The use of local-fodder based supplement and agricultural by product for cattle

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ABSTRACT: Ruminants have some advantages compared to monogastric animals, such as the ability to digest high fiber content feedstuffs for their benefits with the help of microorganisms in the rumen. The action of microbes in the rumen of ruminants enable them to be fed on fibrous roughages, especially agricultural waste and by-products. This research was conducted for six months at the field experimental site of the Faculty of Animal Science, University of Nusa Cendana. The aims of the research was to study the use of feedstuff base on local fodder and agricultural by-product on a performance of cattle. Six male Bali cattle of 1.5 – 2 years old with an initial live weight of 150 ± 2.5 kg were used. Experimental design used was Latin Square design 6 x 6. The treatments were T1 = field grass hay *ad lib*. + 11% protein and 55% TDN supplement; T2 = field grass hay *ad lib*. + 11% protein and 60% TDN supplement; T3 = field grass hay *ad lib*. + 11% protein and 65% TDN supplement; T4 = field grass hay ad lib. + 12% protein and 55% TDN supplement; T5 = field grass hay *ad lib*. + 12% protein and 60% TDN supplement; T6 = field grass hay *ad lib*. + 12% protein and 65% TDN supplement. The results indicated that the effect of treatments were significant ($P< 0.05$) on dry matter, crude protein, and energy intake, and body weight gain. It is concluded that block supplement of feedstuff base on local fodder and agricultural by-product is good for the performance of Bali cattle.

Key words: local-fodder, agricultural by-product, cattle

INTRODUCTION

It has been well recognized that the availability of good quality for animals during a year is a main problem facing by smallholder farmers, especially in eastern part of Indonesia as the biggest contributor of national meat production. Most of feeds available in this region have high fiber but low protein content, such as rice straw and low quality grass. This feed has a potential role on ruminant animal productivity and environmentally friendly in the region (Suharyono *et al*., 2006). In West Timor, particularly, Bali cattle performance is very much reliant on the herbage available on native pasture. Grass availability and particularly its quality fluctuates with season. Reasonable quality grass in this region is only available for a short period during the early rainy season. Even in this period, due to the shooting pattern of growth and more efficient photosynthesis, tropical forage matures rapidly and their crude protein content falls below 4%. For this reason, it is necessary to provide supplement for better utilization of the low quality tropical grasses in attempting to improve productivity of cattle (Belli and Sinlae, 2006). It has also been a general knowledge that ruminants have some advantages compared to monogastric animals, such as the ability to digest high fiber content feedstuffs for their benefits with the help of microorganisms in the rumen. The action of microbes in the rumen enable us to use fibrous roughages, especially agricultural by-products as ruminants feed. In addition, there are abundant of agricultural wastes such as banana's fruit skin, cassava skin, fish waste, tofu by-product, and coconut oil cake, etc. which can be utilized as feed supplement materials. This research was conducted to study the use of supplement based on these agricultural waste and by-product on the performance of cattle.

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MATERIALS AND METHODS

Six male Bali cattle of 1.5 – 2 years old with an initial live weight of 150 ± 2.5 kg were used in this trial for six months. They were housed individually in the Field Laboratory of the Faculty of Animal Science, University of Nusa Cendana. They were offered hay of native grass as basal diet and supplement consisted of as liquid palm sugar, rice bran, corn bran, banana's fruit skin, cassava skin, fish waste, tofu by-product, and coconut oil cake, urea, salt. They are grinded into meal and mixed together with blood meal and bone meal. Experimental design used was Latin Square design 6 x 6. The treatments were T1 = field grass hay *ad lib*. + 11% protein and 55% TDN supplement; T2 = field grass hay *ad lib*. + 11% protein and 60% TDN supplement; T3 = field grass hay *ad lib*. + 11% protein and 65% TDN supplement; T4 = field grass hay ad lib. + 12% protein and 55% TDN supplement; T5 = field grass hay *ad lib*. + 12% protein and 60% TDN supplement; T6 = field grass hay *ad lib*. + 12% protein and 65% TDN supplement. Theses treatments were formulated to meet National Research Council (NRC, 1984) requirements for cattle. Data were statistically analyzed using SAS packaged program (SAS Institute, 1989).

RESULTS AND DISCUSSION

The statistical analysis of the results of the experiment presented in the Table 1 showed that the effect of treatments was significant ($P < 0.05$) on dry matter, crude protein, and energy intake, and body weight gain.

Table 1. Means of dry matter, crude protein and energy intake, and feed conversion, feed efficiency, and body weight gain

Variables	T_0	T_1	T_2	T_3	T_4	T_5
Dry matter, g day^{-1}	4961.1^{a}	5442.9^{ab}	5542^{ab}	5714.7^{bc}	5893.7^{bc}	6446.7^{c}
Crude protein, g day^{-1}	545.72^{a}	598.72^{a}	609.62^{a}	665.768^{b}	693.91^{b}	716.87^{b}
Energy, kcal day^{-1}	2728.58^{a}	3265.74^{a}	3602.30^{bc}	3143.10^{a}	3536.24^{b}	4190.38^{c}
Body weight gain, g day^{-1}	420.42^{a}	462.5^{a}	466.99^{a}	500.24^{b}	520.63^{b}	596.75^{b}

Notes: $^{a, b, c, ab, bc}$ different superscript within rows shows a highly differences between treatments ($P<0.01$).

Dry matter intake of T_3, T_4, and T_5 were higher than of T_0. This means that level 12% of protein able to increase palatability of basal diet. Similarly, for crude protein intake, the same trend was observed. This findings was agreed with Preston and Leng (1987) who reported that protein requirement for growing cattle was ranging from11 to 12 %. In the same way, for energy intake, almost has the same trend with the other two variables, except for T_3. These indicated that dry matter, crude protein, and energy were met the recommendation of National Research Council (NRC, 1984) requirements for cattle. Consequently, the increase of intake of the three main nutrients resulted in body weight gain. This study confirmed previously reported findings that supplemental of crude protein can increase dry matter intake (Elliott and Topps, 1963; Lee *et al*., 1985) and improve live weight changes (Hughes *et al*., 1978; Males, 1987).

CONCLUSION

The results indicated that the effect of treatments were significant ($P< 0.05$) on dry matter, crude protein, and energy intake, and body weight gain. It is concluded that block supplement of feedstuff base on local fodder and agricultural by-product is good for the performance of Bali cattle.

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