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Performance of Bali Cattle on Substitution Feeding Fermented Straw

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Abstract

The purpose of this research is to know the increase of body weight, feed consumption, feed efficiency and conversion of Bali cattle feed given fermented straw as substitution of Elephant Grass. The method used in this Experimental study Method with Randomized Block Design with four treatments and three replications. P2: Elephant Grass 100% (control) P1: Elephant Grass 75% + 25% fermented straw, P2 treatment: Elephant Grass 50% + 50% fermentation straw and P3 Treatment: 25% Grass + Finger straw 75 %. The observed changes were weight gain (kg/day), feed consumption (kg/day), feed efficiency and feed conversion in Bali cattle. The data obtained were analyzed in various ways with Duncan. The result of this research showed that by giving substitution of fermented straw to determine the performance of bovine cow have a real effect (P ≤.05) to the value of body weight gain, feed consumption, feed conversion and efficiency of feed. It shows that with the difference of feeding substitution of fermented straw can give the real effect on the increase of body weight of Bali cattle with feeding of forage grass 50% elephant + 50% fermented straw.

Keywords: Bali cattle, performance, straw fermentation

A. Introduction

Bali cattle is one of the original Indonesian animals that has excellent potential to be developed. The origin of this Bali Cow is a bull (Bossandaicus) that has been domesticated or domesticated for many years. The long domestication process is thought to be the cause of lesser than the beast. Based on the breed (race) pure, classifying the cow into 3 (three) cows, namely European cows (Bos Taurus), the nation of cattle India (Bos indicus), and the nation of Bali cattle (Bos sandwiches). Bali cow (Bos sandwiches) is the original Indonesian cow that becomes suspect as the result of domestication (taming) of the wild bull. Some experts believe that the domestication takes place in Bali so-called (Guntoro, 2002). Bali cow is known as a cow that has the excellent adaptability to environmental conditions are very extreme tense. In these conditions, Bali cattle still have a high carcass production (Guntoro, 2002).

Processing of rice straw can be ammonia or fermentation which can increase the nutrient also can preserve the straw feed material Agus, Suwignyo, & Utomo (2005). Processing used is the fermentation of rice straw by using probiotics. Probiotics is a natural ingredient additive that can improve digestibility in the form of microbes. Cellulosic microbes in probiotics will produce cellulose enzymes that can break the lignocellulose bond so that that digestibility can increase. Fermented rice straw with probiotics can improve the digestibility of in vitro dry matter and organic matter Syamsu, Yusuf, & Abustam (2002). The purpose of this research is to know the performance of mother cows with feeding substitution of fermentation straw.

B. Methodology

1. The material

The materials used in this research are 12 female of Bali cows, Elephant Grass, Fermented Straw. The tools used in this research are Thermometer, Hygrometer, Anemometer, Chopper Machine, Measuring Band and Sitting Scale, Rope, Three Wheel Motor, Bucket, Sickle.

2. Research design

This research was conducted using Randomized Block Design (RBD), which consisted of 4 treatments that were repeated three times so that there were 12 experimental units. The research included 4 P0, P1, P2, P3 treatment factors.

Treatment rations used consisted of four kinds, namely:

P0: Elephant grass 100%
P1: Elephant grass 75% + fermented straw 25%
P2: Elephant grass 50% + fermented straw 50%
P3: Elephant grass 25% + fermented straw 75%.

3. Research procedures

a. Preparation phase

In the preparation phase which lasted for one week, the activities are:

a) Preparation of intensive cage capacity 12 tail, size 2 m x 1.5 m / head / plot.
b) Cattle health examination of the research.
c) Approach the place within the cage for each cattle.
d) Adapting to the cattle to be studied.
e) Feeding:
    1) Taking elephant grass at 6 am.
    2) Provision of the available fermented straw cage.
    3) Provision of drinking water in adlibitum and beat during the daytime.

b. Microclimatic measurement

a) Cage Temperature.
The temperature was measured using a thermometer each mounted in a cage plot (front, center, and back) inside the enclosure of the thermostat 50 cm from the enclosure floor. Take data three times a day, which is at 7 am, 12 am, and 5 pm.

b) Cage humidity.
Humidity is measured using a hygrometer each of which is mounted in a cage plot (front, center, and back) inside a hygrometer mounting cage located 50 cm from the cage floor. Data is taken three times a day at 7 am, 12 am, and 5 pm.

c) Temperature Humidity Index (THI).
Temperature Humidity Index (THI) measured using a dry and wet thermometer installed in each cage of the damp and dry thermometer layers 50 cm from the cage floor. Data is taken three times a day at 7 am, 12 am, and 5 pm.
Calculating of THI by using the following formula (Rohman & Boer, 2000):

THI of Beef Cattle = T-0,55 x (1-rH/100) x (T-58)

Explanation:
THI : temperature-humidity index (^{0}C)
T : temperature in^{0}F
Rh : humidity

d) Performance of Bali Cattle
1) The increase of Body Weight.
Body weight gain of Bali cattle was measured by using a measuring tape and then saw the weight table of Balinese cow body weighted from Lampung Veterinary Centre 2014. The daily weight gain (DWG) of experimental cattle resulted from the difference between the final weight of the observation period and the initial body weight of the observation period divided the long period of observation. DWG is calculated using equations:

$$\mathbf{DWG = \frac{WT - WO}{T}}$$

Explanation:
Wt : weight of livestock at the end of observation period (kg)
Wo : the weight of livestock at the beginning of the observation period (kg)
T : long observation time

2) Feed consumption.
A calculation of the difference in feeding with residual is the definition of feed consumption. Calculated based on the amount of feed given minus the rest of the feed (kg).

Feed Consumption (kg) = Giving (kg) - residual (kg)

3) Feed Conversion Ratio (FCR)
Feed Conversion Ratio (FCR)is a unit to calculate the efficiency of feed on the cultivation of fattening and fattening. By calculating the FCR of cattle will significantly help us in the effectiveness of feed that we will use FCR calculation results with small numbers means the given feed is getting better. The formula for calculating the FCR is the amount of feed during maintenance divided by the total body weight of cattle. The method of Feed Conversion Ratio (FCR):

$$\mathbf{FCR = \frac{The\ amount\ of\ feed\ consumed\ (kg)}{The\ resulting\ weight\ (kg)}}$$

4) Feed efficiency.
Feed efficiency is the ratio between the increase of body weight produced with the feed consumed, with the following formula:

$$\text{Feed Efficiency} = \frac{\text{Body Weight Gain(kg)}}{\text{Feed Consumption (kg)}}$$

4. Parameters of Research

a. Microclimatic parameters at the time of study include temperature, humidity, THI.
b. Livestock performance parameters include weight gain, feed intake, *Feed Conversion Ratio* (FCR), feed efficiency.

5. Data analysis

All data obtained in this study, its variance was analyzed by using Randomized Block Design (RBD) unidirectional pattern to know the effect of treatment on the observed changes.

The mathematical model by using the following formula:

$$Yij = \mu + \alpha i + \varepsilon ij$$

Explanation:
Yij : The observed value of treatment of i-group and j-group
μ : The middle observation value is common
αi : The effect of the I-th treatment
Ɛij : Error (error) experiment on the treatment of i-th and j-th group

Knowing the impact of the treatment on the measured parameter, the data obtained were analyzed by vocabulary with the help of SPSS 21 software. If the therapy showed real effect, then LRD test (Suhaimi, 2001).

C. Result and Discussion

1. Microclimatic environment

To observation of microclimate condition at cage Berdikari Mallomo Utama (BMU) Animal Husbandry Cenrana Village Kahu District Bone District Environmental Condition during research from 7.30 am – 5 pm. The average temperature of the enclosure is 28.65^{0}C, and the humidity of the cage is 78.27% with THI 40.41% being in comfortable condition. Table 1 shows the microclimatic average in the cage.

Table1.The mean value of Microclimatic in the cage during the research

Microclimate	Morning (7 am)	Afternoon I (12 am)	Afternoon II (5 pm)	Average
Temperature	24.56^{o}C	33^{o}C	28.38^{o}C	28.65^{o}C
Humidity	85.31%	68.19%	81.31%	78.27%
THI	38.63%	42.23%	40.37%	40.41%

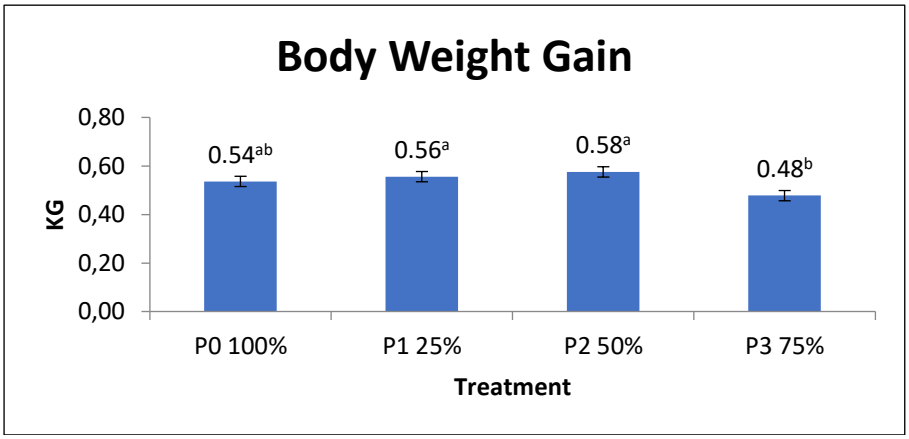
Table 1 explains that the fluctuation of the enclosure temperature with the temperature of the cage in the morning ranges from 24-56^{o}C and experienced important warning during the day at 33^{o}C and gradually decreasing until the afternoon at 28.38^{o}C. It is the same statement of Yulianto & Saprianto (2010), also explains that the air temperature standard in the beef cattle comfort zone is in the range of 27-34^{o}C the temperature is also still by the safe area of beef cattle in the tropics like Indonesia in general. The humidity of the cage in the morning ranges from 85.31% during the day 68.19% and the afternoon is 81.31%. Too high humidity can trigger the presence of disease (dust and fungi), so considered as a determinant of livestock health it is one of the climatic elements.

The results obtained are in comfortable condition due to the temperature of the cage in the morning 24.56^{o}C, and humidity ranges 85.31% and THI 38.63%. By the opinion of Chase & Larry (2006) that THI <72 said that with these environmental conditions the cow is in a comfortable situation and does not cause stress on cattle.

2. Performance of Bali Cattle

a. Body Weight gain of Bali Cows

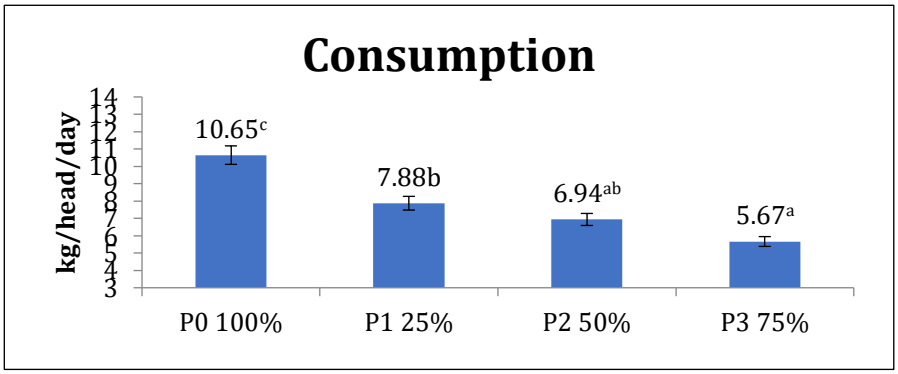
The average daily weight gain of Bali cattle at different ages during the research (Figure 1).



Description: superscripts a, ab and b on the same line indicate the effect real (P ≤ .05).

Figure 1. Average daily weight gain of Bali cattle

The result of variance analysis showed that the feeding of fermented straw had a very significant effect of P ≤.05 on the increase of body weight of the parent of Bali cattle. The average daily weight gain of cattle ranged from .48 to .58 kg / head / day, the highest was in P2 treatment i.e. 50% forage grass elephant + 50% fermented straw of .58 + .03 kg/head/day. The average consumption of Bali cattle feed during the study is shown in Figure 2.



Description: superscript a, ab and b on the same line indicate authentic effect (P ≤.01)

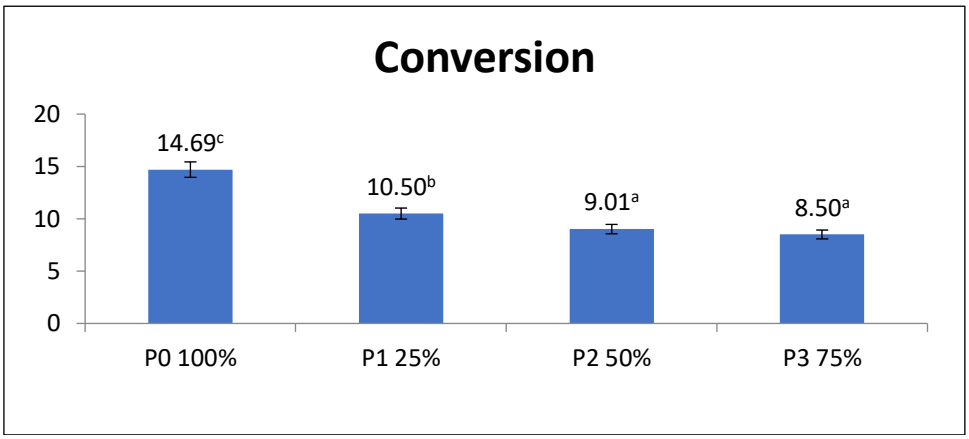
Figure 2. Average consumption of Bali cattle feeds on the substitution of fermented straw.

The result of variance analysis showed that the feeding substitution of fermented straw gave an authentic effect of P≤ .01 by treatment of P1, P2, P3, and P0. It is that means of feed consumption in P0 treatment, showed that consumption was as high as 10.65 + 1.44 kg/ head/day, then respectively decreases in P1, P2 and P3 apiece 7.88 + .29 kg / head / day, 6.94 + .16kg / head / day and 5.67 + .84 kg / head / day. It is due to feed consumption of livestock affected by the quality of feed and environmental conditions of maintenance.

b. Feed conversion

The average feed conversion of Bali cattle feed during the research is shown in Figure 3. Conversion value of feed will be more efficient if the amount of feed consumed less but produce PBBH higher or equal. The lowest feed conversion value of the three treatments was achieved by treatment (P3) i.e. 8.50 + 1.14 followed by treatment (P2) 9.01 + .40, (P1) 10.50 + .38 and (P0) 14.69 + 2.79.

The result of variance analysis showed that the treatment gave a significant effect on feed conversion P ≤.05 because the consumption of dray matter (DM) and DWG produced had a real impact. It indicates that the higher the level of fermented straw provided, the lower the feed conversion. It shows the result of fermented straw decrease feed conversion

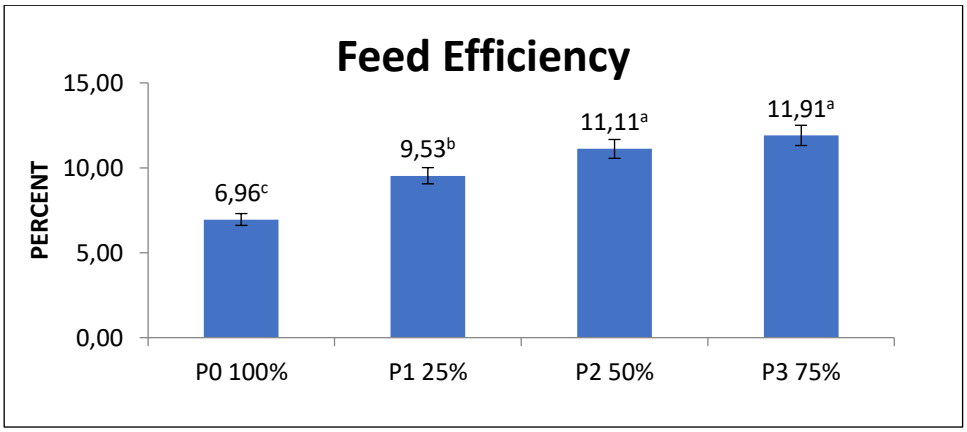


Description: superscript a and b on the same line show a significant effect (P ≤.05)

Figure 3. Average convention of Bali cattle feeds substituted with fermented straw.

c. Feed efficiency

The average efficiency of bovine feed during the research (Figure 4).



Description: superscript a and b on the same line show a significant effect (P ≤.01)

Figure 4. Average cows feed efficiency with fermented straw substitution feed.

The result of variance analysis showed that feeding substitution of fermented straw had a significant effect on feed efficiency where P ≤.01 with treatment P1, P2, P3, and P0. The feed efficiency obtained from this study ranged from 6.96 - 11.91%. The results of this study differed from Akbar (2007) who reported that the feed efficiency of sterilized fermented palm bunches combined with defaunation and protein bypass rumen in local sheep was 4.86 to 13.41%. Siregar (2001), which states that the efficiency of feed used for cattle ranges from 7.52 to 11.29%.

D. Conclusion

The conclusions of the results and discussion of research were that the difference of feeding substitution of fermented straw could give effect to the increase in body weight, consumption, conversion, and efficiency of feed.

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