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Description Of The Quality Of Etawa Breeding Goat Meat At Room Temperature Viewed From Color And Smell Raised In Bali

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Abstract. The offsring of etawa goat (PE) is one of the local goat breeds that are often found in Indonesia, including in Bali island. Assessment of the quality of PE goat meat is one of the things that needs to be considered because it is often equated with other types of livestock meat, this occurs due to the lack of publications regarding the assessment of the quality of goat meat, especially PE goat meat. Color and smell are aspects of the assessment of a meat quality. The aim of this study was to investigate the quality of PE goat meat at room temperature in terms of color and smell within 24 hours. Samples were taken from goat farms in Desa Serpang, Kecamatan Busungbiu Kabupaten Buleleng, Provinsi Bali. The goat samples taken were meat from goats shortly after slaughtered. Tests carried out on PE goat meat were color and odor tests, color tests were carried out using SNI color standards, while odor tests were tested by panelists. This study used a descriptive-quantitative model with ANOVA test and continued with Duncan's test.

Keywords: PE Goat; Color; Smell; Time

I. INTRODUCTION

The goat population in Indonesia is quite large in addition to other livestock populations. In Indonesia, there are currently 8 types of local goats including Marica goat, Samosir goat, Kosta goat, Gembrong goat, Bengal goat, Peranakan Etawa (PE) goat, and kacang goat. The goat population in Indonesia is dominated by kacang and etawa goats[1].

Crossbreeding is sometimes necessary to obtain the best quality goats. Crossbreeding is one way to improve the quality of genes, which is a shortcut to obtaining individuals with better traits than their parents [2]. The Etawa crossbreed goat is a hybrid goat from the Etawa goat and kacang goat, this goat is quite popular because it has dual-purpose characteristics. Besides being able to produce milk, these goats can also be used as meat goats and PE

goats have physical resistance to extreme conditions[3].

Meat is a livestock product which is a source of high quality animal protein and is widely consumed by the public to meet the body's need for essential amino acids. Goat meat is a popular choice of meat and is widely traded in addition to beef and other livestock meat. The level of goat meat production in Indonesia in 2019 was 72,852.33 tons, in 2020 it was 61,711.22 tons, and in 2021 it was 61,724.99 tons[4], while the total goat meat production in Bali Province in 2019 was 1,746.16, in 2020 it will be 1,839 tons, and in 2021 it will be 1,959 tons.

The purchasing power of consumers in choosing meat refers to the quality or quality of the meat. Meat quality can be seen from physical quality and chemical quality. Meat quality is influenced by factors before and after slaughter. Goat meat products are widely traded in traditional markets, location and environmental conditions can affect the quality of the meat. To guarantee the safety of meat quality, it is necessary to examine the condition of the meat both in terms of physical and chemical aspects.

Society pays great attention to physical inspection of meat, consumers will buy meat based on the visuals of meat on the market. However, knowledge related to differences in the assessment of mutton and other types of livestock meat tends to be equated[5]. One aspect that becomes a consumer's visual assessment is color and smell. Research related to the assessment of the quality of mutton is still relatively small so that information related to theoretical references that can be used as references by the public is still very minimal.

Based on the background above, it is necessary to publish information related to the physical assessment of goat meat to see the trend of changes in meat quality in terms of color and smell.

II. MATERIAL AND METHOD

This study used samples from 4 Etawah Peranakan (PE) goats aged over 2 years who were clinically healthy. samples were taken as much as 50 grams from each PE goat. The goat used came from Busungbiu District, Buleleng Regency, Bali, the meat part taken as a sample was musculus longissimus dorsi.

PE Goat Meat Color Assessment

Assessment of the color of PE goat meat is done by looking at the color of the muscle surface and matching it with a color standard. The color score value is determined based on the color standard score that best matches the color of the meat. The meat color standard consists of nine scores ranging from pink to dark red[6]

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PE Meat Odor Test

In the odor test, four PE goat meat samples used five criteria, namely the smell of fresh meat (prengus) which was given a score of five, a slightly fishy smell with a score of four, a fishy odor with a score of three, rancid smell with a score of two and a pungent odor. with a rating score of one. Observation of color and smell was carried out at 0, 3, 6, 9, 12, 15, 18, 21 and 24 hours.

Data Analysis

The observed color and odor data will be tabulated and then tested for normality with the Shapiro-Wilk test before being tested further with parametric and non-parametric tests. The data were then tested using the homogeneity test and continued with the test of variance (Anova test), the results of data that were significantly different were followed by the Duncan test.

III. RESULT AND DISCUSSION

Meat is one of the livestock products which is a source of high quality protein and is widely consumed by the community to meet the needs of amino acids[7]. Factors after slaughter include genetics, species, type of livestock, sex, age, feed and stress conditions. while factors after cutting include meat pH, storage method, type of muscle and location of muscle[8].

Based on test results from PE goat meat samples originating from Busungbiu District, Buleleng Regency, Bali Province, the following results were obtained:

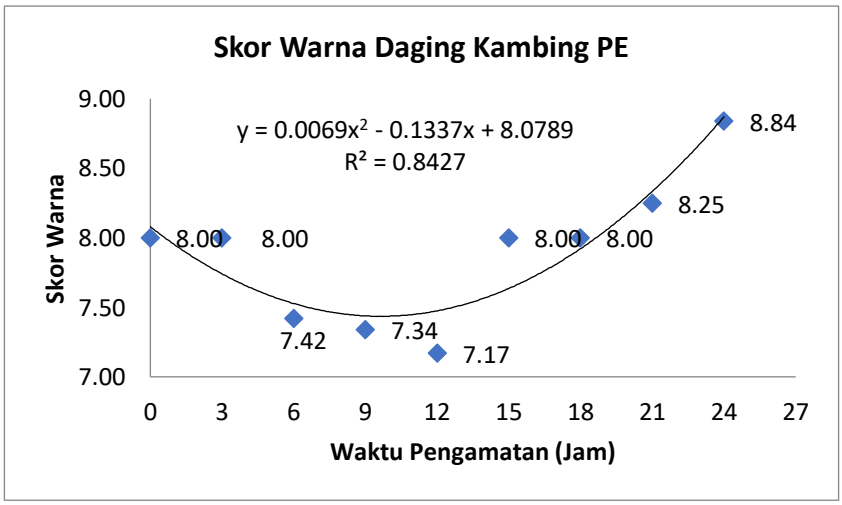

Figure 1. Grafik kecenderungan data hasil penilaian warna daging

Based on the graph above, it can be seen that at the 0th and 3rd hours the meat color value was the same, namely 8.00, then at the 6th hour the meat color value decreased to 7.42, the meat color value continued to decrease at the 9th hour it became 7.34, at the 12th hour the color of the meat also decreased to 7.17. The 12th

hour is the lowest point of the meat color value then the flesh color value rises at the 15th hour to 8.00, the flesh color has the same value at the 18th hour, namely 8.00. At 21 to 24 hours, the value of meat color continued to increase with a color value of 8.25 and 8.84 respectively.

According to statistical tests, it was found that there was a tendency for the color value data to decrease until the 12th hour and then increase until the 24th hour. The trend of meat color values corresponds to the regression line Y = 0.0069x2 - 0.1337x + 8.0789 and the degree of truth is R2 = 0.8427.

Factors that can affect the color of the meat are very dependent on the color pigment of the meat and the meat's exposure to oxygen [9]. The color of fresh meat is indicated by bright red while color deviations in the meat can make the meat unacceptable[10]. It can be seen in the description of the color chart, the color value of the meat decreases gradually until the 12th hour (the meat turns bright red). This indicates the occurrence of oxygenation which changes the color of the meat from purplish red to bright red[11].

After 12 hours, the color of the meat changed its color value, the color of the meat changed to brownish red. This change is caused by the oxidation reaction of iron in heme from the form Fe2+ (Ferrous) to Fe3+ (Ferric) to produce metmyoglobin[11].

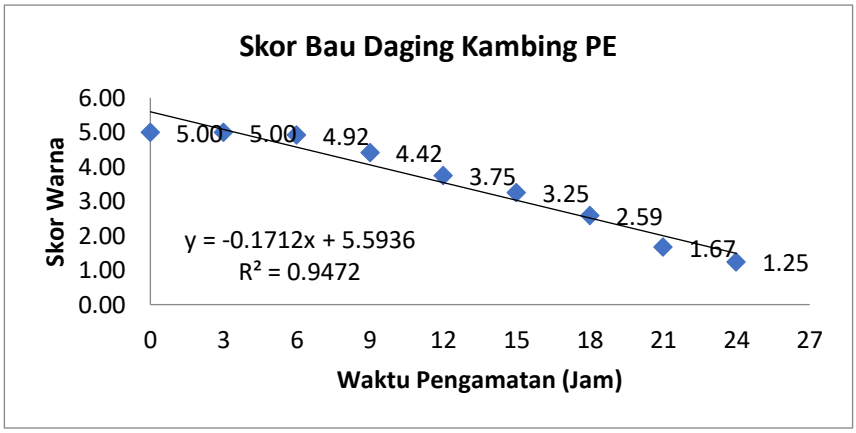

Figure 2. Graph of the trend of PE goat meat odor test results

Based on the graph above, it can be seen that at 0 and 3 hours, the odor value of the meat is 5.00 which indicates the meat is still fresh. At the 6th hour there was a change in the odor value to 4.92 which indicated the activity of microorganisms in the decomposition process, the value of the smell of meat continued to decrease at the 9th hour to 4.42, while at the 12th hour the meat value became 3. .75 which shows that

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the meat has begun to emit an unpleasant odor. At the 15th hour, the meat odor value decreased to 3.25 and finally gave off a rancid odor at the 18th hour which was marked with a value of 2.59. At the 21st and 24th hours, the meat gave off a rotten odor, which was indicated by the value of the meat odor, respectively, of 1.67 and 1.25.

After the data was analyzed, it was found that there was a tendency for the odor test value data to decrease steadily until the 24th hour except for the 0th and 3rd hours which had the same meat odor value. The trend of the odor test value corresponds to the regression line Y = -0.1712x + 5.5936 and the degree of truth is R2 = 0.9472.

The smell of meat is influenced by the type of animal, feed, age, sex, fat, length of time, and storage conditions. The smell of meat from old animals is relatively stronger than young animals[12]. The smell of meat is caused by the presence of a volatile fraction in the form of inosine-5-monophosphate (the result of the conversion of adenosine-5-triphosphate in animal muscle tissue during life) which contains hydrogen sulfide and methyl marcaptan[13]. Meat that is still fresh will smell like fresh blood, based on the graph of the change in the baud aging value of PE goats, the fresh smell lasts until the 9th hour. After that hour, changes in odor values constantly decreased, this was due to the influence of a mixture of lipolytic enzyme activity of triacylglycerols, oxidative rancidity of unsaturated fatty acids and protein degradation products that accumulated in adipose tissue.

Table 1. Color and odor ANOVA test results of PE goat meat

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Color	8.507[a]	8	1.063	7.282	.000
	Odor	66.909[b]	8	8.364	76.662	.000
Intercept	Color	2240.602	1	2240.602	15345.131	.000
	Odor	450.430	1	450.430	4128.667	.000
Amatan	Color	8.507	8	1.063	7.282	.000
	bau	66.909	8	8.364	76.662	.000
Error	Color	3.942	27	.146		
	Odor	2.946	27	.109		
Total	Color	2253.051	36			
	Odor	520.285	36			

Corrected	Color	12.449	35
Total	Odor	69.855	35

a. R Squared = .683 (Adjusted R Squared = .589)
b. R Squared = .958 (Adjusted R Squared = .945)

Based on the results of the ANOVA test, it was found that there was a significant effect (P<0.05) of the time of observation on the color of PE goat meat, this indicated that the time of observation had a significant effect on the color change of PE goat meat. In addition to the effect of observation time on meat color, it can be seen that there is a significant effect with P <0.05 between the time of observation and the smell of PE goat meat, this also indicates that the time of observation has a significant effect on the smell of PE goat meat.

According to the statistical analysis, the color and odor variables interacted with each other (P<0.05) according to the time of observation. This indicates that color and smell are significantly related to one another during the observation process.

Table 2. The results of the data analysis of the PE goat meat color duncan test

No	Observation	Meat Color Variable Observation Value Daging
1	0	8,000^{bc}
2	3	8,000^{ab}
3	6	7,415^{a}
4	9	7,335^{a}
5	12	7,168^{a}
6	15	8,000^{bc}
7	18	8,000^{bc}
8	21	8,250^{c}
9	24	8,835^{d}

Based on the results of the Duncan test on the color assessment of PE goat meat, it showed that at 0 hours there was no significant difference from the 3rd, 15th, and 18th hours. However, the 0 hour has a marked difference with the 6, 9, 12, and 24 hour. The 3rd hour has no significant difference with the 0, 6, 9, 12, 15, and 18th hour but has a significant difference with the 21st and 24th hour. The 6th, 9th and 12th hours had no significant difference with the 3rd hour, but had significant differences with the 0th, 15th, 18th, 21st and 24th hours. The 15th and 18th hours had no significant difference with the 0, 3 and 21 hour hours. However, it has a

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marked difference with the 6th, 9th, 12th, and 24th hour. The 21st hour did not have a significant difference only with the 6th and 7th hour while the other observation hours showed significantly different values. At 24 hours it has a real difference with all other observation hours.

Table 3. The results of the analysis of the duncan test data on the smell of PE goat meat

No	Observation	Meat Odor Variable Observation Value
1	0	5,000[f]
2	3	5,000[f]
3	6	4,918[f]
4	9	4,415[e]
5	12	3,753[d]
6	15	3,250[c]
7	18	2,585[b]
8	21	1,665[a]
9	24	1,250[a]

Based on the results of the Duncan test on PE goat meat odor results according to the table above, it shows that at the 0th, 3rd, and 6th hours, each did not have a significant difference from each other but had a significant difference from other observation hours (9th, 12th, 15th, 18th, 21st and 24th hours). The 9th, 12th, 15th, and 18th hours had significant differences from each other and significantly different from other observation hours (0, 3, 6, 21, and 24 hours). The 21st and 24th hours have no significant differences from each other but have significant differences from other observation hours (0, 3, 6, 9, 12, 15, 18, 21, and 24 hours).

Table 4. The results of the correlation analysis of color, smell, and time of observation of PE goat meat

		Color	Odor	Observation
Color	Pearson Correlation	1	-.486**	.434**
	Sig. (2-tailed)		.003	.008
	N	36	36	36
Odor	Pearson Correlation	-.486**	1	-.953**
	Sig. (2-tailed)	.003		.000
	N	36	36	36
Observation	Pearson Correlation	.434**	-.953**	1
	Sig. (2-tailed)	.008	.000	
	N	36	36	36

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the correlation analysis, it was found that there was a significant negative correlation (P,0,05) between the odor and the observation with a correlation coefficient of -0.953. This indicates that the longer the observation time, the lower the odor score of PE goat meat. In addition, there is a significant positive correlation (P<0.05) between time and observations with a correlation coefficient of 0.434. This indicates that the longer the observation time, the score of the meat color increases.

In addition to the correlation between the smell and color of the meat and the time of observation, there was a significant negative correlation (P<0.05) between the smell and the color of the meat with a correlation coefficient of -0.486. This indicates that the higher the meat color score, the lower the meat odor score.

IV. CONCLUSION

Based on the research results it can be concluded In the observation time range from the 0th hour to the 24th hour in terms of color and smell, the PE mutton underwent a change with details of the color score decreasing until the 12th hour then increasing until the 24th hour. In addition, there is a correlation between the color variable and the PE mutton odor variable as seen from the results of the correlation test. Both have a significant negative correlation coefficient of -0.486.

REFERENCES

[1] Pamungkas, F.A., A. M.D.E. Batubara, Sihite.. Potensi Plasma Nutfah Kambing Lokal Indonesia. Pusat Penelitian dan Pengembangan Peternakan. Sumatera Utara (Badan Penelitian dan Pengembangan Pertanian). 2009

[2] Suyasa, I.N; Suardana, I.W; Putra, I.G.A.A; Suryani, N.N.Morphometry of Kacang and Ettawa Crossbreed Goats Raised in Bali. *Journal of Veterinary and Animal Science* 5(2).2022: 87.

[3] Seftiarini, N. Studi Komparasi Pengelolaan Peternakan Kambing Peranakan Etawa (PE) di Dusun Nganggring dan Dusun Kebonan di Kabupaten Sleman. Universitas Negeri Yogyakarta. 2011.

[4] Badan Pusat Statistik. Produksi Daging Kambing menurut Provinsi (Ton), 2019-2021. https://www.bps.go.id/indicator/24/482/1/produksi-daging-kambing-menurut-provinsi.html. 2022.

[5] Komariah, S., Rahayu, Sarjito. Sifat Fisik Daging Sapi, Kerbau Dan Domba Pada Lama Postmortem Yang Berbeda. *Buletin Peternakan*. 33.2009: 183-189

[6] Badan Standardisasi Nasional. Mutu Karkas dan Daging Sapi. Jakarta (ID) : BSN. 2008.

[7] Sembiring, U.R, Suada I.K., Agustina, K.K. Kualitas Daging Kambing yang Disimpan pada Suhu Ruang Ditinjau Dari Uji Subjektif dan Objektif. Universitas Udayana, Denpasar, Bali. *Indonesia Medicus Veteriner* Vol 4(2).2015: 155-162

[8] Soeparno. 2009. Ilmu dan Teknologi Daging. Cetakan V. Gadjah Mada University Press.Yogyakarta.

[9] Setiani, B.E, Bintoro, V.P, Dwiloka, B, Hintono, A. Determinasi Warna Daging Curing Pada Daging dan Produk Olahan Daging. Fakultas Peternakan dan Pertanian, Universitas Diponegoro. 2014.

.

[10] Urbain, M.W. *Oxygen is key to the color of meat*. *Natprov*. 127. 1952: 140-141

[11] Cross, H.R dan A.J. Overby. World Animal Science : Meat Science, Milk Science and Technology. *Elsevier Science Publisher B.V*. 1986. Amsterdam

[12] Harwanti. Upaya Penyediaan Daging Sapi Yang Sehat dan Bermutu. Pengawas Mutu Hasil Pertanian Dinas Pertanian, Perkebunan dan Peternakan Kabupaten Bangka Barat. 2014.

[13] Suardana, IW. dan Swacita, I.B.N. Higiene Makanan. Udayana University Press. Denpasar, Bali. 2009