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SUBSTITUTION OF RICE BRAN WITH SOIL BEAN SKIN TO INCREASE THE GROWTH OF COWS IN BULELENG DISTRICT, BALI

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Abstract. This study aim to increase feeder cattle growth in Buleleng Bali has been done in Tulus Bakti livestock group from February - June 2019. Completely Randomized Design (CRD) is used. feed treatments: R0 = Cows given forage + 1 kg /cow / day rice bran, R1 = Cows given forage + 1 kg / cow / day (50% rice bran mixed by 50% peanut skin) and R2 = Cows given forage + 1 kg /cow / day (25% rice bran mixed by 75% peanut skin). Parameters observed were weight gain, feed consumption, and Feed Conversion Ratio. To find out farm feasibility level, Revenue cost ratio analysis is done. Result showed cows given R1 treatment resulted 0.40 kg / day weight gain, not significantly (P> 0.05) from R0 and R2. Ration consumption and FCR also no significant (P> 0.05). Farming analysis results showed three treatments gave benefits, but R2 gave highest benefits, its can be seen from R / C ratio R2 (1.22), R1 (1.21) and R0 (1.20). 75% of rice bran substituion by peanut skin can reduce feed prices untill 52.03% and give profit IDR. 1,340,122 so feasible to apply.

1. Introduction

Feed is a problem that has been an obstacle in the cultivation of cattle. Increased livestock productivity is closely related to providing quality feed, available throughout the year and at competitive prices. The narrowness of the land to develop forage and the nature of breeders who are still dependent on nature for the supply of feed causes the productivity of cattle to decline. Besides that the expensive price of rice bran causes breeders rarely provide reinforcing feed to their livestock. Budiari *et a*l. [2] reported that an enlarged cow that was only given field grass feed produced a weight gain of 0.32 kg / day.

The low productivity of cattle causes a decrease in the interest of cattle farmers to raise cattle, causing the population of Bali cattle to continue to decline. In 2014 to 2017 cattle population in Bali were 553,582, 543,642, 546,370 and 507,794, respectively [5]. In the period of 2014 to 2017 there was a decrease of 8.27%.

Efforts to overcome the problem of lack of feed can be done by utilizing agricultural waste as animal feed. Saptana [14] reports that the utilization of food crop waste can contribute to large and small ruminant livestock businesses, so the importance of natural resource management can be utilized as ruminant animal feed. Maryono and Khrisna [10] reported that food crop by-products are characterized by high fiber content, but low protein content resulting in low digestibility. One of the crop waste that can be used as feed is peanut shell waste.

Gerokgak Subdistrict with an area of 35,657 ha, dominantly cultivated agricultural businesses are corn plantations of 4,605 ha and peanut 508 ha [4]. Peanut waste in a year as much as 13,436 tons and for 1 ha of peanut plants produces waste as much as 26.45 tons / ha has the potential to supply as much as 11 cattle feed [3]. The low content of peanut waste protein which is as much as 7.84% is an obstacle in its use for animal feed ingredients. Fattening cows need 12% crude protein in their ration

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[19]. Through fermentation with Tricoderma Viride, the crude fiber content of peanut skins can be reduced from 31.99% to 29.90% and crude protein from 7.84% can be increased to 10.34% [3]. Pangestu [12]. reported that fermentation caused the energy and metabolic protein content to increase and the crude fiber content in fermented feed material to decrease significantly. Furthermore Jaelani *et al*. [8] reported that fermented fibrous feed by microbial coarse fiber fibers can significantly increase feed protein content.

Utilization of peanut skins can provide food in a sustainable manner, can reduce the cost of feed and its availability does not compete with the needs of humans and other livestock. Besides that, the use of peanut shells can cause lower feed prices with better quality. Bidura *et al*. [1] reported that the use of waste as feed can increase farmers' incomes, support increased population and livestock productivity, open business opportunities as well as overcome environmental pollution caused by waste production that is not handled properly. Furthermore, Mahardika [9] reported that feed technology that utilizes agricultural or agro-industrial waste can reduce feed costs by 60% - 70%. The purpose of this study is to find out how much peanut skin can replace rice bran to increase the growth of feeder cattle in Buleleng Regency.

2. Methodology

The study was conducted in the Tulus Bakti livestock group, Musi Village, Gerokgak District, Buleleng Regency from February to June 2019. The design used in this study was a Completely Randomized Design (CRD) with three feed treatments. Each treatment uses 6 one year old female Bali cattle with an average weight of 124.05 kg. Tested feed treatment: R0 = Cows given forage + rice bran 1 kg / cow / day, R1 = Cows given forage + 1 kg / cow / day (50% mixture of rice bran with 50% peanut skin) and R2 = Cows given forage + 1 kg / cow / day (mixture of 25% rice bran with 75% peanut skin). The composition and nutritional content of the treatment ration as Tables 1 and 2.

Table 1. Formula for cattle ration given supplementary rice bran substituted with peanut shells in Musi Village, Gerokgak District, Buleleng Regency

No	Ingredients	Percentage (%)		
		R0	R1	R2
1	Rice brand	100	50,00	25,00
2	Peanut shells	0	49,70	74,70
3	Mineral	0	0,10	0,10
4	Molases	0	0,20	0,20
	Total	100	100	100

Note: The results of the analysis of the Nutrition and Animal Feed laboratory of Beef Cattle Research Station, Grati

Table 2. Composition additional nutritional content of each treatment in Musi Village, District Gerokgak, Buleleng Regency.

No	Type of Sample	Proxximat analysis results (%)				
		DM	Crude Protein	Crude Fat	Crude Fiber	TDN
1	Hijauan	90,88	9,88	2,76	30,43	51,14
2	R0	93,88	8,63	7,02	20,87	58,30
3	R1	94,96	8,15	4,11	25,61	53,87
4	R2	94,25	7,84	1,87	28,08	53,76

Note: The results of the analysis of the Nutrition and Animal Feed laboratory of Beef Cattle Research Station, Grati

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Forage feed is given every day 2 times, in the morning and evening as much as 10% of the body weight of livestock. Forage composition consists of field grass, king grass and gamal. For booster feed is given in the morning before being given forage feed. Before being given feed treatment, all animals are given anti-worming medication and every month they are given additional vitamins (viamin) by injecting 3 ml / cow to maintain the health of livestock.

The materials used in this study were rice bran, fermented peanut shells, molasses, minerals, Trichoderma viride, anti-worms, and medicines, while the tools needed were tarps, shovels, buckets, and digital scales.

Peanut skin before being mixed with rice bran is fermented first with Trichoderma viride solution [7] in the following way:

- Trichoderma Viride is first activated by providing 10 liters of clean (sterile) water then entering 100 grams of sugar, and 100 grams of urea and 50 grams of NPK then stirring until dissolved. After dissolving add 50 ml Trichoderma viride stir again until it dissolves. This Trichoderma Viride solution is obtained from aeration for 24 hours.
- Fermented peanut skins, the way waste is sprinkled 5-10 cm thick on the surface of the tarpaulin, on a pile of material that has been doused with Trichoderma Viride solution sprinkled again with 5-10 cm thick waste material, then watered Trichoderma Viride solution evenly. And so on, so that the material was piled up and splashed with Trichoderma Viride liquid. On top of the pile the material is covered with a clean tarp tightly and left for 7 days. After the age of 7 days the tarp cover is opened.
- Wet fermented waste material is dried in the sun to dry under the sun's purpose to stop the fermentation process, simplify the grinding process and extend the shelf life because the water content will drop to 12-14%.
- After drying the waste material is ground to flour and ready to be mixed with other ingredients.

The flour-shaped feed material is then mixed with rice bran, minerals and molasses until it is even and homogeneous. The ready-to-eat rations are put in sacks and stored in a place that is safe from rat interference.

2.1.Research variable

2.1.1Cow Growth

Cow growth or cow body weight gain is based on initial body weight and final weight. Initial body weights were obtained by weighing at the beginning of the study (before given feed treatment); while the final body weight was obtained by weighing at the end of the study (115 days of maintenance). Weight gain is obtained by reducing the final body weight with the initial weight of the study. Weighing is done every month to find out the weight gain.

2.1.2.Ration consumption

Feed consumption is calculated every day by reducing the amount of feed given with the rest of the feed on that day. Total feed consumption is obtained by adding up feed consumption during fattening.

2.1.3.Feed Conversion

Feed conversion ratio (FCR) is calculated by dividing the amount of ration consumed by weight gain during the study.

2.2.Data analysis

The data obtained were analyzed by analysis of variance, if the treatment had a significant effect ($P < 0.05$), it was followed by a 5% LSD test [6]. Mean while, to determine the feasibility of farming is done through Revenue cost ratio (R / C ratio) analysis. If the R / C ratio> 1, then the farm is feasible to be cultivated, conversely if the R / C ratio <1, then the farming is not feasible [15].

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3.Results And Discussion

3.1.Growth of Cattle

The results of the study showed that cattle fed 50% additional peanut shells instead of rice bran (R1) resulted in weight gain of 0.40 kg / day, not significantly different (P> 0.05) from cows without peanut shells (R0) and given 75% peanut shells (R2) as shown in Table 3. This shows that by giving 50% of peanut skins there is a tendency for a decrease in the nutritional content of the feed given (Table 2), but does not affect the weight gain of livestock. Nuriyasa [11] reports that the growth influence by the balance of energy and protein in it ration. Tillman *et al*. [16] reported that if there was a good balance of protein and energy in the ration, the increase in body weight of livestock would increase, apart from the amount of protein consumed, the palatability of the ration could also affect body weight gain. Bidura *et al*. [1] reported that fermented waste flour can be given as a substitute for the use of rice bran, which is as much as 0.70 - 1.0% of the live weight of cattle.

Table 3. Growth of feeder cattle fed peanut skin feed in Musi Village, Gerokgak District, Buleleng Regency.

No	Description	Treatment		
		R0	R1	R2
1	Initial body weight (Kg)	124,08[a]	123,83[a]	124,25[a]
2	Final weight (kg)	172,33[a]	169,83[a]	168,92[a]
3	Weight gain (kg/day)	0,42[a]	0,40[a]	0,39[a]
4	Consumption of dry ingredients ration (kg/day)	3,73[a]	3,95[a]	4,04[a]
5	FCR	9,06[a]	9,99[a]	10,45[a]

Note :
R0 = Cows given forage + rice bran 1 kg / head / day.
R1 = Cows given forage + 1 kg / head / day (50% mixture of rice bran with 50% peanut skin)
R2 = Cows given forage + 1 kg / head / day (mixture of 25% rice bran with 75% peanut skin).
The same superscript in the same line shows an unreal difference (P> 0.05) and a different superscript in the same line shows a real difference (P <0.05)

Consumption of dry matter ration for the three treatments showed no difference (P> 0.05), although cows given R2 treatment (4.04 kg / day) tended to be more than R0 and R1 treatments, each 3.73 kg / day and 3.95 kg / day (Table 3). This is because the nutritional content of feed for R1 and R2 treatments is lower than R0 so that the consumption of rations is more to meet the nutritional needs of the body. The length of feed flow in the digestive tract also affects the consumption of rations. The higher the digestibility of the ration, the ration flow in the digestive tract faster so that more space is available for food addition.

Table 3. Shows feed conversion at treatments R0, R1 and R2 respectively 9.06, 9.99 and 10.45, statistically the three treatments did not show significant differences (P> 0.05). The results of this study are in line with those obtained by Partama [13] who reported that cows given 5 kg of concentrate + 0.2% pignox + king grass produced an FCR of 9.68. Furthermore Mahardika *et al*. [9] bali cows fed ed lib rice straw + 3 kg concentrate + 150 g supplement feeds produce FCR of 14.13. Siregar [17] reports that the value of good feed conversion for cattle is 8.56-13.29.

3.2.Analysis of Goat Cattle Farming

Farming analysis is an attempt to measure the level of income and illustrate the success or failure of the business activities carried out. The results of this study show that capital spent on R2 animals was IDR. 5,996,018, - smaller than R0 IDR. 6,235,333, -. The low capital spent by R2 is because the additional feed cost incurred is at least IDR. 220,685, - (Table 4). The use of peanut shells as a mixture

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of rice bran because peanut shells are cheaper and take into account processing costs. The cost for a mixture of 75% peanut skin with 25% rice bran results in a price of IDR. 1,919 / kg is much cheaper than medium-quality rice bran at IDR.4,000 / kg. The use of peanut skin as a substitute for rice bran can reduce production costs by 52.03%.

Table 4. Analysis of feeder cattle farming supplemented with additional rice bran substituted with peanut skins in Musi Village, Gerokgak District, Buleleng Regency

Production Input	Volume	Unit	Treatment		
			R0	R1	R2
- Price of seeds	1	Cow	4.000.000	4.000.000	4.000.000
Feed					
- Additional Feed					
- R0 = Rice brand @Rp 4. 000,- /kg	115	kg	460.000	0	0
- R1 = 50% waste @ Rp. 2.669 ,- /kg	115	kg	0	306.935	0
- R2 = 75% waste @Rp.1.919,-/kg	115	kg	0	0	220.685
Medicine and Vitamins	1	time	50.000	50.000	50.000
Labor @Rp.60.000,-/day	28,75	OH	1.725.000	1.725.000	1.725.000
Cage shrinkage	10	year	333	333	333
Total Input (Rp)			6.235.333	6.082.268	5.996.018
Income :					
-sales of livestock	1	Kg	172	170	169
- Price per kg of life Rp. 42.000,-	42.000	Rp	7.237.860	7.132.860	7.094.640
- Compost production	1	kg	345	345	345
compost sale @ Rp.700,-/kg	1	Rp	241.500	241.500	241.500
Total income (Rp)			7.479.360	7.374.360	7.336.140
The advantage (Rp)			1.244.027	1.292.092	1.340.122
R/C Ratio			1,20	1,21	1,22
B/C Ratio			0,20	0,21	0,22

Judging from the income obtained at the end of the study, with the selling price of beef cattle IDR. 42,000, - / kg of cows given R2 treatment yields a maximum profit of IDR. 1,340,122 (7.17%), followed by R1 IDR. 1,292,092, - (3.72%) and R0 IDR.1,244,027 (Table 4). This can be seen from the R / C of each treatment that is R0 = 1.20, R1 = 1.21 and R2 = 1.22. The highest profit is obtained because the cost of feed using peanut shells is much lower than rice bran. Difference in the high feed prices of R0, causing the low final weight of R2 does not affect the profits obtained.

Based on the results of an economic analysis the use of peanut shells as a substitute for rice bran is feasible. This can be seen from the R / C value greater than 1, meaning that the use of peanut shells as feed gives a production value higher than the value of the production costs incurred. Sodiq and Abidin [16] stated that the R / C value illustrates the efficiency or feasibility of developing a business. If the R / C value > 1, the business is profitable or economically feasible. The greater the value of R / C, the lower the cost value and the higher the production value.

4.Conclusion

Cattle feed rice bran with substituted 50% - 75% peanut skins produced weight gain ranging from 0.39 to 0.40 kg / cow / day with feed conversion values of 9.99 - 10.45. The provision of waste feed can reduce feed prices by 52.03% and provide a profit of IDR. 1,340,122, - making it feasible to apply

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