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Differences in Physical Quality Tests of Sapera Goat Milk at Different Milking Times

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ABSTRACT

The aim of this research was to determine the physical quality of sapera goat milk at different milking times from the Bamboe Koening Farm Sukoharjo goat farm. There are 10 lactating female sapera goats. Milk samples were taken three times, 100 ml each for each treatment, at Bamboe Koening Farm Sukoharjo. The experimental design used the Independent Student T-Test with 2 treatments and 10 repetitions. The treatments in this research were A, namely morning milking and B, namely afternoon milking. The variables were observed for pH value, specific gravity, fat content, protein content, boiling value and reductase value. The results of this study show that the pH value, fat content and protein content have a real influence, while specific gravity, boiling value, alcohol value and reductase value have no real influence.

1. Introduction [Heading of Section]

Sapera goats are the result of crossbreeding between male Saanen goats and female PE goats. This cross-breeding produces goats which are usually called Sapera, short for Saanen Peranakan Etawa (Kaleka and Haryadi, 2013). Milk productivity and quality are influenced by milking management, one of the things that can influence milk quality is the milking interval. Milking is usually done twice a day, namely in the morning and evening. The same time interval between morning and evening milking will produce relatively little changes in milk composition, while different milking time intervals will produce different milk composition as well. Apart from that, environmental factors in the form of different cage temperatures between morning and evening can also influence the microbiology contained in milked milk, so it is necessary to test the physical, chemical and microbiological quality of fresh goat milk at different milking times which is then compared with applicable standards. so it is safe for consumption (Akbar et al., 2018).

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Soeharsono (2008) stated that the climatological environment is thought to influence milk quality and production. The quality of milk during afternoon milking is higher, but the amount of milk produced is less due to increasing temperatures during the day which affects physiological conditions. On the other hand, in the morning milking the quality is lower with higher milk production due to physiological conditions which tend to rest at night.

2. State of the Art

2.1. Sapera goats [Heading of Section]

According to (Kaleka and Haryadi, 2013), Sapera goats are the result of crossbreeding between male Saanen goats and female PE goats. This cross-breeding produces goats which are usually called Sapera, an abbreviation of Saanen Peranakan Etawa.

Sapera goats are able to achieve a lactation period of up to one year, as long as they are not bred in the early lactation period, very far from PE which is only able to lactation for 5-6 months, after which it experiences a dry period (Atabany, 2001).

2.2. Milk

Milk has high nutritional value, because it contains chemical elements needed by the body, such as high levels of protein and fat. The main constituents of milk are water (87.9%), protein (3.5%), fat (3.5-4.2%), vitamins and minerals (0.85%) (Estiasih and Ahmadi, 2009).

Its high nutritional value means that milk is an excellent medium for microorganisms to grow and develop, so that in a very short time milk becomes unfit for consumption if not handled properly (Mennane et al., 2007).

2.3. Physical quality of milk

The physical properties of milk indicate the condition of the milk which can be tested using the five senses such as the color of the milk. The color of milk can change from one color to another. This depends on the breed of livestock, type of feed, amount and nature of weak ingredients, solid ingredients, and color-forming compounds (Yusuf, 2010).

Milk quality consists of specific gravity, fat content and grade. The greater the amount of concentrate given increases the specific gravity of the milk and reduces the fat of the milk. Things that influence the decline in milk quality include the cleanliness of milking equipment, livestock health, livestock cleanliness, worker cleanliness, drum conditions, milk room conditions, feeding methods, disease and milk storage.

3. Method

Time and Place of Research

Milk collection was carried out at Bamboe Koening Farm Sukoharjo, where analysis took place at the Veteran Bangun Nusantara Sukoharjo University Laboratory for 2 months from December 2023 to January 2024.

Tools and materials

The tools used in the research were a digital pH meter, measuring cup, lactodensimeter, test tube, tube clamp, pipette, lactoscan, glass funnel, burette, analytical balance.

The ingredients used are Sapera goat milk, 70% alcohol, methylene blue (MB), distilled water.

Research procedure

This research was to analyze the physical quality of Sapera goat's milk by testing it in the laboratory.

Milk samples were taken directly from goat breeders at Bamboe Koening Farm. 10 goats. The samples taken were 100 ml of freshly milked milk directly from goats.

Sapera goat milk samples were added with distilled water, 50 ml of distilled water. Before the pH meter is used, the indicator number must be calibrated using neutral pH. After the indicator number on the

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pH meter is stable, the pH meter electrode is dipped into the sample, then the pH value obtained is read.

The 70 ml milk sample is stirred by pouring it from one measuring cup to another carefully without causing foam so that the milk is evenly distributed. Then add the homogenized milk ±2/3 measuring cup. After that, the lactodensimeter is inserted into the measuring cup. Wait until the shaking stops.

Then BJ (on the scale indicated by the lactodensimeter) and the temperature is read (the thermometer is dipped in milk). The numbers on the lactodensimeter that are read show the second and third numbers after the comma.

Pour 20 ml of milk into the sample glass, then place the sample into the sample holder in the form of an iron funnel then press enter and wait about 1 minute until the results come out. Fat content is written with code F.

Pour 20 ml of milk into the sample glass, then place the sample into the sample holder in the form of an iron funnel then press enter and wait about 1 minute until the results come out. Protein content is written with the code P.

A sample of 5 ml of milk was put into a test tube using a tube clamp, then the tube was heated using a Bunsen flame until it boiled. The boiling test shows a positive result (the milk quality is not good) if there are lumps attached to the wall of the test tube, while a negative result does not occur if there are lumps of milk on the wall of the test tube.

Put 10 ml of milk into a test tube, add 1 ml of methylene blue and cover the test tube with cotton wool, cover it again with aluminum foil, then incubate it in an incubator at a temperature of 30 degrees Celsius. Observations were made by looking at the change in color from blue to white every 1 hour.

This research consisted of 2 treatments and 10 samples and 3 repetitions resulting in 20 experimental units. The treatments used in this research are as follows: A: Sapera goat milking time is 08.00 WIB (morning). B : Sapera goat milking time is 15.00 WIB (afternoon).

Data analysis

The data obtained from the research results will be analyzed using the Independent t Test with the Static Product and Service Solutions (SPSS) software application to determine whether there are differences in treatment.

4. Results and Discussion

The results of the analysis of pH value, specific gravity (BJ), fat content, protein content, boiling point, reductase value of sapera goat milk during morning and evening milking can be seen in Table 1 below:

Table 1. pH value, specific gravity (BJ), fat content, protein content, boiling point, reductase value in sapera goats during morning (A) and afternoon (B) milking

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Parameter	Treatment	Treatment
	A	B
pH*	**6.73**[a]	**6.63**[b]
Specific gravity (mL-3) ns	**1,028**	**1,026**
Fat level (%)*	**2.51**[a]	**4.24**[b]
Protein content (%)*	**3.98**[a]	**3.54**[b]
Boiling point (°C) ns	**92.76**	**93.03**
Reductase value (hours) ns	**4.55**	**4.54**

Note: ns is non-significant (P>0.05)

* significant (P<0.05)

The results of the t test analysis showed that pH had a significant effect (P<0.05) on the milking time of sapera goats. Based on the table, it can be seen that the average pH during morning milking tends to increase by 6.73 compared to afternoon milking, which is 6.63. The pH value can be interpreted as a Journal of Veterinary Medicine Umar, et al., 1945 condition that is alkaline or acidic. The formation of acid in milk is caused by the activity of bacteria which break down lactose to form lactic acid. The percentage of acid in milk can be used as an indicator of milk age and handling (Soewedo, 1982).

The results of this research are also strengthened by previous research conducted by (Arifin, M. 2016) in his research showing that the results of statistical analysis of milking time had no significant effect (P<0.05) on the pH value of milk from morning milking and afternoon milking goats. In the morning milking the average yield was 6,746 and 6,614 in the afternoon milking. Milking time does not affect the pH of goat milk. The pH value of fresh milk as a result of research is in accordance with SNI standards, namely in the range of 6.3-6.8. The difference in pH value in milk is likely due to the higher microbial contamination of morning milk compared to afternoon milk. This is in accordance with Swadayana et al. (2012) who stated that microbial contamination in milk can influence changes in milk pH.

The results of the t test analysis showed that specific gravity had no significant influence (P>0.05) on the milking time of sapera goats. Based on the table, it can be seen that the average specific gravity in morning milking tends to increase by 1.028 compared to afternoon milking, which is 1.026. The difference in specific gravity values is caused by the total solid/dry matter content of milk in afternoon milking being higher than morning milk. This is in accordance with the opinion of Ecles et al. (1984) who stated that the factors that influence changes in the specific gravity of milk are the milk itself which consists of protein, fat, lactose, gas and minerals in milk. The average specific gravity of milk shows that morning milking is in accordance with the minimum limit of the Indonesian National Standard (SNI 2011), namely 1.027, while afternoon milking is not in accordance with SNI because the value is <1.027.

The results of this research are also strengthened by previous research conducted by (Arifin, M. 2016) in his research showing that specific gravity has no significant effect (P<0.05) on milking time. Goat milk from afternoon milking was higher (1.032) than morning milking from goat milk (1.025). It can be seen that there is a difference in the specific gravity between morning milking milk and afternoon milking milk, although analysis of variance shows that it is not significantly different. The difference in specific gravity values is caused by the total solid/dry matter content of milk in afternoon milking being higher than morning milk.

The results of the t test analysis showed that fat content had a significant influence (P<0.05) on the milking time of sapera goats. Based on the table, it can be seen that the average fat content in morning milking tends to decrease by 2.51% compared to afternoon milking, which is 4.24%. It can be seen that there is a difference in the average value of milk for morning milking and afternoon milking. This is

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because the time interval for milking in the morning is longer than in the afternoon, namely with an interval of 7 and 17 hours (Mardalena 2008). According to Budiwiyono et al. (1980) milking time produces a very real influence on milk fat content where milk fat content in the afternoon is higher than in the morning. Apart from that, according to Davendra and Burns (1994) the type of feed can influence the quality of milk composition. Concentrate feed is given by breeders in the morning, but this feed will only be synthesized in milk during afternoon milking, so the composition of afternoon milk is better than that in the morning. The average milk fat content shows that evening milking is in accordance with the minimum limit of the Indonesian National Standard (SNI 2011), namely 3.0%. Meanwhile, milk expressed in the morning does not comply with SNI because the value is <3.0%.

The research results were also strengthened by previous research conducted by (Arifin, M. Oktaviana, A. 2016) in his research showing that analysis of diversity showed that the milk fat content of morning milking milk and afternoon milking milk had a significant difference (P<0.05). With the average milk fat content in the morning milking being lower at 5.53% and in the afternoon milking being higher at 7.83%.

The results of the t test analysis showed that protein levels had a significant effect (P<0.05) on the milking time of sapera goats. Based on the table, it can be seen that the average protein in morning milking tends to increase by 3.98% compared to afternoon milking, which is 3.54%. This difference is due to the different types of feed given and different milking time intervals. According to Zurriyati et al. (2011), good quality feed for livestock tends to increase the non-fat solid content in milk. The quality of the combination of forage food balanced with concentrate, tofu dregs, etc. will produce better protein content compared to feed that is only given forage food. Protein is one of the non-fat solid components (dry matter without fat). The average protein content shows that for morning and evening milking it is in accordance with the Indonesian National Standard (2011), namely with a minimum limit of 2.8%.

The results of this research are also strengthened by previous research conducted by (Arifin, M. Negara, J. 2016) in his research showing that milking time provides a significant difference (P<0.05) in the protein content between morning milking (higher) and afternoon milking (lower).

The results of the t test analysis showed that the boiling test had no significant effect (P>0.05) on the milking time of sapera goats. Based on the table above, it can be seen that the average boiling during morning milking tends to decrease by 92.76ºC when compared to afternoon milking, which is 93.03ºC. Based on the Indonesian National Standard (SNI, 1998) the boiling point ranges from 100.02-100.08ºC. It can be said that the boiling value is not significantly different between the two treatments because it is at temperatures of 92.76ºC and 93.03ºC.

From the data obtained, the data shows a trend in milk that is not good from the two treatments. According to Dwitania and Swacita (2013), if the milk breaks or curdles when boiling, the quality of the milk is included in the bad category and the milk is declared positive. This means that the milk is still in good condition and has not been contaminated, this is because the water coat surrounding the casein is still in good and stable condition which means that the milk casein does not break and curdle when heated. When the test was carried out, no clotting occurred because the casein in the milk was still in good condition. If the milk is still homogeneous and does not break, the milk is included in the good category and is declared negative. The difference in the boiling point of milk is caused by the water content in the milk. The boiling point of milk is very dependent on the amount of water content (Sukarini, 2006).

Based on the t test analysis, the difference in milk reductase time for milking sapera goats in the morning and evening did not have a significant effect (P>0.05). This can be caused by the number of milk bacteria at each milking time.

The results of the reductase test in two treatments, namely morning and evening milking, showed that the morning milking was positive at 4.55 and the afternoon milking was positive at 4.54. Good results are in accordance with those set by the Indonesian National Standards (SNI), namely above 5 hours. According to Van Den Berg (1998), a reductase time above 5 hours indicates very good milk quality, but

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if seen from this study this is not the case because the reductase time is less than 5 hours, but the number of bacteria is more than that determined by SNI standards because of the reductase test cannot be used as a benchmark in estimating the number of bacteria. How long or not the color of methylene blue in milk changes is influenced by the number of bacteria in the milk (Sari et al., 2023).

5. Conclusions

The results of this study can be concluded that the difference in milking time for sapera goats shows that pH, fat content and protein content have a real influence. Meanwhile, specific gravity, boiling, alcohol and reductase have no real influence.

6. References

[1] Akbar, R.R. Heni, I. Lia , B.S. 2018. Analisis Perbandingan Performa Reproduksi Kambing Saanen Dan Peranakan Etawa (Kasus Di BBPTUHPT Baturraden). Jurnal Ilmu Peternakan (JANHUS) 3 (2) : 27-32.

[2] Andi Novita, Razali, Umar. 2015. Derajat Keasaman dan Angka Reduktase Susu Sapi Pasteurisasi dengan Lama Penyimpanan yang Berbeda. Jurnal Media Veterinaria, ISSN : 08531943.

[3] Arifin, M. Oktaviana, A. Wihansah, R. Yusuf Rifkan, M. Negara, J. Sio, A. (2016). Kualitas Fisik Kimia dan Mikrobiologi Susu Kambing Pada Waktu Pemerahan yang Berbeda di Peternakan Changkurawok, Balumbang Jaya, Bogor. Jurnal Ilmu Produksi Dan Teknologi Hasil Peternakan, 04 No.02 J, 291–295.

[4] Atabany, A. 2001. Studi kasus produksi kambing Peranakan Ettawa dan kambing Saanen pada peternakan kambing Barokah dan PT Taurus Dairy Farm. Tesis Program Pasca Sarjana,Institut Pertanian Bogor,Bogor.

[5] Budiwiyono, D., M. Sabrani, D. Lubis dan H. Setiyanto. 1980. Evaluasi kualitas susu pemerahan pagi dan sore hari di Daerah Pengalengan dan Lembang. Bull. Bandung (ID): LPP. 25 :24.

[6] Devendra, C. dan M. Burns. 1994. Produksi Kambing di Daerah Tropis. Penerbit ITB. Bandung.

[7] Dwitania, D. C dan I. B. N. Swacita. 2013. Uji Didih, Alkohol Dan Derajat Asam Susu Sapi Kemasan Yang Dijual Di Pasar Tradisional Kota Denpasar. Indonesia Medicus Veterinus 2(4):437-444.

[8] Eckles, C.H, W.R. Corm dan H. macy. 1984. Milk and Milk product 4th. The Mac Graw Hill Publisher Inc, denvile Ikkinois.

[9] Estiasih T, Ahmadi K. 2016. Teknologi Pengolahan Pangan. Jakarta: Rajawali Press.

[10] Kaleka, N. dan N. K. Haryadi. 2013. Kambing Perah. Penerbit Arcita. Solo.

[11] Mardalena, M. (2008). Pengaruh Waktu Pemerahan dan Tingkat Laktasi terhadap Kualitas Susu Sapi Perah Peranakan Fries Holstein. Jurnal Ilmiah Ilmu-Ilmu Peternakan, 11(3), 107–111.

[12] Mennane Z, Ouhssine MK, Elyachioni M. 2007. Hygenic quality of raw cow's milk feeding from domestic waste in two regions in Morocco. Int. J. Agric. Biol. 9(1): 46-48.

[13] Soeharsono. 2008. Laktasi Produksi dan Peranan Air Susu Bagi Kehidupan Manusia. Widya Padjajaran. Bandung.

[14] Soewedo. 1982. Teknik Uji Mutu Susu dan Hasil Olahannya. Penerbit Liberty, Yogyakarta.

[15] Sukarini. (2006). Produksi dan Komposisi Air Susu Kambing Peranakan Etawah yang Diberi Tambahan Konsentrat Pada Awal Laktasi.

[16] Swadayana P, Sambodho, Budi arti. 2012. Total bakteri dan pH susu akibat lama waktu diping puting kambing peranakan ettawa laktasi. Animal Agricultural Journal 1. (1): 1221 .

[17] Utami, R. T., Fitriani, I., Aminy, S. L., Safitri, M., Sari, W. K., Sari, D. M., dan Syaputri, Y. (2023). MIKROBIOLOGI. PT. Sonpedia Publishing Indonesia.

[18] Van Der Berg., J.C.T. 1988. Dairy Technology in the Tropics and Subtropics. PUDOC. Wageningen.

[19] Yusuf, R. 2010. Kandungan protein susu sapi perah Friesian Holstein akibat pemberian pakan yang meangandung tepung katu (Sauropus androgynous(1.)merr yang berbeda. Jurnal Teknologi Pertanian: 6: 1-6.

[20] Zurriyati, Y., Noor, R. R., Maheswari, R. R. A. 2011. Analisis molekuler genotipekappa kasein

https://doi.org/10.30736/jt.v15i1.238

ISSN 2684-6799(On line)
C. S. Purwati, et. al./Jurnal Ternak 15 (1) 2024 pp. 26-32 ISSN2086-5201(Print)

(kasein) dan komposisi susu kambing Peranakan Etawah, Saanen dan Persilangannya. Jurnal Ilmu Ternak dan Veteriner. 16(1) : 61-70.