RESPONSE OF SOME TYPES OF MICROORGANISM-LOCALIZED (MOL) TO PAKCHONG GRASS GROWTH (*Pennisetum Purpureum Cv. Thailand*)

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Abstract: *Response of local micro-organisms (MOL) to the growth of pakchong grass (Pennisetum purpureum Cv. Thailand). The purpose of this study was to determine the response of several types of Local Micro-Organisms (MOL) to the growth and productivity of Pakchong grass (Pennisetum purpureum Cv. Thailand). This study used a non-factorial Group Randomized Design (RAK) with 4 treatments and 6 repeats, with treatments being: Po (without MOL), P1 (MOL Nature Gene), P2 (D' Boostefer), and P3 (Pamorganic MAS). How to apply MOL to plants is to use 50 ml of liquid organic fertilizer with 4.95 liters of water and then flush each treatment plot. Application is carried out one week after planting, then repeated once every 2 weeks until the plant is 6 weeks old. The parameters observed were plant height growth, stem diameter, number of leaves, and production of fresh and dried grass. The results showed that the use of several types of MOL on Pakchong grass had a real effect ($p < 0.05$) on the growth and productivity of Pakchong grass compared to P0 (control). The best results were P2 >P3 > P1, while the lowest growth and production were found at P0 (Without MOL) which differed markedly from the use of MOL in Pakchong grass.*

INTRODUCTION

Ruminant farming businesses such as beef cattle, dairy cattle, buffaloes, goats, and sheep are growing rapidly, in the development of these livestock is inseparable from the availability of feed, especially forages. The current feed problem is very worry about availability, due to reduced pasture land and declining soil fertility levels, especially entering the dry season resulting in decreased forage quality and quantity (BPS, 2022).

One of the efforts to increase the productivity of ruminant animal feed must be accompany by the provision of forage feed, therefore it is necessary to find alternative forage availability both in quantity and quality that is sufficient for livestock needs

throughout the year. Forages commonly also called Forage Fodder (HMT) is a very important feed ingredient for livestock, almost 90% of ruminant animal feed comes from forage, especially grass, and the need for fresh forage consumption per day as much as 10-15% of livestock body weight (Seseray et al., 2013).

At this time to meet the needs of livestock for feed, one way is to develop forage grass, from the results of research with crosses to get quality forage feed. One of them is Pakchong grass (Pennisetum purpureum cv Thailand). This grass is one of the superior types of grass resulting from a cross between elephant grass (Pennisetum purpureum Schumach) and Pearl millet (Pennisetum glaucum) (Wangchuk et al. 2015). Pakchong grass has a higher protein content, according to (Suherman and Herdiawan, 2021), Pakchong grass production can reach 250-275 tons/ha per year, and crude protein content of 16-18%.

Pakchong grass can grow in any place, and to achieve high productivity it is necessary to apply fertilizer, both types of solid fertilizer and liquid fertilizer, if the soil is less fertile then the plant cannot absorb nutrients (Ayu, 2011). Efforts that can be made to increase soil fertility while improving soil conditions require the application of organic fertilizers both in solid and liquid form.

Giving Local Micro-Organisms (MOL) to plants can increase crop production (Roidah 2013). Local Micro-Organism (MOL) is a fertilizer whose basic ingredients come from animals or plants that have undergone fermentation, and the form of the product is in the form of liquid. The use of Local Micro-Organisms in general by dissolving into water (Fahri et al, 2018).

Local Micro-Organisms used include:

1. **Naturegen Organic Fertilizer**

Naturegen Organic Fertilizer, with a high NPK content, is the best solution for plant growth. This fertilizer is an important element in the world of agriculture and meets the needs of plants. MOL Nature Gen will benefit from high-quality organic fertilizers that support plant growth. Local Microorganism Nature GEN provides tremendous benefits for plant growth.

2. Local Microorganism D'Boosterfer

Local Microorganism D'Boosterfer can improve the physical, chemical, and biological properties of soil. Apart from that, it can increase crop production and maintain stable production. Decomposes soil organic matter, so that microbial pollution can change depending on the storage conditions of the product. D'Booster is created from the natural selection of Fermented and Synthetic Microorganisms in the soil. D'Booster contains fermented bacteria of the genus Lactobacillus and Saccharomyces can ferment organic matter in the soil into organic elements that increase soil fertility and plant productivity. D'Boosterfer also contains N-fixing bacteria and P-solvent bacteria. Phytohormone production as well as organic matter remodeling (cellulotic and lignolytic).

Local Micro-Organisms are fertilizers that can provide nutrients that are by the needs of plants and soil because of their liquid form, so if there is an excess of fertilizer capacity in the soil then plants can easy to regulate fertilization more evenly, and there will be no accumulation of fertilizer concentration in one place (Susanto, 2002). Apart from

that, MOL can improve the physical, chemical, and biological properties of the soil, also help increase crop production, and improve the quality of plant products (Welasih, 2015).

METHODS

This research was conducted in Sunggal District, Deli Serdang Regency, North Sumatra Province. The method used is a non-factorial Complete Randomized Design (RAL) experimental method consisting of 4 treatments in the form of hormones from plants with 6 repeats so that there are 24 research plots. The treatment in this study consists of:
P0: (control) without treatment,
P1: POC Naturagen
P2: POC D'Boostefer
P3: POC Pamorganik mas.

Sample Preparation

A total of 24 treatment plots with a plot size of 100 cm x 100 cm each. Each application of liquid organic fertilizer is adjusted to its treatment. P0 treatment without POC, P1 giving POC Nature GEN, P2 giving D'Boostefer, and P3 giving POC Pamorganik Mas.

The Treatment of Local Micro-Organisms is adjusted to each treatment. Treatment P0 (without MOL), P1 (administration of MOL Nature GEN), P2 (administration of D'Boostefer), and P3 (administration of MOL Pamorganic Mas). How to apply it to plants is to use 50 ml of liquid organic fertilizer and 4.95 liters of water and then flush each plot. Application is carried out one week after planting and followed by 2 weeks until the plant is 6 weeks old. The variables observed were Plant Height (cm), Number of Leaves (strands), Stem Diameter, Fresh Weight (kg).

RESULTS AND DISCUSSION

The results of the observation of the average height growth of Pakchong grass from the effect of fertilization from several MOL (liquid organic fertilizers) carried out at the age of 2 weeks after planting (MST) to 8 mst can be seen in Table 1.

Table 1, Average growth rate of Pakchong grass height (cm) from the effect of giving some MOL

Treatment	2 MST	4 MST	6 MST	8 MST
P_0	28,83a	90,97b	117,55c	155,37c
P_1	28,87a	96,63ab	125,63b	166,26b
P_2	29,02a	98,52a	134,36a	181,39a
P_3	29,26a	98,02ab	128,27ab	173,17ab

Note; The notation of the same letter in the same column differs markedly at the level of 5%

Table 1, showing the development of Pakchong grass height from the effect of giving several types of MOL obtained and the results of statistical analysis at 2 weeks after planting (mst) with an average height of Pakchong grass between 28.83 cm to 29.26 cm, showed no real difference ($p > 0.05$) between all treatments. The effect of fertilization with several MOL showed a marked difference of $p<0.05$ between treatments after grass on the observation of 4 mst of each type of MOL applied. The effect of MOL use on the height of

Pakchong grass continued to increase the height in each treatment and at 8 MST observations, each treatment was seen. MOL type D'Bosstefer (P2) is a type of fertilizer that provides the highest height growth of Pakchong grass with an average height of 181.39 cm, not real difference ($p > 0.05$) with the use of MOL Pamorganik mas (P3) with an average height of 173.17 cm but significantly different from the use of MOL Naturagen (P1) with an average of 166.26 cm (is the lowest grass height of the three types of MOL tested).

The P0 (Control) treatment gave the lowest height growth of Pakchong grass with an average of 155.37 cm significantly different from the MOL treatment (P1, P2, and P3). Pakchong grass planting land, requires fertile soil to produce high productivity, in general, the soil at this time results in the need for fertilizer addition so fertilization needs to be done. According to Rica (2012), stated that if the soil is not fertile, plants cannot meet their nutritional needs, the successful growth of forage feed requires the support of the physical environment of the soil and ideal climate, therefore one way to get good forage growth and development is to fertilize. The increase in plant height indicates the vegetative growth activity of a plant, as long as the needs of nutrients, water, and light are fulfilled in plants and there is no competition between plants, then the rate of photosynthesis in the growth process is relatively the same and causes plant height to also be relatively the same (Sutedjo, 2002).

Stem Diameter and Number of leaves

The diameter of the stem of the Pakchong grass from the influence of the use of different MOL fertilizers on plants aged 8 mst. The results of measurement, calculation, and analysis of the effect of the use of several types of MOL on rod diameter can be seen in Table 2.

Table 2, Average stem diameter (mm) and Number of Pakchong leaves (strands) from the influence of multiple MOL

	Stem Diameter		Number leaves	
Treatment	Average	Notation	Average	Notation
Po	18,07	c	10,21	a
P_1	19,33	bc	10,43	a
P_2	21,03	a	11,33	a
P_3	20,14	ab	10,82	a

Description: The same letter in the same column shows an intangible difference at the level of 5%

Diameter of Pakchong grass stems Table 2. It can be seen that the largest average rod diameter of 21.03 mm was obtained in the use of P2 treatment (D'Boostefer) and has almost the same ability as the use of MOL Pamorganik Mas (P3) with an average of 20.114 mm where both are based on different analysis not real ($p > 0.05$). Of the three MOLs tested, there was a P1 (Naturagen) treatment giving an average smallest rod diameter of 19.33 mm with no real difference from the control (the average diameter was 118.07 mm compared to the tested treatment, but P1 was not significantly different compared to P3 but significantly different from P2.

The number of leaves of Pakchong grass from the effect of the use of three types of MOL fertilizer was measured at 8 MST and the results of statistical analysis showed no real

difference (p > 0.05) for the four treatments including control with an average leaf count between 10.21 – 11.33 strands, with the lowest number of leaves from testing 3 types of MOL obtained in the P1 (Nature Gen) treatment and most obtained at the use of P2 (D'boostefer) on average 11.33 strands with an average number of average leaves an average of 42.82 strands but compared to the control (P0) the least number of leaves averaged 10.21 strands compared to the tested route.

The development of grass such as stem diameter is influenced by the proper application of MOL so that it can be known the real influence on the best type of MOL. The opinion of Santia, Anis, & Kaunang (2017) states that the diameter of the stem and the number of saplings are indicators of the ability of forage feed to grow again as well as a sign of the potential to produce high biomass. Leaves are where photosynthesis occurs. The size of photosynthesis in a plant will have an impact on increasing and decreasing leaf size (Yulia et al. 2022), but in this study, different leaf numbers are not real for all treatments, this is due to genetic factors supported by the formation of leaves at the same time, but the formation of the first leaf from cuttings will be influenced by the treatment carried out on cuttings (Putriana, 2019).

The results of this study with the highest number of leaves and an average of 11.33 strands, the results of this study are the same compared to research (Sathees & Santhiralingam 2022) on Pak Chong grass planted with different planting spacing patterns at the age of 56 days with a number of leaves of 11.33 strands. Farda et al. (2020) and (Kusuma 2013) mentioned that an increase in the population of a plant will be followed by an increase in the yield of broad unity. Another factor that may affect biomass production is the decreased rainfall intensity during the study period.

Produksi Berat Segar dan Kering

The results of measuring the fresh weight and dry weight of Pakcong grass by testing several types of MOL at the age of 8 weeks after planting can be seen in Table 3.

Table 3, Average Fresh weight of Pakcong grass (kg/clump) from the effect of several MOL at 8 MST

	Fresh weight		Dry weight	
Treatment	Average	Notation	Average	Notation
Po	428,81	c	122,64	c
P_1	505,43	b	149,61	b
P_2	565,92	a	167,51	a
P_3	533,36	ab	157,87	ab

Description: The same letter in the same column shows an intangible difference at the level of 5%

Table 3, shows the production of fresh-weight and dry weight of Pakchong grass from the effect of testing several types of fertilizers from MOL. The use of MOL d'Boostefer MAS (P2) shows the greatest weight with an average fresh weight of 565.92 g/clump and 167.51 g/clump for dry weight. Production at P2 from the analysis results produced an intangible difference (p > 0.05) compared to the use of MOL Pamorganik mas (P3) with an average of 533.36 g, Of the three types of MOL with the lowest production using MOL

Naturagen (P1) with an average of 505.43 grams of fresh weight and 149.61 grams for dry weight of Pakchong grass in each clump.

The treatment without MOL (P0) from Table 3, shows the smallest fresh and dry production compared to all treatments with an average of 428.81 grams/clump Fresh weight and 122.64 grams/clump dry weight, where Po differs markedly ($p<0.05$) from the use of MOL.

Factors that affect plant growth and production (fresh and dry in the tropics are the availability of nitrogen in the soil as a growing medium for Pakchong grass (Hanafi et al., 2019). Panggabean & Wardati (2015) stated that plants will thrive if the nutrients needed by plants are available in sufficient quantities and can be absorbed by plants. The availability of nutrients can stimulate plants to absorb more nutrients and photosynthesis. Wijiyanti et al. (2019) mentioned that dry weight consists of all plant parts. Previous research (Ahmed et al. 2021) reported that pakchong grass with 60 days of cutting was able to increase both fresh weight and dry weight. The land used in this study is classified as dry-critical land, where the nutrients contained in it are very low. Therefore it takes more than 1 month to absorb nutrients. If critical dry land is fertilized, the plants that grow in it will be further stunted growth, so the lower the percentage of nutrients available, the soil fertility will decline (Kuentz, Ledru, & Thouret, 2012).

CONCLUSION

1. The use of several types of MOL produces a real different influence on the growth and production of Pakchong grass with the best type being P2>P3>P1.
2. The use of MOL in P2 and P3 treatment (D'Boostefer and Pamorganik mas), can increase the growth and production of fresh leaves that are high enough so that this MOL is a recommendation for the development of Pakchong grass forage

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