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Effects of Katuk Leaf (*Sauropus androgynus* L. Merr) Meal Supplementation on Physiological and Hematological Status of Peranakan Etawah Goats

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ABSTRACT: The study aimed to determine the effect of supplementing katuk leaf meal in concentrate on physiological and haematological status of Etawah grade goats. The research took place at the Goat Breeding and Forage Production Installation Sumlili Village, West Kupang district of Kupang Regency, from March to August 2024. The materials used were 12 heifers of Peranakan Etawah (PE) goats with body weight of 21.5 - 25.3kg, mean 23.4 ± 1.85kg; rations were forage (lamtoro) and concentrate. The study used a 4 x 3 completely randomised design (CRD), with four treatments tried, namely: P_0 = farmer's pattern ration of lamtoro leaves + 300g concentrate (70% fine bran: 30% ground yellow corn) without katuk leaf meal; P_1 = P_0 + 5% DM forage; P_2: P_0 + 10% DM forage; P_3= P_0 + 15% DM forage. The observed variables were respiration rate, pulsus rate, rectal temperature, haemoglobin content, erythrocyte count, erythrocyte and haematocrit numbers. Data were analysed according to the variance analysis procedure. The results of statistical tests showed that the treatment had no significant effect (P>0.05) on all variables observed. The average results obtained were respiration rate 63.5 beats/minute; pulsus rate 81.08 beats/minute, rectal temperature 38.16°C, haemoglobin level 10.3 g/dL; erythrocyte count 11.12 x10^6/mm^3; leucocytes 10.3 x 10^3/mm^3 and haematocrit number 31.0%. It was concluded that supplementation of katuk leaf meal in concentrate did not interfere with metabolism in PE heifers under conditions with indications of physiological and haematological status within normal ranges.

KEYWORDS: haematological, heifers PE goat, katuk leaf meal, physiological, supplementation.

INTRODUCTION

The challenge for the livestock sub-sector nationally is that the rate of livestock production in the country has not kept pace with domestic demand for meat. Statistical data shows that beef production in Indonesia will be 498,923.14 tonnes in 2022. The number increased by 2.28% compared to the previous year which was 487,802.21 [1]. It is known that the population of goats currently reaches 19.3 million heads and sheep 18 million heads. In detail, overall goat meat production reached 61.7 million tonnes and sheep 55.8 million tonnes so that goat and sheep meat production contributed 2.4 percent to overall meat [2]. This fact shows that goats in general have the potential to be developed as one of the sources of national meat production. Meanwhile, goats, especially Peranakan Ettawa (PE), with the main function of producing milk, have a secondary product, namely meat.

In East Nusa Tenggara (ENT) Province, especially goats, statistical data shows a population of 1 059 223 [1], but there is no specific mention of the existence of PE goats. Limited data in 2022, the total population of PE goats in the Goat Breeding Installation of ENT Province was 159 heads, as a forerunner to the distribution of PE goat seeds throughout ENT. The PE dairy goat business in ENT and the island of Timor in particular has not been managed professionally, where animal feed only depends on feed production in natural pastures or tree leguminous forage on a limited scale [3]. This condition causes the productivity of PE goats at the farm level is still low with birth weight of PE goats 2.406 ± 0.426 kg and milk production of 487.67 ± 297 ml/day [4]. Weakening factors in terms of feed management need to be improved through supplementary feed strategies to boost livestock productivity. PE heifers as prospective parents need to be well prepared by providing adequate nutritious feed so that body and udder growth occurs proportionally according to their genetic potential. One strategy in this regard is to apply supplementary feed technology to the farmer's pattern management system by utilising local plants such as katuk.

Katuk (*Sauropus androgynus* L. Merr) is one of the potential local feed ingredients as a supplement, because in addition to the nutritional factors in it such as protein 29.2%; energy 401.4 kcal; fat 4.6%; crude fibre 8.2% and ash 12.5 [3] there are also other

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compounds such as saponins, flavonoids and alkaloids that act as sexual stimulants and increase libido [5] and the large content of provitamin A (β carotene) [6] which plays a role in increasing milk production as well as antioxidants. The selection of katuk leaves refers to [3] who reported a good response from PE goat mothers to supplementation of katuk leaf meal with the impact of a significant increase in cempe birth weight and milk production. Departing from the thoughts that have been described, it is necessary to conduct a study on the use of katuk leaf meal as a supplement in the diet of virgin goats as prospective parents with the initial stage of studying its impact on physiological and haematological status, where these two parameters are indicators to study the effectiveness and safety of a consumed feed ingredient. Blood has cellular elements consisting of erythrocytes, leukocytes and blood keeping. The ration is an important ingredient for blood metabolism because it requires protein, vitamins and minerals in the formation of red blood cells [7]. The formation of erythrocytes requires many processes so it is necessary to supply sufficient amounts of protein, iron, copper and cobalt.

MATERIALS AND METHOD

The research took place at the Goat Breeding and Forage Production Installation, Sumlili village-Kupang Regency, from March to August 2024, including the preparation stage, application of supplementation treatment, data collection, analysis and reporting. A total of 12 Peranakan Ettawa (PE) heifers aged 6-8 months with an average body weight of 23.4 ± 1.85kg were used in this study. Feed ingredients were lamtoro forage (DM 20%), ground corn (DM 86%), fine bran (DM 87%), and katuk meal (DM 89%). The cages used were stage type with a plot size of 100x200cm. Supporting equipment in the form of digital hanging scales with a capacity of 75kg with a sensitivity of 10g, sitting scales with a capacity of 5kg with a sensitivity of 1g, a bucket with a capacity of 5 litres as a place for drinking water, a basin with a capacity of 1kg as a place for concentrate feed, milling machines and equipment, maximum-minimum thermometers, room thermometers, digital clinical thermometers, blood sampling equipment Ethylene-Diamine-Tetraacetic-Acid (EDTA) tubes, 10ml syringes, venoject needles, holders, gloves, cool boxes, and ice gell.The study used a completely randomised design (CRD) with four treatments tried and each consisting of three replicates, namely: P_0= farmer's pattern feed which is lamtoro leaves + concentrate (70% fine bran: 30% ground yellow corn) 300g without katuk leaf meal; P_1= P_0 + katuk leaf meal 5% forage DM; P_2= P_0 + 10% forage DM; P_3= P_0 + 15% forage DM. The collected data were tabulated and analysed according to the variance analysis procedure [8] using Excel software version.25

Research variables:

1. Physiological Status (referring to the conventional procedures used [9].
   a. Respiration rate (snort/minute), known by counting the number of abdominal fluttering movements for 10 seconds, then the number of snorts multiplied by 6 (= 1 minute respiration rate)
   b. Pulsus rate (pulsation/minute), known by holding the coccygeae artery at the base of the ventral tail then counting the number of pulsations for 10 seconds, the number of pulsations multiplied by 6 (= pulsus rate 1 minute)
   c. Rectal temperature (°C), which is the internal body temperature condition known by inserting a digital clinical thermometer into the rectum 3cm deep, until an "alarm" is heard. Rectal temperature data is read on the disply.
2. Haematological status (by examination of blood profile at the Regional Health Laboratory) including haemoglobin/Hb (g/dL), erythrocyte count (10^6/mm^3), leucocyte count (10^3/mm^3) and haematocrit number (%).

Research Procedure

Concentrate was prepared as a mixture of 70% rice bran and 30% ground yellow corn. The powdered katuk leaves were prepared by chopping 2-3cm of fresh katuk leaves, sun-drying them and grinding them twice to obtain particles equivalent to fine bran. Heifer goat was weighed to obtain body weight data while selecting livestock with weights that met the requirements of the experimental design used (KV ≤ 15%). Ration requirements were set on a dry matter basis at 3% body weight, while the balance of concentrate forage in the ration was 70:30. Furthermore, randomised using a lottery to cage plots and treatment rations. Concentrate feeding with katuk leaf meal was done in the morning before forage feeding with a frequency of 1 time per day. Forage feed in the form of fresh lamtoro is given as needed (10% body weight) with a frequency of twice a day, namely morning and evening. Feed samples (forage and concentrate) were analysed proximate at the Laboratory of Animal Nutrition and Feeding of Kupang State Agricultural Polytechnic (Table 1). Drinking water was provided ad libitum. Physiological performance data were collected every 2 days within 2 hours starting at 08:00 until 18:00 with techniques appropriate to each parameter. Blood sampling was conducted towards the end

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of treatment (8th week of treatment feed application) in the morning at 07:00-08:00. by veterinary personnel (Veterinarian). Prior to blood sampling, animals were fed for 12 hours. Blood samples were taken through the jugular vein on the neck of the cempe using a venoject needle and EDTA tube, each as much as 2.5ml placed in a coolbox filled with ice gell which was then examined at the Regional Health Laboratory of ENT province.

Table 1. Nutrient Composition of Feed Ingredients and Research Rations*)

No	Feedstuff/Ration	DM (%)	OM (%)	CP (%)	CF (%)	FIBER (%)	ASH (%)
1.	Lamtoro	92.51	85.73	21.57	2.05	18.46	6.78
2.	Yellow corn meal	88.11	86.88	9.19	2.98	4.23	1.23
3.	Rice bran	89.56	76.70	8.00	5.57	28.06	12.85
4.	Katuk leaf meal	91.49	82.24	17.28	8.06	24.38	9.25
5.	P_0	93.00	84.97	17.95	3.08	18.56	8.04
6.	P_1	92.98	85.12	18.00	3.59	18.16	7.86
7.	P_2	92.37	84.55	18.38	3.16	17.87	7.82
8.	P_3	91.98	83.51	18.80	3.49	19.47	8.47

*) Laboratory of Animal Nutrition and Diet of Kupang State Agricultural Polytechnic (2024).

RESULT AND DISCUSSION

Effects of Katuk Leaf Meal Supplementation on Physiological Status

Physiological status which includes respiration rate, pulse rate and rectal temperature are common indicators used in predicting and determining the comfort state of livestock. The observation results of physiological status of PE heifers from this study are presented in Table 2.

Table 2. Physiological Status of PE Heifers Feeding Concentrate with Katuk Leaf (*Sauropus androgynus* L. Merr) Meal

Variables	Treatments				Average	P-value
	P_0	P_1	P_2	P_3		
Respiration rate (beats/minute)	61.67	62.67	64.67	65.00	63.50	0.309
Pulse rate (beats/minute)	80.33	80.67	81.33	82.00	81.08	0.229
Rectal temperature (°C)	38.30	38.17	38.13	38.03	38.16	0.279

P_0= without katuk leaf meal; P_1=5% katuk leaf meal; P_2= 10% katuk leaf meal and P_3= 15% katuk leaf meal

Respiration Rate

The respiration rate of PE heifers from this study ranged from 61.67 to 65 beats/minute with an average of 63.5 beats/minute. The data in Table 2 shows that the respiration rate of PE ewes increased slightly as the level of katuk leaf meal in the concentrate increased, but the results of variance analysis showed no significant effect (P>0.05). This indicates that the addition of katuk leaf meal in the concentrate consumed by the PE goats did not cause any changes in the respiration rate. Increasing the level of katuk leaf meal in concentrate up to 15% forage DM has not produced a large metabolic heat so it does not have an impact on the thermoregulation mechanism in the heifers. This response indicates that the heifers are able to activate their body thermoregulation system to keep body temperature constant, by rhythmically dissipating heat through respiration.

Normal respiration rate in goats ranges from 26 - 54 beats/minute [7]. The results obtained from this study were higher than the normal range and also higher than the report of Noach and [9] on old pregnant ewes which ranged from 58.21 - 63.31 with an average of 60.80 beats/minute. Another study reported the respiration rate of exposed PE heifers 58.70 ± 35.10 beats/minute 58.70 ± 35.10 [10], while in young males it was much higher ranging from 81.0 - 81.8 with an average of 81.43 beats/minute [11]. In theory, according to [9] four hours after livestock consume feed, the metabolic process begins to take place and one of the products produced is heat (metabolic heat). [12] states that respiration is one of the most likely pathways in the process of dissipating some of the body's heat when the heat load from environmental heat and metabolic heat increases.

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The increase in respiratory frequency is thought to be caused by an increase in body temperature caused by a combination of environmental temperature factors that began to heat and a higher proportion of forage rations in all treatments. A large proportion of forage causes body heat production/heat increament of goats to increase so that it adds to the body heat load and must be released. The release of body heat to the outside of the body by transferring heat from the internal organs of the body to the outer parts of the body organs, especially the sweat glands in the skin and mucous glands along the respiratory tract. Thus, the addition of katuk leaf meal in concentrates up to 15% of forage dry matter applied in this study does not have a negative impact on livestock because there is no additional body heat load that requires heat dissipation through increased respiration rate.

Pulse rate

The pulse rate of heifer PE goat obtained in this study ranged from 80.33 to 82.00 with an average of 81.08 beats/minute. The data in Table 2 shows that the pulsus rate of PE ewes increased slightly as the level of katuk leaf meal in the concentrate increased, but the results of variance analysis showed no significant effect (P>0.05). This indicates that the addition of katuk leaf meal in the concentrate consumed by the PE goats did not cause any changes to the pulsus rate. Increasing the level of katuk leaf meal in concentrate up to 15% forage DM has not produced a large metabolic heat so that it does not have an impact on the thermoregulation mechanism in the heifers. This response indicates that the heifers are able to activate their thermoregulatory system to keep body temperature constant, by rhythmically dissipating heat through respiration.

The normal pulse rate in goats ranges from 70 - 135 beats/minute [7]. The results of this study are still within this range, indicating that in the case of this study the body heat load of livestock is still in standard conditions so it does not trigger the heart to work in the thermoregulation mechanism for the process of releasing body heat load to the environment. Physiologically, the increased heart rate aims to pump blood to the periphery to help dissipate heat from the internal organs to the body surface. The results of this study are slightly lower than the report [10] of 84.33 ± 12.44 beats/minute in exposed heifers, but not different from the report [9] in old pregnant cows which ranged from 79.0 - 82.1 with an average of 80.51 beats/minute. As with the respiration rate, the pulse rate of PE heifers in this study was not impaired by the supplementation of concentrate containing 5 to 15% forage dry matter and was within the normal range.

Rectal temperature

The rectal temperature of PE goat heifers obtained in this study ranged from 38.03 to 38.30 with an average of 38.16°C. The data in Table 2 shows a decrease in rectal temperature of PE heifers as the portion of added katuk leaf meal in concentrate increased, but the results of variance analysis showed no significant effect (P>0.05). This indicates that the addition of katuk leaf meal in the concentrate consumed by the PE goats did not cause changes in rectal temperature. According to [13], normal rectal temperature in goats ranges from 38.0 and 39.9°C with an average of 38.7°C. The results obtained from this study are within the range and not much different from the report [10] of 39.48 ± 0.62°C in exposed PE heifers, while [9] found that the rectal temperature of old pregnant goats ranged from 38.3 - 38.36°C with an average of 38.12°C. The results of this study indicate that the rectal temperature of the goats in this study was higher than that of the goats in this study. The results of this study indicate that PE heifers respond quite well to the supplementation of concentrate with katuk leaf meal, through a thermoregulation mechanism that can maintain their body temperature remains in a constant condition.

Overall, data on respiration rate, pulse rate and rectal temperature of PE heifers goat are still within the normal range, indicating that the animals respond positively to the addition of katuk leaf meal as a supplement up to 15% BK forage. The comparative advantage of katuk leaves with protein content of 29.2%, crude fibre 8.2%, fat 4.6%, ash 12.5% and energy 401.4 kcal and phytochemical compounds contained therein can be utilised without disturbing the normal thermoregulation mechanism in livestock, thus expected to show optimal production performance. [14] stated that katuk plants contain Sauropii folium nutrients that are good for milk. Sauropii folium in katuk leaves can increase the flow of nutrients into the mammary glands and affect cell activity and is rich in amino acids that can stimulate milk production. This according to [15] is due to several possibilities, namely katuk leaf meal contains many active substances that can encourage the process of increasing the concentration of milk.

Effect of Katuk Leaf Meal Supplementation on Hematological Status

The haematological response can be studied through the picture or blood profile of livestock which includes haemoglobin, erythrocyte, leucocyte and haematocrit levels as well as an indicator that is commonly used to detect the health status of livestock

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in response to their environment including the feed consumed. Data on changes in haematological responses in PE heifers supplemented with concentrate containing katuk leaf meal are presented in Table 3.

Table 3. Haematological Status of PE Heifers Goats Feeding with Concentrate with Katuk Leaf (*Sauropus androgynus* L. Merr) Meal

Variables	Treatments				Average	P-value
	P_0	P_1	P_2	P_3		
Haemoglobin (g/dL)	12.20	13.93	9.43	5.65	10.30	0.283
Erythrocyte (10^6/mm^3)	10.90	10.73	9.03	13.80	11.12	0.552
Leucocyte (10^3/mm^3)	10.25	10.25	9.63	11.06	10.30	0.484
Haematocrit (PCV) (%)	29.67	31.00	32.00	31.33	31.00	0.158

P_0= without katuk leaf meal; P_1=5% katuk leaf meal; P_2= 10% katuk leaf meal and P_3= 15% katuk leaf meal

Haemoglobin

Haemoglobin of PE heifers from this study ranged from 5.65 to 13.93g/dL with an average of 10.30g/dL. The results of variance showed that concentrate supplementation with katuk leaf meal had no significant effect (P>0.05) on haemoglobin of PE ewes. The mean haemoglobin levels obtained were within the normal range, indicating that the level of 5 to 15% dry matter added to the concentrate did not negatively affect the changes in haemoglobin of the PE ewes and could be used as a supplement. The data in Table 2 shows that haemoglobin levels vary as the portion of katuk leaf meal in the concentrate increases, where the use of katuk leaf meal in the concentrate at a low level (5%) is able to improve haemoglobin levels compared to without katuk leaf meal, but when the level is increased (10 and 15%) it decreases haemoglobin. Normal haemoglobin levels in ruminants are 8-14g/dL [16]. [17] stated that haemoglobin plays a role in binding oxygen in the blood. Increased haemoglobin levels in the body of livestock can increase the efficiency of oxygen and carbon dioxide exchange, while a decrease in haemoglobin levels can inhibit metabolism. According to [18], haemoglobin levels in the blood are influenced by nutritional adequacy, especially protein as a constituent of haemoglobin, breed, age, sex and livestock activity. Decreased oxygen levels in the blood cause haemoglobin levels to increase resulting in increased haemoglobin levels and vice versa.

The results of this study are not much different from those reported earlier in PE heifers, which were fed rations with different urea additions that obtained blood haemoglobin levels ranging from 9.17 - 10.22g/dL [19]. In addition to protein, it is suggested that katuk leaves contain vitamin A 10,371 IU, vitamin C 239 mg, vitamin B1 0.1mg, fibre 1.5g, iron 2.7-3.5mg, calcium 204mg and phosphorus 83mg [20]. Haemoglobin levels are also related to iron (Fe) content in the feed. Iron is mainly required in the process of erythrocyte formation, namely in the synthesis of haemoglobin [21]. Iron is the main component of haemoglobin, so iron deficiency will affect haemoglobin formation. Reduced iron absorption causes the amount of ferritin (iron stored in the body) will also decrease which will have an impact on reducing the amount of iron that will be used for haemoglobin synthesis so that it can cause anaemia. [22], states that haemoglobin levels are also affected by season, body activity, presence or absence of erythrocyte damage, blood handling during examination, and nutrition in feed.

Erythrocytes

The number of blood erythrocytes of PE heifers obtained from this study ranged from 9.03 -13.80 x 10^6/mm^3 with an average of 11.12 x 10^6/mm^3. Based on the variance analysis, it is known that the supplementation treatment of katuk leaf meal in concentrate did not affect the number of blood erythrocytes of PE heifers (P>0.05). This condition illustrates that the supplementary feed given to livestock has uniform nutrition (Table 1). Erythropoesis or the formation of erythrocytes requires an adequate supply of protein, iron, copper, and cobalt and it is suspected that the rations used are sufficient for these needs. The average number of erythrocytes obtained in this study is still within the normal range, as stated by [23] that the total erythrocytes of goats range from 8-18 x 10^6/µL. The normal number of erythrocytes in this study indicates that the PE heifers while consuming concentrate with katuk leaf meal, are in optimal health condition. This means that katuk leaf meal can be relied upon as one of the supplementary feed ingredients, however, it needs to be followed up through studies on other aspects such as udder growth performance, considering that PE heifers are an asset of the replacement programme in a commercial farming business. Another study with soybean meal supplementation

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and organic micro minerals Zn and Cr in Rambon goats gave no different results [24] and was still normal with total erythrocytes ranging from 13.70-14.50 x 10^6 cells/µL.

Leucocytes

The number of blood leucocytes of PE heifers obtained from this study ranged from 9.63 -11.06 x 103/mm^3 with an average of 10.30 x 103/mm^3. Based on the analysis of variance, it was found that the supplementation treatment of katuk leaf meal in concentrate did not affect the number of blood leucocytes of PE ewes (P>0.05). This condition illustrates that the addition of 5 to 15% dry matter of forage does not cause changes to the number of leucocytes. The results of this study are still within the normal range of goat blood leucocyte counts with a range of 6-16 thousand/mm3 [25] [16]. Leukocytes are known as active mobile units that play an important role in the body's defence mechanism [26] [27] [28] where the main function of these cells is to phagocyte disease seeds/foreign objects that enter the body, then the number of cells depends on the disease seeds/foreign objects that enter the body (Raguati and Ramatang, 2012) [17]. An increase in the number of leucocytes can be caused by environmental stress that increases the production of corticosteroids and glucocorticoids that adversely affect chicken health and reduce the body's defence system [27]. The health status of livestock can be known through the number of white blood cells that have attacking agents to fight bacteria [28]. Leukocytes are one of the blood plasma suspensions that function as the body's defence system from the attack of bacteria, viruses and other pathogenic agents through the mechanism of antibody formation which is currently widely used as one of the indicators determining the health of livestock. The normal results of this study indicate that concentrate supplementation containing katuk leaf meal contains good nutrition (Table 1) and does not interfere with normal metabolism and health in livestock.

Hematokrit

The haematocrit numbers often known as packed cell volume is the percentage of solid part of blood consist of erythocyte, leucocyte and blood platelets to total bloods. Haematocrit of heifer goat by this study range from of 29.67 to 32% with average 31,0%. Result of variance analysis showed that supplementation of katuk leaf meal have no significant on haematocrit (P>.05). This is because erythrocytes and leucocites as part of the blood components also show not signifficant. This condition is due to nutritive of the concentrate consumed have similar in protein content with range of 17.93 to 18.38%.

The haematocrit numbers from this study in normal ranges as reported of 24 to 48% [25], 18 to 38% [16] and higher than previous study of goats were fed concentrate contained moringga, gamal, sengon and randu leaves where not significant with ranges 18.33 to 22.78% [29], and heifers goat were fed different levels of urea with ranges of 22.6 to 31.15% and Jawarandu goats with supplement organic microminerals Zn and Cu ranges of 5.67 to 8.33% [30]. Overall, it can be said that supplementation of katuk leaf meal in concentrate does not interfere with animal health were all variables are within the normal range. This has strong indicate that katuk leaf meal reliable as one of the potential feedstuff in feed supplement strategy programme to improve the productivity.

CONCLUSSION

It can be concluded that supplementation of concentrate containing katuk leaf meal does not interfere both the physiological and haematological of heifers PE goat. Physiological, those heifers within normal status with respiration rate 63.5 breats/minutes; pulse rate 81.08 beats/minute, rectal temperature 38.16°C, meanwhile, the haematological described by haemoglobin 10.30g/dL, erythrocytes 11.12 x 10^6/mm^3, leucocytes 10.30 x 10^3/mm^3 and haematocrit 31%.

REFERENCES

1. BPS NTT, 2022. *Populasi Ternak Kecil Menurut Kabupaten/Kota 2020-2022.* *https://ntt.bps.go.id/indicator/24/55/1/populasi-ternak-kecil-menurut-kabupaten-kota.html* diakses 30 Desember 2023.
2. Ditjen PKH-Kemantan RI, 2021. Statistik Peternakan dan Kesehatan Hewan https://pusvetma.ditjenpkh.pertanian.go.id/upload/statistik/1644549920.Buku_Statistik_2021.pdf diakses 30 Desember 2023.
3. Noach, Y.R., H.T. Handayani and Y.L. Henuk. 2019. Birth weight, milk production and milk quality of Etawah Grade goat at first kidding period supplemented with oncentrate contained (*Sauropus androgynus*) leaf meal and Zn biocomplex, IOP Conference Series: Earth and Environmental Science, Volume 454, International Conference on Agriculture, Environment and Food Security (AEFS) 2019 10 October 2019, Medan-Indonesia

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4. Noach, Y.R. and H.T. Handayani. 2017. Kinerja Induk Kambing Peranakan Ettawa di Desa Sumlili Kabupaten Kupang. *Senimar Nasional Peternakan III*, Kupang 14 – 15 November 2017.
5. Andini D. 2014. Potential of katuk leaves (Sauropus androgynus L Merr) as aphrodisiac. *J Major*. 3:17-22.
6. Selvi S.V and A. Basker 2012. Phytochemical analysis and GCMS profiling in the leaves of Sauropus androgynus (L) Merr. *Int J Drug Dev Res*. 4:162-167
7. Frandson, R.D. 1996. Anatomi dan Fisiologi Ternak. Ed ke-4. Srigandono B, Praseno K, penerjemah. Yogyakarta (ID): UGM Press. Terjemahan dari: Anatomy Physiology of Farm Animals.
8. Gaspersz, V.G, 1991, Metode Statistik dan Rancangan Percobaan, CV Ganesha, Jakarta.
9. Noach, Y.R. and Handayani, H.T. 2019. Respons Fisiologis Induk Kambing Peranakan Etawah Bunting Terhadap Suplementasi Tepung Daun Katuk (*Sauropus Androgynus*) Dan Zn Bikompleks. *Journal of Tropical Animal Science and Technology*: 1 (1), pp, 1-6, Juli 2019
10. The, E. 2018. Respon Fisiologis dan Hematologis Kambing Peranakan Etawah terhadap Cekaman Panas. *Jurnal Triton*, Vol.9, No.1, Juni 2018
11. Qisthon, A and Y. Widodo. 2015. Pengaruh Peningkatan Rasio Konsentrat Dalam Ransum Kambing Peranakan Ettawah Di Lingkungan Panas Alami Terhadap Konsumsi Ransum, Respons Fisiologis, Dan PertumbuhaN. *Jurnal Zootek ("Zootrek" Journal)* Vol. 35 No. 2 : 351-360 (Juli 2015) ISSN 0852 -2626
12. Noach, Y.R. 2000. Pengaruh Penyemprotan Air pada Tubuh terhadap Kondisi Fisiologis Induk Sapi Friesian Holstein Laktasi. *Tesis*. Program Pasca Sarjana UGM, Yogyakarta
13. Adisuwiryo, D., Soetrisno and S.J.A. Setyawati. 2001. Dasar Fisiologi Ternak. Fakultas Peternakan Unsoed. Purwokerto
14. Yustendi, D. 2017. Pemanfaatan Tanaman Katuk (*Sauropus Androgynus* L. Merr) Dalam Ransumuntuk Meningkatkan Produksi Susu Kambing Betina Peranakan Ettawa. *Jurnal Biology Education* Vol. 6 No. 1 Oktober 2017
15. Yusman R., T.R. Ferasyi and Mustaqien. 2014. Pengaruh Pemberian Tepung Daun Katuk (*Saoropus androgynus*) terhadap Peningkatan Ukuran Lingkar Skrotum pada Kambing Jantan Lokal. Jurnal Medika Veterinaria, Vol. 8 No. 2 Agustus 2014. ISSN 0853-1943. Hal 114-116. Fakultas Kedoteran Universitas Syah Kuala Banda Aceh.
16. Anonymous. 2019. Select Physiological Parameters for the Goat. https://goats.extension.org/select-physiological-parameters-for-the-goat/ diakses 10 Juli 2024
17. Raguati and Rahmatang. 2012. Suplementasi Urea Saka Multinutrien Blok (USMB) Plus terhadap Hemogram Darah Kambing Peranakan Ettawa (PE). *Jurnal Peternakan Sriwijaya* (JPS), Volume 1 Nomor 1 Desember 2012
18. Swenson, M.J. 1997. Dukes Physiology of Domestical Animal. Ed ke-9. London: Cornell University Press.
19. Yanti, E.G., I. Isroli and T.H. Suprayogi. 2013. Performans Darah Kambing Peranakan Ettawa Dara Yang Diberi Ransum Dengan Tambahan Urea Yang Berbeda. Animal Agriculture Journal, vol 2(1) https://ejournal3.undip.ac.id/index.php/aaj
20. Santoso, U 2009. Manfaat daun katuk bagi kesehatan manusia dan produktivitas ternak. http://uripsantoso.wordpress.com. (diakses tanggal 30 Juni 2024)
21. Arifin Z. 2008. Some micromineral which are essential for biological systems and its analysis methods. Jurnal Litbang Pertanian. 27:99-105.
22. Andriyanto, Y.S. Rahmadani, A.S. Satyaningsih, and S. Abadi. 2010. Gambaran hematologi domba selama transportasi: peran multivitamin dan meniran. Jurnal Ilmu Peternakan Indonesia. 15(3): 134-136.
23. Weiss, D.J., and K.J. Wardrop. 2011. Schalm's Veterinary Hematolgy. 6th Ed. Willey-Blackwell, Philadelphia, PA. USA. https://onlinelibrary.wiley.com/doi/10.1111/j.1939-165X.2011.00324.x
24. Muhtarudin., A. Lidyana, F.T. Farda, M. Hartono and M.M.P. Sirat. 2024. Efektivitas Suplementasi Soybean Meal, Zn dan Cr dalam Ransum Terhadap Total Eritrosit, Kadar Hemoglobin, Nilai Packed Cell Volume Kambing Rambon. Jurnal Ilmiah Peternakan Terpadu. Vol. 12(2): 96-110, July 2024. https://dx.doi.org/10.23960/jipt.
25. Gregg L.V and S.L. Swist. 2011. Hematologi Tehmiques and Concept for Veterinary Technicians, 2nd Ed, Wiley-Blackwell, E-Book, ISBN: 978-0-813-81456-8
26. Astuti, D.A., E. Wina, B. Haryanto and S. Suharti. 2009. Performance and profile of some blood components of Ongole crossbred cattle fed ration containing lerak (Sapindus rarak De Candole). Media Peternakan 32 (1): 63-70.

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27. Falahudin, I., E.R. Pane dan Sugiati. 2016. Efektifitas larutan temulawak (Curcuma xanthorrhizaRoxb.) terhadap peningkatan jumlah leukosit ayam broiler (Gallus gallus Domestica sp.). JurnalBiota (2)1 : 68 – 74.
28. Yuniwarti, E.Y.W. 2015. Profil darah ayam broiler setelah vaksinasi dan pemberian berbagai kadar vco. Buletin Anatomi dan Fisiologi(23)
29. Marhaeniyanto, E., S. Susanti, B. Siswanto and A.T. Murti. 2019. Profil Darah Kambing Peranakan Etawa Jantan Muda yang Disuplementasi Daun Tanaman dalam Konsentrat. Conference on Innovation and Application of Science and Technology (CIASTECH 2019) Universitas Widyagama Malang, 02 Oktober 2019
30. Ekasari, Y. 2022. Pengaruh Suplementasi Mineral Mikro Organik terhadap Jumlah Eritrosit, Hemoglobin, dan Hematokrit Kambing Perah Jawarandu. *Skripsi*. Fakultas Pertanian Universitas Lampung. Lampung.

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