Quest Journals
Journal of Software Engineering and Simulation
Volume 7 ~ Issue 12 (2021) pp: 43-46
ISSN(Online) :2321-3795 ISSN (Print):2321-3809
www.questjournals.org

Research Paper

Effect Of Bisozyme In Elephant Grass Cv. Taiwan (*Pennisetum purpereum*) To The Characteristics (Ph, Ch3 And Vfa) Of Rument Fluid By In-Vitro

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ABSTRACT : *This research aims to determined the effect of Bisozyme utilization on the characteristics of rumen fluid (pH, NH3, and VFA) of Elephant grass (Pennisetum purpureum) cv. Taiwan in the second harvesting compared to the used of chemical fertilizers. The design used in this research was Randomized Block Design (RBD) with 5 (five) treatments, namely: P0 (Manure + N, P, and K), P1 (Bisozyme), P2 (Bisozyme + Manure), P3 (Bisozyme) + N, P, and K), P4 (Bisozyme + Manure + N, P, and K) and 4 (four) replications (groups). Research showed that the effect between treatments was not significantly different (P> 0.05) on pH, N-NH3 concentration and total VFA of rumen fluid. Rumen pH ranged from 6.13 to 6.22, the rumen N-NH3 concentration ranged from 11.11 mg / 100 ml to 12.38 mg / 100 ml, and the total rumen VFA production ranged from 123.33 mM to 151.67 mM repectively. From the results of this research it could be concluded elephant grass fertilized with Bisozyme only gave relatively the same results as elephant grass fertilized with manure and fertilizer N, P, K (control) in producing characteristic values of rumen fluid (pH, CH_3 and VFA).*
KEYWORDS: *Bisozyme, Elephant Grass cv. Taiwan, In vitro and NPK*

***R**eceived 16 Dec, 2021; **R**evised 28 Dec, 2021; **A**ccepted 31 Dec, 2021 © The author(s) 2021.*
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I. INTRODUCTION

Feed is one of the important factors in increasing livestock business because it is related to livestock productivity, so it is necessary to increase the quality, quantity and continuity. Ruminants are ruminants that have a polygastric animal consisting of the rumen, reticulum, omasum, and abomasum. Forage is the main source of feed for ruminants, both for basic living, growth, production and reproduction because forages contain food substances needed by ruminants (Muhakka et al., 2013). As much as 74-90% of food consumed by ruminants comes from forage, both in fresh and dry form (Susetyo, 1980).

Elephant grass (Pennisetum pupureum) is a food crop known to have high productivity with fresh forage production ranging from 500 - 800 tonnes / ha / year (Suyitman et al., 2003). This grass is an annual plant (perennial) that can grow in various types of soil and is easily planted by cuttings and pols. One of the elephant grass varieties which is very potential and is often given to ruminants is elephant grass (Pennisetum purpureum) cv. Taiwan. This variety is one of the superior grasses native to Taiwan without crossing with other grasses. Elephant grass (Pennisetum purpureum) cv. Taiwan has a fairly high production, many tillers and has strong roots, stems that are not hard and have short knots, the leaves are wider than other varieties of elephant grass, namely the Hawaiian and African varieties, and do not have fine hairs. on the leaf surface so it is very popular with livestock (BET, 1997).

The limited availability of forage is due to the lack of available land for forage development, because most of the land available for forage development is marginal land, such as dry land and ultisol soil types with low fertility (Prasetyo and Suriadikarta, 2006).

To improve soil fertility and environmental balance, and reduce the risk due to the buildup of pesticide residues and chemical fertilizers as well as to increase forage production, the enzyme Bisozyme is created,

which is produced from yeast extract. Bisozyme is the result of yeast extraction incubated in the molasses fraction of sugarcane. Therefore bisozyme is very safe and has no effect on the ecosystem. 500-1000 dilutions of bisozyme are used in crop cultivation (DT1000 for soil management supplements and MK1000 for insect repellent supplements) and fish culture (LP1000 and BF1000) (Wijaya et al., 2016).

Besides increasing forage production, Bisozyme is expected to provide better forage digestibility values. Digestibility is one of the parameters of the quality of feed ingredients and is an important thing to pay attention to in feeding. Digestibility value is very important in relation to the amount of food substances that are absorbed and utilized by livestock. To obtain information on the digestibility of feed ingredients an in-vitro measurement approach can be used (Susanti, 2007). In the laboratory, the digestibility of the rumen fluid in-vitro can be determined by looking at the total VFA, NH3, and pH concentration.

Based on the above, a study entitled "The Effect of Bisozyme in Planting Elephant Grass cv. Taiwan on the Second Harvesting Against Characteristics of Rumen Fluid In Vitro ".

II. MATERIALS AND METHODS

Research materials: Elephant Grass (Pennisetum purpureum) cv. Taiwan which has been harvested once and manure, N, P, and K fertilizers and bisozyme, and a land area of 399.5 m2.

Research tools: The equipment used consists of tools for plant care to harvesting, tools for chemical analysis and in-vitro experiments, and a set of laboratory tools for the analysis of rumen fluid characteristics (pH, VFA, NH3).

Method: This research was conducted using a randomized block design (RBD) method consisting of 5 types of treatment and 3 replications, with the following treatments P0: Manure + fertilizer N, P and K (control), P1: *Bisozyme*, P2: *Bisozyme* +Manure, P3: *Bisozyme* + N, P and K, and P4: *Bisozyme* + Manure + N,P and K.

Observed Variables: The variables observed in this research were The degree of acidity (pH) of the rumen fluid, Production of total VFA (mM) of rumen fluid and Concentration of NH3 (mg // 100 ml) rumen fluid

III. RESULTS AND DISCUSSION

Degree of Acidity (pH) of Rumen Fluid

The average pH of the rumen fluid obtained from this study can be seen in the following table:

Table 1: In vitro rumen pH mean

treatment	Degfree of Acidity (pH) of Rumen Fluid
A	6,13
B	6,17
C	6,21
D	6,22
E	6,22
CV	0,04

Note : Between treatments showed no significant difference (P> 0.05)
CV : Critical Value

In Table 1, it can be seen that the results of the diversity analysis show that the treatment has an insignificant difference (P> 0.05) on the pH value (acidity) of the rumen fluid of elephant grass cv Taiwan. The pH value of the rumen fluid in this study ranged from 6.13 to 6.22, this pH value is still considered optimal for rumen microbial growth, meaning that the use of Bisozyme in elephant grass does not interfere with rumen microbial activity in fermenting feed in the rumen. This statement is supported by Sayuti's (1989) opinion that the optimal rumen pH for digestive activity in the rumen is 6.5 - 7.0. The pH value of the rumen fluid which is less than 6.0 or up to 7.2 can inhibit the proteolysis and deamination process. Likewise, the activity of cellulolytic bacteria will be disrupted and the digestibility of crude fiber will decrease (Orskov, 1982). The optimal rumen pH value is one indicator of the occurrence of good feed degradation, because at this pH the microbes that produce crude fiber digestive enzymes can live optimally in the rumen (Jean-Blain, 1991).

In fact, the pH of the rumen fluid is different because the use of buffers as artificial saliva causes the pH of the rumen fluid to stabilize. This is in accordance with the opinion of Church and Pond (1988) that saliva acts as a buffer to maintain the stability of the pH of the rumen fluid, and Arora's (1995) opinion that rumen pH will remain due to the balance of VFA which is acidic and NH3 which is alkaline. VFA production and NH3 concentration also showed insignificant differences, so that the resulting pH also had no significant effect, according to Van Soest's (1982) statement that rumen pH was influenced by NH3 and VFA.

The degree of rumen acidity (pH) obtained in each treatment was optimal for growth and development and development of rumen microorganisms in digesting food substances, especially carbohydrates from

cellulose and hemicellulose and for synthesizing microbial protein in the rumen. This is in accordance with the opinion of Arora (1989) which states that the optimal rumen pH range for digestive activity ranges from 6-7.1. Then Orskov (1982) added that a rumen pH of less than 6 can inhibit the proteolysis and deamination process, because the growth of the rumen of bacteria can be inhibited.

Production of Volatyle Fatty Acid (VFA) Rumen Fluid

Volatile Fatty Acid (VFA) is a fermented product from carbohydrates and fats which can be used as an energy source for livestock and also as a carbon framework for rumen microbes. Effect of Bisozyme application on planting elephant grass cv. Taiwan on rumen fluid VFA production can be seen in Table 2.

Table 2: Mean rumen fluid VFA production in vitro (mM)

Treatment	Rumen Fluid VFA Production (mM)
A	136,67
B	130,00
C	123,33
D	151,67
E	148,33
CV	8,72

Note : Between treatments showed no significant difference (P> 0.05)
CV : Critical Value

In Table 5, it can be seen that the results of the diversity analysis showed that the treatment had an insignificant difference (P> 0.05) on the VFA production of elephant grass rumen fluid. This means that the treatment provides a VFA value that is relatively the same as the control. The average VFA production from this study ranged from 123.33-151.67 mM.

High VFA production provides a sufficient source of energy for rumen microbes to reproduce so that more microbial cells are formed to produce enzymes, so that the level of feed degradation in the rumen will be higher and digestibility will increase. This is supported by the opinion of Sakinah (2005) that high VFA production is sufficient energy for livestock. The less VFA production is produced, the less soluble protein and carbohydrates, and the lower the digestibility.

The total VFA production obtained was relatively the same even though the treatments given were different. This is because the crude fiber content between treatments is also relatively the same. The low crude fiber, the cellulolytic enzymes will degrade in the rumen easily so that the total concentration of VFA increases. In accordance with the opinion of Harrison et al. (1975) stated that the high degradation of crude fiber in the rumen would also increase the total VFA.

Bisozyme contains enzymes and minerals as well as co-enzymes which can increase plant growth based on the resistance system and improve soil quality by soil bacteria so that it does not show any effect. This is supported by the opinion of Wijaya et al., (2016) that bisozyme includes small molecules, such as nutritional compounds, co-enzymes and proteins (i.e. enzymes produced by cultivated yeast), which are very helpful for soil management without bacterial contamination.

Concentration of NH3 (Ammonia) in Rumen Fluid

NH3 is a product of protein degradation by rumen microbes, NH3 in the rumen can be utilized by microbes as a source of nitrogen for body protein synthesis, with the increase in NH3 it can increase microbial growth and development, thereby increasing the digestibility of feed in the rumen. Effect of Bisozyme application on planting elephant grass cv. Taiwan's rumen fluid NH3 concentration can be seen in Table 3.

Table 3: Average NH3 of Elephant Grass Rumen Fluid

Treatment	Concentration NH_3 (mg/100 ml)
A	11,73
B	11,17
C	11,11
D	11,53
E	12,38
SE	1,03

Note : Between treatments showed no significant difference (P> 0.05)
CV : Critical Value

In Table 3, it can be seen that the results of the diversity analysis show that the treatment has an insignificant difference (P> 0.05) on the NH3 concentration of the rumen fluid of elephant grass cv. Taiwan grown with the addition of Bisozyme. This is due to the protein content of elephant grass cv. Taiwan is relatively the same. NH3 depends on whether or not the protein is easily degraded. If protein degradation is faster than microbial protein synthesis, NH3 will accumulate and exceed its optimum concentration. Treatments given N fertilizers obtained higher NH3 concentration values compared to treatments that were not given N fertilizers. crude protein base.

The average NH3 values obtained from this study ranged from 11.11 - 12.38 mg / 100 ml of rumen fluid. The concentration of NH3 in this study is still at a value that meets the needs for rumen microbial growth. The minimum concentration of NH3 required for microbial protein synthesis is 5 mg / 100 ml of rumen fluid (Jamarun and Zain, 2013), and according to Stern and Hooven (1979) states that the optimal requirement for NH3 concentration for microbial growth and development is 29 mg / 100 ml. rumen fluid. The main factor influencing the utilization of rumen NH3 by microbes according to Humen (1982) is the energy source available in the rumen, namely carbohydrates that are easily digested.

Crude protein content obtained in each treatment was not significantly different due to the absorption of nutrients found in treatments A, B, C, D, and E which were sufficient for the growth and nutritional content of Gajah grass cv. Taiwan normally. This is in accordance with the opinion of Tisdale and Nelson (1975) that N is the main nutrient in the formation of dietary protein, therefore more N elements are needed to increase the crude protein content, supported by the opinion of Lakit (2007) that N is the basic ingredient for forming amino acids and proteins which will be used for metabolic processes from plants.

IV. CONCLUSION

From the results of the study it can be concluded that elephant grass fertilized with Bisozyme gives relatively the same results as elephant grass fertilized with manure and N, P, K (control) fertilizers in producing the characteristic values of rumen fluid, where the pH value of the study is around 6.13. -6.22, VFA production ranged from 123.33-151.67 mM, and for NH3 concentrations ranged from 11.11-12.38 mg / 100ml rumen fluid.

V. RECOMMENDATION

Furthermore, the results of this study need to be tested on livestock, so that it can be seen the growth and body weight of organic livestock.