

Application of Technology for Processing Rice Straw as Feed for Beef Cattle

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Abstract. The objective of this study was to apply the processing of technology for rice straw as cattle feed at smallholder beef cattle farms in supporting the integration between beef cattle and paddy. The study was conducted in smallholder beef cattle farmer groups, in Pinrang Regency, South Sulawesi, Indonesia. The results of this study showed that farmer perception toward the use of technology and knowledge processing rice straw as cattle feed as much as 56.6% of respondents considered not pollute the environment rice straw, and rice straw can be used as animal feed (43.4%), and composting materials (15.8%). However, there are still many farmers who do the burning of rice straw in the field after harvest (40.8%). In general, the application of rice straw fermentation technology showed an increase in the quality of rice straw. Quality of crude protein of fermented rice straw was increased in comparison to unfermented one, and it was followed by a decrease in crude fiber content after fermentation.

Keywords: feed technology, rice straw, cattle-paddy integration

1. Introduction

Integration of beef cattle with paddy is the best strategy to improve the optimization of resource utilization of agricultural waste, but this effort has not been implemented properly, because its implementation is still done on a partial, not integrated and holistic. The main technology components that need to be controlled by farmers in the system integration of beef cattle and grain namely waste treatment technologies so as to embody the principle of zero waste [1]. The main constraint in the utilization of waste in the system integration is still not taken into account for rice straw waste as a feed. The number of farmers that have knowledge regarding feed technology is high enough (54.80%), however the application of this technology was low (11.62%). Besides that, the farmers have not yet utilized the livestock waste such as feces optimally as a source of alternative energy (biogas) and production inputs (fertilizers) for farming, so the principle of integration has not yet been achieved [2].

Based on this condition, it is required an effort to optimize the utilization of rice straw as feed for beef cattle in order to support integration between beef cattle and paddy, and in turn, the sustainability integration could be achieved through the application of treatment technology, such as processing rice straw as feed. Therefore, the current study aimed to apply the processing technology of rice straw as feed for beef cattle in the farm-level in supporting the integration between beef cattle and paddy, and in turn, the optimal resource management to improve productivity and increase the farmer's income by the presence of added value which is obtained upon application of wastewater treatment technology of rice straw as feed for beef cattle can be achieved.

2. Materials and Methods

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The study was carried out in the farmers cattle in Pinrang District, South Sulawesi, Indonesia. The experiment was conducted in two stages. First, identify the perceptions of farmers on the use and processing of rice straw as animal feed, by conducting interviews using questionnaires. Farmer respondents were members of a farmer group. The second stage is the application of processing technology of rice straw as cattle feed. The material used was rice straw obtained from the location where the study was taking place, and of extra material in fermentation was a starter microbes; starbio. The process for fermentation was preceded by preparing the place of fermentation at once serves as a stockroom of feed. Fermented rice straws with probiotics starbio in pitch of the scale, with the use of starbio standard and urea each 0.6 % of the weight of rice straw [3].

The procedure for fermentation was accumulate rice straw approximately 30 centimeters first and if necessary, the straws were pressed down then sprinkled with starbio, and urea then added by water to maintain the moisture of 60%. This stage repeated to reach a height of rice straw of 1.5 meters. A stack of the straws was incubated for 21 days without any treatment. After 21 days, the straws were then dried by simple aeration. Variables observed were crude protein, crude fiber, ether extract, ash [4], neutral detergent fiber, acid detergent fiber, cellulose, lignin [5]. The data was analyzed using t-student [6].

3. Results and Discussion

Table 1. Farmer perceptions toward the use of technology and knowledge processing rice straw as cattle feed

No	Description	Total Respondents (people)	Percentage (%)
1	Rice straw pollute the environment		
	Do not agree	43	56,6
	Less agree	21	27,6
	Agree	12	15,8
2	Rice straw as cattle feed		
	Do not agree	11	14,5
	Less agree	16	21,1
	Agree	49	64,5
3	Utilization of rice straw after harvest		
	Burned in the fields	31	40,8
	Compost material	12	15,8
	Animal feed	33	43,4
4	Hay Technology		
	Do not know	22	28,9
	Less know	12	15,8
	Know	42	55,3
5	Ammoniation Technology		
	Do not know	31	40,8
	Less know	12	15,8
	Know	33	43,4
6	Fermentation Technology		
	Do not know	30	39,5
	Less know	25	32,9
	Know	21	27,6

Farmer perceptions toward the use of technology and knowledge processing rice straw as cattle feed as shown in Table 1. Table 1 shows the farmers as much as 56.6% of respondents considered not pollute the environment rice straw, and rice straw can be used as animal feed (43.4%), and composting materials (15.8%).

However, there are still many farmers who do the burning of rice straw in the field after harvest (40.8%). Results technology applications processing rice straw through technology fermentation are showing in Figure 1, in general showed that there was an increased occurrence of the quality of rice straws after conducting the technology processing. Average the quality of rice straw fermentation is shown in Table 2.

Therefore, it can be presumed that during the fermentation period, the bond of lignocellulose/hemicellulose of rice straw were break down. Lignolytic microbe in microbe starter helped to break the lignocellulose bond resulting the cellulose and lignin could be detached from the bonds by the enzyme lignase. This phenomenon is seen with decreased the content of cellulose and lignin of rice straw fermented. Decreased levels of lignin decomposition occurred during fermentation indicates the bond of lignin and hemicelluloses [7].



Fig. 1: The implementation of the application technology of fermentation of rice straw

Table 2. The average of nutrients quality of rice straw without fermenting and fermented with a starter of microbes

Nutritive Values (% dry matter)	Rice Straw	
	without fermenting	fermented with a starter of microbes
Crude protein	4.12 ^a	9.17 ^b
Crude fibre	41.23 ^a	34.25 ^b
Ether extract	1.18 ^a	1.54 ^a
Ash	22.34 ^a	20.19 ^a
Neutral detergent fiber	72.52 ^a	69.22 ^b
Acid detergent fiber	57.76 ^a	47.64 ^b
Cellulose	34.03 ^a	26.72 ^b
Lignin	8.13 ^a	4.96 ^b

Different superscript letters to significant differences (P<0.05)

The sustainable integration of beef cattle and rice is determined by the first, the potential carrying capacity of rice straw can be used as cattle feed. Therefore, efforts to increase the utilization of rice straw as a source of cattle feed. This is must be done because the condition of pasture each year undergo conversion to residential land, plantations, and others. Sustainability efforts during the cow's ecological base is pasture land as a source of feed, will experience a shift by substitution utilization of waste as feed crops through the application and integration of beef cattle rice. Second, an increase in knowledge of farmers on rice straw as feed processing can be done by first by increasing motivation and willingness breeders. Motivation and willpower are the main determinants of doing processing and utilization of rice straw as feed [8].

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5. References

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