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Performance of Kacang Goats Fed Chemically and Biologically Treated Durian Husk

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ABSTRACT

Background: Feed is one of the most important parts of the livestock production system because it can account for 60-80% of production costs, besides that very elements needed by livestock to grow, develop and produce. A study has been conducted to evaluate the effects of chemical and biological urea-treated durian husk on the production performance of Kacang female goats.

Methods: The research method used was plotted in the 2 × 3 factorial randomized block design (RBD). The first factor was two processing methods of urease (A) and fermentation (F) and the second factor was three levels of urea, namely 1.0% (L1), 2.5% (L2) and 5% (L3), with four replicates as groups. The data were analyzed using analysis of variances and mean comparison using the least significant difference (LSD) test.

Result: The results showed however, the application of durian husk with different urea levels produced a significant effect (P<0.05) on the body weight gain, hematocrit value, non-carcass weight and percentage, internal non-carcass weight and percentage, as well as non-carcass weight and percentage, of Kacang female goats. That administration of chemically and biologically processed durian fruit husk supplemented with urea up to 5.0%, can be implemented without negative effects on production performance, physiological conditions, carcass characteristics, as well as non-carcass characteristics.

Key words: Durian husk, Fermentation, Kacang goats, Physiological status, Productivity.

INTRODUCTION

Feed is one of the most important parts of the livestock production system because it can account for 60-80% of production costs (Shandilya *et al.,* 2019; Ragasa *et al.*, 2022; Worku, 2023). Ideal feed has to contain all the elements needed by livestock to grow, develop and produce (Su and Chen, 2020). Feed in the tropical region is commonly high in crude fiber content and low in crude protein content. Meanwhile, feed from agricultural byproducts or plantation waste, such as durian husk, is potentially given to the livestock.

The potential production of durian fruit in Central Sulawesi in 2021 was 4,198.06 tons. The total weight of durian fruit consists of about 20-25% flesh and 5-15% seeds and the remaining husk weight reaches 60-70% (Sanchez *et al.*, 2022). There were 2,464.84-2,875.64 tons of durian husk potential to be used as animal feed. The husk contains cellulose (50-60%), lignin (5%) and starch (5%) (Faisal *et al.*, 2018). High cellulose content and lignin content can result in low biological value of durian husk for livestock. Therefore, efforts are required to overcome this through chemical and biological treatments.

Various methods that can be done to improve the feed quality are physical, chemical and biological methods, as well as a combination between chemical and physical methods or a combination of all three methods. Chemical methods can be applied by using an acid or alkali solution, adding certain enzymes, using microorganisms, or a combination of these methods. The easiest method to process fibrous waste is alkaline, using urea as the main ingredient. Urea is a cheap non-protein nitrogen (NPN) source commonly used as a nitrogen source in ruminant nutrition, reducing animal feed costs (Gonçalves *et al.*, 2015).

Ruminant animals, especially cattle, sheep and buffalo, can use urea as a feed ingredient, but a lack of information has been found in the literature regarding urea application in goats. The reason for the use of urea in ruminant diets is that it is easy to get at a low price (Xin *et al.*, 2010; Yıldız and Erdoğan, 2018). However, the inclusion of urea in the ruminant diet needs to be done carefully because it causes negative impacts such as reduced feed palatability, disruption of the fermentation process in the rumen and poisoning (Sharma *et al.*, 2017). Urea can be used as an additive in various ways and forms, such as ammoniation, mixed with molasses (Mobashar *et al.*, 2023), urea molasses blocks, urea molasses mineral block (Singh *et al.,* 2010;

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Muralidharan *et al*., 2016) and urea molasses multi-nutrient block (Jayawickrama *et al*., 2013). Processing feed ingredients with the addition of urea is a typical process for high crude fiber feed and aims to increase the intake and digestibility of fibrous feed.

Urea is not intended as a feed ingredient that is given directly; it needs to go through several stages of the process, such as the urease process. Feeding urea directly to livestock will be a very dangerous poison for the rumen. Utilization of urea: in addition to the ammoniation process, urea is also often used as a source of nitrogen for microbial growth during the fermentation process of feed ingredients before being given to livestock. Animal hosts cannot use urea directly, but it is first broken down by microbes during feed processing. In addition to the use of urea, a previous study used mold as an inoculant for fermentation to enhance the feeding value of the white membrane of durian husk. According to Sulistyowati *et al.* (2019), 7,510.52 tons/year of durian skin can be converted into durian skin flour (inner white membrane), which is 43.26% or 2,276.9 tons/year. Furthermore, inclusion of fermented durian husk flour with *Pleurotus ostreatus* (Oyster mushroom) in the dairy cow's diet produced higher milk production (8.93 l/head/day) compared to the other treatments (Sulistyowati *et al.,* 2021). Based on this, a study has been conducted on the use of urea as a source of nitrogen in the chemical and biological processing of durian fruit husks to determine its effect on the production performance of female Kacang goats.

MATERIALS AND METHODS

Experimental animals

An experiment was carried out and involved 24 female Kacang goats, each approximately 1 year old, with a weight range of 10-20 kg. They were arranged in a Randomized Block Design based on the animal's initial body weight, with a 2 × 3 factorial pattern. The first factor was the processing method, denoted as A = Urease and F = Fermentation, while the second factor was the urea level, denoted as L1 = 1.0% urea, L2 = 2.5% urea and L3 = 5.0% urea. Each treatment combination was replicated four times, forming 24 blocks. Treated durian husk powder were:

The goats were kept in individual stage pens with a wooden slat floor. The pen was plotted into 24 plots; each pen was equipped with feed and drinking troughs. Drinking water was freely available throughout the study period. The goats were allowed 14 days for adaptation, followed by 56 days for data collection. Feed offered and refusals were recorded daily to estimate intake. Body weight was measured weekly in the morning before offering the feed. At the end of the growth experiment, the goats were slaughtered for carcass and non carcass assessment. The research protocol in this study has been approved by the animal ethic committee of Faculty of Animal Husbandry and Fishery, Tadulako University Palu, Indonesia.

Experimental diets

Diets consisted of concentrate and forage of *Panicum sarmentosum*. The concentrate ingredients were 13% soybean meal, 55% rice bran and 32% maize as basal concentrate. Chemical or biological treated durian fruit husk flour was used to substitute the basal concentrate by as much as 20% on dry matter basis and the treated durian fruit husk was air-dried for 4-5 days before being mixed with the basal concentrate. The concentrate mixture was offered at 07.30 am with as much as 1.5% dry matter of body weight, while *Panicum sarmentosum* Roxburg (Roxb) was freely given after the concentrate was totally consumed. The nutritional content of the feed ingredients is described in Table 1.

Chemical processing of durian fruit husk

The durian fruit husks, cut into approximately 5-cm pieces, were dried for 4-5 days and subsequently ground into powder. The treatments in this study consisted of A1: durian fruit husk powder + 1.0% urea; A2: durian fruit husk powder + 2.5% urea; and A3: durian fruit husk powder + 5.0% urea. All treatments were supplemented with 40% sterilized water based on the dry weight of the durian fruit husk. The

Table 1: Nutritional content of feed ingredients used during the research.

Feed ingredients	Nutritional content				
	Dry matter	Crude protein	Crude fiber	Crude fat	TDN**
Soybeans meal*	91.97	31.35	9.73	11.65	61.00
Corn meal*	86.82	9.54	9.92	8.30	80.87
Rice Bran*	89.92	10.67	18.39	4.62	61.21
A1*	75.57	10.62	35.85	0.69	67.50
A2*	62.70	11.42	37.10	0.97	66.50
A3*	66.05	11.46	20.19	0.69	75.28
F1*	86.56	11.62	33.81	0.77	67.91
F2*	72.73	11.70	34.30	0.69	67.30
F3*	74.54	12.46	28.32	0.97	69.16
*Panicum sharmentosum**	26.29	11.51	30.20	1.90	59.54

Description: * = The results of the analysis of the feed nutrition laboratory of the faculty of animal science and fishery and ** = Calculated based on Hermawan *et al.* (2021).

treatments were sealed in the plastic containers at room temperature for 14 days.

Biological processing of durian fruit husk

The durian fruit husks, cut into approximately 5-cm pieces, were dried for 4-5 days and subsequently ground into powder. The treatments were as follows: F1: durian fruit husk powder + 1.0% urea; F2: durian fruit husk powder + 2.5% urea; and F3: durian fruit husk powder + 5.0% urea. All treatments were supplemented with 40% sterilized water based on the dry weight of the durian fruit husk powder. Thus, they were stored in sealed plastic containers at room temperature for 7 days and subsequently added to 10% *Lactobacillus casei* bacteria (Yakult) and 2% palm sugar, followed by another 7-day incubation. Once the ammoniation and fermentation processes were completed and the durian fruit husk was air-dried for approximately 4-5 days.

Carcass evaluation

After an overnight feed deprivation, all goats were slaughtered for carcass examination. The goats were slaughtered by cutting the jugular vein and carotid artery and allowing them to bleed for many minutes. The goats were dressing and eviscerating immediately after bleeding. For each goat, different portions of the body were separated, weighed and recorded. Dressing percentage was computed by dividing hot carcass weight by slaughter weight and/or empty body weight. After removing the weight of the digesta from the slaughter weight, the empty body weight was computed. After removing the animal's head, thoracic, abdominal and pelvic contents, skin and feet, the hot carcass weight was calculated. Total edible offals (TEO) were defined in this study as the sum of blood, kidney, heart, liver, tongue, small and large intestine, reticulo-rumen, omasum-abomasum, tail and total fat. The total nonedible offals (TNEO) were calculated by adding the skin, fetlock, sexual organs and urinary bladder, as well as the spleen, lungs with trachea, diaphragm and esophagus.

Blood collection

Blood was obtained from the experimental animals' jugular veins at the start of the study and at the end of the trial, before feeding at 09.30 hr, in a vial containing ethylene diamine tetra-acetic acid (EDTA). With disposable needles, 5ml of whole blood was taken aseptically from the jugular vein. The remands were placed in simple tubes with 2ml of blood in EDTA-containing vacutainer tubes for serum tests. The EDTA tubes were quickly capped and the contents were gently mixed for one minute by inversion or rocking. The packed cell volume (PCV) and haemoglobin (Hb) concentration of blood samples were determined immediately after collection. After proper dilution, the Neubauer haemocytometer was used to determine red blood cells RBCs, whitw blood cells WBCs and differential WBC counts.

Body temperature, respiratory rate, pulsed rate and physiological activity

Rectal temperature (Tr), respiration rate (RR) and pulse rate (Pr) were measured daily in the morning (09.30 hr) before feeding. Tr was measured for 1 minute using a clinical thermometer placed into the rectum. RR was calculated by counting flank motions for 1 minute. For 1 minute, Pr was measured by hand in the femoral vein. Physiological activity was observed directly by recording activity of feeding duration, feeding frequenc, rumination time and resting time starting from 6:00 to 18:00 pm. Behaviour evaluation was conducted by direct observation and by camera-recording.

Data analysis

All collected data were subjected to the analysis of variance "ANOVA" (Steel and Torrie, 1991) and followed by Least Significant Difference (LSD) test results for comparison between treatments.

RESULTS AND DISCUSSION

Production performance

The production performance of female Kacang goats fed with chemically and biologically treated durian fruit husk with different urea levels is presented in Table 2. The analysis of variance (ANOVA) results indicated that there was no significant interaction ($P>0.05$) between the administration of chemically and biologically processed durian fruit husk with different levels of urea on the variables of weight gain, dry matter intake, protein intake, feed utilization efficiency, feeding duration, rumination duration, resting duration and feeding frequency in the female Kacang goats. Similarly, the administration of durian fruit husk using different processing methods did not have a significant effect ($P>0.05$) on dry matter intake, feeding duration, rumination duration, rest duration and feeding frequency. However, the administration of durian fruit husk with different levels of urea had a significant effect ($P<0.05$) on the weight gain of the female Kacang goats.

The least significant difference (LSD) test results revealed that the weight gain, crude protein intake, protein utilization efficiency and feed utilization efficiency of goats fed biologically processed durian fruit husk were significantly higher compared to those fed chemically processed durian fruit husk. The higher weight gain, crude protein intake, protein utilization efficiency and feed utilization efficiency when goats were fed biologically processed durian fruit husk can be attributed to the superior quality of the feed compared to chemically processed durian fruit husk. The biological processing of feed ingredients enhances their quality through the involvement of microorganisms before animal consumption. This process is closely related to the functions of microorganisms during processing, as they are capable of breaking down complex compounds into simpler forms, particularly fiber components that often limit feed utilization in animals. Consequently, this improvement in feed quality directly enhances weight gain and nutrient utilization efficiency in animals.

The most essential nutrients for Kacang goats in cell formation and cell size enlargement are proteins, which contribute to weight gain. However, it is important to note that goats do not directly digest the whole proteins. Instead, protein undergos a process of breakdown by microorganisms through fermentation in the rumen.

The absence of effect on dry matter intake, feeding duration, rumination duration, resting duration and feeding frequency due to the administration of processed durian fruit husk can be related to the bulk characteristics of the forage consumed by Kacang goats. Additionally, the contents of the digestive tract remain in the reticulorumen for a significant period, approximately 70-90 hours, while the digestion of consumed feed primarily occurs within the rumen (Tyagi *et al.*, 2022).

The Least Significant Difference (LSD) test results indicated that the weight gain of goats fed durian fruit husk with 1.0% urea was significantly lower (P<0.05) compared to those fed with 2.5% and 5.0% urea levels. However, no significant difference in weight gain was observed between goats fed with 2.5% and 5.0% urea levels. The higher weight gain found in the goats fed processed feed with 2.5%-5.0% urea levels is caused by the availability of ammonia and VFA for rumen microbial growth, which help in the digestion of consumed feed. This is consistent with McDonald *et al.* (2010) finding that urea in animal feed quickly dissolves and hydrolyzes into ammonia by rumen bacteria. Protein degradation in the rumen produces ammonia, VFA and CO2, where ammonia is utilized as an N source for microbial protein growth, while VFA is utilized by the animal's body for growth and CO_2 is expelled out.

Physiological condition

The physiological conditions (functional status and hematological values) of female Kacang goats fed chemically and biologically processed durian fruit husk with different levels of urea are presented in Table 3. The analysis of variance (ANOVA) test revealed that there was no significant interaction (P>0.05) between the administration of chemically and biologically processed durian fruit husk with different levels of urea on the physiological status (body temperature, respiratory rate and pulse rate) and hematological values (white blood cell count, red blood cell count, hemoglobin level and hematocrit value) in the Kacang goats. Similarly, the administration of durian fruit husk using different processing methods did not have a significant effect (P>0.05) on the physiological status (body temperature, respiratory rate and

Table 2: The average of body weight gain, feed intake, feed utilization efficiency and feeding behavior in Kacang goats during the research period.

Parameter	Processing method	Urea Level			Average
		L_1	L_2	L_3	
Weight gain	Chemical	36.79	38.53	39.64	38.32[a]
(g/head/day)	Biological	38.79	43.66	45.94	42.80[b]
	Average	37.79[a]	41.09[b]	42.79[b]	
Dry matter intake	Chemical	519.22	532.33	541.98	531.17
(g/head/day)	Biological	543.79	548.45	571.72	554.65
	Average	531.50	540.39	556.85	
Feed efficiency	Chemical	0.071	0.072	0.073	0.072[a]
	Biological	0.072	0.080	0.081	0.077[b]
	Average	0.071	0.076	0.077	
Crude protein consumption	Chemical	62.22	64.02	65.34	63.86[a]
(g/head/day)	Biological	65.62	66.18	69.30	67.03[b]
	Average	63.92	65.10	67.32	
Crude protein efficiency	Chemical	0.594	0.602	0.609	0.602[a]
	Biological	0.595	0.660	0.665	0.640[b]
	Average	0.595	0.631	0.637	
Feeding duration	Chemical	455.00	441.13	439.88	445.33
(minutes/day)	Biological	474.13	477.63	478.13	476.63
	Average	464.56	459.38	459.00	
Rumination time	Chemical	436.13	433.63	432.75	434.17
(minutes/day)	Biological	429.13	421.63	420.88	423.88
	Average	432.63	427.63	426.81	
Resting time	Chemical	548.88	565.25	567.38	560.50
(minutes/day)	Biological	536.75	540.75	541.00	539.50
	Average	542.81	553.00	554.19	
Feeding frequency	Chemical	13.88	13.88	13.75	13.83
(times/day)	Biological	13.75	13.75	13.50	13.67
	Average	13.81	13.81	13.63	

Description: - Different letters within line or column indicate significantly different (P<0.05).

pulse rate) and hematological values (white blood cell count, red blood cell count, hemoglobin level and hematocrit value) of the Kacang goats. Additionally, the different levels of urea in durian fruit husk did not have a significant effect (P>0.05) on the functional status (body temperature, respiratory rate and pulse rate) and hematological values (white blood cell count, red blood cell count and hemoglobin level), except for the hematocrit value in the Kacang goats.

The results of this study indicate that the physiological status (body temperature, respiratory rate and pulse rate) and hematological parameters (white blood cell count, red blood cell count, hemoglobin level and hematocrit value) obtained from the goats fall within the normal range. The physiological condition (functional status and hematological values) of goats fed durian fruit husk processed using different methods and urea levels did not disrupt their physiological well-being. This suggests that both chemical and biological processing methods, with urea levels up to 5.0%, can be tolerated by goats for their normal activities. These findings are supported by Bata *et al.* (2022), who revealed that the use of 5% urea in the fermentation process of rice straw was found to improve the digestibility of dry matter and organic matter without inducing negative effects. Similarly, Puga *et al.* (2001) demonstrated that the utilization of 5% urea in the processing of agricultural waste enhanced the performance of rumen microorganisms in sheep.

The least significant difference (LSD) test results indicated that the hematocrit values of goats fed with 5% urea (L3) were significantly (P<0.05) higher compared to those fed with 1% urea but did not differ significantly from the values observed in goats fed with 2.5% urea (L2). However, there was no significant difference in hematocrit values between goats fed with 1% and 2.5% urea levels. The increasing levels of urea administration indicate an elevation in erythrocyte volume, indicating the availability of protein sources in red blood cell formation. Erythrocytes are essential components of the blood responsible for transporting oxygen and carbon dioxide. Erythrocytes are composed of approximately 60% water and 40% protein, which forms heme. Each erythrocyte contains 400 million hemoglobin molecules and constitutes 95% of the dry weight (Hess and D'Alessandro, 2022).

Carcass and non-carcass

The results of the observations on slaughter weight, weight and percentage of carcass and non-carcass edible parts in female Kacang goats fed durian fruit husk processed using different chemical and biological methods and urea levels are presented in Table 4. The analysis of variance (ANOVA) showed that there was no significant interaction (P>0.05) between the administration of durian fruit husk processed using different chemical and biological methods and urea levels on the carcass weight, carcass percentage, non-carcass weight and percentage, internal non-carcass weight and percentage, external non-carcass weight and percentage and edible non-carcass weight and percentage

Table 3: Average body temperature, respiration frequency, pulse frequency, white blood cell count, red blood cell count, hemoglobin level and hematocrit value of Kacang goats during the research.

Parameter	Processing	Urea Level			Average
		L_1	L_2	L_3	
Rectal temperature	Chemical	38.72	38.60	38.57	38.63
(°C)	Biological	38.50	38.49	38.43	38.47
	Average	38.61	38.55	38.50	
Respiration frequency	Chemical	56.43	56.74	57.17	56.78
(times/minute)	Biological	53.42	55.36	55.63	54.80
	Average	54.93	56.05	56.40	
Pulse frequency	Chemical	80.13	80.21	81.20	80.51
(times/minute)	Biological	80.61	81.38	82.37	81.45
	Average	80.37	80.80	81.78	
White blood cells	Chemical	18.80	18.13	17.17	18.03
(thousand/mm^3)	Biological	17.78	17.48	16.03	17.09
	Average	18.29	17.80	16.60	
Red blood cells	Chemical	9.72	10.18	10.21	10.04
(million/mm^3)	Biological	9.93	10.07	10.11	10.03
	Average	9.82	10.12	10.16	
Hemoglobin	Chemical	9.05	9.20	9.33	9.19
(g/dL)	Biological	9.23	9.25	9.35	9.28
	Average	9.14	9.23	9.34	
Hematocrit	Chemical	24.75	25.10	25.13	24.99
(%)	Biological	24.95	25.23	25.68	25.28
	Average	24.85^a	25.16^{ab}	25.40^b	

Description: - Different letters within row indicate significantly different (P<0.05).

on the Kacang goats. Similarly, the administration of durian fruit husk using different processing methods did not have a significant effect ($P>0.05$) on carcass weight, carcass percentage, external non-carcass percentage and non-carcass edible weight and percentage on the Kacang goats. Additionally, the durian fruit husk with different urea levels did not have a significant effect ($P>0.05$) on carcass weight, carcass percentage, external non-carcass weight and percentage and non-carcass edible weight and percentage. However, it had a significant effect on non-carcass weight and percentage and internal non-carcass weight and percentage in female Kacang goats.

The least significant difference (LSD) test results revealed that the percentage of non-carcass and the weight and percentage of internal non-carcass parts in goats fed 5% urea (L3) were significantly higher compared to those fed 1% urea (L1) and 2.5% urea (L2). However, no significant differences were observed between the 1% and 2.5% urea levels. The similar weights and percentages of carcasses in this study may be attributed to the similar quality of the feed provided in each treatment. Conversely, the increasing levels of urea resulted in increased non-carcass and internal non-carcass components, indicating possible fat deposition along the goat's digestive tract. Growing goats in Indonesia requires a dietary protein content of 12-14% and a DE (digestible energy) of 2.8 Mcal.

A sufficient quantity and quality of feed cannot alter the genetically small body size of animals. However, providing inadequate feed quantities will not lead to optimal weight gain and carcass growth aligned with the genetic potential

Table 4: Mean values of slaughter weight, weight and percentage of carcass and non- carcass edible parts in Kacang goats during the research.

Parameter	Processing	Level			Average
		0,0%	10,0%	20,0%	
Slaughter weight	Chemical	17.32	16.92	17.95	17.40
(kg/head)	Biological	17.91	18.09	18.15	18.05
	Average	17.62	17.50	18.05	
Carcass weight	Chemical	7.48	7.52	8.03	7.67^{a}
(kg/head)	Biological	7.97	8.06	8.40	8.15^{b}
	Average	7.73	7.79	8.21	
Carcass percentage	Chemical	43.22	44.49	44.85	44.19
(%)	Biological	44.59	44.64	46.19	45.14
	Average	43.90	44.57	45.52	
Non-carcass weight	Chemical	4.36	4.54	4.85	4.58^{a}
(kg/head)	Biological	4.90	4.99	5.40	5.10^{b}
	Average	4.63a	4.76ab	5.12b	
Non-carcass percentage	Chemical	25.24	26.84	27.14	26.41^{a}
(%)	Biological	27.52	27.60	29.73	28.28^{b}
	Average	26.38^{a}	27.22^{a}	28.43^{b}	
Internal non-carcass weight	Chemical	1.90	2.02	2.18	2.03^{a}
(kg/head)	Biological	2.24	2.29	2.52	2.35^{b}
	Average	2.07^{a}	2.15^{a}	2.35^{b}	
Internal non-carcass percentage	Chemical	11.07	12.00	12.21	11.76^{a}
(%)	Biological	12.58	12.65	13.91	13.05^{b}
	Average	11.82^{a}	12.33^{a}	13.06^{b}	
External non-carcass weight	Chemical	2.45	2.51	2.67	2.55^{a}
(kg/head)	Biological	2.66	2.71	2.88	2.75^{b}
	Average	2.56	2.61	2.77	
External non-carcass percentage	Chemical	14.18	14.84	14.92	14.64
(%)	Biological	14.94	14.94	15.83	15.24
	Average	14.56	14.89	15.37	
Edible non-carcass weight	Chemical	2.24	2.24	2.40	2.29
(kg/head)	Biological	2.30	2.38	2.32	2.33
	Average	2.27	2.31	2.36	
Edible non-carcass percentage	Chemical	12.97	13.26	13.42	13.22
(%)	Biological	12.88	13.14	12.75	12.92
	Average	12.92	13.20	13.09	

Description: - Different letters within row or column indicate significantly different ($P<0.05$).

of each animal, such as a high growth rate and carcass percentage, among others (Lutfi *et al.*, 2022). The quality or nutritional value of feed can influence the amount of feed consumed by livestock. The quality of feed consumed by livestock can also affect the carcass percentage. Rohana *et al.* (2020) stated that protein and energy are crucial elements for growth processes and a high-protein and high-energy diet can lead to significant weight gain.

Based on the results of this study, the carcass weights for each treatment ranged from 16.92 to 18.15 kg, resulting in little variation in non-carcass edible weight and percentage. This agrees with the finding by Clinquart *et al.* (2022) that factors influencing carcass production in animals include breed, age, sex, growth rate, slaughter weight and nutrition. The percentage of non-carcass edible components that can be consumed can be calculated by dividing the weight of non-carcass edible components by the carcass weight and multiplying by 100%. The results of this study indicated that the treatments increased the percentage of non-carcass edible components that could be consumed.

CONCLUSION

Chemically and biologically treated durian fruit husk supplemented with urea up to a 5.0% urea level, could be apply to the Kacang goat without negative effects on the production performance (weight gain, dry matter intake, protein intake, feed utilization efficiency, feeding duration, rumination duration, resting duration and feeding frequency), physiological conditions (body temperature, respiratory rate, pulse rate, white blood cell count, red blood cell count, hemoglobin level and hematocrit value), as well as carcass and non-carcass parameters (carcass weight, carcass percentage, non-carcass weight, non-carcass percentage, internal non-carcass weight and percentage, external non-carcass weight and percentage, edible non-carcass weight and percentage).

Conflict of interest: None.

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