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# Enhancing performance of Murrah Buffalo through improved probiotic feed management in Kapau Village, Agam Regency

# Enhancing performance of Murrah Buffalo through improved probiotic feed management in Kapau Village, Agam Regency

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**Abstract.** This study aims to improve the production performance of Murrah buffalo which covers average weight gain, feed consumption, and feed conversion by increasing probiotic feed. The research was conducted on the herd of Murrah buffalo at Kelok Rambai, Kapau Village, West Sumatera, Indonesia. Fifteen Murrah buffaloes with three to five years of age were used in the research. There were three treatments conducted including P1 = basal feed + probiotics; P2 = P1 + concentrate (cassava leaf pellet); and P3 = P1 + commercial concentrate (pellet). All three treatments were also given 7 cc/head/month of probiotics. The results of the study with probiotic feeding on Murrah buffalo showed the average feed consumption of P2 (36.55), P3 (35.99), P1 (35.74) and daily weight gain (DWG) P2 (1.09 kg/head/day), P3 (0.91 kg/head/day), P1 (0.55 kg/head/day) did not show a significant difference, while in feed conversion, P2 (0.68 ), P1 (0.46), P3 (0. 31) it showed a significant difference ($p>0.05$). This study concludes that the provision of basal ration plus cassava leaf pellets showed significant results on feed conversion in Murrah buffalo but did not show significant differences in feed consumption and DWG. However, it showed a substantial enough average of P2 that could be used as a feed supplement in Murrah buffalo.

## 1. Introduction

Indonesia has enormous potential in the cultivation of buffalo livestock, wherein in 2019, the buffalo population in Indonesia reached 1,141,29 [1]. About 95 % of local buffalo in Indonesia are mud or swamp buffalo, while 5% are river buffalo/Murrah (riverine buffalo). Murrah buffalo is a dairy-type buffalo with milk production of about 6-8 liters/head/day, which is higher than the milk production of mud/swamp buffalo [2]. West Sumatra is one of the provinces in Indonesia that can cultivate buffalo, especially Murrah buffalo. The population of buffalo cattle in West Sumatra in 2019 was 84,289 [1], which are generally mud/swamp buffalo with low milk production due to the lack of knowledge of good breeders in maintenance and feed management.

The lack of feed management in terms of the amount of feed and nutritional content leads to nutritional issues, resulting in low milk production and reproductive disorders in buffaloes. One type of potential feed is cassava leaves *(Manihot utilissima)* which is widely available in rural areas. Dried cassava leaves (hay) are a source of protein and can be used as a nutritional supplement for ruminants, especially for dairy cattle, beef cattle, and buffalo [3]. Dried cassava leaves contain protein 19.5% dry matter and condensed tannins 4.0% dry matter. The administration can be direct as a feed supplement and as a source of protein in concentrate [4] or as a component of high-quality block feed ingredients [5]. Giving cassava leaves as supplementary feed as much as 1.5 kg/head/day improves production

performance by increasing hemoglobin levels, erythrocyte counts, leukocytes, hematocrit, glucose, and buffalo blood protein [6].

Furthermore, probiotics can be used to increase feed digestibility. Probiotics are different feed-in microorganisms that can digest fiber to increase livestock productivity [7], given by mouth or put into drinking water. The digestive process of ruminants is very dependent on the fermentation process by microbes found in the rumen. The fermentation process of fibrous feed in the rumen produces Volatile Fatty Acids (VFA) used as an energy source in ruminants. Feeding probiotics also creates a balance of microflora in the digestive tract to create optimum conditions for feed digestion and increase feed conversion efficiency to facilitate nutrient absorption. It also improves livestock health, shortens calving distance, accelerates growth, reduces calf mortality, and protects against pathogenic diseases. Therefore, it can increase milk or meat production [8]. The probiotics provided are isolated from buffalo milk, whose safety has been researched and can be used as a supplement for ruminants [9].

## 2. Material and methods

This research is an effort to improve the production performance of Murrah buffalo in Nagari Kapau, Tilatang Kamang, Agam Regency, West Sumatra through improved probiotic feed management.

### *2.1 Sample*

The sample used is 15 female Murrah buffaloes aged 3-5 years from North Sumatra and reared in Nagari Kapau, Agam Regency.

### *2.2 Methods*

This research is an experimental study, using 15 female Murrah buffaloes as samples divided into three treatment groups. Each treatment group was repeated five times. Data collection was based on three treatments, namely:

P1 = Basal feed + probiotics,

P2= P1+ concentrate (cassava leaf pellet)

P3 = P1+ commercial concentrate (Pellet)

for the three treatments was given probiotics as much as 7 cc/head/month.

### *2.3 Parameter*

*2.3.1 Feed Consumption.* Feed consumption by calculating the difference between the amount of ration given, and the rest of the ration.

*2.3.2. Daily Weight Gain (DWG).* Daily weight gain estimation was carried out by measuring chest circumference using a measuring tape and calculating the formula for calculating bodyweight for large ruminants.

$$\text{Daily weight gain} = \frac{(Chest\ Size\ +22)2}{100}$$

*2.3.3 Feed Conversion.* Feed conversion is a value that determines the amount of ration consumed to produce body weight gain in a specific time.

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

**Table 1.** Commercial feed analysis.

| Chemical Content | KPSS pellet (%) |
|---|---|
| Water content | 12 |
| Crude Protein (Min.) | 15 |
| Crude Fat (Max.) | 6 |
| TDN (Min.) | 68 |
| Calcium (Ca) | 12 |
| Total Phosphorus (P) | 0,8–1 |
| NDF (Max.) | 0,6 – 0,8 |
| Aflatoxin (Max.) | 200 ppb |

**Table 2.** Results of proximate analysis of cassava leaf supplement feed.

| Chemical Content | Results |
|---|---|
| Water content (%) | 8,99 |
| Ash (%) | 29,14 |
| Crude Protein (%) | 19,78 |
| Crude fiber (%) | 17,66 |
| Crude Fat (%) | 4,28 |
| Nitrogen Free Extract (%) | 29,14 |
| Energy (Kkal/Kg) | 3718 |

Note: Laboratory of Nutrition and Chemistry, Padjadjaran University.

*2.4. Research procedure*

*2.4.1. Feeding.* Feeding was carried out twice a day with basal feed, cassava pellets, and commercial pellets given according to each treatment. Feeding time is around 07.00 am and in the afternoon around 03.00 pm. It also provided buffalo's water ad libitum given probiotics at the beginning of the study and in the 2nd week of the study.

*2.4.2. Data collection.* The data was collected during the study including feed consumption, body weight gain at the beginning and at the end of the study, and feed conversion.

*2.5. Data analysis*

The data obtained were processed using a Completely Randomized Design (CRD) with the Minitab 14 application.

## 3. Results and discussion

*3.1 Feed consumption*

Feed consumption of Murrah buffalo in this study can be seen in table 3.

**Table 3.** Feed consumption.

| Treatment | Average |
|---|---|
| P2 | 36,55 |
| P3 | 35,99 |
| P1 | 35,74 |

Feed consumption is the amount of food consumed by livestock used to meet basic life and livestock production [10]. It can be seen from Table 3 above that the feed consumption of Murrah buffalo in treatment P2 (36.55) has the highest value, and the lowest value is P1 (35.74). The results of the analysis

of variance showed that there was no difference between the treatments given. It can be caused by the feed provided has been able to meet the needs of Murrah buffalo, but the provision of basal feed and cassava leaf pellet concentrate (P2) showed the highest average consumption of 36.55. The high average feed consumption in treatment P2 was due to better palatability/liking of livestock to the feed compared to treatments P1 and P3. Similarly, the opinion of [11], states that palatability/liking is an essential factor that determines the level of feed consumption in terms of texture, taste, smell, and temperature. Also, [12] added that feed consumption is influenced by palatability and digestibility, race, sex, age, and health condition of livestock.

Graph of feed consumption of Murrah buffalo fed probiotic feed, can be seen in the following Figure 1.

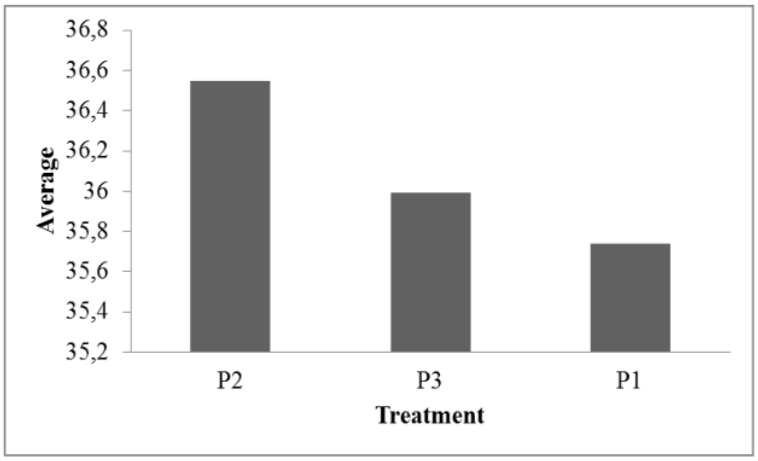


**Figure 1.** Feed consumption.

*3.2 Daily weight gain*

Daily weight gain of Murrah buffalo in this study can be seen in table 4.

**Table 4.** Daily weight gain.

| Treatment | Average (Kg) |
|---|---|
| P2 | 1,09 |
| P3 | 0,91 |
| P1 | 0,55 |

Daily weight gain (DWG) is a complex process, including daily weight gain and the formation of all body parts evenly [13]. Based on table 4, the highest DWG is at P3 (1.29), and the lowest is at P1 (0.55). The analysis of variance showed no difference between the treatments. Also, body weight gain is generally influenced by the level of feed consumption [14]; the higher the feed consumed, the higher body weight increased. In addition, the BK for buffalo feed given still does not meet their needs, so the results of the body weight gain obtained do not show a significant difference. Furthermore, [15] explained that cattle that received BK intake more minor than the requirement could not show optimal productivity.

The study results on DWG were higher than the study results of [16], where the increase in DWG of Murrah buffalo by feeding fermented coffee fruit flesh skin using local microorganisms ranged from 0.46 kg - 0. 67 kg. The graph of DWG of Murrah buffalo fed probiotic feed can be seen in the following Figure 2.

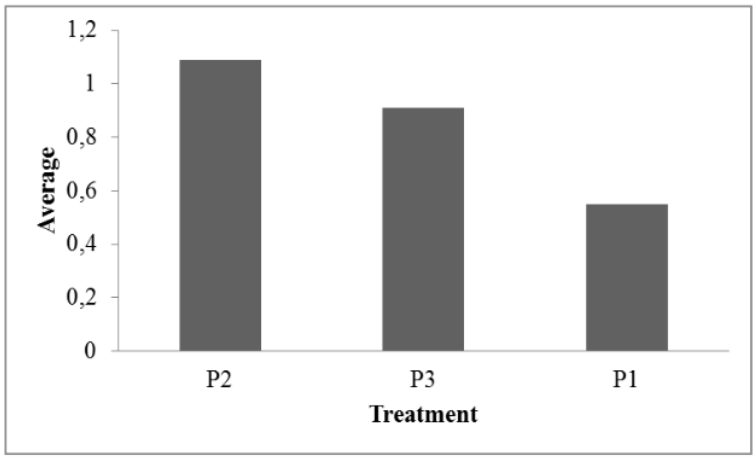


**Figure 2.** Daily weight gain.

*3.3 Feed conversion*

The feed conversion of Murrah buffalo in this study can be seen in table 5.

**Table 5.** Feed conversion.

| Treatment | Average |
|---|---|
| P2 | 0,68 [a] |
| P1 | 0,46 [b] |
| P3 | 0,31 [b] |

Note: Different superscripts [(a,b,c)] in the same line show significant differences (P>0.05).

Feed conversion is the ability of livestock to convert feed into meat [17]. As seen in Table 5 above, it is found that there is a significant difference. The highest feed conversion average is at P2 (0.68), and the lowest is at P3 (0.31). This is due to the high nutrient content of cassava leaf pellet feed (Table 2), resulting in small feed conversion. Feed conversion is one of the technical indicators that can show the level of feed efficiency, where the lower the feed conversion, the more efficient the feed is [12]. In addition, several factors affect feed conversion, including the ability of livestock to digest feed ingredients, the adequacy of feed substances for bare life, growth and body functions, and the nutritional content of feed [18]. The better the feed quality, the better the efficiency of energy formation and livestock production [19].

The feed conversion obtained was lower than the study results [16], where the conversion of cheap buffalo feed by feeding fermented coffee fruit flesh skin using local microorganisms ranged from 10.53-14.29. Feed conversion graph of Murrah buffalo fed probiotic feed can be seen in the following Figure 3.

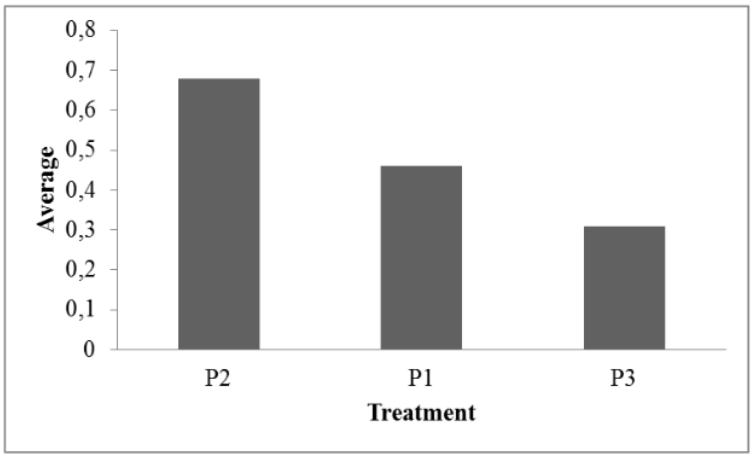


**Figure 3.** Feed conversion.

## 4. Conclussion

The provision of basal rations added with cassava leaf pellets showed significant results on feed conversion in Murrah buffalo, but it did not show a substantial difference in feed consumption and daily weight gain. However, it showed a reasonably high average, indicating that P2 could be used as supplementary feed in Murrah buffalo.

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