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# The Effect of Providing Gamal Leaf Silage (Gliricidia Sepium) on Consumption, Weight Gain and Ransum Convertion of Local Male Goats Derived from Ettawa Crossbreeds

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**ABSTRACT**

***Objective:*** *This study aimed to evaluate the effect of gamal (Gliricidia sepium) leaf silage on the growth performance of local male goats. The research focused on key growth parameters, including daily feed consumption, daily body weight gain (PBBH), feed conversion, and feed efficiency.* ***Method:*** *The experiment was conducted using a randomized block design (RAK) with four treatments and four replications. The treatments included (P0) control with elephant grass without gamal leaves, (P1) 20% gamal leaf silage and 80% elephant grass, (P2) 50% gamal leaf silage and 50% elephant grass, and (P3) 100% gamal leaf silage. The goats were monitored over four weeks to assess their growth response to different feeding compositions.* ***Results:*** *The findings revealed a significant effect of gamal leaf silage on the growth performance of local male goats. The inclusion of gamal leaf silage improved daily body weight gain, feed conversion, and feed efficiency. Higher proportions of gamal leaf silage in the diet resulted in better growth performance compared to the control group.* ***Novelty:*** *This study highlights the potential of gamal leaf silage as an alternative, cost-effective feed source for ruminants. The results contribute to the understanding of utilizing non-conventional feed ingredients to reduce feed costs while maintaining livestock productivity.*

## INTRODUCTION

Goat is animal domestication the oldest who has socialize with man more from 1000 years. Goat classified as chewer breed, hoofed even and have pair curved horns. Goat is animal mountains life on steep slopes that have characteristic sufficient adaptation Good to change season [1].

Cost feed used in maintenance goat moment This the more tall so that need effort For look for alternative source material other feeds so that they can press cost production. One of them that is with utilise material Cheap non - conventional feed, quality good and easy found around the farm area as well as No compete with need man.

Gamal is one of the alternative fulfillment feed goat that can made into alternative. Gamal is plant legumes that can grow with fast in the area tropical. Plants gamal own a number of superiority that is method its planting easy, have Power sufficient adaptation good and still still produce although season drought so that can available almost throughout season and have high protein content. However utilization gamal as material feed cattle still must be noticed Because weakness plant This that is own low palatability consequence its specific smell so that not enough liked by livestock. Specific odor This originate from coumarin compounds which are anti - nutrients that cause smell stinging

and bitter taste in rations. One of the method alternatives that can used For remove anti - nutrients the that is with method made silage [2].

Providing gamal leaf silage (Gliricidia sepium) as feed for male local goats of Peranakan Ettawa descent has a significant effect on consumption, weight gain, and feed conversion. Silage is a method of preserving green fodder that can increase feed availability during the dry season, which is often a challenge for goat farmers in Indonesia [3]. Research shows that silage made from gamal leaves can improve feed quality with high protein content, so it can contribute to the growth and health of goats [3], [4].

Feed consumption of goats given gamal leaf silage also showed a significant increase. In a study conducted by Langgajanji et al., it was found that mixed silage of sorghum and gamal leaves could increase feed consumption of female local goats [5]. This shows that gamal leaf silage can be an effective alternative feed, especially in increasing the nutritional intake of goats. In addition, research by Jarmuji et al. also confirmed that the use of well-formulated feed can increase dry matter consumption and feed efficiency [6].

The weight gain of goats fed gamal leaf silage also showed positive results. In a study by Muhammad et al., it was found that the use of alternative feed ingredients such as date seed flour in a concentrate mixture can increase the daily weight gain of Etawah crossbreed goats [7]. This is in line with the finding that gamal leaf silage, which is rich in protein, can increase goat growth, especially in the early growth phase [4]. Another study by Fahik and Tahuk showed that different forage-based silages can affect goat metabolism and growth, indicating the importance of choosing the right feed ingredients [8].

Feed conversion, which is the ratio between body weight gained and the amount of feed consumed, can also be affected by the provision of gamal leaf silage. Research by Harmoko and Padang showed that the performance of goats fed fermented feed had better feed utilization efficiency [9]. In other words, gamal leaf silage can increase feed conversion efficiency, which means that goats can utilize feed better for growth and production. Research by Naitili et al. also showed that forage-based silage can contribute to the linear growth of the goat's body, which is directly related to efficient feed conversion [10].

In the context of providing gamal leaf silage, it is important to consider other factors that can affect the results. For example, the quality of the silage produced is highly dependent on the fermentation process and the raw materials used. Research by Sofía et al. showed that the addition of carbohydrates in the fermentation process can improve silage quality [11]. Therefore, choosing the right ingredients and good fermentation techniques are very important to produce high-quality silage.

Overall, the provision of gamal leaf silage has great potential to increase consumption, weight gain, and feed conversion of local male goats of Peranakan Ettawa descent. By utilizing silage as feed, farmers can increase the productivity of their goats,

especially in facing the challenges of the dry season. Further research is needed to explore various feed formulations and silage processing techniques that can further improve the results obtained.

## RESEARCH METHOD

Study This conducted on October 1 – October 31, 2023 in Gampong Sukadamai Saree, Lembah Seulawah District, Aceh Besar. The research This use material as following : leaves 50 kg of fresh gamal, 1 liter of solution molasses, 1 ½ bottle of EM4, 2 liters of water and bran as much as 3 kg. Equipment used that is goats, scales, drums /plastic silos, watering cans, buckets, cages individual and place drinking. Research methods This use experiment with Randomized Block Design (RBD) consisting of from 4 treatments with 4 repetitions. On treatment study this is what is used namely P0 = without silage leaf gamal, P1= 20% silage leaf gamal, P2= 50% silage leaf gamal, P3= 100% silage leaf gamal.

**1. Preparation goat study**

Goats used in study This is goat local male descendants of the Etawa crossbreed whose average age is 2 years with an average weight of 15 kg, the goats used in study This as many as 16 tails.

**2. Making silage leaf gamal**

Step by step making silage that is First prepare tools and materials used, Then withered leaf gamal until water content ± 60-70%, then count leaf gamal with manual way or Can using a chopper, place it feed that has been cut into pieces on the floor covered with a tarpaulin, then mix 3 kg of bran with leaf gamal who has cut, dissolve 1 ½ closed bottle of EM4 into 2 liters of water, add 1 liter molasses stir until solution mixed secata evenly, pour it on mixture solution mentioned in the feed in a way evenly, stir ingredients mentioned until mixed well, after That material feed the entered in silos or drums and compacted so that No There is cavity air, after material feed that has been entered all given sheet plastic and covered meeting and ready saved.

**3. Observed parameters**

Parameters measured in study This is as following :

- **Consumption feed daily (gr)**

  *Feed given (gr/ head / day ) – Remaining feed (gr/ head / day )*

- **Growth daily body weight (DBM)**

$$PBBH=\frac{berat\ badan\ akhir\ (gr/ekor/hari)-berat\ badan\ awal(gr/ekor/hari)}{lama\ pemeliharaan}$$

- **Calculate feed conversion using the formula :**

$$\frac{konsumsi\ pakan\ (gr/ekor/hari)}{PBBH\ (gr/ekor/hari)}$$

**4. Data analysis**

Study This use Randomized Complete Block Design (RBD) with 4 treatments and 4 replications each group repeated as many as 4 repetitions. Consumption data feed, growth weight and convention feed obtained analyzed with ANOVA, if there is difference, then further testing was carried out using the further test of Real Difference Smallest (BNT).

## RESULTS AND DISCUSSION

### A. Average consumption feed

Based on results analysis variance, average consumption feed the goat that gets treatment composition silage leaf different gamal as shown in table 1 below :

**Table 1**. Average consumption feed.

| Treatment | Average consumption feed (gr/ head / hr ) | | | | |
|---|---|---|---|---|---|
| | Week I | Week II | Week III | Week IV | Average |
| P0 | 2360 [d] | 2265 | 2245 | 2498 | 2342 |
| P1 | 1928 [b] | 2085 | 2123 | 2123 | 2057 |
| P2 | 2218 [c] | 2168 | 2170 | 2245 | 2200 |
| P3 | 1398 [a] | 1940 | 2068 | 2190 | 1899 |
| **Total** | **7903** | **8458** | **8573** | **9055** | **8498** |

Caption: Analysis results variance shows, subscripts in the same column show very significant effect (P<0.01).

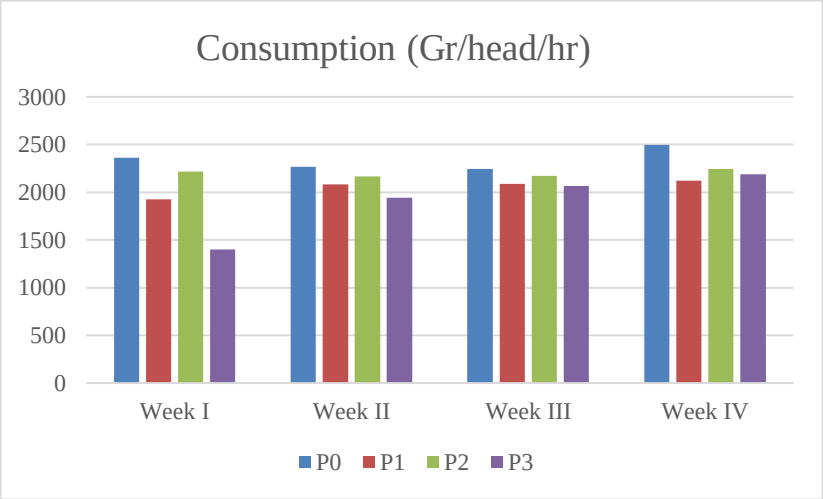


**Figure 1.** Average consumption graph feed goat gr/ head / day.

Analysis results variance in treatment consumption feed goat week I shows very significant effect (P<0.01) between treatment that is, P0 is different with P1, P2 and P3.

Likewise with P1 treatment is different with P2 and P3. Difference This influenced by the amount consumption feed in each group.

Analysis results consumption diversity fingerprint feed goat weeks II, III and IV no show real influence between treatment (P>0.05) namely P0 does not different with P1, P2 and P3 and between neither did treatments P1, P2 and P3 show significant difference (P>0.05). This means goats consuming silage (PI, P2 and P3) no different with group goats consuming fresh grass (P0). Condition This show group the goat that got P1, P2 and P3 feeds have been capable adapt with feed silage given.

In weeks I, II, III and IV consume feed in groups the goat that gets P3 treatment shows consumption the lowest feed compared to the group the goat that gets treatment P 0, P1 and P2. Conditions This influenced by attitude selective goat in choose feed. Low consumption feed in groups goats consuming ration P3 treatment starts from week I to Sunday to IV due to Because change giving previous feed goat consumption fresh grass replaced with ration P3 research, so that impact on the number of consumption low feed.

In general quantitative average consumption amount feed the goat that got P3 feed in week I 1,938 gr/ day, week II 1,940 gr/ day, week III 2,068 gr/ day, week IV 2,190 gr/ day show existence improvement amount consumption feed. Improvement amount consumption the influenced by the increase palatability goat to P3 feed. Palatability is level the preferences shown by livestock For consume a material the feed given in period certain [12]. In the group the goat that gets P0 treatment shows consumption highest feed compared to with group the goat that gets treatments P1, P2 and P3. His height consumption feed goats that get P0 are caused Because goat basically consume fresh greens that are palatable more tall compared to with silage.

In the treatment consumption feed goat Sunday II, III and IV already show existence improvement consumption, with thus goat Already adaptable with feed the.

**B. Increase weight**

Based on results analysis variance, average increase the weight the goat is gaining treatment composition silage leaf different gamal as shown in table 2 below :

**Table 2**. Average increase weight.

| Treatment | Average Goat Weight (gr/ head / hr ) | | | |
|---|---|---|---|---|
| | **Week I** | **Week II** | **Week III** | **Week IV Average** |
| P0 | 32.14 | 29.57 | 28.57 | 53.57 $^{b}$ 22.57 |
| P1 | 35.71 | 53.57 | 42.86 | 46.43 $^{a}$ 33.04 |
| P2 | 35.71 | 39.29 | 39.29 | 53.57 $^{b}$ 28.57 |
| P3 | 39.29 | 25.00 | 42.86 | 53.57 $^{b}$ 26.79 |
| **Total** | **142.85** | **147.43** | **153.58** | **207.14 110.97** |

Caption: Analysis results variance shows, subscripts in the same column show very significant effect (P<0.01).

Based on results analysis variance in observation increase goat weight weeks I, II and III no show influence real (P>0.05) between treatment. Meanwhile, in week IV, there was an increase the weight the goat is gaining P1 treatment shows decline weight compared with group the goat that gets treatments P0, P2 and P3. As for the goat that gets it treatments P0, P2 and P3 show increase relative weight same. This is show that results analysis variance in observation increase goat weight Sunday to IV shows influence significant (P<0.01) between treatment. According to Zurriyati [13] stated that, there is Addition Daily Body Weight (DWB) at almost the age of same in livestock goat because of diversity individual (variation) genetics), management maintenance and condition different environments. The goats used with average age 8 months still in the growth process so that support moment given treatment For measure PBBH rate.

The low increase body weight in goats that gain P1 treatment is caused Because influence amount consumption feed goats in treatment silage leaf gamal by 20% in feed in the week I,II and III. Addition livestock body weight ruminants are greatly influenced by the quality and quantity feed, thing this is what is meant is evaluation increase livestock body weight comparable with rations consumed.

**C. Feed Conversion**

Based on results analysis variance, average conversion feed the goat that gets treatment composition silage leaf different gamal as stated in table 3 below :

**Table 3.** Average conversion feed.

| Treatment | Average Conversion feed (gr/ head / hr ) | | | |
|---|---|---|---|---|
| | **Week I** | **Week II** | **Week III** | **Week IV Average** |
| P0 | 74.11 | 91.14 | 78.58 | 51.89 [c] 60.96 |
| P1 | 60.70 | 43.74 | 56.33 | 48.08 [to] 40.19 |
| P2 | 64.69 | 76.22 | 64.00 | 36.66 [a] 51.23 |
| P3 | 58.71 | 84.34 | 51.36 | 37.46 [b] 48.60 |
| **Total** | **258.22** | **295.45** | **250.27** | **170.08 200.98** |

Caption: Analysis results variance shows, subscripts in the same column show very significant effect (P<0.01)

Analysis results variance fingerprint on average conversion feed goat Sunday I,II,III and IV do not show influence real (P>0.05) between treatment, namely P0 is different with P1, P2 and P3. Likewise with P1 treatment is different with P2 and P3. Difference This influenced by the amount consumption feed in each group.

P3 treatment shows consumption more feed low compared to with P0, P1 and P2. Meanwhile, in the P0 treatment it was more tall compared to with P1, P2 and P3.

Alwi [14] stated that the higher the feed conversion value, the more feed is used to increase body weight per unit weight or the lower the feed efficiency. The low consumption feed for goats that get P3 treatment is caused by influence adaptation goats in treatment silage leaf gamal by 100% in feed in weeks I, II, III and IV. Feed conversion

can be used to determine production efficiency because it is closely related to production costs. The lower the feed conversion value, the higher the efficiency of feed use [15].

## CONCLUSION

**Fundamental Finding :** The study confirmed that feeding male local goats of Peranakan Ettawa descent with gamal leaf silage significantly improved feed consumption, weight gain, and feed conversion efficiency. Despite initial adaptation challenges due to the specific odor of gamal leaves, the goats gradually accepted the silage, leading to increased feed intake over time. The high protein content in gamal leaves contributed to better growth rates, and the silage processing method helped reduce anti-nutritional factors, making the feed more palatable and digestible. **Implication :** The findings highlight the potential of gamal leaf silage as an alternative feed source to reduce dependence on conventional feeds and lower production costs for goat farmers. Given its high nutritional value and year-round availability, gamal leaf silage can help improve goat farming sustainability, especially in regions prone to seasonal feed shortages. However, proper fermentation techniques and balancing the feed formulation with other nutritional sources are essential to maximize its benefits. **Limitation :** The study was conducted over a short period and in a specific geographical area, which may limit its generalizability to different environmental conditions and goat breeds. Additionally, the study did not explore long-term effects on overall goat health and reproduction. Future research should address these limitations by considering different climates, extended observation periods, and the inclusion of additional variables such as feed digestibility and immune response. **Future Research :** Further studies should focus on optimizing the silage fermentation process to enhance palatability and nutrient retention. Research on combining gamal leaf silage with other alternative feed ingredients could provide more balanced nutritional formulations. Additionally, investigating the long-term effects of gamal leaf silage on reproductive performance and overall herd health would offer a more comprehensive understanding of its viability as a sustainable feed option for goat farming.

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