Awassi and 1/8 Sakız blood. The high twinning rate in meat type sheep requires that these types produce milk with the quality and quantity to feed the offspring. Comparing to improved genotype with Awassi sheep, the native gene source and has high milk performance, is important in terms of determining the characteristics of the breed. As a result, palmitoleic acid, heptadecenoic acid, gamma linolenic acid, arachidic acid, eicosanoic acid, nervonic acid and lignoceric acid, differences between breeds were significant ($p < 0.05$) accoridng to the results of colostrum fatty acids analysis. It is understood that butyric acid, myristic acid, myristoleic acid, palmitic acid, palmitoleic acid, margaric acid, stearic acid and nervonic acid ratios were higher in CMTS Sheeps. Also, it was seen that the docosahexaenoic acid ratio was higher in Awassi Sheep. In adition to this, nervonic acid, which has important duties, had a higher rate in ÇBS Sheep.

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