Performance of an-estrus postpartum Bali cattle by additional feed of multiple nutrient molasses based on \textit{Indigofera}

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\textbf{Abstract}. This study utilized Urea Multiplenutrient Molasses Block (UMMB) based on 40\% of \textit{Indigofera} flour to determine daily gain and performance of postpartum Bali Cattle. The parameters of the study were daily gain, chest depth, body length, and withers height. The UMMB consisting of rice bran, urea, coconut cake meal, shrimp waste meal, molasses, mineral, \textit{Indigofera} flour, salt, and cement as an adhesive. This study was divided into two paddocks where each paddock consisted of 10 head an-estrus postpartum Bali Cattle. Subsequently, each paddock was arranged by different treatment consisted of control (without any treatments) and additional feed supplement of UMMB. The mean values of each parameter were compared by T-Test. The result revealed that the additional feed supplement of UMMB had significant effect on average daily gain (0.8 kg head\(^{-1}\) day\(^{-1}\)) compared to the control treatment (0.2 kg head\(^{-1}\) day\(^{-1}\)). The treatments had significant effect on chest circumference (0.2 ± 0.05 vs 0.3 ± 0.02 cm head\(^{-1}\) day\(^{-1}\)) and body length (0.04 ± 0.01 vs 0.14 ± 0.05 cm head\(^{-1}\) day\(^{-1}\)). In contrary, neither control nor additional feed supplement had no significantly effect (P = 0.55) to shoulder height of postpartum Bali Cattle (0.13 ± 0.03 vs 0.18 ± 0.06 cm head\(^{-1}\) day\(^{-1}\)). Daily gain of an-estrus post-partum Bali cattle tended to be high by feed supplement of UMMB. Therefore, UMMB was appropriate for ruminant diet as a feed supplement.

1. Introduction
Generally, smallholder livestock farming in South Sulawesi is a semi-intensive system. The system kept the cattle in the cage with cut-and-carry system at night and herd the cattle grazed on the native pasture in the morning [1,2]. Utilization of the grazing pasture as a source of forage is conducted hereditary by farmers. Besides, grazing system is not only the cheapest source of feed, but also low labor therefore it does not interfere their main activities as farmers. However, recently, pasture productivity decreased due to the climate changes, global warming and shift of function from native pasture to settlements [3,4] resulting pasture quality decreased, nutrients, and also mineral deficiency occurred in the livestock. This deficiency negatively affects to the livestock performance. So that adequate feed management is needed to increase the livestock productivity. UMMB is one of the adequate feed management.

UMMB is feed supplement made by the National Nuclear Energy Agency (BATAN), consisting of urea, molasses, and salt. Urea is a non-protein-nitrogen source that can be used as compensation for nitrogen deficiencies in forage. This urea can increase digestibility, consumption, and nutrition through rumen fermentation. Some researchers reported that feed supplement of UMMB increased the daily gain of livestock, milk production, meat quality, and reproductive performance. It has been an alternative way to overcome deficiencies nutrient cattle during the dry season [5,6]; increased rumen ammonia...
levels of the buffalo [7] and suitable method for supplementing nutrition of grazing sheep in Ethiopia and reduce endoparasites effects [8]. Feed nutrition in mature cattle increases with increasing UMMB intake [9]. Further, [10] added that feed supplement of UMMB increased 69% of pregnancy rates compared without any feed supplements (44.66%).

The current study utilized feed supplement of UMMB based on Indigofera sp. Indigofera is easy to cultivate, tolerant of dry weather, saline, alkali, acid soils, and defoliated resistance. Indigofera sp. is a type of tree legume which had a biomass of 52 tons ha·year· [11] with high nutritional content (crude protein 27.68%; crude fiber 15.25%; digestibility of dry matter 67.50% and digestibility of organic matter 60.32% [12,13].

Therefore, the objectives were to determine daily gain and performance i.e. chest depth, body length, and withers height of Bali Cattle postpartum by providing feed supplement of UMMB based on Indigofera flour.

2. Materials and methods

2.1. Site and material research
The study was conducted at the Maiwa Breeding Center (MBC), Pattondong Salu Village, Maiwa District, Enrekang Regency from June to September 2019. Chemical analysis (proximate and fibre analysis) of UMMB were conducted at the Laboratory of Chemical Feed Laboratory, Faculty of Animal Science, Hasanuddin University, Makassar.

The composition of the feed supplement of UMMB consisting of rice bran, urea, coconut cake meal, shrimp waste meal, molasses, mineral, Indigofera flour, salt, and cement as an adhesive. The composition of UMMB feed supplement is presented in table 1.

2.2. Research Implementation
All feedstuffs were weighed according to the formulations and mixed thoroughly using a hand mixer. Put them into a round shape mold and then pressed by a press equipment. Furthermore, the UMMB was sun-dried about 3 days, then applied to the post-partum Bali cattle. The first treatment as a control was without feed supplement of UMMB, while the second treatment with feed supplement of UMMB at 500 gr head·day·. In all the treatments, 10 heads of post-partum Bali cattle were to determine daily gain and performance of chest circumference, body length, and shoulder height. The treatment was provided the grazing cattle in the separately pasture area of 1 Ha each without any additional feed concentrate along 120 days.

2.3. Parameters study
The observed parameters in this study as below;
1. Daily gain (kg head·day·) = [Ending weight – Starting weight]/Experimental Period
2. Body performance of the cattle:
   a. Chest circumference; measured circularly on a round chest thoroughly the back shoulder of scapula by a measuring tape (cm);
   b. Body length; measured from the scapula to the pelvis by a measuring tape (cm); and
   c. Shoulder height; looked for a level place on solid ground for where the cattle standing up. Put the measuring stick on the back of front leg and then slide down to the shoulders.

2.4. Statistical analysis
The means in daily gain and performance of chest circumference, body length, and shoulder height were analysed by T-Test.
3. Results and Discussion
The results of the composition of UMMB feed supplement is presented in Table 1.

Table 1. Chemical and fibre components of the Urea Multiplesubnutrient Molasses Block*

| Proximate Components (%) |       |
|--------------------------|-------|
| Crude protein            | 27.25 |
| Crude Fibre              | 4.34  |
| Ash                      | 17.53 |
| Nitrogen Free Extract    | 42.51 |

| Fibre Components (%)   |       |
|------------------------|-------|
| NDF                    | 18.61 |
| ADF                    | 24.69 |

*Chemical Feed Laboratory, University of Hasanuddin, 2019.

Table 1 presented that 27.25% crude protein (CP) content of the UMMB. Even the CP was higher than CP of feed complete which consisting of elephant grass, rice bran, corn meal, and coconut cake: 13.4% [14], the CP content is high enough for the ruminant. Also, the CP content meets the minimum fed standards (SNI 3146-2: 2017). If CP content lower than 7%, the micro-organism in the rumen cannot break down the feed efficiently, resulting in the decrease of animal body weight [15]. Some researches resulted that feed supplement of UMMB affect daily gain [16] contributed 6.5 % Energy Metabolism and 14 % CP intake per day of dairy cow [17].

As one of the highest feedstuffs with 40% Indigofera used in the formulation refers to the study of [18] which states that Indigofera sp could be used at the level of 30 to 45% dry matter for growing kids of goat. This percentage might influence the CP content of the UMMB. Indigofera as a source of forage legume has nutritional value of crude fat (6.15%); CP (24.17%); ash (6.41%); NDF (54.24%); and ADF (44.69%) [19]. Besides, feeding of Indigofera increased the body weight of Ongole [20] and goats [18].

Mean data of Neutral detergent fibre (NDF) of feed supplement UMMB high enough for ruminant needs according to the Indonesian National Standard [21] that the maximum standard NDF is 35% (table 1). In addition, [22] stated that in models for predicting the dry matter (DM) intake of lactating cows fed high energy diets ranging in NDF from 25 to 42% of DM.

Performance of cattle is closely related to the measurement of body dimensions for weight gain. Results of measurements of daily gain and performance of postpartum Bali Cattle is presented in table 2.

Table 2. Measurement of daily gain and performance of postpartum bali cattle.

| Parameters                | Treatments       | Sig.   |
|---------------------------|------------------|--------|
|                           | Control          | UMMB   |        |
| Daily gain (kg head⁻¹ day⁻¹) | 0.2 ± 0.07       | 0.8 ± 0.14 | P = 0.02 |
| Chest circumference (cm head⁻¹ day⁻¹) | 0.2 ± 0.05       | 0.3 ± 0.02 | P = 0.41 |
| Body length (cm head⁻¹ day⁻¹) | 0.04 ± 0.01      | 0.14 ± 0.05 | P = 0.18 |
| Shoulder height (cm head⁻¹ day⁻¹) | 0.13 ± 0.03      | 0.18 ± 0.06 | P = 0.55 |

Feed supplement of UMMB had significant effect (P = 0.02) on daily gain of postpartum Bali Cattle and was higher (0.8 ± 0.14 vs 0.2 ± 0.07 kg head⁻¹ day⁻¹) compared to the control. [23] stated that UMMB increases livestock productivity thoroughly increased protein synthesis by microbes in the rumen, increased feed digestibility, and increased feed intake which would provide a better balance between the
supply of amino acids and energy, and also for livestock growing. [24] reported that feed supplement of UMMB optimally improve the efficiency of nutrition. Rumen microorganisms required crude fibre to support their activities. Increase of rumen microorganisms with the increasing of livestock productivity. Feed supplement of UMMB increases the daily DM intake and the digestibility coefficient in buffalo calves [25]. [26] added that the livestock performance was influenced by several factors i.e. breed, age of the cattle, gender, feed intake, the temperature, and climate of the environment around the cattle.

UMMB had significant effect (P = 0.41) on chest circumference of postpartum Bali Cattle and was higher (0.3 ± 0.02 vs 0.2 ± 0.05 cm head⁻¹ day⁻¹) compared to the control, even though the differentiation was very slightly. Generally, chest circumference is positively correlated with livestock daily gain [27].

The body length of postpartum Bali Cattle was higher (0.14 ± 0.05 vs 0.04 ± 0.01 cm head⁻¹ day⁻¹) and significantly (P = 0.18) effect in the treatments which feeding of UMMB compared to the controls. In contrary, shoulder height of postpartum Bali Cattle had no significantly effect (P = 0.55) neither the control nor feeding of the UMMB (0.18 ± 0.06 vs 0.13 ± 0.03 cm head⁻¹ day⁻¹). Ideally, chest circumference, body length, and shoulder height could be used as indicators in the measurement of livestock body weight [28].

4. Conclusion
CP content and NDF were high enough for ruminant diet. Daily gain of an-tresse post-partum Bali cattle tended to be high by feed supplement of UMMB. Therefore, UMMB was appropriate for ruminant diet as a feed supplement.

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