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FIELD GRASS SILAGE WITH THE ADDITION OF COLI FRUIT FIBER QUESTION AS RUMINANT ANIMAL FEED

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ABSTRACT

This research aims to find out what % of coli fruit fiber juice is used to produce good quality silage, and to find out the physical quality of field grass silage with the addition of coli fruit fiber juice. The materials used in this research were field grass and coli fruit fiber juice brought from Moa Island, Southwest Maluku Regency. This research will be carried out for 2 months (October-November, 2022) at the Faculty of Agriculture, Animal Husbandry Department, Pattimura University, Ambon. The harvested silage will be subject to observation and/or physical analysis of field grass silage at the Animal Nutrition and Forage Laboratory, Pattimura University, Ambon. The variables observed were color, aroma, texture, pH and the presence or absence of mold in the silage. The physical quality was tested by the 5 students selected as panelists using the questionnaire provided.

Keywords: *silage, grass, fiber, fruit coli*

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INTRODUCTION

Maluku Province is an area that has potential for the development of ruminant livestock, especially goats and beef cattle, especially in the Tidore Islands area. This is supported by the potential of available local resources, especially ruminant feed ingredients originating from field grass, elephant grass, gamal leaves and agricultural waste in the form of rice straw in the area. In order to stimulate an increase in the ruminant livestock population, especially goats and cattle, it needs to be supported by semi-intensive or more intensive cultivation techniques and the provision of quality forage. This will make it easier for farmers to control the growth and development of the livestock they keep. Ruminant livestock require forage for growth, production and reproduction and its availability must be met throughout the year. Forage availability is generally abundant in the rainy season and very less during the rainy season dry season (Zailzar, et al., 2011). Forage that is abundant during the rainy season must be processed by preserving it, so that The nutritional quality of the forage remains guaranteed, so that it can meet the feed needs of ruminants throughout the year. One of the feed processing technologies using techniques preservation is by making silage.

Silage making is done to preserve and minimize nutrient loss and can also improve feed nutrition (Jaelani, et. al., 2014). Silage is forage forage (HMT) that is preserved by anaerobic fermentation in conditions of high water content (60-70%) with the formation of acid. Making Silage is usually added with additives in the form of molasses, urea and bran. Silage is a wet preserve that is stored in a silo, a tightly

closed and airtight place, under anaerobic conditions. In this anaerobic atmosphere, the growth of anaerobic bacteria will accelerate to form lactic acid (Mugiawati, 2013). Silage making has been known for a long time and has developed in countries with subtropical climates. The principle of making silage is fermentation of forage by microbes which produce a lot of lactic acid.

The silage fermentation process aims to maximize the preservation of the nutritional content contained in forage or other animal feed ingredients so that the silage formed can be stored for a long period of time, without greatly reducing the nutritional content of the raw materials. This silage can be given as animal feed, especially to overcome difficulties in obtaining forage during the dry season. When making silage, additional ingredients are needed with the aim of adding nutritional value to the silage making. The feed ingredients that will be added must contain high and easily soluble carbohydrates because they are the most important substrate for the development of lactic acid bacteria which are rarely found in forage but are often found in silage (Wijiyanto et al., 2005 and Zamro 2022). Thus, coli fruit fiber juice can be added as an additional feed ingredient, because coli fruit fiber juice has a sweet taste or contains glucose which can be used as an energy source in feed in making silage.

METHOD

The research was carried out at the Feed Engineering Technology Laboratory, Department of Animal Husbandry, Faculty of Agriculture, Pattimura University, Ambon from the end of October to the beginning of November 2022. The materials used in this research were Field grass and Koli/Lontar Fruit Fiber Juice *(Borasus flabilifer Lin)* obtained from the island. Moa, Southwest Maluku Regency. The equipment used included: machetes, plastic sacks, tarpaulins, digital scales, raffia rope, label paper, 10kg PE plastic, litmus paper, large baking sheets, measuring cups, vacuum pumps, thermometers, cameras and stationery. The research method used was a Completely Randomized Design (CRD) consisting of 4 treatments with 4 replications. Where the 4 treatments consist of: P0; Field Grass+ 0% coli fruit fiber essence, P1; Field grass+ 2.5% coli fruit fiber essence, P2; Field grass + 5% coli fruit fiber essence, P3 Field Grass + 7.5% coli fruit fiber essence.

Procedure

1. Old cabbage (which fell on the ground)
2. Separate the outer skin from the cabbage
3. Separate the fiber from the coli seed shell
4. Then the coli fiber is squeezed to get the coli fiber juice
5. Field grass is chopped using a machete to soften the stems and leaves, after being chopped it is then left in the air for 3 days until the water content is reduced
6. Field grass is weighed and the dose of coli fiber juice used is measured according to the specified treatment.
7. Put the field grass into a baking dish then pour in the cabbage fiber juice little by little, mix until evenly distributed (homogeneous).

Data analysis

The data obtained was then analyzed using a further test, namely the Honestly Significant Difference (BNJ) test according to the instructions of Gaspersz (1995).

$Yij = \mu + \tau i + \varepsilon ij$

Yij = Observation value in treatment I, replication j
μ = general mean value
τi = effect of treatment i
εij = random influence (experimental error) in treatment I and replication j

RESULTS AND DISCUSSION

Assessment of the physical quality of field grass silage by adding different doses of coli fruit fiber juice using physical characteristic assessment parameters including texture, color, aroma, presence or absence of mold and pH. Average results of physical quality of field grass silage with the addition of a dose of coli fruit fiber essence. can be seen in table 1.

Table 1. Quality of field grass silage

Treatment	Color	Aroma	Texture
P0	Brownish Green	Very Sour	Soft, easy to separate.
P1	Yellowish Green	Very Sour	Soft, easy to separate.
P2	Yellowish Green	Slightly Sour	Soft, easy to separate.
P3	Yellowish Green	Sour	Soft, easy to separate.

Color

Silage color is one indicator of assessing the physical quality of silage, a color that is like the original color is good quality silage, silage that deviates from the original color is low quality silage. This silage can be categorized as good quality. This is in accordance with Maulidayanti's (2015) explanation: The color of good silage is yellowish green with brownish green to not green. Wati et al. (2018) reported that bright green or brownish green silage is the natural color of grass silage, while brownish yellow is the color of withered grass silage. The color transformation that occurs in plants that undergo the ensilage process is caused by changes that take place in the plant due to an active aerobic respiration process as long as the oxygen supply in the silo is still there. The color changes that occur during the silage making process are also influenced by the Maillard response that occurs during the fermentation process. the Maillard response will occur if the silage temperature is high, and will give the silage a brown to dark color (Rahayu et al, 2017).

Silage that is made and stored in a cool, overcast room avoids exposure to direct sunlight, so the temperature in the room can be controlled, namely 25-28oC, which does not have a negative effect on the silage that is made. The room temperature in this study was around 28oC, so there is a high probability that the color change process can proceed well, indicating the presence of brownish yellow and yellowish green colors. According to Kojo et al. (2015), temperatures that cannot be controlled, namely 55oC, can produce dark brown to black silage and this causes a decrease in the nutritional value of the feed because many carbohydrates are lost.

Texture

One indicator of assessing the physical quality of silage is texture. Silage can be said to be of good quality if it has a soft, dense texture, not lumpy or slimy. The denser the texture produced indicates that the silage is of good quality. The texture of silage is influenced by the water content (>75%) which will create a slimy, soft texture and the growth of mold. A small water content (<25%) will create a dry and moldy texture. The large water content creates liquid which can trigger oxygen in the silo to increase. The low water content makes the compaction reaction difficult so that a lot of oxygen is trapped in the silo. The water content during the research was around 70% so the silage texture obtained was still in the good quality category.

Based on table 2, the texture of silage with the addition of a dose of coli fiber juice in each treatment shows a rough, soft, easily separated solid texture and no mucus. The silage results in this study can be categorized as good quality. This is in accordance with the statement of Zakariah (2016), reporting that the texture of good quality silage is characterized by the absence of mucus in the silage, the texture is smooth, dense, this indicates that the fermentation process is going well without any damage so that oxygen will not be able to enter the silo in this condition. Anaerobic fungal growth cannot develop. Research results (Sadarman et al, 2022) state that the accumulation of commercial discarded syrup is able to create a smooth and non-clumping texture in elephant grass silage with tofu dregs. The smooth and lump-free texture is created because the volume of glucose in commercial syrup can be used by Lactic Acid Bacteria as a source of energy to stimulate the ensiling mechanism. The high sugar content in coli fiber juice is able to create field grass silage that has a soft texture and does not thicken. Utomo (2015) said that silage can be said to be good if it has a texture that is still clearly visible like its origin, whereas if the texture is lumpy, soft, slimy, it is in the low quality category. Silage that is increasingly dense is silage in the good quality category, meanwhile silage that has a less dense texture indicates that the silage is of low quality (Prayitno et al, 2020).

Aroma

One indicator for assessing the physical quality of silage is the aroma of the silage. The normal aroma for good silage results is a sour aroma because rot occurs during the silage process. The sour aroma indicates good quality. On the other hand, if there is a rotten aroma in the silage, it shows that the quality is not good. The aroma of the silage of each treatment has an aroma that is towards sour. This is thought to be due to the

formation of the silage fermentation process which produces lactic acid. To produce sour-flavored silage in anaerobic conditions, the bacteria will actively work to obtain organic acids (Syafi'I and Rizqina, 2017). Added the opinion (Kim et al, 2017) that when the silage decomposition mechanism actively works, it can create organic acids which are formed by lactic acid from anaerobic bacteria. Lactic acid will work actively, giving rise to a distinctive silage aroma, namely sour.

The results showed that the aroma of silage in treatments P2, P3 was very fresh and sour. The acidic condition obtained shows that the greater the dose of coli fruit fiber juice that is given, the more the silage smells, the more sour it is due to the development of lactic acid bacteria during the rotting mechanism. This is in accordance with the explanation (Larangahean et al, 2017) who reported that the greater the fiber juice from koli fruit that is given and packaged for a relatively long time, it will produce a very sour aroma because the carbohydrate content contained in the fiber juice from koli fruit causes a marked change in the aroma of silage. According to Hynd (2019), fast fermentation can cause acidity, characterized by a decrease in the pH value. The decrease in the degree of acidity (pH) is indicated by the sour smell of silage typical of fermentation. Treatment P1 displayed a very sour aroma, the slightly sour aroma of the silage was suspected if little lactic acid was produced due to the small amount of soluble carbohydrates (coli fruit juice) being given. Kurnianingtyas et al, (2012) reported that the sour aroma produced by silage was caused by anaerobic bacteria which produced organic acids. Meanwhile, with P0 treatment, the resulting smell is slightly rancid, there is a high probability of the growth of clostridia bacteria which can cause rot in the silage. This matter can be explained (Wattiaux, 2013) by the failure of fermentation in making silage feed due to the growth of unwanted bacteria such as Clostridia.

Mold

The presence of fungi in silage is an indicator to determine the physical quality of silage. Silage that does not contain mold indicates that the silage is of very good quality. The average value for the presence or absence of mold can be seen in table 2.

Table 2. Average of Fungi in Field Grass Silage

Treatment	Experiment				Mean	Mold
	1	2	3	4		
P0	1	1	2	2	1,5[a]	Lots
P1	3	3	3	3	3[b]	A little
P2	3	4	3	4	3,5[b]	A little
P3	3	4	4	3	3,5[b]	A little

[a, b] Different superscripts in the same column indicate significant differences (P<0,01).: P0 : field grass + 0% coli juice; P1: field grass + 2.5% coli fruit juice; P2: field grass + 5% coli fruit juice; P3: field grass + 7.5% coli fruit juice.

The results of analysis of variance showed that between treatments there were significant differences (P<0.01) in fungi in field grass silage. The BNJ test shows that treatment P0 is very significantly different from P1, P2 and P3. Treatment P1 is not significantly different from P2 and P3 but is significantly different from P0. This identified that field grass silage treated with different levels of coli juice showed different responses in each treatment. The average results of mushroom observations in each treatment were PO 13.62 g, P1 8 g, P2 6.37 g and P3 6.87 g. The mold that appears in the silage is found on the surface of the silo. This silage can be categorized as medium quality silage. This is in accordance with the opinion of the Ministry of Agriculture (1980) which states that good quality silage has absolutely no mold, good quality silage has little mold, medium quality silage has more mold and poor quality silage has lots of mold at every point.

CONCLUSION

1. The addition of 5% and 7.5% coli fruit fiber juice produces better quality silage compared to other treatments.
2. The addition of coli fiber juice does not have a real influence on the physical quality of the color and texture of the silage, but has a very real influence on the physical quality of the aroma, fungal growth and pH of the silage.

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