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The Effect of Length Fermentation Rice Straw and Tithonia (*Tithonia Diversifolia*) Used Local Microorganisms on The Content of Dry Matter Organic Matter and Crude Protein as Ruminant Feed.

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ABSTRACT

This study aimed to examine the effect of the length of fermentation of rice straw and titonia *(Tithonia diversifolia)* with local microorganisms (MOL) in the rumen content of cows on the content of dry matter. Organic matter. and crude protein. This study was conducted using a completely randomised design with 4 treatments and 4 replications for each treatment. The treatments consisted of PO (Combination of Rice Straw and Tithonia without MOL). Pl (Combination of Rice Straw and Tithonia with 0 Days of Fermented MOL). P2 (Combination of Rice Straw and Tithonia with 7 Days of Fermented MOL). and P3 (Combination of Rice Straw and Tithonia). With a 14-day MOL fermentation). The results of statistical analysis showed that the effect of fermenting rice straw and Tithonia *(Tithonia diversifolia)* with local microorganisms (MOL) in bovine rumen content had an insignificant difference (P>0.05) on the dry matter and crude protein content. but a very significant difference (P <0.01) on Organic Matter content. Based on the study's results. it can be concluded that the fermentation of rice straw and Tithonia *(Tithonia diversifolia)* with MOL fermentation is optimal for fermentation for 7 days.

Keywords: Rice straw. tithonia. fermentation. local microorganisms.

1. INTRODUCTION

Solok is known as a large rice-producing area. which leaves abundant rice straw as a by-product of rice harvesting and has not been utilised utilized. The area of rice fields in Solok City in 2019 was 874.6 ha. and the area of rice fields in Solok Regency in 2019 Based on the data. it can be predicted that the amount of rice straw in Solok City and was 23.438 ha. (https://ww.bps.go.id2020). According to Yunilas (2009). rice straw production reached 12-15 tons per/ha per harvest or 4-5 tons of dry matte.r depending on the location and variety used.

Solok Regency 2 harvests per year is around 7184.304 (ha/ton). This abundant

amount of production has the potential to be used as feed material. The utilisation of straw as animal feed has a major weakness; there are the low nutritional value is due to the high content of lignocellulose. lignin and silica. while the low nutritional value is mainly due to the low content of energy. protein. minerals and vitamins (Sarnklong et al.. 2010: Yanuarto et al.. 2017). The protein content of rice straw is low when used as a green source for livestock that is given alone; it is necessary to have a touch of feed technology by combining other types of forage that can increase the nutritional value of rice straw. One of the forages that can be used as a combination forage to increase the nutritional value of rice straw is Tithonia (*Tithonia diversifolia*) which is easily found on the edges of rice fields and roadsides.

Tithonia has a high nutritional content. especially crude protein. The nutritional content of the whole plant Tithonia is dry matter 25.57%. organic matter 84.01%. crude protein 22.98%. crude fat 4.71%. and crude fibre 18.17% (Jamarun et al. 2017). In addition. (Fasuyi *et al*., 2010). Titonia leaves contain quite complex amino acids. such as lysine. arginine. aspartate. glutamate. methionine + cystine. isoleucine. tyrosine and phenylalanine. which are high in content compared to other amino acids. However. Tithonia also has limiting factors: phytic acid. tannins. saponins. oxalate. alkaloids and flavonoids (Fasuyi *et al*., 2010). In Tithonia. of course. the palatability is low. so biological processing of feed is carried out. Tithonia (*Tithonia Diversifolia*) is also referred to as a paitan plant because there is a bitter taste in Tithonia which causes low palatability. biological processing of feed ingredients is carried out. The limiting factors of rice straw and Tithonia (*Tithonia diversifolia*) then need fermentation is carried out. Fermentation is one of the biological processing technologies for feed ingredients that involves the activity of microorganisms to improve the nutrition of low-quality ingredients. Fermentation can improve the quality of feed ingredients because. in the fermentation process. chemical changes occur in organic compounds (carbohydrates. fats. proteins. crude fibre and other organic materials) in aerobic and anaerobic conditions through the work of enzymes produced by microbes. (Sukaryana, et al., 2011) In the manufacture of local microorganisms. which is used is rumen content. that abattoir waste that can pollute the environment. The availability of this rumen content is also so much; it can be seen based on the number of cattle and buffalo slaughtered in the abattoir.

In addition to containing rumen microbes and enzymes secreted by rumen microbes. it contains food substances resulting from the reshuffle of rumen microbes and enzymes. as well as vitamins and minerals that are soluble in the rumen. The nutritional content of cow's rumen content is 9.29% water. 8.45% crude protein. 1.23% crude fat. 33.53% crude fibre; 0.20% Ca. 0.45% P; 16.19% ash; and vitamin B12. so the rumen content potential as feed additives. (Wizna *et al,*. 2008) So many proteolytic bacteria in the rumen; there are the most common types of bacteria found in the digestive tract of mammals. including carnivores. Some examples of proteolytic bacteria include *Bacteriode samylophilus, Clostridium sporogenes, Bacillus licheniformis*, amino acids. and vitamin-rich mineral deposits (Soetanto, 1998). Enzyme curing is an alternative technology used to hydrolyse crude fibre and increase the nutritional value of local feed raw materials (Budiansyah *et al,*. 2011).

This research aimed to determine the effect of straw and titonia fermentation with local microorganisms with different curing times on dry matter and organic matter content.

2. METHODS

The materials used in this study consisted of straw and rice Tithonia in a ratio of 75% (334 grams): to 25% (196 grams). And 20% MOL (106 ml) as a starter. A set of substances used in protein analysis.

The tools used in this study were: a knife/machete. Chopper machine. Jar containers. Bottles. Hoses. Scales. Measuring cups. Oven, and the next are tools for taking rumen contents. Namely a hot water thermos. Filter cloth and tools used for DM. OM and CP. This research method is an experimental method using a Completely Randomized Design with 4 treatments and 4 replications. In this study using. a combination of 75% rice ,straw 25% Tithonia (based on initial experiments) will be fermented with local microorganisms with different fermentation times or treatments:

PO = Combination of rice straw and Tithonia without local microorganisms (without fermentation) as a control.

Pl = Combination of rice straw and Tithonia with Local microorganism Fermentation 0 days

P2 = Combination of rice straw and

Tithonia with Local microorganism Fermentation 7 days

P3 = Combination of rice straw and Tithonia with Local microorganism Fermentation 14 days

Parameters measured in the implementation of this research are:

The Content of dry matter, organic matter, and Crude protein content

Procedures

Local Microorganism (MOL) manufacturing process

1) The water taken from the RPH was mixed with soaked soybeans and molasses in a tightly closed jar.
2) The lid of the jar is in the hole and connected with a small cross with a bottle containing equates.
3) Then incubation as long as for 7 days

3. RESULTS AND DISCUSSION

The average dry matter content of fermented rice straw and different Tithonia (tithoni diversifolia) can tithonia in the table

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Table 1. Average Dry Matter, Organic Matter and Crude Protein Content Fermentation Straw Rice and Tithonia(Tithonidiversifolia)(%

Treatment	Dry matter (%)	Organic matter (%)	Crude protein (%)
P0	96.09	77.84[a]	8.75
P1	96.36	79.37[a]	9.08
P2	95.88	76.32[a]	9.17
P3	95.24	73.24[b]	8.90

Note : Different superscript (a, b) in the same column show very significant differences (P<0.01).

Based on the results of the analysis of variance, it showed that the incubation time of fermentation of rice straw and Tithonia (Tithonia diversifolia) had no significant effect (P>0.05) on the dry matter content.

This was due to the study using MOL in liquid form only as much as 20% of the material, which was not significantly different from PO. The longer the fermentation time of rice straw and Tithonia caused more substances. Food substances are used by microbes as a source of nutrition during the fermentation process and are used as an energy source for glucose. Glucose is broken down and produces water molecules, carbohydrates and heat so that the water content increases and the dry matter in the product becomes. Some water will come from the substrate, and the rest will be left in the product. This causes the water content of the fermented product to increase, so the dry matter content is reduced (Gervais, 2008). This is the opinion Ramachandran *et al*, (2008), which states that during fermentation, micromicroorganisms use carbohydrates from the substrate as an energy source and produce water and CO2 molecules during fermentationextended the fermentation, the longer the opportunity for microorganisms to work from the rumen contents, which resulted in storage products being more readily degraded in the rumen and during storage, a decrease in the dry matter could occur due to the activity of enzymes, Added Kasmiran (2011) stated that the longer the fermentation time, the lower the dry matter content; this was due to the increase in the fermentation time, and the better, even, and compact mould growth was obtained so that optimal mould growth was obtained. The more moulds that grow, the more food substances there are in the remodelled material as a source of energy. As a renergy sourceules produced from the metabolic processes of moulds also increase. In this study, the longer the incubation time, the higher the water content and the lower the dry matter; it is suspected that in the local micoorganismsthere are large numbers of microorganisms in the local micoorganisms rumen content processes by forming a pair so that the water content increased. Based on the results of the analysis of variance, it showed that the incubation period of rice straw and Tithonia (*Tithonia diversifolia*) fermentation had a very significantly different effect ($P<0.01$) on the organic matter content. This was caused by Microorganisms caused this carrying out various fermentation activities at different incubation periods.DNMRT further test showed that the organic matter content of rice straw and Tithonia (*Tithonia diversifolia*) in P1 treatment was higher than that of PO and P2, and P3 was significantly lower than Pl.

However, the optimal fermentation time can reduce the ingredient content organic. The decrease in organic matter occurred in the P2 and P3 treatments, while the increase in organic matter occurred in the Pl treatment.

The high and low content of organic matter in the treatment was also made possible by microbial activity in the fermentation process, which caused the breakdown of the substrate content, making it easier for existing microorganisms to digest organic matter, and the fermented organi. Thereleased the fermentation products in the form of sugar, alcohol, and amino acids and also caused by the activity of microorganisms so that changes occurred Ksmiran (2011) that affect the nutritional value of fermentation. stated that the decrease iStatednic matter content was due to the nutrients available in the material having been overhauled and utilised by moulds. Mould growth was closely related to fermentation time. Where the longer the fermentation, the growth of the mould will development, even and compact by the absents of the material. Mol that grow more actively carry out of carbohydrates and proteins, which are part of organic matter.

Based on the results of the analysis of variance, it showed that the duration of fermentation of rice straw and Tithonia (*Tithonia diversifolia*) gave no significant difference (P>0.05) to the crude protein content. This was due to Local microorganisms' activity during fermentation not being able to significantly increase the crude protein content of rice straw and Tithonia. P2 (9.17%) was fermenteseven days, and P3 (8.90%) was fermented for 14 days. This is due to the long incubation time of rice straw and Tithonia with rumen fluid Local microorganisms, allowing the activity of microorganisms to produce protease enzymes in simple peptides. Protein reshuffle is converted into polypeptides, then into simple peptides. Then these peptides will be broken down into amino acids. These amino acids will use microbes will use these amino acids to increase protein, which was related to adding protein from microbial cells that increases the fermentation process (Anggorodi, 1994) Table 1 shows the optimal incubation time for fermentation for seven days, and when the incubation period is added, there is a decrease in protein content. Enzyme activity will increase in line with the increase in fermentation time and decrease on day 10. This follows the growth pattern of microorganisms that undergo several growth phases, namely the adaptation phase, exponential phase, stationary phase and death phase.

4. CONCLUSION

Based on the results of the study, it can be concluded that the effect of fermenting rice straw and Tithonia (*Tithonia diversifolia*) with local microorganisms (MOL) with

different curing times gave no significant impact ($p>0.05$) on dry matter content, crude protein, and a very substantial effect ($p<0.01$) on organic matter content. Adding Tithonia (*Tithonia diversifolia*) in rice straw fermentation can increase the crude protein content of rice straw.

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