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STUDY OF HEMOGLOBIN LEVELS CATTLE FED *Moringa oleifera* AND PREBIOTIC FROM MARE'S MILK

Nemay Ndaong[1*], Novianty Ndun[1], Frans Umbu Datta[1], Annytha Detha[2], Nancy Foeh[3]

[1]Anatomy, Physiology, Pharmacology and Biochemistry Laboratory, Faculty of Veterinary Medicine, Nusa Cendana University
[2]Laboratory of Veterinary Disease and Veterinary Public Health, Faculty of Veterinary Medicine, Nusa Cendana University
[3]Clinical, Reproductive, Pathology and Nutrition Laboratory, Faculty of Veterinary Medicine, Nusa Cendana University
*Correspondence e-mail: nemayndanong@gmail.com

ABSTRACT

Penelitian ini bertujuan untuk mengetahui perbandingan kadar hemoglobin pada sapi onggole muda yang diberi *Moringa oleifera* dan susu prebiotik. Penelitian ini menggunakan sembilan ekor pedet Sumba Ongole umur 5-7 bulan dengan berat badan ± 130 kg. Penelitian diawali dengan persiapan alat dan bahan yang dibutuhkan berupa persiapan kandang individu, pembuatan tepung kelor, pembuatan rumput amunisi, pembuatan konsentrat, pembuatan susu, penyiapan prebiotik, adaptasi hewan. Perlakuan pedet dibagi menjadi 3 kelompok yaitu kelompok kontrol (KK), kelompok perlakuan 1 (KP1), kelompok perlakuan 2 (KP2). Kelompok kontrol diberi makan rumput kering amonia, konsentrat, susu sedangkan kelompok perlakuan 1 diberi pakan rumput kering diamoniase, konsentrat, susu, prebiotik, dan kelompok perlakuan 2 diberi pakan rumput kering diamoniase, konsentrat, tepung kelor. Pada setiap penarikan diambil ± 3 mL darah kemudian dimasukkan ke dalam tabung Ethylenediamine Tetraacetic Acid (EDTA) dan masing-masing tabung diberi label sesuai kode sampel. Hasil penelitian menunjukkan pedet pada kelompok kontrol memiliki kisaran nilai Hb 7,7-11,8 g/dl, sedangkan kelompok yang diberi susu prebiotik memiliki kisaran nilai Hb 8,8 hingga 11,4 g/dl. Kelompok yang diberi pakan *Moringa oleifera* memiliki kisaran nilai Hb 8,8-14,4 g/dl. Hasil tersebut menunjukkan nilai hemoglobin dari ketiga kelompok perlakuan berada dalam kisaran normal nilai hemoglobin sapi yaitu 9,1-15,7 g/dl namun terjadi peningkatan hemoglobin pada kelompok perlakuan yang diberikan susu prebiotik dan kelor. Pakan kelor yang ditambahkan ke KP2 menghasilkan Hb yang lebih tinggi dibandingkan dengan KP1 dan KK. Nilai Hb yang lebih tinggi diduga karena kandungan protein yang tinggi pada tanaman kelor yaitu 27% sehingga dapat meningkatkan produktivitas ternak.

Kata kunci: bakteri asam laktat, hemoglobin, *Moringa oleifera*

INTRODUCTION

Calves can be relied on as a source of protein fulfillment from animal origin. Maintenance patterns in a modern and professional manner with the keys to good maintenance management such as; feed, health care, housing, seeds, environmental conditions such as a favorable climate can increase the rate of livestock production. The success of the livestock business is inseparable from 30% genetic factors and 70% environmental factors (Astuti *et a*l., 2015). Obstacles in achieving this are when farmers are faced with tropical climate conditions with semi-arid environments such as in East Nusa Tenggara (ENT).

The feed is an important aspect of raising cattle. Feed with good quality and quantity can increase livestock productivity. A limited supply of feed and types of feed can lead to stunted growth of livestock, especially calves. Utilization of potential local feed for Moringa oilefera in livestock can optimize livestock growth and livestock productivity. The leaves, flowers, young fruit of the Moringa oilefera plant can be used as animal feed. The composition is quite complex in it such as protein, amino acids (Argin, Histidine, Isoleucine, Leucine, Lysine, Methionine, Phenylalanine, Threonine, Tryptophane, Valine), vitamins (vitamin A, vitamin B, vitamin C), and high in antioxidants and antimicrobials (Mardiah, 2017; Aminah, S., Ramdhan, T. and Yanis, 2015) can optimize the body's work functions.

The provision of prebiotics to calves is to maximize the digestibility of the nutrients given (Detha *et al* 2018., Detha *et al* 2019., Detha *et al* 2020). The prebiotic effect in the animal body is to compete with pathogenic bacteria, reducing the pH of the stoma.ch thereby creating unfavorable conditions for the development of pathogenic microbes and absorbing harmful pathogens and toxins produced on the intestinal surface (Datta et al. 1998; Datta et al. 2020; Radzikowski, 2017) so that optimum growth can occur in the body of livestock.

The productivity of livestock is determined by the physiological components of the body. One of the important parameters that reflect the condition of the livestock is blood. Blood has a very complex role so that physiological processes can run well so that livestock productivity can be optimal. Hemoglobin is a part of blood components that are synthesized in red blood cells which play a role in the body's physiological functions to bind, transport, deliver oxygen to body tissues, and transport carbon dioxide from tissues to the lungs (Grindem, 2011). The level of hemoglobin value in the blood can be a reference for body metabolism.

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MATERIALS AND METHODS

This study used 9 Sumba Ongole calves divided into 3 treatment groups with 3 calves for each group. The animal feed consists of Moringa flour obtained from fresh Moringa oilefera (leaves, flowers, fruit) dried for 3-4 days and mashed into flour, ammoniated grass, and concentrate feed consisting of wheat bran, cornflour, fish meal. The prebiotics used is derived from palm oil. To make 1 L of palm sap prebiotics, it is done by mixing 100 mL of palm oil fermentation and 900 mL of palm sugar water. Milk is made by mixing 510 g of powdered milk into 2700 mL of warm water then stirring until homogeneous.

Table 1. Types Of Treatment Groups In Sumba Ongole Calves

Type of Treatment Groups (KP)	Amount Of Feed (g/day)			Milk (mL/day)	Prebiotics (mL/day)
	Moringa Flour	Ammonia Grass	Concentrate Feed		
KK	-	2400	1600	1800	-
KP 1	-	2400	1600	1800	200
KP 2	400	2400	1200	-	-

Weighing the body weight in the morning before the calves are fed. Once a week for 6 weeks Weighing using the Sonic T 18 digital scale. Blood samples were taken on days 0, 21, 42 before sampling, Ongole cattle were physically restrained. Blood was collected ± 3 mL from the jugular vein collected in an EDTA tube that had been given sample code. Examination of blood samples using the hematology analyzer MEK-8222J / K CELLTA-F. The results of the quantitative data were analyzed using the Anova test.

RESULTS AND DISCUSSION

The results showed that the range of hemoglobin values for calves in Sumba Ongole KK was 7.7-11.8 g / dl, KP1 was 8.8-11.4 g / dl and KP2 was 8.8-14.4 g / dl. The normal range of bovine hemoglobin is 9.1–15.7 g / dl (Jain, 1993).

Hemoglobin levels in the blood are influenced by several factors, age, species behavior patterns, body activity, feed, disease, season (Reece et al., 2015). Feeding with flour resulted in higher hemoglobin levels than the two treatment groups. The value of higher hemoglobin levels is thought to be due to the high protein content in the Moringa plant, which is 27% so that it can increase livestock productivity (Nisa *et al*., 2017).

Protein and iron play an important role in the hemoglobin synthesis process because hemoglobin synthesis is influenced by amino acids, one of which is methionine, which serves as a precursor to succinyl Co-A, which is an important amino acid in the formation of hemoglobin (Rosita et al., 2015). Moringa plant contains the amino acid methionine of 350 mg / 100 g (Aminah et al., 2015) so that it can function as a precursor in the formation of hemoglobin and iron content of 17.2 mg / 100 g (Nisa *et al*., 2017). The factor that affects the absorption of iron is vitamin C. Vitamin C can increase the value of hemoglobin because vitamin C has two functions, namely helping the absorption of iron and antioxidants (Saputro and Junaidi, 2015). Vitamin C functions as a reducing compound that reduces iron from ferrous (Fe3 +) to ferrous (Fe2 +) so that it is easily absorbed by the intestine (Sahana and Sumarmi, 2015). The vitamin C content of Moringa Oilefera leaves is 17.3 mg / 100 g (Mahmood et al., 2010) so it is thought to increase iron absorption, thus the combination of protein, vitamins, minerals in Moringa can increase body weight gain and hemoglobin. on the calf. The results showed that the treatment group with Moringa flour gained 614 g / day of body weight, while in the KK group 555 g / day and KP1 598 g / day.

Table 2. The Results Of The Examination Of The Hemoglobin Value

Type of Treatment Groups (KP)	**Hemoglobin Value (g/dl)**			**Normal Haemoglobin Values (g/dl)**		**P–value**
	H-0	**H-21**	**H-42**	**Jain (1993)**	**Barwa *et al*., (2018)**	
KK	10.2 ± 1.77[a] (8.3-11.8)[b]	9.9 ± 0.63[a] (9.34-10.6)[b]	9.3 ± 1.44[a] (7.7-10.3)[b]	8.0–15.0	8.7 - 11.9	0.123
KP1	11.1 ± 0.26[a] (10.5-11.5)[b]	11.4 ± 2.59[a] (9.45-14.4)[b]	9.3 ± 0. 43[a] (8.8-9.6)[b]			
KP2	10.4 ± 1.60[a] (9.1-12.2)[b]	13.5 ± 2.05[a] (11.6-15.7)[b]	12.9 ± 1.03[a] (11.7-13.5)[b]			

Note: [a]mean ± standard deviation, [b]range of Hb values, KK (control group), KP1 (treatment group 1) KP2 (treatment group)

The prebiotics of lontar juice given to KP1 resulted in higher hemoglobin levels than KK. The increase in the concentration of the hemoglobin value at KP1 is thought to be caused by an increase in iron absorption in the digestive tract. This is by the research of Yogi et al., (2017) that prebiotics can increase the absorption of Ca, Mg, Fe, Zn, Cu. Research conducted by Dar et al., (2017) adding prebiotics to crossbred

calf feed (Bos indicus X Bos Taurus) can increase the hemoglobin value caused by increased iron absorption in the intestine due to prebiotic supplementation. A decrease in hemoglobin value indicates a deficiency of amino acids, vitamins (vitamin B12, vitamin E, folic acid, niacin) and/or minerals. Decreased hemoglobin, with or without a decrease in red blood cells, causes symptoms of anemia (Ndlovu et al., 2007).

CONCLUSION

The hemoglobin level of Sumba Ongole calves fed with *Moringa Oilefera* flour is the normal range. The hemoglobin level of the calf Sumba Ongole gave moringa flour feed that has a higher value than the prebiotic palm sap and milk. The provision of Moringa flour to Sumba Ongole calves as an alternative dry season feed while maintaining livestock productivity.

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