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Physiological Response of Bali Cattle to Feeding Substitution of Balinese Fermentation Straw

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Abstract

This study aims to see the physiological response of Bali cattle to the feeding of fermented straw substitution. A total of 12 head of Bali cattle average age five years. This research was conducted from August to September 2017 in Cenrana Village, Kahu Sub-district, Bone District, which is a location in the business of Berdikari Berdikari Mallomo Utama. This study used a randomized block design (RBD) with 4 treatments and 3 replications so that there were 12 experimental units, the procedure was P0: 100% elephant grass + 100% fermentation control, P1: elephant grass 75% + generation fermentation 25%, P2: 50%, elephant grass + 50% fermenting straw, and P3: Elephant grass 25% + 75% fermentation straw. The parameters observed were body temperature, respiration rate, and liver rate. The data obtained were analyzed variance and continued with LRD test. The results showed that the substitution of hay fermentation had a significant effect (P <.01) on the physiological response of Balinese cow heart, but no significant effect (P> .05) to the body temperature and the rate of respiration of Bali cattle. The conclusion that by giving fermented straw substitution feed provide an effect on heart rate (58.33 / min) with treatment 25% elephant grass + 75% fermented straw in the normal range for Bali cattle.

Keywords: female Bali cattle, physiological response, fermentation straw

A. Introduction

Bali cattle is an ideal animal slaughtered regarding meat production due to its low-fat content, great reproductive aspect due to high fertility, has the superb adaptability to the new environment, both on air temperature, humidity and wind, and resistant to the condition of land, feed, and disease Guntoro (2002).

Cattle get hot from metabolic and environmental activities, will lose heat through convection, radiation, conduction, and evaporation. Livestock adaptation to the environment is a form or behavior trait intended to survive or reproduce in a particular situation. The improper climate can lead to changes in the physiological status of cattle called stress or stress. Livestock affected by weight will show behavior changes the way animals to cope or reduce stress is by adjustment, both genetically and phenotype. Explained further increase in breath frequency and body temperature will affect with growing pulse rate. The purpose of this study is to determine the physiological response of Bali cattle to the feeding substitution of fermented straw.

B. Methodology

1. The material

The materials used in this study are elephant grass, fermented straw, and 12 female calves. Which maintaining in the business of Berdikari Mallomo Utama farm, Cenrana Village, Kahu Sub-district, Bone District.

The tool used in this research is Thermometer, Stethoscope, Stopwatch, Haigrometer, Rope, Wet Tissue, Bucket, Book, and Pen.

2. Research design

This research was conducted using Randomized Block Design (RBD), consisting of 4 treatments that were repeated three times so that there were 12 experimental units. This research includes four factors of therapy of P0, P1, P2, and P3.

Treatment rations used consisted of four kinds, namely:

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

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) Observe Animal health inspection in the study.
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 ad libitum and beat during the daytime.

b. Microclimatic measurement

a) Environmental temperature
The temperature was measured using a thermometer mounted in a first cage plot inside a thermometer fixing cage located 50 cm from the cage floor. Recording data is three times a day, which is at 7 am, 12 am, and 5 pm.

b) Moisture cage.
Humidity was measured using a hygrometer mounted in a front cage housing the hygrometer mount was 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).
Wet and dry temperature or THI is measured using a dry, and damp thermometer mounted in front of the cage, damp and dry thermometer installation is 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

c. Physiological Measurement of Livestock

a) Body temperature.

The thermometer to be used is clean and dry, carefully lifted the cow's tail up, then insert the tip of the thermostat (1/3 part) into the rectum for about 10 seconds, observed how the cow's body temperature is indication on scale thermometer, data taken 3 times a day, i.e., at 7 am, 12 am, and 5 pm.

b) Respiration rate.

Doing Respiration Rate Measurement by attaching a stethoscope to the chest or neck so that the sound of breath sounds. The frequency of breathing is a calculation for one minute using the stopwatch in duplicate. Taking Data is three times a day, which is at 7 am, 12 am, and 5 pm

c) The frequency of Cattle Heartbeat

Heart rate measurement is a performance by attaching a stethoscope to the chest near the front of the cow's quadriceps, the number of pulses or Rothko sound is counting for one minute using the stopwatch in duplicate. Taking Data is three times a day, which is at 7 am, 12 am, and 5 pm.

4. Parameters of Research

a. Microclimatic at the time of study include temperature environment, humidity, and THI.
b. Physiological parameters include body temperature, respiration rate, and heart rate.

5. Data analysis

All data obtained in this study analyzed its variance by using Randomized Block Design (RBD) to determine the effect of treatment on the observed changes. The mathematical model by using the following formula:

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

Explanation:
A : treatment
I : groups
: 1, 2, 3, ... n
Yij : The observed value of the i-th treatment and the j-group
μ : The middle observation value is common
αi : The effect of the i-th treatment
ϵij : Error (error) experiment on the treatment of i and group j

Finding out the effect of treatment on measured parameters, so the data obtained were analyzed by vocabulary with the help of SPSS software. If the therapy exhibits a real impact, then the LRD test is performed (Suhaimi, 2001)

C. Result and Discussion

1. Microclimatic environment

Table 1 showed results of observation of microclimate conditions in the cage BMU Berdikari Mallomo Utama Ranch Cenrana Village, Kahu District, Bone District Environmental Condition during the study.

Tabel 1. the mean value of Microclimatic with the substitution of fermented straw feed

Microclimate	Morning (07.00)	Afternoon I (12.00)	Afternoon II Sore (17.00)	Average
Temperature	24.56°C	33°C	28.38°C	28.65°C
Humidity	85.31%	68.19%	81.31%	78.27%
THI	38.63%	42.23%	40.37%	40.41%

Source: Primary data that have processed, 2017

Table 1 shows the average obtained temperature of the cage is 28.65°C, and the humidity of the pen is 78.27% with THI 40,41%. It can explain that the fluctuations in the morning temperatures ranged from 24.56°C and experienced significant warning during the day 33°C and gradually decreased until the afternoon at 28,38°C temperature range, the environmental temperature value has the potential to provide day physiologic stress on Bali cattle by giving elephant grass and fermented straw, higher heat load leads to decreased appetite in livestock. It is suitable with Yulianto & Saprianto (2010). Also explained that the standard air temperature in the beef cattle comfort zone is in the range of 27-34°C, the heat is also from the safe area of livestock in tropical regions like Indonesia in general. Relative humidity indicates a value that is opposite to the ambient temperature. Average humidity during the study in the morning of 85.31% during the day 68.19% and afternoon 81.31% can see that the average moisture is normal to calculate the life of beef cattle. The average THI value also experienced the same change in the environmental temperature, i.e., in the morning about 38.63% then increased to 42.23% and decreased to 40.37%.

2. Animal Physiological Response Measurements

a. Body temperature

Body temperature indicates the body's ability to release and receive heat. Measurement of body temperature is inherently tricky since the frequency of body temperature is the resultant of various rates in various places Figure 1 shows the body temperature of the cow by substitution of the fermented straw.

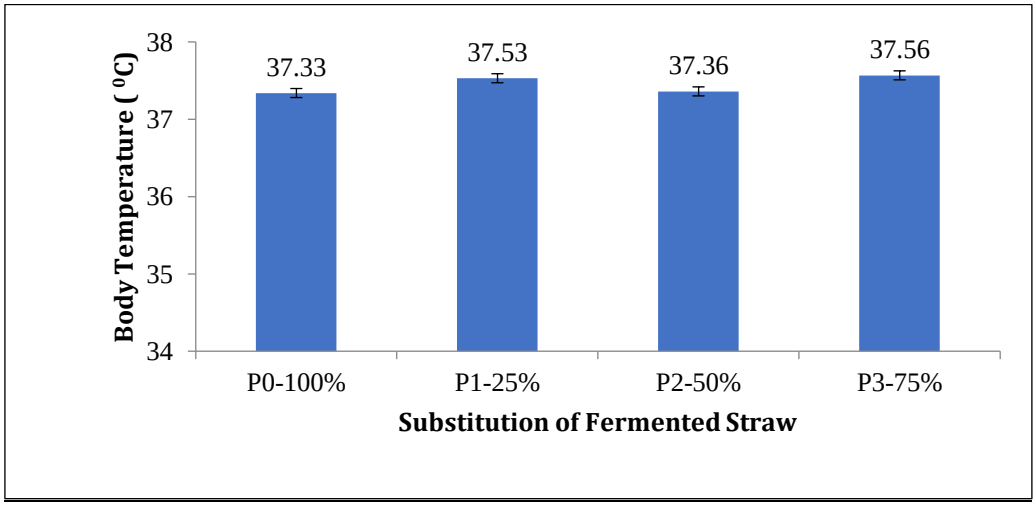


Figure 1. The average body temperature of Bali cattle fed with the substitution of fermented straw.

The result of variance analysis showed that fermented straw substitution feeding on Bali cattle had no significant effect (P >.05) to body temperature i.e. P0 (37.34 + .16) 0C, P1 (37.53 + .04) 0C, P2 (37.36 + .28) 0C, and P3 (37.56 + .06) 0C are still in the normal range, this is supported by Santosa, Bambang, & Agus (2004), which states that the normal body temperature range in cattle is 370C up to 390C.

This study showed that body temperature at P3 treatment (37.56 + .06) 0C did not differ much with treatment of P1 (37.53 + .04) 0C, compared P2 (37.36 + .28) 0C. It is due to the feeding with high protein level that is 9.11% nutrient content of fermented straw does not affect the body temperature of Bali cattle, because of cow able to do thermoregulation process through mechanism homeostasis in the body.

b. Respiration rate

Respiration is the process of taking oxygen from the air and the release of carbon dioxide from the network through the lungs, breathing is a biochemical process done by animals to obtain energy. Breath plays a role in regulating the acidity of extracellular fluids in the body, helping with temperature control, water elimination, and sound formation.

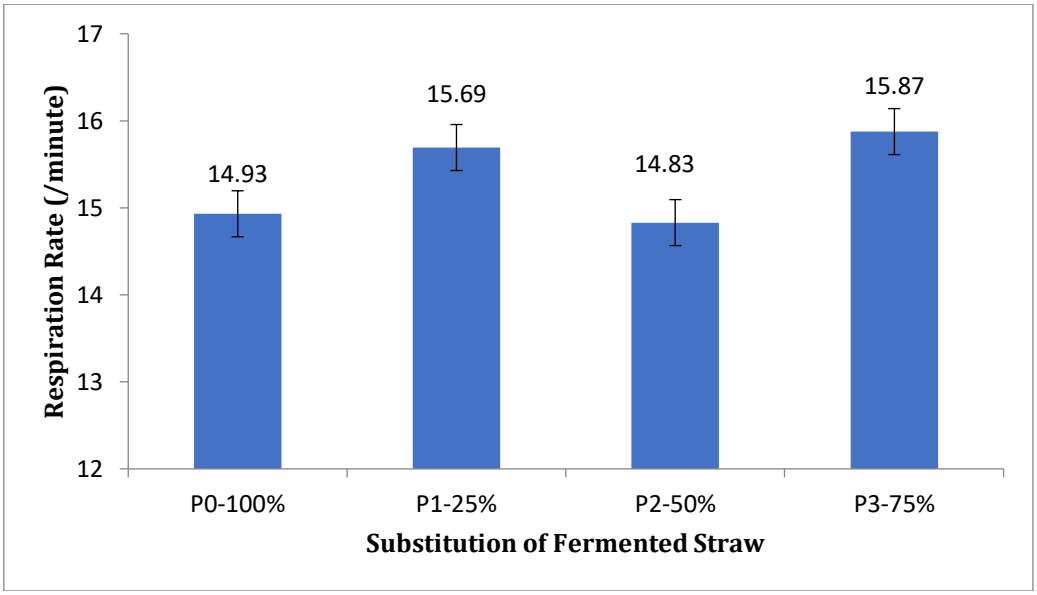


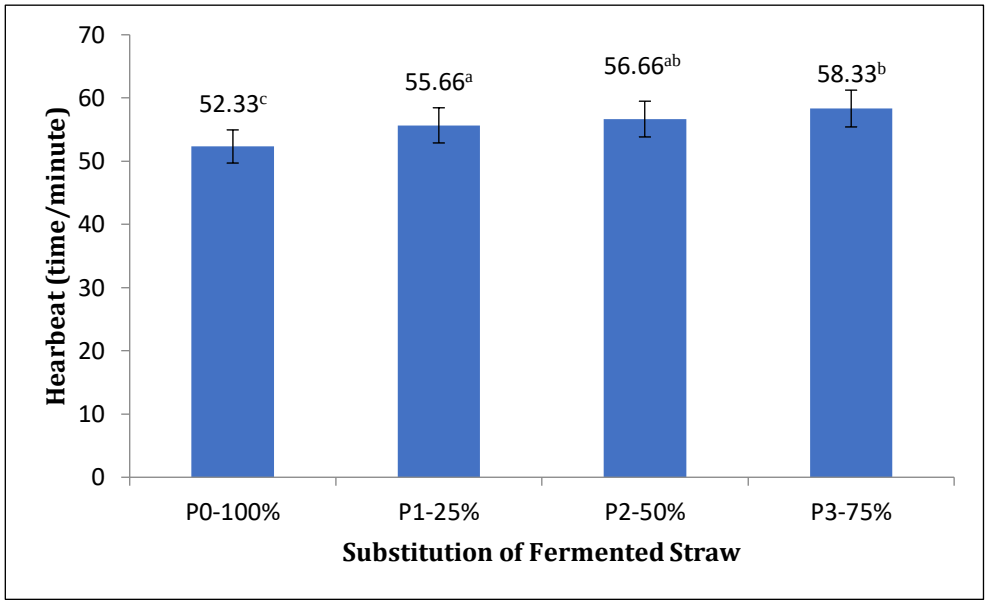
Figure 2. Average value of the respiratory rate of Bali cattle fed with fermented straw substitution.

The result of variance analysis showed that the substitution of fermented straw in animal feeding had no significant effect (P >.05) to the rate of respiration of Bali cattle. The mean obtained during the study in Figure 5. P0 (14.93 + .34 / min), P1 (15.69 + .61 / min), P2 (14.83 + 1.03 / min) and P3 (15.87 + .36 / min) is still in normal condition. According to the opinion of Akoso (2008) Frequency of breathing every minute for animal species is not the same, in adult cattle ranged from 12 to 16 times per minute, while in young cows between 27-37 times per minute.

It is explained that the value of P1 (15.69 + .61 / min), P2 (14.83 + 1.03 / min) and P3 (15.87 + .36 / min) have no effect on the respiration rate produced, feed consumption tends to be higher at P3 (15.87 + .36 / min) did not differ significantly with P1 (15.69 + 0.61 / min) compared with P2 treatment (14.83 + 1.03 / min). It is due to the increased metabolism in the body; this increase resulted in the cows having heat stress, high environmental temperatures during the day, in maintaining the body's heat balance the cow seeks to remove heat by accelerating the rate of respiration.

c. The frequency of Cattle Heartbeat

The function of the heart is to pump blood throughout the body Blood can bring O2 throughout the body and bring CO_2 to the lungs, besides the blood can also function in carrying and flattening the heat in the body.



Description: Superscript a, b and ab showed very significant effect (P <.01).

Figure 3. The average value of Balinese heart rate with Fermentation Straw Substitution.

The result of variance analysis showed that substitution of fermented straw with different treatment had a significant effect (P <.01) on Balinese heartbeat. The mean heart rate obtained during the study was P0 (52.33 + .57 / min), P1 (55.66 + .57 / min), P2 (56.66 + .57 / min) and P3 (58.33 + 0.57 / min) explained that the heart rate obtained in the substitution of fermented straw at treatment P3 (58.33 + .57 / minute) i.e. P2 (56.66 + .57 / min) compared with P1 (55.66 + .57 / min). It is by the opinion of Akoso (1996), i.e., the heart rate in normal conditions of a cow is between 40-60 times per minute.

D. Conclusion

Based on the results and discussion of research, it can give the conclusion that the feeding substitution of fermented straw gives a real effect on heart rate (58.33/min) with the treatment of 25% elephant grass + 75% fermented straw, mass is in the normal range for Bali cattle.

E. References

Akoso, B. T. (2008). *Manual untuk Paramedi Kesehatan Hewan.* Yogyakarta, Indonesia: Tiara Wacana.

Akoso, B. T. (1996). *Kesehatan Sapi*. Yogyakarta, Indonesia: Penerbit Kanisius.

Guntoro. (2002). *Membudidayakan Sapi Bali*. Yogyakarta, Indonesia: Penerbit Kanisius.

Rohman, L. & Boer, R. (2000). Penggunaan indeks kenyamanan untuk mengevaluasi kesesuaian wilayah untuk proses produksi ternak domba. *Indonesia journal of Agricultural meterologi*. Bogor

Santosa, Bambang, & Agus. (2004). *Buku Petunjuk Praktikum Produksi Ternak Perah*. Semarang, Indonesia: Fakultas Peternakan Universitas Diponegoro.

Suhaimi, M. & Ong, H. K. (2001). *Composting Empty Fruit Bunches of Oil Palm.* Malaysia: Malaysian Agricultural Research and Development Institute (MARDI).

Yulianto, P. & Saprianto, C. (2010). P*embesaran Sapi Potong Secara Intensif***.** Jakarta, Indonesia: Penebar Swadaya.