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The Ratio of Fermented Mother Liquor and Molasses as Additives in Making Elephant Grass Silage (Pennisetum purpureum Cv. Thailand) and Corn Cob (Zea Mays. L) on the Quality of Ensilage Results

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ABSTRACT: This study aims to determine the effect of the ratio of fermented mother liquor (FML) and molasses as additives in the manufacture of elephant grass (Pennisetum purpureum cv. Thailand) and corn stalks (Zea mays) silage on the quality ofensilage results in terms of nutrient concentration and in vitro digestibility. The research materials were elephant grass of the Pakchong variety and corn stalks. FML and molasses were added to elephant grass and corn stalks in the processing of ensilage. This study used a Completely Randomized Design with 4 treatments and 3 replications in total elephant grass and corn stalks so that 24 experimental research units were obtained. The treatments were P1 = corn cob+ additive (FML 0% + 6% Molasses), P2: (FML 2% + 4% Molasses), P3: (FML 4% + 2% Molasses) P4: (FMl 6% + 0% Molasses) and P1: R. Gajah + additive (FML 0% + 6% Molasses), P2: (FML 2% + 4% Molasses), P3 (FML 4% + 2% Molasses), P4 (FML 6% + 0% Molasses). Data were analyzed using Analysis of Variance (ANOVA), if the resultsobtained were significantly different, then continued with Duncan's Multiple Test. The results showed that the treatmenthad a very significant effect (P <0.01) on the content of BO, PK and LK as well as KCBK and KCBO. The study concludes that the use of the Ratio at P4: (FMl 6% + Molasses 0%) can produce silage in the very good category of ensilage on elephant grass and corn stalks in terms of green forage preservation with a pH below 4.2 and has good nutritional value with a PK content of around 12% and BO digestibility above 60%.

KEYWORDS: Elephant grass, corn cob, fml, molasses, ensilage

INTRODUCTION

Greens are the main feed for ruminant livestock such as cows and goats, because of their high fiber content and ability to improve livestock digestive health. Elephant grass (Pennisetum purpureum) and corn cob (Zea mays.L) are two types of greens that are popular as livestock feed. Corn cobs are corn plant waste that has the potential as a source of animal feed (Andini, et al., 2023). According to data from the Central Statistics Agency (BPS, 2020), the total nationalcorn production reached 12,928,940.80 tons. Corn cobs contributed around 60%, or 7,757,364.48 tons. The potential for large amounts of corn cobs can be optimally utilized as alternative animal feed, especially during the dry season when the availability of green fodder decreases. Corn cobs generally have a fairly high carbohydrate content of 30–40%which can provide energy for microbes during the fermentation process.

Elephant grass (Pennisetum purpureum) is a forage plant known for its fast growth, high biomass production, andadaptation to various soil conditions (Sarker et al., 2019). One of its superior varieties is Pakchong Elephant grass (Pennisetum purpureum × Pennisetum glaucum). Pakchong grass can grow to more than 3 m in less than 60 days and has a crude protein content of 16-18%, harvested within 45 days after planting (Ahamed et al, 2021) and continues to decrease as the harvest age increases. Liman and Wiajaya, Rwanto, et al. (2022) stated that the crude protein content ofpakchong grass at 40 days of cutting (16%), and decreased at 50 (11%), 60 (10%) and 70 days of cutting (10%).

The main constraints in the provision of green fodder are its perishable nature and limited storage capacity. Thismakes the availability of green fodder very dependent on the planting season, especially in the rainy season when the growth of green fodder reaches its peak. This condition is a major challenge for livestock farmers because the decreasein the availability of green fodder during the dry season can have a significant impact on the decrease in livestock productivity (Mr. Wahyudin, *et al.*, 2023), In addition, the surplus of corn stalks produced during the main harvest is often not utilized optimally, resulting in the loss of great potential as a source of animal feed that should be used efficiently. The strategy to overcome fluctuations in feed availability is

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through the use of feed preservation technologysuch as silage. Silage is a fermented feed made by storing fresh greens in anaerobic conditions (without oxygen). In conditions without oxygen, lactic acid bacteria break down the sugars contained in the green material into lactic acid. This acid functions as a natural preservative by lowering the pH of the silage, thereby preventing the growth of rotting microorganisms and extending the shelf life of the greens.(Wati et al., 2018). This process allows the fermented greensto be stored for months without losing nutritional content.

The silage making process will run more optimally if additives are added during silage, (McDonald *et al.*,2022).The goal is to stimulate the growth of lactic acid bacteria or inhibit the development of harmful bacteria, so that the ensilage process can be accelerated and the quality of the silage can be maintained. One of the additives that can be usedis FML (Fermented Mother Liquor). FML is a liquid resulting from the processing of by-products from the MonosodiumGlutamate (MSG) production process, containing more than 20% crude protein. FML has the potential to be used in making silage, namely by mixing FML around 3-5% into greens such as grass, leaves, or rice straw, the quality of the silage can be improved. The use of FML as a silage additive as is generally done by farmers needs to be further evaluatedso that the potential is a buffer that can inhibit the decrease in pH in the ensilage process, considering this, the use of FML needs to be combined with materials that have a high soluble carbohydrate content such as Molasses.

Molasses is a by-product of sugar cane processing that is rich in water-soluble carbohydrates (WSC), especially sucrose. The use of molasses as an additional ingredient in silage production can increase sugar levels and provide energy for lactic acid bacteria in the ensilage process. (Jasin, 2014). The addition of a soluble carbohydrate source willgreatly assist in providing a source of easily fermented substrate for Lactic Acid Bacteria (McDonaldet al. 2011). However, the optimal ratio between FML and molasses in silage making still requires further study, especially in the use of local raw materials such as elephant grass and corn stalks.

The use of the right ratio between FML and molasses is expected to optimize the fermentation process, produce good quality silage, and improve the nutritional value of the silage produced. This is very important in the context of modern livestock farming, which not only demands efficiency in terms of costs, but also feed quality to increase livestock productivity. Based on this background, this study will focus on the analysis of the effect of the ratio of FMLand molasses on the quality of silage from elephant grass and corn stalks, and explore FML potential as a substitute/ molasses substitute, can be assessed from pH, chemical composition of dry matter, organic matter, crude protein, crudefat, crude fiber, nitrogen-free extract, neutral detergent fiber, acid detergent fiber and gas production and digestibility ofdry matter and digestibility of organic matter can be assessed.

MATERIALS AND METHODS

Field research consisted of silage making, silage pH observation was carried out at the Sumber Sekar Field Laboratory,Faculty of Animal Husbandry, Brawijaya University, Malang. Proximate analysis, digestibility, and in vitro gas production were conducted at the Animal Nutrition and Feed Laboratory at Fapet-UB Malang. The research implementation period was 5 (five) months, from September 18, 2023 - February 23, 2024. The materials used in this study were elephant grass of the Pakchong variety harvested at 70 days old, obtained from the grass garden owned by the Sumbersekar Field Laboratory, Faculty of Animal Husbandry, Brawijaya University. Corn cobs harvested at 80-90days old came from Kepanjen District, Malang Regency. Molasses obtained from the Kebon Agung Malang sugar factory. Fermented Mother Liquor (FML) obtained from PT Ajinomoto in Mojokerto. The tools used in the study were35-liter plastic barrels, digital hanging scales, a mini crane scale with a capacity of ± 100 kg, a Chopper Machine, Horizontal mixer, ATC digital pH meter.

METHODS

The method used in this research is completely Randomized Design (CRD), with 4 treatments and 3 replications on elephant grass and corn stalks in total so that 24 experimental research units were obtained. The treatments were: P1 = corn stalks + additive (FML 0% + 6% Drops), P2: (FML 2% + 4% Drops), P3: (FML 4% + 2% Drops) P4: (FMl 6% +0% Drops) and P1: Elephant Grass + additive (FML 0% + 6% Drops), P2: (FML 2% + 4% Drops), P3 (FML 4% + 2%Drops), P4 (FML 6% + 0% Drops). Data were analyzed using Analysis of Variance (ANOVA), if the results obtained were significantly different, then continued with Duncan's Multiple Test.

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RESULT AND DISCUSSION

Degree of Acidity (pH)

Silage is a product of the fermentation process where its effectiveness is determined by the acidity level achievedduring ensilage (Kung et al., 2018). Analysis of variance showed that the type of forage had a very significant effect (P <0.01) on the pH of silage while the type of additive used and the interaction of the two factors did not significantly (P>0.05) affect the pH of the silage produced. The pH data of silage between treatments tested are presented in Table 3below.

Table 3. Average and standard deviation of silage pH in each combination treatment.

	Treatment	Average pH
	P1	3.37 ± 0.46
T. Corn	P2	3.13 ± 0.01
	P3	3.16 ± 0.01
	P4	3.19 ± 0.01
	Average	3.21 ± 0.11a
	P1	3.63 ± 0.06
R. Elephant	P2	3.60 ± 0.00
	P3	3.70 ± 0.00
	P4	3.73 ± 0.06
	Average	3.67 ± 0.06b

Note: different superscripts in the same column indicate very significant differences (P<0.01)

Table 3 data shows that the pH of corn stalk silage (3.21 ± 0.11) is significantly lower than the pH of elephant grass silage (3.67 ± 0.06) however, Table 3 also shows that the pH of corn stalk silage and elephant grass on various additives tried is less than 4.2 which is the maximum pH for gramineous silage in the very good category (Hidayat., 2014). Based on this study, corn stalk silage and elephant grass produced in this study are included in the very good category and are believed to be able to be stored for a long time. The achievement of silage pH <4.2 obtained in this study is the result of the use of additives consisting of molasses alone or FML alone or a combination of FML and molasses according to the treatment. Ratnakomala et al. (2006) stated that good silage has a pH value of 3.80-4.20 andhas a smooth texture and a distinctive fermented odor, a brownish green color, does not release water and odor when squeezed, and a water content of 60-70%. Noting that the decrease in pH during silage is mainly caused by the formationof lactic acid by lactic acid bacteria that ferment easily soluble carbohydrates. (McDonald et al., 2011), it is assumed that the carbohydrates referred to in this study have been sufficiently provided by the four combinations of additives tested and the green fodder raw materials used in this study.

In general, materials containing high protein provide buffer properties that can inhibit a decrease in pH during ensilage due to the formation of ammonia due to protein fermentation by clostridia (Cherney and Cherney, 2003). However, in this study, the use of FML as much as 6% of the total green material (w/w) was found not to cause a buffereffect that inhibits the decrease in pH during the ensiling process. This is because lactic acid bacteria ferment silage carbohydrates faster and produce lactic acid which lowers the pH at the beginning of ensiling, thereby stopping the activity of clostridia to degrade protein as stated by Kung et al (2018).

Nutritional Quality of Silage

Based on the analysis of variance, it was found that the treatments did not have a significant effect (P>0.05) on the content of BK and fiber components (SK, NDF and ADF) of silage. While the type of forage had a very significanteffect (P<0.01) on the BO and BETN content of silage and a significant effect (P<0.05) on the LK content of the silage.The interaction between the type of forage and the type of additive had a very significant effect (P<0.01) on the BO, PKand LK content. The nutritional content of the resulting silage is presented in Tables 4, 5 and 6.

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Table 4. Nutritional Content of Ensilage Results

Information	Treatment	Nutritional Content (%)							
		BK	BO	PK	SK	LK	BET	NDF	ADF
T. Corn	P1	29.30±3.11	85.70±0.62	8.11±0.44	33.5±3.5	1.7±0.19	50.52±3.69	55.8±1.68	37.4±1.24
	P2	30.11±4.21	86.10±0.33	10.44±0.18	30.3±1.5	1.5±0.16	52.42±1.16	53.5±1.28	38.2±1.20
	P3	28.93±2.94	85.83±0.48	12.34±0.09	30.1±0.1	1.5±0.03	50.09±0.26	52.1±3.04	36.3±1.06
	P4	28.30±1.21	86.10±0.15	12.21±0.51	30.8±0.1	1.4±0.07	50.05±0.70	56.7±2.92	36.1±0.60
R. Elephant	P1	33.02±1.10	83.03±0.07	7.13±1.12	32.0±1.2	1.7±0.09	51.49±1.88	57.5±2.90	38.1±0.83
	P2	27.01±4.86	83.00±1.16	9.32±0.08	30.3±0.0	1.6±0.21	51.06±0.54	56.9±0.98	37.5±0.49
	P3	28.14±1.93	84.07±0.10	11.58±1.15	32.4±4.8	1.9±0.02	46.55±3.72	57.2±1.92	37.3±0.27
	P4	30.11±2.02	83.50±0.18	12.64±0.94	31.1±0.7	1.9±0.07	46.40±2.17	58.9±1.72	38.5±1.20
Total	P1	31.15±2.94	84.37±1.65	7.62a±0.93	32.3±1.3	1.71±0.13	51.01b±2.67	37.8±1.10	56.7±2.84
	P2	28.55±4.40	84.4±2.28	9.88b±0.81	30.3±1.1	1.54±0.17	51.74b±1.10	38.1±0.90	55.3±2.13
	P3	28.53±2.22	84.95±1.16	11.96c±0.84	32.1±3.5	1.73±0.21	48.32±3.05	37.0±0.89	55.1±5.82
	P4	29.21±1.80	84.8±1.48	12.43c±0.72	31.0±0.5	1.68±0.31	48.23±2.46	37.3±1.54	58.4±2.26

Note: Different superscripts in the same column indicate highly significant differences (P<0.01).

Dry Matter Content (DW)

Dry Matter (DM) content is an important parameter that reflects the total nutrients that can be absorbed by livestock from the feed given. Based on the data from Table 4, there is no significant difference in DM content betweendifferent treatments, either in Corn Tebon or Elephant Grass silage. However, numerically, the P2 corn tebon and P1 elephant grass treatments showed the highest treatment compared to other treatments, namely 30.1% and 33.0% and P4corn tebon and P2 elephant grass were the lowest, namely 28.30% and 27.01%. The higher DM content in P2 corn tebonis thought to be due to the ratio used of 2% FML and 4% molasses, where molasses provides sufficient energy sourcesfor fermentative microorganisms such as lactic acid bacteria and microbial populations from FML which create more effective fermentation conditions. This energy source supports rapid lactic acid production and lowers the pH of silage,thereby accelerating the preservation process and minimizing DM loss. This is in line with the findings of McDonald et*al.* (1991) who stated that molasses plays an important role in increasing fermentation activity and maintaining BK levels during the ensilage process.

On the other hand, in P1 which only used 6% molasses without FML, the use of high molasses (6%) likely increased the water content in the silage, which in turn slowed down the fermentation process. The high water content in the silage can create less than ideal conditions for lactic acid bacteria, so that the ensilage process takes place more slowly. According to Surono and Soejono (2006), ensilage can result in the loss of dry matter (DM) and organic matter (OM) of silage when compared to fresh greens. McDonald (1981) explained that during the ensilage process, there willbe a decrease in DM content, this has an impact on the increase in water content caused by the first ensilage process where respiration is still taking place, so that glucose is converted into CO2, H2O and heat. Dry matter content usuallyaffects the quality of silage fermentation and the ideal DM content considered as good silage is above 21% (McDonald*et al.*, 1991). In this study, the DM content of elephant grass and harvested corn stalks was higher than 21 percent indicating that the matter used was included in the good category for silage fermentation. The Dry Matter (DM) contentin P4 corn stalks was recorded as the lowest (28.30% ± 1.21) compared to other treatments.

Organic Matter (OM) Content

Based on the analysis of variance, it shows that the OM content in corn stalks is relatively higher and more consistent compared to elephant grass, with a range of values ranging from 85.70% to 86.10%. The highest was recordedin P2 and P4 for corn stalks, each with a value of 86.10%. The high OM content indicates that corn stalks are able to maintain high organic matter content in the ensilage process. As a feed ingredient, the high OM content indicates the potential energy available to livestock, which is one of the main factors in feed quality. The results of ensilage on elephant grass showed a slightly lower OM content, namely between 83.00% and 84.07%. The highest OM content in elephant grass was recorded in P3 (84.07%), while the lowest was in P2 (83.00%). The decrease in OM content in elephant grass can be caused by a more varied composition of materials or a higher fiber content

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compared to corn stalks, which can affect the effectiveness of fermentation. Other studies have shown that additives such as FML and molasses can increase the organic matter content in silage through more efficient fermentation, because FML contains lactic acid bacteria that function as inoculum and molasses provides an energy source for microorganisms in silage (Lestari., 2020).

Crude Protein Content (CP)

Crude Protein (CP) content listed in Table 4 above shows significant variation (P<0.01) in corn stalks and elephantgrass after the ensilage process. Based on the data, the P3 and P4 treatments on corn stalks produced high CP content, respectively 12.34% ± 0.09 and 12.21% ± 0.51. These results are not much different from the highest CP produced by elephant grass in P4 (12.64% ± 0.94), which uses a combination of 6% FML without molasses. This shows that the useof FML with a high concentration (6%) consistently increases CP content in both corn stalks and elephant grass. The addition of FML in high concentrations is the main factor in increasing CP. FML, which has a very high protein content(35%), contributes significantly to the increase in total CP in silage. In addition, FML also functions as a source of nitrogen that supports the growth of microorganisms in the fermentation process which helps increase the efficiency ofprotein degradation and minimizes nitrogen loss during the ensilage process. Therefore, the high PK content in P3 and P4 corn stalks and P4 elephant grass correlates with the optimization of FML use as an additive. In contrast, in P1 cornstalks (6% molasses without FML), the PK content is lower (8.11% ± 0.44). Although molasses can support fermentationby providing an energy source (Wakano, Nohong, *et al*., 2019), the increase in PK content from molasses is not comparable to the effect provided by FML. This shows that the use of molasses without FML is not enough to significantly increase PK, although the fermentation process is still running well.

Crude Fiber Content (CF)

The data in Table 4 show that the treatments did not significantly affect (P>0.05) the content of SK, LK and BETN. However, numerically, the P1 corn cob treatment showed a high SK content (33.5 ± 3.5%) which could be caused by the use of high concentration molasses (6%) without the addition of FML. Research by McDonald et al. (1991) revealed that molasses tends to increase the availability of energy for microorganisms, but does not directly affectthe degradation of crude fiber. This can be seen in the higher results in P1 compared to the treatment using FML (P2- P4), which has a lower SK content. FML, which is rich in fermentative microorganisms, especially lactic acid bacteria,plays a role in reducing SK through more efficient fermentation. As reported by Kung et al. (2003), additives containingfermentative microorganisms can accelerate fiber breakdown and increase nutrient availability in silage.

Based on table 4, elephant grass shows a more complex pattern. The SK content in P1 and P2 is relatively high (32.0 ± 1.2% and 30.3 ± 0.0%), while in P3 and P4, the SK decreased slightly but remained higher than corn stalks. When compared to the initial SK of elephant grass (30.8%), the increase in SK in P3 and P4 (32.4 ± 4.8% and 31.1 ± 0.7%) indicates that despite the addition of FML, elephant grass crude fiber is more difficult to degrade during the fermentation process. These results are in line with the findings of Van Soest (1994), who stated that the type of plant and the composition of lignin and cellulose in crude fiber can affect the ease of fiber degradation during fermentation. Differences in crude fiber degradation can also be influenced by the physical structure of the forage itself (Guo et al., 2020). The crude fiber in elephant grass has a higher lignin content than corn cobs, making it more difficult to degradenaturally during fermentation.

Crude Fat Content (CFU)

The crude fat (CFL) content in corn and elephant grass silage presented in Table 4 shows the highest P1 treatment, which is 1.7 ± 0.19% and the P2, P3, and P4 treatments are lower, with values of 1.5 ± 0.16%, 1.5 ± 0.03%,and 1.4 ± 0.07% respectively. This decrease is due to the additive factors applied. The addition of molasses to the P1 treatment can increase energy availability but does not necessarily increase CFL content. Research (Zhao, et al., 2020)states that although molasses serves as an energy source, the higher water content of molasses can contribute to less homogeneous mixing reducing the efficiency of lipid conversion to crude fat fraction in silage. In elephant grass, treatments P3 and P4 showed the highest LK content, namely 1.9 ± 0.02% and 1.9 ± 0.07%, respectively. This increaseindicates that the presence of FML additives in higher amounts can contribute to the efficiency of fat breakdown. Research by Wang et al. (2018) supports this finding, showing that increasing the ratio of microorganisms in silage can contribute to increasing LK content.

The use of additives such as FML and molasses can contribute to increased fermentation but do not significantlyincrease the crude fat content. Hynd (2019) stated that fat is one source of energy for microbes, both in making silage and in the rumen. Table 7

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data shows that the crude fat content (CFA) of corn stalks and elephant grass in this study hadan average value of below 5%, however, it is still considered suitable for use as ruminant livestock feed. This finding isin line with the opinion of Haryanto (2012), who stated that in ruminant livestock, the fat content in feed should not exceed 5%, because high-fat levels can affect microbial activity in the rumen which has an impact on reducing the population of fiber-digesting microbes. Kurniati (2016) also added that too high a crude fat content in ruminant livestockfeed can also interfere with the fermentation process of feed ingredients in the rumen.

BETN (Nitrogen-Free Extract Material) Content

Based on the data in Table 4, it can be seen that the highest BETN (Nitrogen-Free Extract Material) content incorn cobs was found in the P2 treatment with a value of 52.42 ± 1.16%. This is thought to be because the molasses ratioused of 4% provides sufficient energy sources so that the fermentation process runs optimally. BETN mainly consists of soluble carbohydrates such as sugar produced from the addition of molasses (Anggorodi, 2005). Molasses is rich in sugar, thus increasing the availability of energy for microorganisms during ensilage(McDonald et al., 2011), which ultimately contributed to better preservation and higher BETN content. However, in treatment P1, although more molasses was given (6%), the BETN content was actually lower, namely 50.52 ± 3.69%. One factor that may have caused this decrease is the high water content in the molasses used, which reduces the concentration of sugar that is actually involved in the fermentation process and causes dilution of the soluble carbohydrate content.

BETN of elephant grass was lower overall compared to corn stalks. The highest BETN content was found in treatment P1 (51.49 ± 1.88%), followed by P2 (51.06 ± 0.54%), P3 and P4 showed lower BETN values, 46.55 ± 3.72%and 46.40 ± 2.17%, respectively. This is thought to be due to the characteristics of elephant grass which has higher crudefiber (Laounglawanet al., 2014)compared to corn stalks, causing fermentation added with FML to focus more on crudefiber degradation than maximizing soluble carbohydrates. In treatments P3 and P4, the combination of FML and molasses actually prioritizes fiber breakdown, so that the BETN content is lower than other treatments which are directlyproportional to the increase in SK in P3 and P4 elephant grass. SK content will affect BETN because SK is related to carbohydrates, carbohydrate components, namely BETN and SK (Sutowo, et al., 2016).

The addition of FML can increase the activity of microorganisms, especially lactic acid bacteria, which play a role in accelerating the fermentation of crude fiber. Lahtinen et al. (2009) stated that lactic acid bacteria can hydrolyze crude fiber components into simpler components, but often soluble carbohydrate components such as BETN are neglected in the process, especially in green fodder with high crude fiber such as elephant grass. This opinion is in linewith (Ogunade et al., 2018) also highlighting that in green fodder silage with high crude fiber such as elephant grass, the fermentation process is often focused on the decomposition of lignocellulose, which requires more microbial energy.This has an impact on the limited degradation of soluble carbohydrate components such as BETN, which ultimately affects the BETN yield in silage.

NDF (Neutral Detergent Fiber) content

The data in Table 4 shows that the highest Neutral Detergent Fiber (NDF) content in corn stalks was found in the P4 treatment at 56.7%, while in elephant grass, the highest NDF content was also recorded in the P4 treatment, which was 58.9%. In general, elephant grass has a higher NDF content than corn stalks in all treatments. This is following the botanical characteristics of elephant grass which has a more complex crude fiber structure and higher lignin than corn stalks (Laounglawan et al., 2014). The higher crude fiber content in elephant grass causes this forage tohave a higher NDF which affects lower digestibility compared to forages with lower fiber content. The use of FML in fermentation helps accelerate the degradation of crude fiber, but cannot completely reduce the high NDF content in elephant grass. Van Soest et al. (1991) explained that NDF represents the plant cell wall which consists of hemicellulose,cellulose and lignin which are relatively difficult to digest, so even though FML improves the fermentation process, elephant grass still shows a high NDF content due to the more complex nature of its fiber.

Molasses provides an energy source in the form of sugar that helps increase microbial activity, especially in corn stalks, can increase fermentation activity by providing a fast fermentation substrate for microbes (Zhou et al., 2019), However, in elephant grass the addition of molasses is not enough to significantly reduce NDF due to the limitations of microbes in breaking down more complex crude fibers. Kung et al. (2018) also explained that effective fermentation depends on the combination of additives and forage characteristics. FML and molasses help accelerate thefermentation of soluble carbohydrates, but in elephant grass with higher fiber, the decrease in NDF cannot occur significantly.

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ADF (Acid Detergent Fiber) Content

Acid Detergent Fiber(ADF) is an indicator of crude fiber content, especially lignin and cellulose, which are difficult for livestock to digest (Van Soest, 1994). High ADF content is often associated with decreased digestibility and nutritional quality of green fodder (Nurkhasanah et al., 2020). Corn cob ensilage data in Table 5 shows that the highestADF content is in P2 (38.2%), while the lowest value is in P4 (36.1%). The use of Fermented Mother Liquor (FML) inP4 without the addition of molasses has a better effect in reducing ADF. FML contains enzymes that can facilitate the degradation of crude fiber components, especially cellulose, which is dominant in ADF (Zhao et al., 2019). This is following Sun's research *et al*. (2016) who found that the use of enzyme-based additives can accelerate the decomposition of plant fibers through lignocellulose hydrolysis. The ADF value in elephant grass is relatively higher than in corn stalks. The highest ADF content in P4 reached 38.5%, indicating that although FML has a good effect on the fermentation process, the more complex structure of elephant grass fibers and its high lignin content (Laounglawanet al., 2014) can inhibit further degradation. According to Cherney et al. (1990), forages with high lignin content such as elephant grass are more difficult to degrade even though silage fermentation is running optimally.

Loss of Dry Matter, Organic Matter and Crude Protein

Based on the results of the analysis, the additives have a very significant effect (p>0.01) on BK and PK, but theadditives have no effect (P>0.01) on BO. The nutritional depletion table is presented in the table below.

Table 5. Loss of BK, BO and PK

Information	Lost (%)			
	Treatment	BK	BO	PK
Corn cob	P1	5.7±0.10	-0.20±2.08	1.9±0.20
	P2	5.3±0.10	-0.60±0.10	0.8±0.20
	P3	5.4±1.30	-0.30±2.25	3.2±0.20
	P4	5.13±0.06	-0.60±0.10	2.2±0.26
	Average	5.38±0.26	-0.43±1.32	2.03±0.91
Elephant grass	P1	5.58±0.08	2.07±0.64	1.60±0.30
	P2	4.6±0.20	2.50±0.40	0.43±0.15
	P3	4.8±-.17	1.10±0.10	3.10±0.20
	P4	5.4±0.10	1.60±0.10	3.30±0.30
	Average	5.10±0.44	1.82±0.64	2.11±1.24
Total	P1	5.64b±0.10	0.93±1.85	1.75b±0.28
	P2	4.95a±-.41	0.95±1.72	0.62a±0.26
	P3	5.10a±0.39	0.40±1.62	3.15c±0.19
	P4	5.27a±0.16	0.50±1.21	2.75c±0.65
	Average	5.24±0.38	0.70±1.53	2.07±0.35

Note: Different superscripts in the same column indicate highly significant differences (P<0.01).

The data in Table 5 shows that quantitatively the dry matter (DM) of the ensilaged material decreased in almostall treatments, both in corn stalks and elephant grass. The decrease in the DM value in both types of materials indicatesan active fermentation process in which microorganisms utilize most of the substrate as an energy source, causing the degradation of nutrient components. This fermentation process generally involves the conversion of carbohydrates intoend products such as lactic acid, CO_2 and other organic acids, which contribute to the decrease in DM. The data in Table5 shows that in the P1 treatment, there was a decrease in DM in corn stalks reaching -17.40%, which indicates that fermentation relies more on the natural conditions of the substrate and the P4 treatment recorded a lower decrease of - 15.01%. This can be interpreted that the addition of FML at this level contributes to maintaining DM content during theensilage process. According to Kung and Shaver (2001), the addition of additives in the ensilage process can reduce therate of decomposition of feed materials, especially dry matter, by inhibiting the activity of decomposing microbes. Thelowest decrease in dry matter (DM) content of elephant grass occurred in the P4 treatment, which was -14.47%. The decrease was associated with the characteristics of higher fiber in elephant grass, so it tends to be difficult to decomposeduring the fermentation process. According to Laounglawan et al. (2014), the high crude fiber structure in elephant grassprovides resistance to total DM degradation, even with the addition of FML. This is in line with research conducted byKurniati (2016), which states that feed materials with high crude fiber content have a slower fermentation rate comparedto feed materials with lower fiber. This slow fermentation process has an impact on causing DM stability during silagestorage, because the nutritional components are more protected from decomposition by microorganisms. Furthermore, the findings by Yuvita et al. (2019) also support this finding, where microbial activity in silage fermentation plays a role in breaking down feed components. However, in elephant grass which has high crude fiber, this activity is inhibited, thus affecting the rate of BK reduction.

Loss of BO (Organic Matter)

Based on the data in Table 5, the shrinkage of organic matter (OM) in corn stalks showed the lowest value in the P4 treatment, which was -15.36%. This decrease indicates that although the addition of FML contributed to maintaining the Dry Matter (DM) content, there was significant degradation of organic components during the fermentation process. This reflects that OM is part of DM, and a decrease in OM will directly contribute to a decrease in DM value. In the P1 treatment, the OM shrinkage value reached -17.32%, higher than P4. Without the addition of FML, fermentation relies more on the natural conditions of the substrate, leading to further degradation of OM, which has the potential to reduce the overall DM value. Research by Rukmana et al. (2020) explains that the use of additives such as FML and molasses can increase the activity of fermentative microbes in silage which helps maintain OM levelsand ultimately contributes to the stability of DM values.

According to Prastowo et al. (2018), the addition of molasses in the ensilage process can increase the retentionof organic components by optimizing the growth of beneficial microbes and increasing the fermentation rate so that theaddition of molasses contributes to maintaining higher BO, which in turn supports more optimal BK values. Handoko et al. (2019) stated that the addition of molasses can increase the levels of fat and carbohydrates in silage, which overallcontributes to improving feed quality.

Loss of PK (Crude Protein)

The results showed that the reduction in Crude Protein (CP) in corn stalk silage and elephant grass varied based on the treatment given. In corn stalk silage, treatment P1 recorded a CP reduction of -12.04%. Although using molassesas an additive, these results indicate that this treatment is not optimal in maintaining CP quality. The availability of molasses that is not balanced with FML may not be effective enough in suppressing protein degradation, which is usuallycaused by the activity of decomposing microorganisms. The addition of Fermented Mother Liquor (FML) in treatmentsP2, P3 and P4 showed an increase in the stability of Crude Protein (CP), with a reduction of +7.03%, +15.69% and +10.31%. This indicates that the use of FML of 4 to 6% can maintain and even increase the CP of silage raw materialsquantitatively. This is in line with the observation results that qualitatively there is an increase in the CP content of silagewith the use of FML of 4 to 6% as stated in Sub-Chapter 5.3.3. The addition of FML at this level has the potential to increase lactic acid production, which functions to suppress the growth of harmful microbes. Research by Kurniati et al.(2019) shows that the use of additives containing lactic acid can increase protein availability by suppressing the activityof decomposing microbes. The increase in crude protein also occurs from the formation of protein from bacterial residues (free N) and residual VFA compounds that lose O, N and H ions during the fermentation process (Sariri and Sukaryani, 2021).

In vitro digestibility

Table 6. In-vitro digestibility values of BK and BO from corn and elephant grass silage with various additives.

Type of Greens (A)	Types of additives (B)	Digestibility	
		BK	BO
Corn cob	P1	59.82a± 2.21	63.24c ± 5.33
	P2	63.94b ± 9.43	66.83e ± 0.43
	P3	65.88b ± 1.36	67.91f ± 2.35
	P4	63.23ab ± 1.29	64.47d ± 1.84

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Average		**63.2 ± 2.53**	**65.6B ± 2.14**
	P1	57.82a ± 0.66	60.50a ± 0.80
Elephant Grass	P2	64.04b ± 2.04	66.87e ± 1.80
	P3	60.96ab ± 1.16	62.95b ± 3.20
	P4	60.65ab ± 1.03	64.85d ± 1.39
Average		**60.9 ± 2.54**	**63.8A ± 2.72**
$\bar{x}$ P1		58.8 ± 1.41	61.91 ± 1.94
$\bar{x}$ P2		64.0 ± 0.07	66.93 ± 0.03
$\bar{x}$ P3		63.4 ± 3.48	65.43 ± 3.51
$\bar{x}$ P4		61.9 ± 1.82	64.72 ± 0.27
Signification	A	Ns	*
	B	ns	**
	A x B	**	**

Description: ns (Not Significant) * Significantly different (P<0.05) ** Very significantly different (P< 0.01) af differentsuperscripts in the same column indicate differences (P<0.01) 1-3 different superscripts in the same column indicate differences (P<0.05) AB different superscripts in the same column indicate differences (P<0.01)

The data presented in Table 6 shows that all silages produced have good dry matter (DM) and organic matter (OM) digestibility, with an OM digestibility value of more than 60%. This is in line with the research of Jancik et al. (2011), which states that a digestibility value above 60% indicates that silage can function as good green fodder. The results of the analysis show that the digestibility of DM and OM for silage with additive P1 is always lower than that ofsilage using additives P2, P3, and P4. This shows that the addition of FML as an additive in the corn and elephant grassensilage process can increase the digestibility of DM and OM. The P3 treatment produced silage with the highest OM digestibility. Research by Kurniati et al. (2019) shows that the use of additives containing lactic acid can increase the stability and digestibility of protein, contributing to increased OM digestibility. Meanwhile, the use of P4 additive showed high BO digestibility but slightly lower than P3, indicating that even though more FML was added, reducing molasses could affect the final result.

Gas Production

Gas production data from the tested silage are presented in Table 7. Analysis of variance on gas production data shows that the type of forage, type of additive and the interaction between the two have no significant effect (P>0.05) on total gas production or the rate of gas formation. The interaction between the type of forage and type of additive hasa very significant effect (P<0.01) on the potential for gas production.

Table 7. Silage Gas Production Parameters between treatments

Type of Greens (A)	Types of additives (B)	Gas Production Parameters (ml/500 mg DK)		
		Total Gas	Gas potential	c value (ml/h)
	P1	98.1 ± 11.4	107.9bc ± 1.31	0.03 ± 0.01
Corn cob	P2	99.4 ± 14.0	118.6d ± 2.34	0.03 ± 0.01
	P3	99.8 ± 4.9	101.8c ± 4.8	0.03 ± 0.01
	P4	99.1 ± 3.2	103.4bc ± 1.5	0.04 ± 0.01
Average		99.1 ± 0.72	107.8B ± 7.56	0.04 ± 0.01
	P1	92.7 ± 6.0	91.4a ± 5.6	0.03 ± 0.0
Elephant Grass	P2	104.7 ± 9.9	107.3c ± 6.7	0.03 ± 0.0
	P3	83.7 ± 1.0	87.2a ± 0.24	0.04 ± 0.01

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	P4	94.4 ± 0.7	93.2b ± 3.2	0.04 ± 0.02
Average		92.4 ± 9.37	94.8A ± 8.64	0.04 ± 0.00
$\bar{x}$ P1		92.4 ± 8.01	99.41 ± 11.38	0.03± 0.00
$\bar{x}$ P2		102.1 ± 3.78	112.93 ± 7.98	0.03 ± 0.00
$\bar{x}$ P3		91.7 ± 11.33	94.71 ± 10.15	0.04 ± 0.01
$\bar{x}$ P4		96.7 ± 3.33	98.32 ± 7.17	0.04 ± 0.00
ification	A	ns	**	ns
	B	ns	*	ns
	A x B	ns	**	ns

Description: ns (Not Significant) * Significantly different (P<0.05) ** Very significantly different (P< 0.01) ad different superscripts in the same column indicate differences (P<0.01) 1-3 different superscripts in the same column indicate differences (P<0.05) AB different superscripts in the same column indicate differences (P<0.01)

The data in Table 7 show that although there was variation in gas production potential between the silages produced, the total gas production from all treatments remained relatively similar after 48 hours of incubation. This indicates that the composition and interaction between the types of forage and the types of additives used did not have a significant effect on the fermentation ability in the rumen. The limited effect of this treatment may be due to the similarity in the nutrient composition and structure of the silages tested, which has implications for the rate and quantity of organic matter (OM) degradation in the rumen. This indicates that the crude protein (CP) in the silage did not undergosignificant fermentation in the rumen, but was rather digested in the post-rumen digestive tract. This process can contribute to the formation of amino acids that are important for animal metabolism.

According to McDonald et al. (2002), the presence of more easily digested protein in the post-rumen digestivetract, often referred to as "by-pass protein," can increase the efficiency of feed use, because the amino acids produced can be directly used for protein synthesis in the animal's body. These results are in line with studies showing that the addition of additives such as Fermented Mother Liquor (FML) can improve silage quality, thereby increasing protein digestibility in the post-rumen section (Rahmadani et al., 2021). This shows that although total gas production does notshow a significant increase, the nutritional quality of silage can be improved, increasing the potential for silage use as amore efficient feed.

CONCLUSION

Based on the research results, it can be concluded that the use of an FML additive ratio of up to 6% (P4) of theweight of corn stalk or elephant grass forage can produce silage in a very good category in terms of forage preservationwith a pH below 4.2 and has good nutritional value with a PK content of around 12% and BO digestibility above 60%.

REFERENCES

1. Ahamed, S., MRH Rakib and MA Jalil, 2021. Forage growth, biomass yield and nutrient content of two different hybrid Napier cultivars grown in Bangladesh. Bangladesh J. Anim. Sci., 50(1): 43-49. DOI: 10.3329/bjas.v50i1- 2.56355.
2. Andini, R., Mubarakati, NJ, Zayadi, H., and Retnowulan, D. (2023). Analysis of spermatozoa quality of productive-age male goats (Capra aegagrus hircus) after being given corn stalk silage. Journal of Comprehensive Science (JCS),2(1), 422-429.
3. Anggorodi, R. 1995. Nutrition of various poultry livestock. PT. Gramedia Pustaka Utama, Jakarta.
4. Azizah, NH, Ayuningsih, B., & Susilawati, I. (2020). The Effect of Fermented Bran Usage on Dry Matter and Organic Matter Content of Elephant Grass (Pennisetum Purpureum) Silage. Journal of Animal Resources, 1(1), 9- 13. Doi:http:/doi.org/10.24198/jsdh.v1i1.31391
5. Central Statistics Agency (BPS)https://www.bps.go.id/id/statistics-table/2/MjIwNCMy/lebar-panen--produk--dan-produktif-jagung-menrut-provinsi.htmlaccessed on September 20, 2024
6. Cherney and Cherney, 2003. Assessing silage quality. Silage Science and Technology. Agronomy Monograph No. 42, American Society of Agronomy, Madison, WI (2003), pp. 141 - 198
7. Dhalika T., Atun B, and AR Tarmidi. 2021. The effect of adding molasses to the ensilage process on the quality ofsweet potato straw silage (Ipomoea batatas). Journal of Animal Science. 21(1):33-39.

8. Handoko, P., Rahman, I., and Yuniar, R. (2019). Analysis of organic matter in silage and its effect on ruminant productivity. Journal of Animal Science, 10(2), 85-92.doi:10.15408/jit.v10i2.11212.
9. Haryanto, B., Purwanto, E., and Widodo, S. 2016. Utilization of molasses and additives in silage making. IndonesianJournal of Agricultural Science. Doi:10.1007/s13197-015-1936-3
10. Jancik, J., Kral, V., and Malek, J. (2011). The quality of silage is a factor influencing rumen function. Acta Veterinaria Brno, 80(1), 43-50.
11. Jasin, I. 2014. The effect of adding molasses and lactic acid bacteria isolates from the rumen fluid of Po cattle onthe quality of elephant grass (Pennisetum purpureum) silage. Agripet. 14(1), 50- 55.https://doi.org/10.3923/pjn.2020.166.171
12. Jasin. I. and Sugiyono., 2014. The Effect of Cassava Meal and Lactic Acid Bacteria Isolated from Rumen Fluid of PO Cattle on the Quality of Napier Grass Silage. Indonesian Animal Husbandry Journal. Vol. 16(2): 96-103.
13. Keles, A. F., and Demirci, M. (2011). "Effects of molasses and inoculants on fermentation quality and nutritive value of silage." Turkish Journal of Veterinary and Animal Sciences, 35(1), 37-43.DOI: 10.3906/vet-1004-18.
14. Kung Jr, L., Shaver, R.D., Grant, R.J., and Schmidt, R.J. (2018). Silage review: Interpretation of chemical, microbial, and organoleptic components of silages. Journal of Dairy Science, Vol. 101(5), 4020-4033.DOI: 10.3168/jds.2017-13909.
15. Kurniati, D., Santoso, U., and Haryanto, B. (2019). Effect of temperature and pH on fungal growth in silage feed. Journal of Feed Technology, 14(2), 110-117.
16. Liman, Wijaya, A, K, Erwanto, Muhtarudin, Septianingsih, C, Asidiq, T, Nur, T and Adhianto, K. 2022. Productivityand quality of pakchong-1 hybrid grass (Pennisetum purpureum × Pennisetum americanum) at different harvestingages and fertilizer levels. Pakistan Journal of Biological Sciences. 25 (5): 426-432.DOI: 10.3923/pjbs.2022.426.432
17. Lestari, T., et al. (2020). The Effect of Molasses Addition on the Quality of Corn Silage. Journal of Animal Husbandry, 10(3), 123-130.
18. Lounglawan, P., Lounglawan, W., and Suksombat, W. (2014). Effect of cutting interval and cutting height on yieldand chemical composition of King Napier grass (Pennisetum purpureum x Pennisetum americanum). APCBEE procedia, 8, 27-31.
19. McDonald P, Henderson AR, Heron SJE. 2002. The Biochemistry of Silage. Second Edition, Marlow:
20. McDonald, P. 1981. Biochemistry of Silage. John Willey and Sons, Chichester. New York.
21. McDonald, P., Edwards R., Greenhalgh J., Morgan C., Sinclair L. and Wilkinson R. 2011. Animal Nutrition. Prentice Hall. New York, USA.
22. McDonald, P., Edwards R.., Greenhalgh J., Morgan C., L. Sinclair, and R. Wilkinson. 2022. Animal Nutrition, 8thEdn. Pearson Ltd. Singapore.
23. McDonald, P., Henderson, A. R., and Heron, S. J. (1991). The Biochemistry of Silage (2nd Edition). Chalcombe Publications.
24. Newbold, C. J. (1999). The role of microbial proteins in ruminant nutrition. Animal Feed Science and Technology,82(1-2), 163-186.
25. Nurkhasanah, I., Nuswantara, LK, Christiyanto, M., & Pangestu, E. (2020). Digestibility of neutral detergent fiber (NDF), acid detergent fiber (ADF) and hemicellulose of forage in vitro. Central Java Provincial Research and Development Journal, 18(1), 55-63.
26. Ogunade, IM, Kim, D.H., Jiang, Y., Weinberg, ZG, Jeong, KC and Adesogan, AT 2016. Control of Escherichia coliO157:H7 in contaminated alfalfa silage: Effects of silage additives. Journal of Dairy Science Vol. 99(6): 4427– 4436. http://dx.doi.org/10.3168/jds.2015-10766
27. Pratiwi, AS, (2019). Effectiveness of Fermentation-Based Additives in Improving the Quality of Elephant Grass Silage. Journal of Nutrition and Feed Science, 15(2), 89-95.
28. Prastowo, B., Widiastuti, U., and Hardiyanto, E. (2018). The role of additives in improving silage quality. Indonesian Journal of Animal Science, 14(2), 109-117.doi:10.24198/jasi.v14i2.121.
29. Rahmadani, M., Hermana, W., & Nahrowi, N. (2021). Administration of cassava flour added with isoamylase in feed on broiler chicken performance. Journal of Nutrition Science and Feed Technology, 19(1), 1-5.
30. Raguati, R., D. Darlis, A. Azalani, Z. Ningsih, F. Hoesni and E. Musnandar. 2022. Effect of ensiling time and EM4bioactivator levels on physical quality and HCN content of cassava skin silage (Manihot utilissima pohl). JIUBJ. 22(1): 510-516.

31. Rukmana, D., Nurjanah, E., and Nugraha, R. (2020). The Effect of Various Fermented Solutions on the Quality ofCorn Silage. Indonesian Journal of Animal Husbandry, 22(1), 1-10.doi:10.21776/ub.jpi.2020.022.1.1.
32. Sariri, A., and Sukaryani, S. (2021). Fermentation of animal feed: theory and application. Journal of Animal and Veterinary Science, 26(1), 67-75.
33. Sarker NR, Habib MA, Yeasmin D, Tabassum F and Mohammed RA 2016 Studies on biomass yield, morphological characteristics and nutritive quality of Napier cultivars under two different geo-topographic conditions of Bangladesh. American Journal of Plant Sciences, 12, 914-925.
34. Sun, S., Sun, X. Cao, R. and Sun. 2016. The role of pretreatment in improving the enzymatic hydrolysis of lignocellulosic materials, Bioresour. Technol. 199 49–58, https://doi.org/10.1016/j.biortech.2015.08.061.
35. Surono., M. Soejono and SPS Budhi. 2006. Loss of dry matter and organic matter of elephant grass silage at differentcutting ages and additive levels. J.Indon.Anim.Agric. Vol. 31(1): 62-68
36. Sutowo, IT, Adelina, and D. Febrina. 2016. Nutritional quality of banana waste silage (stems and tubers) and different levels of molasses as an alternative feed for ruminant livestock. Journal of Animal Husbandry. 12 (2) : 41-47.
37. Van Soest, P.J., Robertson, J.B., and Lewis, B.A. (1991). Methods for dietary fiber, neutral detergent fiber, and nonstarch polysaccharides in relation to animal nutrition. Journal of Dairy Science. Vol. 74(10), 3583-3597.DOI: 10.3168/jds.S0022-0302(91)78551-2.
38. Wahyudin, Solehudin, Nurlaeni, L., Nabila, TI, Mansyur, and Setiyawan, H. (2023). Corn straw processing for animal feed. Journal of Tropical Animal Nutrition and Feed Science, 5(1), 33–39.
39. Wakano, F., Nohong, B., & Rinduwati, R. (2019). Effect of Molasses and Sugar Supplementation on pH and Elephant Grass Silage Production (Pennisetum purpureun sp). Animal Nutrition and Feed Bulletin, 13(1).
40. Wang, Y., Wang, C., Zhou, W., Yang, FY, Chen, XY, and Zhang, Q. 2018. The effect of wilt and lactobacillus plansto increase the quality of fermentation and microbial communities of moringa leaf oleiferalase . Front. Microbiol. 9:1817.
41. Wati, WS, Mashudi, and A. Isyammawati. 2018. Silage quality of odot grass (Pennisetum *purpureum cv. Mott*) with the addition of Lactobacillus plantarum and molasses at different incubation times. Journal of Tropical Animal Nutrition. 1(1): 45-53. https://doi.org/10.21776/ub.jnt.2018.001.01.6
42. Yuvita, E., Hartini, S., and Kristanti, R. (2019). "Microbial activity in the fermentation of silage." Journal of AnimalHusbandry, 5(1), 45-52.DOI: 10.31539/jah.v5i1.784.
43. Zhao, H., Xu, Z., Liu, Z., and Zhang, H. (2020). Effects of different enzymes on fermentation quality and nutrient digestibility of whole-plant corn silage. Journal of Animal Science and Technology, 62(1), 34.DOI:10.1186/s40781-020-00253-2
44. Zhou, Y., Zhao, X., Meng, Q., and Xue, B. (2019). Effects of bacterial inoculants and molasses on the fermentationquality, nutrient composition, and in vitro digestibility of foraged oat silage. Grassland Science. Vol.65(4), 234-242. DOI: 10.1111/grs.12255.

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