# APPLICATION OF BOKASHI SLUDGE BIOGAS FERTILIZER IN LAMTORO LEAVES AT THE EARLY GROWTH OF LAMTORO TARRAMBA WITH DIFFERENT LEVELS

**By**
**Arwati Ata Linda[1], I Made Adi Sudarma[2]**
**[1,2] Sains and Technology Faculty, Unkriswina Sumba**
**E-mail: [2]made@unkriswina.ac.id**

***Article History:***
*Received: 06-12-2022*
*Revised: 14-12-2022*
*Accepted: 11-01-2023*

***Keywords:***
*Lamtoro Tarramba, Growth, Sludge Biogas Sludge.*

***Abstract:*** *This study aims to determine the application of bokashi sludge biogas fertilizer from lamtoro leaves on the early growth of Tarramba lamtoro with different levels. This study used a completely randomized design (CRD) with 5 treatments and 4 replications. The treatments tested were without fertilizer/polybag (P0), 200 gram/polybag (P1), 400 gram/polybag (P2), 600 gram/polybag (P3) fertilizer, and 800 gram/polybag (P4). The variables measured in this study were plant height, number of compound leaves (strands), stem diameter, and petiole. The results of this study showed that there was a significant effect (P<0.05) on the growth of the 6th week except for the number of compound leaves. Lamtoro Tarramba plant growth with bokashi sludge biogas fertilizer from lamtoro leaves at the best level of treatment P4(800) gram/polybag at week 6 where the plant height was 48.33 cm, stem diameter was 3.63 cm, number of compound leaves 95.33 leaves. It was concluded that the application of lamtoro leaf biogas sludge with level 800 grams to the lamtoro Tarramba plant give the best result.*

## INTRODUCTION

East Sumba Regency has an extensive savanna field of 700,005 hectares (1) and the development of grazing every year has increased. However, the availability of feed is greatly reduced, especially in the dry season. For this reason, steps that can be taken to overcome the shortage of feed in the dry season are by cultivating forage, one of which is Lamtoro Tarramba (Leucaena leucocephala cv. Tarramba). According to (2) stated that Lamtoro Tarramba (Leucaena leucocephala cv. Tarramba) is a good type of legume plant to be cultivated as animal feed, especially during the dry season and is capable of producing high forage. Lamtoro Tarramba has the advantages of high forage production, good nutrition, drought resistance, can fix nitrogen in the soil, resistance to pruning and resistance to fleas. Another advantage of lamtoro tarramba is that it has a high protein content (23.7 - 34%), vitamins and minerals. Meanwhile, according to the results of (3) states that lamtoro has a nutritional content of 89.19% DM; 92.36% BO; 22.41% PK; 6.56% FI; 13.50% SK; 63.39% CHO; 49.88% BETN to meet the nutritional needs needed by livestock. Lamtoro Tarramba is a type of legume with a very high level of palatability and has a good response to fertilization.

Fertilization is an effort made to increase soil fertility while changing the properties of

the soil because the application of chemical fertilizers and soil is one of the main factors that influence the cultivation of forage forage (4). Fertilizer is the most important part for plants. Fertilizer is produced from livestock waste residue or waste products from livestock, one of which is sludge biogas. Sludge biogas is the result of waste residue from livestock in the form of semi-fermented shells and has the ability to be used as organic or biological fertilizer. Besides being used as fertilizer, biogas sludge can have a positive impact on the community environment, namely preventing environmental pollution. It has been reported that the use of sludge biogas as a basic ingredient for making bokashi fertilizer with different levels (0-40 tons/ha) can provide significant results in the regrowth of odot grass plants both in plant height, leaf length and fresh weight production (5; 6; 7; 8).

In making biogas sludge fertilizer, lamtoro leaves can be added. Lamtoro leaves besides animal feed can also be used as fertilizer because the benefits of lamtoro leaves (L. leucocephala) are to increase the nitrogen (N) content of fertilizer and change nutrients in the soil. Based on the above problems and there is no utilization of lamtoro leaf biogas sludge in the early growth of lamtoro tarramba plants. So the researchers wanted to know the application of bokashi sludge biogas fertilizer with lamtoro leaves on the initial growth of lamtoro tarramba at different levels.

## RESEARCH METHODS

The materials used in this study consisted of biogas sludge, lamtoro leaves, husk charcoal, rice bran, EM4, sugar, and water. This study used 20 lamtoro tarramba saplings where in each polybag there was 1 sapling. Polybags are prepared for transferring lamtoro tarramba puppies from the beds to polybags. Meanwhile, the equipment used in the study included shovels, hoes, meters, calipers, buckets, machetes, scales, cameras, HVS paper, pens and thermometers.

In this study a completely randomized design (CRD) method was used with 5 treatments and 4 replications where each replicate (polybag) consisted of 1 tiller so that a total of 20 trials of lamtoro tarramba tillers. The treatment given was without fertilizer (P0), 200 grams of fertilizer (P1), 400 grams of fertilizer (P2), 600 grams of fertilizer (P3), and 800 grams of fertilizer (P4). The collected data were analyzed using ANOVA and Duncan's further test.

## RESULT

**Table 1.** The height, stem diameter and number of compound leaves of the Lamtoro Tarramba plants was observed in the 6th week

| Treatment | | Variable | |
|---|---|---|---|
| | Plant height (cm) | Stem diameter (cm) | Number of Compound Leaves |
| $P_0$ (Control) | 25,00$^{a}$ | 1,86$^{a}$ | 55,00$^{a}$ |
| $P_1$ (200) | 35,33$^{a,b}$ | 2,36$^{a}$ | 64,00$^{a}$ |
| $P_2$ (400) | 37,33$^{a,b}$ | 2,76$^{a'b}$ | 78,67$^{a}$ |
| $P_3$ (600) | 34,67$^{a,b}$ | 2,86$^{a'b}$ | 78,00$^{a}$ |
| $P_4$ (800) | 48,33$^{b}$ | 3,63$^{b}$ | 95,33$^{a}$ |

*Note: numbers followed by different superscripts in the same column show a significant difference (P<0.05)*


ISSN 2798-3471 (Cetak)
ISSN 2798-3641 (Online)

The height of the Tarramba lamtoro plant is measured from the ground surface to the tip of the highest leaf. Measurement of the height of the Tarramba lamtoro plant aims to determine the increase in plant height in the initial growth of the lamtoro Tarramba plant by applying bokashi sludge biogas fertilizer from lamtoro leaves. Based on table 1. shows that the initial growth in height of the Tarramba lamtoro plant was highest at the P4 level (800) gram compared to other treatments. Meanwhile, the lowest plant height of the Tarramba lamtoro was found at the P0 level (control) without fertilizer application. This shows that the application of fertilizer has a significant effect on the initial growth in height of the Tarramba lamtoro plant.

In the 6th week it was shown that the initial growth in height of the Tarramba lamtoro plant which was given bokashi sludge biogas fertilizer with lamtoro leaves at different levels had a significant difference ($P<0.05$). Where in the 6th week the height of Tarramba's lamtoro at the P4 (800) gram level treatment produced the highest plant height, namely 48.33 cm and the lowest at the level treatment without fertilizer application or P0 (control) gram with a height of 25.00 cm. According to (9) showed that the growth in height of the Tarramba lamtoro plant in week 6 was 36.4 cm with the fertilizer given, namely cow manure. Furthermore, (10) that the application of chicken manure bokashi fertilizer at different levels showed that in week 6 the treatment of the 800gram level was the best (fertilizer application), where at the 800gram level it produced a lamtoro Tarramba plant height of 72.31 cm and at the 0gram level treatment (without applying fertilizer) has a plant height of 31.15 cm. From the comparison above, it shows that the initial growth of the 6-week-old Tarramba lamtoro plant has a significant effect on the fertilizer treatment given. The higher the level of fertilizer given to the Tarramba lamtoro, the higher the growth of the lamtoro plant.

The stem diameter is the length of the line between two points on the circle around the stem that passes through the center point (axis) of the stem. Stem diameter was measured at the bottom of the base of the plant using a caliper to determine the increase in diameter of the Tarramba lamtoro plant. Table 1 shows that the initial growth in stem diameter of the Tarramba lamtoro plant was highest at the P4 (800) gram level compared to other treatments. While the stem diameter of the Tarramba lamtoro plant was the lowest at the P0 level (control) without fertilizer application. This shows that the application of fertilizer has a significant effect on the initial growth of the stem diameter of the Tarramba lamtoro plant.

In week 6 it was shown that the initial growth of lamtoro Tarramba with the application of bokashi sludge biogas fertilizer from lamtoro leaves had a significant difference ($P <0.05$). Where the treatment level P0 (Control) and treatment level P1 (200) grams were not much different, while the treatment level P4 (800) grams had a significant difference ($P <0.05$) between P0 (Control) or without fertilizer application. This is because the fertilizer given to each treatment is different, so that the increase in diameter is also different.

The number of compound leaves (strands) is calculated for all compound leaves to determine the production of compound leaves (strands) produced in Lamtoro Tarramba. The number of compound leaves also affects the height of the plant. Thus, the number of

compound leaves every week has an increase in compound leaves in the initial growth of the Tarramba lamtoro. Based on table 1. above, it shows that the application of bokashi sludge biogas fertilizer for lamtoro leaves at different levels on the number of compound leaves (strands) was not significantly different. The highest number of compound leaves (strands) was at the P4 level (800) gram treatment, namely the number of compound leaves at week 6 of 95.33 strands. While the number of compound leaves at treatment level P0 (control) without fertilizer application was the lowest.

Table 1. shows that the initial growth of the Tarramba lamtoro plant with the application of bokashi sludge biogas fertilizer at lamtoro leaves at different levels of the highest number of compound leaves (strands) was at the treatment level P4 (800) gram. Where in the treatment level P4 (800) gram the highest with the number of compound leaves 95.33 strands and the lowest in the treatment level P0 (control) gram. According to the research results of Tendean et al. (2018) stated that the application of chicken manure bokashi fertilizer to the initial growth of lamtoro at different levels showed that in week 6 the 800gram level treatment produced 71.31 compound leaves and at the 400gram level 63.50 leaves, very significantly different. compared to the treatment level of 0 gram and 200gram. From the above comparison it can be concluded that in this study with the results of (10) has a significant difference ($P<0.05$). This is because in this study using bokashi sludge biogas fertilizer from lamtoro leaves, while (10) used chicken manure bokashi fertilizer. From the results of this study it can be concluded that the more fertilizer given to the Tarramba lamtoro plant, the more leaf production will be produced, even though the fertilizer given is different.

## CONCLUSION

Based on the research data above, it can be concluded that the effect of applying bokashi sludge biogas fertilizer on lamtoro leaves at different levels has a significant effect on the growth pattern of lamtoro Tarramba plants. Where of all the treatments given the highest was the application of fertilizer level P4 (800) gram both on plant height, stem diameter, and number of compound leaves. The more fertilizer given to the plant, the better the growth pattern.

## REFERENCE

[1] BPS Kab. Sumba Timur. (2017). Kabupaten Sumba Timur dalam Angka. BPS Sumba Timur.
[2] Yumiarty, H., & Suradi, K. (2010). Utilization of lamtoro leaf in diet on pet production and the lose of hair rabbit's pelt. Jurnal ilmu ternak, 7(1), 73-77.
[3] Sudarma, I. M. A. (2018). Pengujian Konsistensi, Waktu Adaptasi, Palatabilitas dan Persentase Disintegrasi Ransum Blok Khusus Ternak Sapi Potong Antarpulau. Jurnal Sain Peternakan Indonesia, 13(3), 265-273.
[4] Tufaila, M., Laksana, D. D., & Alam, S. (2014). Aplikasi kompos kotoran ayam untuk meningkatkan hasil tanaman mentimun (Cucumis sativus L.) di tanah masam. Jurnal Agroteknos, 4(2), 244107.
[5] Praing, Y. K., & Sudarma, I. M. A. (2022). Pengaruh Pemberian Pupuk Bokashi Sludge Biogas Pada Level Berbeda (0; 7, 5; 15 Dan 22, 5 Ton/Ha) Terhadap Pertumbuhan Kembali Rumput Odot (*Pennisetum purpureum cv. Mott*). *Jurnal Inovasi Penelitian*, *2*(11), 3653-

3658.
[6] Yowa, N. K., & Sudarma, I. M. A. (2022). Pertumbuhan Kembali Rumput Odot Yang Di Berikan Pupuk Bokasi Sludge Biogas Dengan Level 0, 10 Dan 20 Ton/Hektar Di Kabupaten Sumba Timur. Jurnal Inovasi Penelitian, 2(11), 3659-3664.
[7] Mbani, M. N., & Sudarma, I. M. A. (2022). Pengaruh Pemberian Pupuk Bokashi Sludge Biogas Level 0, 15 Dan 30 Ton/Ha Terhadap Pertumbuhan Kembali Rumput Odot (*Pennisetum purpureum cv. Mott*). *Jurnal Inovasi Penelitian*, *2*(9), 3021-3026.
[8] Kana, D. D. W., & Sudarma, I. M. A. (2022). Pengaruh Pemberian Pupuk Bokashi Sludge Biogas Dengan Level O, 20 Dan 40 Ton/Hektar Terhadap Pertumbuhan Kembali Rumput Odot (Pennisetum purpureum cv. Mott). Jurnal Inovasi Penelitian, 2(9), 2927-2932.
[9] Handayani, D. P., Ayunisa, W., Nawfetrias, W., & Royani, I. (2021). Potensi Hasil Beberapa Aksesi Lamtoro Sebagai Sumber Hijauan Makanan Ternak (HMT). Pastura: Journal of Tropical Forage Science, 10(2), 69-73.
[10] Tendean, M., Kaligis, D. A., & Kaunang, W. B. (2017). Pengaruh Level Pupuk Bokashi Kotoran Ayam Terhadap Pertumbuhan Lamtoro (Leucaena leucocephala). Zootec, 38(1), 44-49.

THIS PAGE IS INTENTIONALLY LEFT BLANK


*ISSN 2798-3471 (Cetak)*
*ISSN 2798-3641 (Online)*