Body Weight Gain of Donggala Bull Given Supplement Feed on Basis of Cocoa Pod Husks Fermentation

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ABSTRACT: Donggala cattle is one of native cattle in Indonesia which has the largest contribution in meat providers for the local and other provinces. One of livestock management is by improving the feeding management with feed supplement on based of cocoa pod husk (CPH) fermentation with natural microbes. The aims of the research was to determine the effect of feeding supplement on based of CPH fermentation on the body weight gain of Donggala bulls. CPH was fermented using natural microbes (anaerobic condition). The total of Donggala bulls used were 12 heads. Daily feed treatment for every bull, P_0: CPH without fermenting+natural grass *ad-libitum* (farmer method), P_1: CPH fermentation 30% on diet and P_2: CPH fermentation 60% on diet. The content of CPH nutrients were analyzed by proximate method. Feed supplement on based of CPH fermentation was feeding trials on beef cattle with total of crude protein content about 12%. Adaptation of feeding supplement on Donggala bull was done for 15 days and continued with feeding trials during 3.5 months. The measurement of body weight was done every two weeks, in the morning before feeding. Statistical analysis used a complete randomized design (CRD) and tested with the smallest real difference (SRD) test. The result of statistical analysis shown that average daily gain (ADG) of beef cattle for P_2 was significant ($P<0.05$) higher than P_1 and P_0 which were 0.93 kg, 0.70 kg and 0.36 kg, respectively. It was concluded that the highest of ADG with feeding on based of CPH fermentation with added 60% on feed supplement.

Keywords: Donggala Bull, Body Weight, FCR, CPH, Fermentation

INTRODUCTION

Donggala cattle is one of native cattle in Indonesia which has the largest contribution in meat providers for local and other provinces. However, the development of Donggala cattle is not optimal due to general system maintenance extensively and intensively. Semi intensive rearing system, farmers put in the animals in the simple pen and give them natural grass only. Feeding the animals are not concerned to fulfill their feed nutrients needs. This is caused by ignorance of farmers in feeding management for primarily calculating the needs of beef cattle (for main live, production, and reproduction) so that, it lower the increase of the beef cattle body weight and low erreproductive performance (Rusdin *et al.*, 2009).

One of livestock management is by improving the feeding management with feed supplement on based on cocoa pod husk (CPH) fermentation with natural microbes. It because the agricultural by-products are usually characterized by their low nutritional quality, they also contain highly fibrous materials and low protein content (Laconi and Jayanegara, 2015). Fermentation using natural microbes is expected to guarantee continuation of fermentation process of the feed materials particularly in the rural areas and easier with a cheap cost. However, the fermentation process with natural microbes in anaerobic conditions is a longer fermentation time compared with commercial microbes, but changes in the chemical composition is relatively the same. The

anaerobic fermentation process is commonly types of natural microbes such as lactic acid bacteria (LAB) and yeast (Yang *et al.,* 2006). During the ensilase process, LAB decomposes the selulose become hemiselulose into simple sugars. Some bacteria change simple sugars into lactic or acetic acid, and butyric. The perfect fermentation process must produce a product in the form of lactic acid, because lactic acid is produced by lactic acid bacteria which will avoid the feed materials from damage and also attack the docomposer bacteria, so that the feed materials are more durable and long lasting. Lactic acid contained in the silage is consumed by the ruminants, are used as energy source and also as probiotics (Widyastuti, 2008).

The CPH fermentation process uses natural microbes is expected to improve nutrient and digestibility and tobe stored in long period of time. CPH Fermented with *Phanerochaete chrysosporium* and added 3% molasses (w/w) with crude protein content to increase up to 10.0% and crude fiber to decrease become 45.6%, while CPH without any treatment is crude protein content only 8.4 % and crude fiber about 55.7 % (Laconi and Jayanegara, 2015). TThe aims of the research was to determine the effect of feeding supplement on based of CPH fermentation on the body weight gain of Donggala bulls.

MATERIALS AND METHODS

The research was conducted on June-November 2013 in Tanah Mpulu Village, South Banawa Sub-District, Donggala Regency, Central Sulawesi Province. The total of Donggala bulls (the local cattle) used were 12 heads whose age were about 1.5-2.0 years old. Every feeding trial used four head animals. Daily feeding trial for group bull, P_0: CPH without fermenting+natural grass *ad-libitum* (farmer method), P_1: CPH fermentation 30% on diet and P2: CPH fermentation 60% on diet. The content of CPH nutrients were analyzed by proximate method. Feed supplement on based of CPH fermentation was feeding trials on beef cattle with totall of crude protein content was about 12%. Additional of feed materials as a protein and energy sources for P_1 and P_2 were fish mill 0.1 kg and rice bran 1.2 kg. Basal feed was given fresh natural grass about 10-15 kg, while P_0 in range was 25-35 kg. Adaptation of feeding supplement on Donggala bull was done for 15 days and continued with feeding trial during 3.5 months.

CPH was placed under the solar sun in the whole day during 3-5 days. Later, the grinded CPH was fermented using natural microbes in anaerobic condition during 21 days. Moisture content of CPH during fermentation process was estimated about 35-40%. The urea was added 1% of a total CPH (on dry matter basis) as nitrogen source for microbial activity. Nutrient content of feed materials were analyzed by proximate method (AOAC, 2005) in Laboratory of Feed Science, Faculty of Animal Science, Universitas Gadjah Mada, Yogyakarta. Data and information were collected and analized in both of quantitative manner. Computation of feed conversion ratio (FCR) according to the formulation by Kellems and Church (1998) and suppoted by Shike (2013) namely:

$$FCR = \frac{\text{weights the feed consumed}}{\text{unit of a product produced}}$$

The measurement of body weight was done every two weeks, in the morning before feeding treatment. Statistical analysis used a complete randomized design (CRD) and tested with the smallest real difference (SRD) test according to the procedure of Gomez and Gomez(1984).

RESULTS AND DISSCUSSION

Chemical Composition of Feed Materials

Chemical composition of feed materials for the animals with material base on CPH anaerobic fermentation is showed on Table 1 below.

Table 1. Chemical Composition of Feed Materials

Feed Materials	Chemical Composition (%)						
	DM	OM	CPt	CP	CF	NFE	TDN
Natural Grass	85.35	75.09	1.19	7.17	31.43	49.95	48.25
CPH non Fermentation	87.97	74.23	0.37	8.73	31.53	45.62	52.95
CPH Anaerobic Fermentation	88.70	76.25	0.89	13.05	32.07	41.55	50.46
Fish Mill	89.54	41.89	3.29	35.83	1.38	11.86	12.97
Rice Bran	90.17	64.14	2.88	14.23	22.32	34.54	43.85
Feed (Anaerobic Fermentation)	88.94	71.57	3.31	13.53	21.92	43.87	67.29

Feed materials were analyzed in Lab. of Feed Science, Fac. of Anim. Sci., UGM, Yogyakarta, 2012 DM: dry matter, OM: organic matter, CPt :crude fat, CP;crude protein, CF: crude fiber, NFE: nitrogen free extract, TDN: total digestible nutrient.

Feed Intake, Body Weight Gain and Feed Conversion Ratio

The feed intake, body weight gain and feed conversion ratio of animals with feed material based on CPH anaerobic fermentation was seen on Table 2 below.

Table 2. Feed Intake, Body Weight Gain and Feed Conversion Ratio

Description	Treatment		
	P_0	P_1	P_2
Feed intake (kg DM)	$23.17^{b} \pm 7.36$	$11.33^{a} \pm 0.94$	$10.56^{a} \pm 1.63$
Initial body weight	181.00 ± 57.54	204.25 ± 10.40	181.25 ± 46.59
Find weight weight (kg)	$218.75^{b} \pm 65.77$	$277.75^{a} \pm 12.97$	$278.25^{a} \pm 50.12$
Increasing body weight (kg)	$37.50^{c} \pm 8.89$	$73.50^{b} \pm 10.41$	$97.00^{a} \pm 5.59$
Average daily gain (kg/day)	$0.36^{c} \pm 0.085$	$0.70^{b} \pm 0.099$	$0.93^{a} \pm 0.051$
Feed conversion ratio (FCR)	63.61b ± 10.61	$16.49^{a} \pm 2.61$	$11.76^{a} \pm 1.21$

^{a,b,c} Different superscripts in the same columns denote significant differences ($P<0.05$)

The results of Donggala bulls weighing every two weeks showed that giving of feed supplement on basis of CPH anaerobic fermented may be raising weights of animals. This can be showed at the end of the researsh which is P_1 and P_2 occur increasing of body weight. While body weight of P_0 was sometimes given CPH without fermenting (CPH chop) also increasing relatively low which it can be seen in Table 2. Development of body weight every two weeks the animal was conducted measurements. Measurements result showed that tend to increasing of body weight (Figure 1).

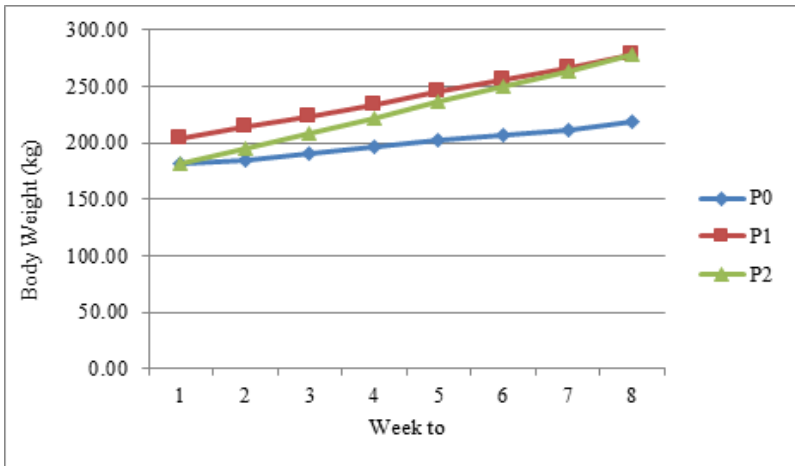

Figure 1. The development of Body Weight Donggala Bull for Three Months

The increase of average daily gain (ADG) of Donggala bull on P_2 0.93 kg was significant differences ($P<0.05$) compared to that of P_1 and P_0 with ADG 0.70 kg and 0.36 kg, respectively. The high of ADG was feeding on basis of adding CPH 60% which is the highest portion than other treatments. The high of CPH fermented portion (60%) in ration did not influence the animals' feed consumption because CPH in anaerobic fermentation has a good odor and flavor. This condition made the animals more interested in consuming the feed supplement. Preston and Leng (1987); Baumont (1996) reported that taste, odor and flavor were importance factors in feed. Animal can refuse the feed given without tasting it first because they dislike the flavor. FCR of P_2 11.76 was significant differences ($P<0.05$) more efficient than P_1 and P_0 16.49 and 63.61, respectively. Bertram and Oliver (1990) reported that feed conversion was affected by feed quality (particle size, processing, and nutritional levels), cattle body weight, sex, cattle temprament, growth promotant and rumen modifiers. According to Siregar (2008) that feed conversion that is good for the beef cattle is ranging between 8.56 to 13.29. P_2 has FCR in ideal range which gather fewer feed need for raising body weight per unit than P_1 and P_0. This condition was caused by P_2 that consumed more feed supplement on basis of CPH with portion of 60% but fewer to consume natural grass which is more efficient to raise body weight per unit. Feed intake of P_2 was only 10.56 kg (DM) lower than P_1 11.33 kg (DM) and P_0 23.17 kg (DM) or lower 0.77 kg (P2 versus P1) and 12.61 kg (P2 versus P_0), respectively.

CONCLUSIONS

It was concluded that the highest of ADG with feeding on based of CPH fermentation with high percentage (60%) in feed supplement which was followed by FCR was the most efficient.

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