KESANS: International Journal of Health and Science
e-ISSN: 2808-7178, p-ISSN: 2808-7380
Web: http://kesans.rifainstitute.com/index.php/kesans/index

Utilization of Local Microorganism (MOL) Gained from Stale Rice as Organic Fertilizes for Bok Choy (*Brassica chinensis*)

Muh. Anwar Rasyid
Program Study of Biology Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Malang, Jawa Timur, Indonesia
am.anwarrasyid87@gmail.com

Article Information
Submitted: **01 July 2024**
Accepted: **04 July 2024**
Online Publish: **20 July 2024**

Abstract
Introduction: *Rice is one of the main staple foods for Indonesians. The consumption of rice in Indonesian society is increasing every year along with the increasing population of Indonesia.* ***Objective:*** *this Research will test the effectiveness of stale rice MOL organic fertilizer in accelerating the growth rate of Bok choy plants.* ***Method:*** *This Research used experimental research methods to determine the effect of using MOL fertilizer on the growth rate of Bok choy plant height. This research will use a Completely Randomized Design as the design method and with 3 research subjects namely the analytical method to be used in this study is one-way ANOVA with LSD/BNT follow-up test* ***Result and Discussion****: it was found that the average growth of plant height given MOL fertilizer on the leaves (S2) had the highest plant growth rate. MOL fertilizer can increase plant height growth 0.2 cm faster than those not fertilized,* ***Conclusions:*** *The results of applying MOL fertilizer to Bok choy plants affect the growth of Bok choy plant height but not significantly. The fastest growth is in the treatment given to the leaves of the plant*
Keywords: Stale Rice; Local Microorganism (MOL); Bok Choy;

How to Cite **Muh. Anwar Rasyid/Utilization of Local Microorganism (MOL) Gained from Stale Rice as Organic Fertilizes for Bok Choy (*Brassica chinensis*), Vol. 3, No. 10, 2024**
DOI https://doi.org/10.54543/kesans.v3i10.299
e-ISSN/p-ISSN **2808-7178 / 2808-7380**
Published by **Rifa'Isntitute**

Introduction

Rice is one of the main staple foods for Indonesians (Asnur, Kurniasih, Arti, Ramdan, & Yulianti, 2023). The consumption of rice in Indonesian society is increasing every year along with the increasing population of Indonesia (Suryani, Abdurrachim, & Alindah, 2016). Every day there must be leftover rice that is no longer consumed and will become stale rice. This stale rice can be utilized if processed properly (Mukti, Rohmawati, & Sulistiyani, 2018). Usually, stale rice is used as animal feed or sometimes just wasted in the trash. Recent research states that stale rice can be used as a basic ingredient for making organic fertilizer to fertilize plants (Selviana, 2019).

Rice has several important nutrients for living things including carbohydrates, proteins, minerals, Iron (Fe), Phosphorus (P), Manganese (Mn), Selenium (Se), Magnesium (Mg), Potassium (K), vitamins, carbohydrates, carbon and hydrogen ions (Naim, 2024). The carbon and hydrogen ions will later be processed into a simpler form, namely sugar. Sugar is a source of energy for microorganisms in the soil to multiply and reproduce so that it can help the soil to improve its structure, both chemically and biologically (Selviana, 2019).

Materials added to the growing medium to meet the nutrient needs of plants so that they can produce well are called fertilizers (Waqfin, Rahmatullah, Imami, & Wahyudi, 2022). Fertilizer material can be organic or non-organic, good fertilizer is organic fertilizer (Indonesia, 2020). Organic fertilizer is one of the efforts that can be done to meet the nutritional needs of plants that are environmentally friendly today (Ferayanti, 2015). Many fertilizers are made from chemicals, in the long run this fertilizer can damage the environment, of course this is very dangerous for the environment around us, one way to overcome this is to use organic fertilizers made from local microorganisms (MOL) (Jahari, Amrizal, & Putri, 2024).

MOL is the manufacture of organic fertilizers in the form of solids or liquids using microorganisms as the main ingredient or stater (Koeshardjono et al., 2023). The main ingredients needed in making MOL are glucose, carbohydrates, and microorganism sources. These basic ingredients can be obtained from household waste (Mursalim, Mustami, & Ali, 2018) The main ingredient that will be used in this research is carbohydrates obtained from organic household wastes, especially stale rice (Mursalim et al., 2018)

The use of organic fertilizers has several advantages, namely that it can support environmentally friendly plant cultivation (Kurniawan, 2018), can overcome the problem of household waste pollution and agricultural waste that usually uses chemical fertilizers, is easier to use and can enrich the diversity of soil biota and can improve soil and plant quality (Selviana, 2019).

This research will test the effectiveness of stale rice MOL organic fertilizer in accelerating the growth rate of Bok choy plants, Bok choy plants were chosen because of their relatively fast growth, the high level of consumption of Bok choy plants in the community, and Bok choy plant seeds that are easily found around (Anjeliza, 2013).

Method

This research will test the growth rate of Bok choy plant height in 3 treatments, namely Bok choy which is not given MOL fertilizer, Bok choy which is given MOL fertilizer on plant leaves, and Bok choy which is given MOL fertilizer in the planting medium (soil). This research used experimental research methods to determine the effect of using MOL fertilizer on the growth rate of Bok choy plant height. This research also use the method of supporting literature studies and information through various journals and scientific references related to MOL fertilizer and the growth rate of green bok choy plants. In this study, fertilization was carried out once a day and watering twice a day. Measurement of differences in bok choy plant height will be carried out every 2 days.

This research takes 4 months, starting from February 3 to May 21, 2022. This research will plant and observe seedlings in Sidorejo Village, Ponggok District, Blitar Regency. Bok choy seeds and other equipment will be purchased at the Siderejo Village farm shop. This research will start giving treatment to subjects for two weeks starting on 4-18 April 2022. The researcher will observe and measure the growth rate every 2 times a day. This research will use a Completely Randomized Design as the design method and with 3 research subjects namely

Our randomization was carried out by numbering the available plots 1-18 and then randomizing them one by one using the help of the wheel of names. The analytical method to be used in this study is one-way ANOVA with LSD/BNT follow-up test.

Research and Discussions

Based on the measurement results, it was found that the average growth of plant height given MOL fertilizer on the leaves (S2) had the highest plant growth rate, while the application of MOL fertilizer to the planting media also grew faster but not as fast as when compared to those given to the leaves of the plant. It appears that the closer the application of MOL fertilizer to photosynthetic organs such as leaves, the higher the growth of bok choy plants (Table 1).

Tabel 1

Average Measurement Results of Height Growth Rate

Treatment of MOL fertilizer	Average plant height growth in 2 weeks (cm)
Without MOL fertilizer (S1)	7.3150 ± 0.21^{a}
Plant Leaf Application (S2)	7.5433 ± 0.17^{a}
Application in Planting Media (S3)	7.5083 ± 0.21^{a}

Description: In the column, the same letter above the number indicates that the value of the number is not significantly different based on BNT test test with a 5% significance level (mean ± stdev; n=1).

The availability of nutrients is necessary to help the growth process of bok choy plants. Previous research shows that MOL can help meet the availability of plant nutrients, the success of MOL fertilizer as an organic liquid fertilizer can be assessed from the aspect of plant height growth.

MOL fertilizer is considered successful if it can accelerate plant height growth. MOL organic fertilizer tested on bok choy plants can increase plant height growth 0.2 cm faster than those not fertilized. This is supported by the results of research by (Patang & Mustarin, 2017) who have tested the success of MOL organic fertilizer on the growth rate of land kale plant height.

The results obtained are not in accordance with the results of research by (Mursalim et al., 2018) which states that MOL fertilizer has no effect on the growth rate of bok choy plant height. Which states that MOL fertilizer has no effect on the growth rate of bok choy plant height. This may occur due to differences in the contents of MOL fertilizer fermentation. This study used stale rice as an ingredient for MOL fertilizer while (Mursalim et al., 2018) used rice, banana stems, and tuna.

The fastest and most effective growth rate in bok choy plants is in the second treatment (applied to plant leaves). This indicates that the place of watering on the leaves of the plant proved effective. This research is not in accordance with the results of Hadi's research (2019) which does not recommend applying MOL fertilizer to stems and leaves because MOL is hot and can interfere with plant height growth, Hadi suggests sprinkling MOL on the planting media. MOL fertilizer given to leaves and planting media can increase plant height growth even though it is not significant.

Conclusion

The results of applying MOL fertilizer to Bok choy plants affect the growth of Bok choy plant height but not significantly. The fastest growth is in the treatment given to the leaves of the plant. Based on the results of the study, the place that effectively affects the growth of Bok choy plant height is on the leaves of the plant. This is not in accordance with the results of Hadi's research (2019) which does not recommend applying MOL fertilizer to stems and leaves because MOL is hot and can interfere with plant height growth. This can occur because there are differences in subjects and the provision of MOL concentrations.

Reference

Anjeliza, R. Y. (2013). Pertumbuhan dan Produksi Tanaman Sawi Hijau Brassica juncea L. Pada Berbagai Desain Hidroponik. Universitas Hassanuddin.

Asnur, P., Kurniasih, R., Arti, I. M., Ramdan, E. P., & Yulianti, F. (2023). Pemanfaatan Nasi Basi Dan Kulit Buah Nanas Menjadi Pupuk Organik Cair (POC). *Jurnal Pengabdian Masyarakat Sapangambei Manoktok Hitei*, *3*(1), 16–22.

Ferayanti. (2015). Cara membuat mol dari nasi basi sebagai starter dalam pembuatan kompos organik.

Indonesia, S. S. (2020). Manfaat MOL dari Nasi Basi, Alternatif Pupuk Organik Untuk Menyuburkan Tanaman. Safety Sign Indonesia.

Jahari, J., Amrizal, S. N., & Putri, R. M. S. (2024). APLIKASI MOL (Mikroorganisme Lokal) JEROAN IKAN SEBAGAI BIOAKTIVATOR PUPUK CAIR LIMBAH ORGANIK PADA TANAMAN PAKCOY (Brassica rapa L). *Marinade*, *7*(01), 1–9.

Koeshardjono, R. H., Sulistyowati, R., Hartanti, A., Hamidun, H., Hikam, R. A., Utami, L., Sari, E. N. (2023). Optimalisasi Pemanfaatan MOL (Mikroorganisme Lokal) Nasi Basi Sebagai Pupuk Organik Ramah Lingkungan. *INTEGRITAS: Jurnal Pengabdian*, *7*(2), 364–373.

Kurniawan, A. (2018). Produksi mol (mikroorganisme lokal) dengan pemanfaatan bahan-bahan organik yang ada di sekitar. *Jurnal Hexagro*, *2*(2).

Mukti, K. S., Rohmawati, N., & Sulistiyani, S. (2018). Analisis kandungan karbohidrat, glukosa, dan uji daya terima pada nasi bakar, nasi panggang, dan nasi biasa. *Jurnal Agroteknologi*, *12*(01), 90–99.

Mursalim, I., Mustami, M. K., & Ali, A. (2018). Pengaruh penggunaan pupuk organik mikroorganisme lokal media nasi, batang pisang, dan ikan tongkol terhadap pertumbuhan tanaman sawi (Brassica juncea). *Jurnal Biotek*, *6*(1), 32–42.

Naim, M. (2024). Pengaruh Dosis Pupuk NPK dan Konsentrasi POC Nasi Basi terhadap Pertumbuhan Tanaman Hias Sirih Gading (Epipremnum aureum). *Perbal: Jurnal Pertanian Berkelanjutan*, *12*(2), 276–285.

Patang, P., & Mustarin, A. (2017). Pengaruh pemberian MOL terhadap pertumbuhan dan produksi tanaman kangkung darat (Ipomea reptans Poir). *Jurnal Pendidikan Teknologi Pertanian*, *3*, S19–S29.

Selviana, T. E. (2019). Pengolahan Limbah Nasi Basi menjadi Pupuk Organik Cair Mikroorganisme Lokal (MOL) bagi Tanaman. https://doi.org/10.31219/osf.io/snbdv

Suryani, N., Abdurrachim, R., & Alindah, N. (2016). Analisis Kandungan Karbohidrat, Serat Dan Indeks Glikemik Pada Hasil Olahan Beras Siam Unus Sebagai Alternatif Makanan Selingan Penderita Diabetes Mellitus. *Poltekkes Kemenkes Banjarmasin*, *1*(3), 107–115.

Waqfin, M. S. I., Rahmatullah, V., Imami, N. F., & Wahyudi, M. S. (2022). Pupuk cair pembuatan mol dan pupuk organik cair: pembuatan pupuk cair MOL. *Jumat Pertanian: Jurnal Pengabdian Masyarakat*, *3*(1), 25–28.