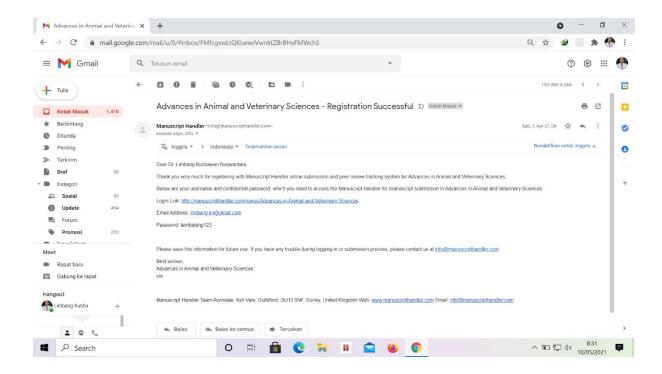
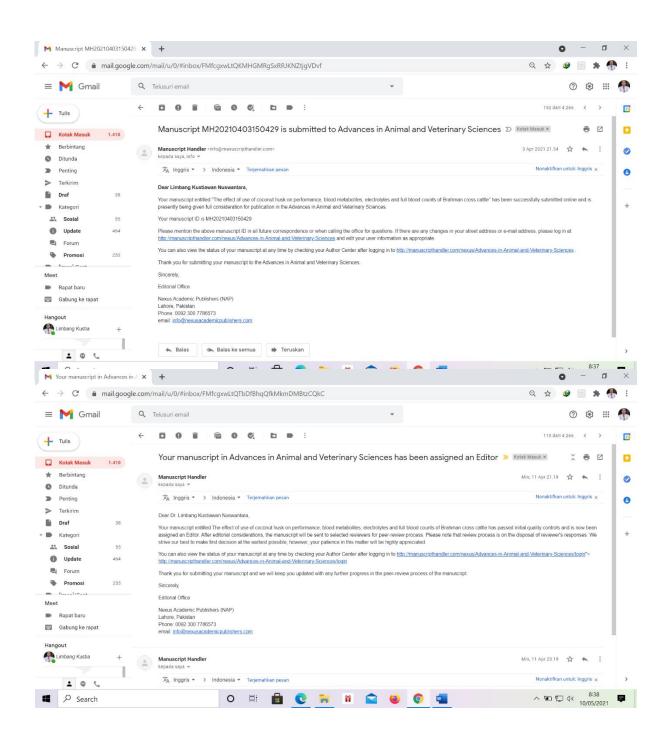
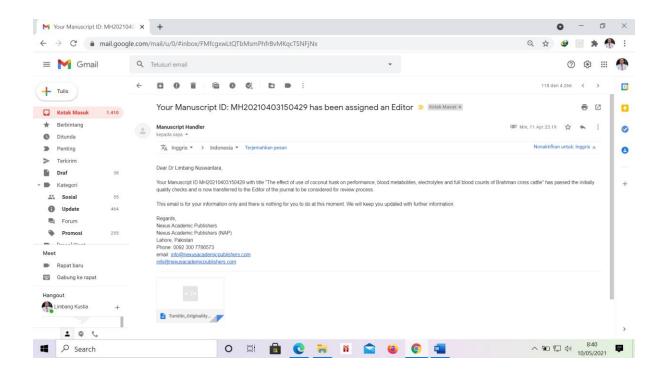
BUKTI KORESPONDENSI PENULIS DENGAN PENGELOLA JURNAL Artikel Tahun 2020 dengan Judul: "The effect of use of coconut husk on performance, blood metabolites, electrolytes and full blood counts of Brahman cross cattle"

No.	Tanggal	Keterangan
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paper text:

Running text: effect of coconut husk on cattle The effect of use of coconut husk on performance, blood metabolites, electrolytes and full blood counts of Brahman cross cattle

L.K. Nuswantara*, Sunarso, Mukh Arifin and A. Setiadi 6Faculty of Animal and

Agricultural Sciences Diponegoro University, Indonesia Prof Sudarto SH

Streets, Tembalang, Semarang, Central Java, Indonesia 50275 Corresponding email:

limbang.kn@gmail.com Abstract. 5The study aimed was to determine the effect

of utilization coconut husk on blood metabolites, and electrolytes of

Brahman cross

cattle. Sixteen Brahman cross beef cattle were used in the study. Four treatments, including R0, R1, R3, and R4 was applied in the study, and that every treatment consisted of four replications. The rations were made up of isoprotein and isoenergy. The ration was made with 11% crude protein and 66% gross digestible nutrients. The treatment used was complete feed R1: fermented coconut husk supplementation of 15%, R2: supplementation of fermented coconut husk of 20%, R3: supplementation of fermented coconut husk of 25%, R4: 30% fermented coconut husk supplementation. This experiment was conducted for 90 days of

treatment. The consumption

2of dry matter, organic matter, crude fiber, and

crude protein were observed during the study. The digestibility of 13dry matter,

organic matter, crude fiber, and crude protein were also observed

during the

experiment. Blood metabolites and electrolytes, and blood counts were all determined. The intake, digestibility, and average daily gain were superior at cattle fed R2. Blood metabolites,

electrolytes, and blood counts

18were not substantially different

(P>0.05) between the treatment groups. Overall, coconut husk may be used to

replace rice straw for Brahman cross cattle. Keywords: blood counts, blood metabolites, cattle, coconut husk, electrolytes INTRODUCTION In Indonesia, beef cattle is one of the most popular livestock commodities. The per capita demand for beef cattle has risen in recent years. Beef cattle have long been common livestock in Indonesia. On average, farmers raise two to three heads of beef cattle. The supply of feed, in general, determines the profitability of livestock businesses, including beef cattle. Agricultural and plantation waste, industrial waste of agriculture, forage cultivation, and grazing are all potential ruminant feed sources, although

the last two sources are often hindered by land-use competition. As a result, it is essential to take advantage of two additional feed sources with consistent supply, high quality, and a reasonable price. Feed costs are the most costly aspect of the beef cattle fattening process, accounting for approximately 70% of overall costs. Seeking alternate feeds that widely available and do not compete with human needs is one way to cut manufacturing costs. Rice straw is an agricultural residue that is widely used for animal feed. Research using rice straw

as animal feed has been carried out by several researchers such as Doolatabada

24<u>et</u>

al. (2020), Tayengwa et al. (2020), Nassara et al.

(2019), Cherdthong et al. (2021),

Thanh (2012),

19Ware and Zinn (2005), Nuswantara et al. 2020, Nuswantara et

al. 2005 and

Hoerbe et al. (2020). Rice straw is very potential to be used for livestock

production in Indonesia. Rice straw can be used as an animal feed, and up to 20% of the overall feed can have the best ADG (He et al., 2018). However, rice straw is exceedingly scarce during the dry season, a common concern for beef cattle farmers in Indonesia. In this case, alternate feeds that are close to rice straw must be sought. One of the potentials for alternative feed as a fiber source is coconut husk (the outermost component of a coconut, which is a fibrous layer about 5 cm thick). In 2006, around 1,104,880 tons of coconut husk were estimated to have been produced. This volume can be processed into usable items, so research in that direction is necessary. Coconut husk contains high ingredients of lignin, cellulose, and hemicellulose. Its chemical composition is 42.10% lignin, 32.69% cellulose, and 22.56% hemicellulose (Muensri et al., 2011). Even so, the coconut husk is rich in macronutrients (Neto et al., 2004). Based on the nutritional potential, coconut husk cannot be given to livestock directly. However, because of its high fiber content, it must be reduced by processing feed to increase its nutritional value and digestibility. One of the methods to reduce fiber content and increase the digestibility of the fiber-rich stuff is by fermentation using fiber digesting microbes. In this study, the fiber 2 digesting bacteria were isolated from the buffalo rumen fluid (Wannapat et al., 2009). Cellulolytic bacteria from buffalo rumen are considered feasible because they have more benefits in terms of degradation value and cellulose digestibility than those from cattle rumen. Buffaloes have a gross cellulolytic bacterium of 3.3 x 109 CFU/ml, which is higher than cows' 2.7 x 108 CFU/ml (Wannapat et al., 2009). Strong xylanase enzymes are believed to be produced by rumen microorganisms (Kulkarni et al., 1999). Therefore, the high content of cellulose and hemicellulose in coconut husk should be

degraded by a culture of fiber- digesting bacteria isolated 9from buffalo rumen

fluid used as a starter

fermentation process, according to this assumption.

Overall.

5the study aimed to determine the effect of utilization coconut

husk on blood metabolites and electrolytes of Brahman cross cattle. MATERIALS AND

METHODS

10The animal ethics committee of the Faculty of Animal and

Agricultural Sciences, Diponegoro University approved the

experiment (No.

3122/UN.7/III/2020, March, 29, 2020). This study was conducted at

the

14Faculty of Animal and Agricultural Sciences, Diponegoro University

Semarang.

This study used 16 Brahman cross (male) cattle aged around 8-10 months

with a 134-187 kg body weight. The cattle were placed in an individual cage (210 x 120 cm). The study lasted for 14 days for feed adaptation, 90 days for experimental treatment and data collection. Complete feed and drinking water were given ad libitum at 7 am, and the remaining feed was weighed at 7 am the following day. The composition and nutrient content of the complete feed for treatment are presented in Table 2. The content of the complete feed formulation used in this study was in dry form. Fermented coconut husk as a supplement was used in the dry formulation, with crude protein (CP) content of 11% - 12% and TDN 65% -

70%. The research

12design used

was a randomized block design (RBD) with four treatments and four bodyweight

groups as replications. The treatment used was

complete 3 feed R1: fermented

coconut husk supplementation of 15%, R2: supplementation of fermented coconut husk 20%, R3: supplementation of fermented coconut husk 25%, R4: 30% fermented coconut husk supplementation. The proximate analysis of the fermented coconut husk was presented in Table 1. Fermentation Process The buffalo rumen fluid microbial culture with the highest enzyme activity was re- inoculated in a liquid medium for 16 hours before being used as an inoculum in the coconut husk fermentation method. The coconut husk was shaved to a size of 1 to 2 cm. Fermentation was carried out by adding 0.1% urea, 3% molasses, distilled water (calculation of 60% moisture content based on dry coconut husk material), and 5% inoculum.

The coconut husk mixed evenly was put in an airtight room and incubated for four weeks. Before being used as a complete feed, the fermented coconut husk was analyzed for its proximate analysis (AOAC, 2005). This research was conducted for 90 days of treatment. The consumption 2of dry matter, organic matter, crude fiber, and crude protein were observed during the study. The digestibility of 15 dry matter, organic matter, crude fiber, and crude protein was also determined during the experiment. Blood metabolites, electrolytes, and blood counts were among the parameters measured. Feed consumption Feed consumption is calculated by weighing the feed before it is given to livestock minus the remaining unconsumed feed in the form of % DM. Consumption of feed nutrients which includes DM, OM, CP and CF (g / kg BW 0.75) The following is the consumption formula (Purbowati et al., 2004). a. DM consumption (kg / head / day) = feed given (kg) x% DM feed - leftover feed (kg) x % DM leftover feed b. OM consumption (kg / head / day) = consumption of feed DM (kg) x% OM c. CP consumption 3**(kg / head** / day) = consumption of DM feed (kg) x% CP d. CF consumption 3(kg / head / day) = consumption of DM feed (kg) x% CF Digestibility is the percentage of nutrients that are absorbed in the digestive tract which can be determined by looking at the difference between the amount of nutrients eaten and the amount of nutrients released in feces. Dry Matter Digestibility (DMD). Dry matter digestibility is measured by calculating according to the formula: DM consumption-DM feces DMD = (DM consumption) x 100% The consumption and excretion of feces are obtained in the measurement period during the collection period of one 3digestibility of organic matter can week. Organic Matter Digestibility (OMD). The measured by calculating according to the **3formula: OM consumption- OM be** feces OMD = (OM consumption) x 100% Blood samples. 20Blood samples were collected at the end of the treatment during maintenance, before the cows were fed. Blood samples were collected into heparinized tubes, centrifuges at 1000 x 8g for

15 min at 4°C, and plasma was immediately frozen (-20°C) until

determination of

blood metabolites, electrolytes and blood counts. A blood sample of 3

mL was taken from each cow through the jugular vein with a syringe (size 10 mL), then the measurement of blood metabolites and electrolytes was carried out by means of a blood sample that had been obtained by centrifuge for 15 minutes at a speed of 3000 rpm to take plasma. The plasma that has been obtained was analyzed for blood metabolites, electrolytes

and blood counts and urea nitrogen levels using a microlab 300 spectophotometer.

9The

data obtained were analyzed based on Analysis of Variance (ANOVA).

If there

were differences, continue

1 with the Duncan Multiple Range

Test (DMRT). RESULTS AND DISCUSSION

As

25shown in Table 3, there

were significant differences

between treatments.

22**Dry matter**

consumption, organic matter consumption, and crude protein consumption

of

beef cattle fed R3 was lower (P < 0.05) than R1, R2, and R4. Crude fiber consumption of beef cattle fed R3 was the lowest among other treatments. Table 4 shows that beef cattle fed R1, R2, and R4 had higher digestibility (P<0.05) than beef cattle fed R3. Beef cattle served 15%, 20%, or 30% of fermented coconut husk in their feed have high digestibility. As shown in Figure 1, there was a significant difference in ADG of beef cattle given with coconut husk in the feed. Beef cattle fed R2 (20%) coconut husks had the best ADG. As shown 1in

Table 5, there was no significant difference between blood metabolites,

electrolytes, and

blood counts of beef cattle fed coconut husk. This condition shows that

feeding coconut fiber in the feed did not have a negative effect. Beef cattle were able to utilize coconut fiber to meet fiber needs. Hence, fermented coconut husk can be used to replace rice straw. To determine the adverse effects of using coconut husk in beef cattle, blood metabolism, electrolytes, and complete blood count analysis were also carried out. The

content of blood metabolites, electrolytes, and total blood counts

21was not

significantly (P>0.05) different among

treatments showing that beef cattle could

make good use of fiber sources. In Indonesia, the dry season is often quite long, at which time the availability of rice straw is running low. Coconut husk in Indonesia is only used as waste; it has not been used as animal feed, although the crude protein content is quite high. The use of coconut husk as animal feed will reduce feed costs. The use of coconut husk up to 20% in beef cattle feed can produce the best ADG, and this is because, at this 20% level, beef cattle can consume and digest the feed properly without any deleterious effects on the beef cattle. Blood metabolites, electrolytes, and hematology were not significantly different, and their values were in the normal range of healthy cows. Blood metabolism, electrolytes, and hematology reflect the health of cattle. High levels of consumption of the rations R1, R2, and R4 and supported by high nutrient digestibility will cause the nutrients used by the body to increase. The high consumption and digestibility in R2 are supported by the high digestibility level of crude fiber, which results in higher ADG than R1, R4, and R3. Beef cattle, according to Hoerbe et al. (2020), are able to consume the high-fiber feed. According to the present findings, beef cattle were able to make effective use of the fiber sources in a coconut husk and turn it into weight gain. The fermented coconut husk was used up to 20% on beef cattle, which provided good performance in intake and digestibility. In this regard, the fermented coconut husk has a lot of potential for use in beef cattle, particularly during the dry season when the

rice straw is scarce.

1 The results of this study are in line with Hoerbe et al.

(2020),

which state that beef cattle have an optimum amount of fiber content that can be utilized

properly to become ADG. The

6results of the study are also in line with the

research of Tanh et al. (2012), which states that

giving rice straw in the feed will

provide ADG 0.6-0.7. Blood metabolites, electrolytes, and total blood count

23were

not statistically different (P>0.05). This indicates that beef cattle

can also make good

use of 7 coconut husks such as rice straw. This is supported by data on blood metabolites such as albumin, globulin, albumin, and globulin ratio, and the same alkaline phosphatase, indicating that cattle are in normal condition and are not in stressed or dehydrated position due

to feeding with different coconut husk levels. This

17can be seen from the results of

the study

from the average albumin value of 2.96 to 3.3 g/dL. This value, when

referenced from the normal standard according to

7Schalm (1975) and Anderson et

al. (1977),

is still in the normal range of 2

7.1-3.6 g / dL. At the globulin

value with

an average value of 3.2 to 3.7 g / dL and if it is referred to from the normal standard value according to Schalm (1975) and Anderson et al. (1977) is still in the normal range, namely 2.9-4.9 g / dL. Likewise, the value of the albumin: globulin (A / G) balance obtained an average yield of 0.8 to 0.9 g / dL. and when compared with normal standard values according

7Schalm (1975) and Anderson et al. (1977), the A / G balance value was below

the normal range, namely 1.1-1.5 g / dL. Provision of coconut husk 20% in feed gives the highest ADG without disturbing the cattle's health. This means that the use of coconut husk 20% did not interfere with the metabolic processes in the body of cattle. This indicates that coconut husk is safe to use as animal feed. CONCLUSION The results showed that beef cattle fed with R2 (20% coconut husk) gave the best consumption, digestibility, and ADG results.

The

16results showed that there was no difference in blood metabolites,

electrolytes, and

total blood counts; it showed that beef cattle were able to make good

use of coconut husks, so it could be concluded that coconut husk was able to replace rice

straw. AKNOWLEDGEMENTS

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CONFLICT

11OF INTEREST

The authors state there is no conflict of interest. AUTHOR'S

CONTRIBUTION

All authors contribute to the conduct of research, the writing process,

and in data analysis. REFERENCES Anderson, P.H., B. Sylvia., J.B. Pamela, H.C. Nancy, J.W. Parfitt, and D.S.P. Patterson. 1977. Biochemical indicators of liver injury in calves with experimental fascioliasis. The Veterinary Record., 100. 43-45 AOAC. (2005). Official Methods of Analysis. Assosiation of Official Chemist. Inc. Virginia. Cherdthong, A., C. Suntara, W. Khota and M. Wanapat. 2021. Feed utilization and rumen fermentation characteristics of Thaiindigenous beef cattle fed ensiled rice straw with Lactobacillus casei TH14, molasses, and cellulase enzymes. Livestock Science Vol. 245, pp. 104405 Doolatabada, S. S., M. Saria and G. R. Ghorbani. 2020. Effect of partial replacement of dietary starch with fiber and fat on performance, feeding behavior, ruminal fermentation and some blood metabolites of Holstein calves. Animal Feed Science and Technology Vo. 270, pp. 114691 Hartadi, H., S. Reksohadiprodjo dan A. D. Tillman. 1993. Tabel Komposisi Pakan untuk Indonesia. Gadjah Mada University Press, Yogyakarta. He, Y., H. Wang., Z. Yu., W. Niu., Q. Qiu., H. Su and B. Cao. 2018. Effects of the gender differences in cattle rumen fermentation on aerobic fermentation of wheat straw. Journal of cleaner production Vol. 205: 845-853. Hoerbe, J.B., A. G. Sessim., G. R. Pereira., D. D. Brutti, T. E. Oliveira., J. O. J. Barcellos. 2020. Cow-calf intensification through the feeding of rice straw. Livestock Science Vol. 242 pp. 104296 Kulkarni, N.A. Shendye, and M. Rao. 1999. Molecular and biotechnological aspects of xylanase. FEMS Microbiol. Rev. 23:411-456. Muensri, P., Kunanopparat, T., Menut, P., Siriwattanayotin, S., 2011. Effect of lignin removal on the properties of coconut coir fiber/wheat gluten biocomposite. J. Composites: Part A. 42(2): 173-179. Mor, P., B. Bals., A.K. Tyagi., F. Teymouri., N. Tyagi., S. Kumar., V. Bringi and M. VandeHaar. 2018. Effect of ammonia fiber expansion on the available energy content of wheat straw fed to lactating cattle and buffalo in India. J. Dairy Sci. Vol 101, pp. 7990–8003 Nassara. M.K., S. Lyua., J. Zentekc and G.A. Brockmann. 2019. Dietary fiber content affects growth, body composition, and feed intake and their associations with a major growth locus in growing male chickens of an advanced inter cross population. Livestock Science, Vol. 227: 135-142 Neto, C.P.C.T., F.F.H. Ferreira, F.C. Bezerra, R.F. Sousa and M.L.F. Cavalcanti. 2004. Efeito de diferentes substratos na aclimatizacao "ex-vitro" de mudas de Violeta Africana (Saintpaulia ionantha Wendl.). Revista de Biologia e Ciencias da Terra 4(2): 2-6. Nuswantara, L. K., Sunarso, M. Arifin dan A. Setiadi. 2020. Komponen serat sabut kelapa yang difermentasi menggunakan mikroba pencerna serat dari rumen kerbau. Jurnal Agripet. 20 (1):1-8. Nuswantara, L.K., M. Soejono., R. Utomo dan B.P Widyobroto. 2005. Kecernaan nutrient ransum prekursor nitrogen dan energi tinggi pada sapi perah yang diberikan pakan basal jerami padi. J. Indon Trop. Anim. Agric 30 (3): 172-178. Purbowati, E., E. Baliarti dan S.P.S. Budhi. 2004. Tampilan Glukosa, NH3 dan urea darah domba yang digemukan secara feedlot dengan pakan dasar dan level kosentrat yang berbeda. J. Pengemb. Pet. Trop. 1: 81-85. Schalm, O.N. 1975. Veterinary Hematology. 3rd Ed. Department of Clinical Pathology of Veterinary Medicine. University of California. Lea and Febiger. Philadelphia Tayengwaa, T., O.C. Chikwanhaa, M. E.R. Dugan., T. Mutsvangwac, C. Mapiyea. 2020. Influence of feeding fruit by-products as alternative dietary fibre sources to wheat bran on beef production and quality of Angus steers. Meat Science Vol. 161, pp. 107969 Thanh, V.T.K. 2012. The effect on introduction of adding urea to rice straw for cattle and buffalo calves. Livestock Science Vol 150, pp. 111-113 Wannapat, M., R. Pilajun, & P. Kongmun. 2009. Ruminal ecology of swamp buffalo as influenced by dietary sources. Anim.

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