



The Effect of Organic Chicken Manure Fertilizer on the Yield of Chicory Microgreens

Hana Kusuma Wardani¹, Farida iriani², Aghnia Rahmawati³

^{1,2,3}Universitas Insan Cendekia Mandiri, Jawa Barat, email: farida.iriani52@gmail.com

Abstract. Chicory is one of the interesting plants to cultivate microgreens. Microgreens cultivation began to trend carried out by urban communities in Indonesia during the pandemic, considering the Indonesian government's policy on the Implementation of Community Activity Restrictions. The application of organic fertilizers in microgreens cultivation planting media is important as a supplier of nutrients for the sustainability of plant growth and yield. Organic chicken manure fertilizer has been formulated consisting of chicken manure, kokopit, burnt husks and EM4 activator and fermented for 3 weeks, then tested against the growth and yield of chicory cultivated microgreens. How the effect of chicken manure organic fertilizer on the growth of chicory microgreens is the goal of this experiment. The experiment used a single-factor randomized group design consisting of five treatments and six groups. The treatment is the level of organic fertilizer dose of chicken manure, namely, 0, 125, 250, 375, and 500 g on an area of 27.10-2 M 2,100 plants with a total planting media weight of 2.10³g per treatment. The experimental results showed that the level of chicken manure fertilizer 250 g per plot was the best for the variable response of fresh weight of plants, and fresh weight of roots, while the dose of 375 g had the best effect on germination, plant height, and root length.

Keywords: microgreen, chicory, organic fertilizer, chicken manure, fermentasi

INTRODUCTION

The production of chicory plants in Indonesia within three years continues to increase. Based on data from the Central Statistics Agency in 2020, it shows that the amount of chicory production in Indonesia is 667,473 tons, then there is an increase in the amount of production in 2021 of 59,994 tons with a total chicory production of 727,467 tons and in 2022 the production of chicory plants also increases by 760,608 tons (Central Statistics Agency, 2023). White mustard plants or belonging to the *Brassica* group which are quite in demand by the public, are often consumed raw or processed into various cuisines (Novianti, 2017). White mustard plants contain protein, fat, carbohydrates, calcium, phosphorus, iron

(Fe), vitamin A, vitamin B, and vitamin C in addition, so it plays an important role in supporting public health.

The cultivation of *microgreens* appeared in the era of the 1980s, especially served in the culinary community of San Francisco, California. The 1990s began to spread to the southern part of California, until finally to Indonesia which became a trend for urban people to fill PPKM (Enforcement of Community Activity Restrictions) activities during the COVID-19 pandemic. *Microgreens* or soft textured young vegetables with the part consumed by the first leaf have been completely opened, stems and cotyledons (Agus, 2021). According to Gofar et al (2022), the attraction of *microgreens* plants is the tiny shape, and attractive colors, according to the type of plant. Some species that can be cultivated by *microgreens* include the families Brassicaceae, Asteraceae, Amarillydaceae, Amaranthaceae, Cucurbitaceae, Cereals, Leguminaceae, Oleaginous and other types of aromatic plants.

Efforts to increase growth and yield through *microgreens* cultivation include selecting the appropriate planting media composition, spacing and irradiation with LED *growlight* (Gofar et al., 2022). Planting media plays an important role as a source of plant nutrition. Planting media is divided into two, namely, organic media such as husk charcoal, *cocopeat*, compost and inorganic media such as *rockwool*. The use of organic media is superior, because it is able to bind water better, provide oxygen, increase cation exchange capacity, improve aeration and drainage, and provide nutrients (Bariyyah et al., 2015). The use of organic fertilizers can also improve the physical, chemical and biological properties of the soil and increase the absorption of nutrients by plants (Wigati et al., 2006). Organic fertilizers made from chicken manure waste, burnt husks, cocopotes and EM-4 activators are effective in the process of accelerating decomposition, increasing the pH of the growing media, and increasing the humidity of the media around plants (Iriani et al., 2022). How is the effect and what is the best dose of chicken manure fertilizer applied to microgreen planting media for chicory plants is the purpose of this experiment.

The experiment has been carried out in the Dago Asri area, Dago Village, Coblong District, Bandung city, Indonesia with an altitude of 740 meters above sea level, an average daily temperature of 24-27°C, and an experimental room air humidity of 40-60%

The ingredients used in are, eikun variety chicory seeds, soil, *cocopeat*, burnt husks and chicken manure fertilizer. The tools used are iron racks, plastic trays measuring 30x30 cm, measuring instruments, digital scales, pH meters, hygrometers, LED lights, sprayers, grinders of planting media, plastic covers and android cameras.

METHOD

The experiment used the single-factor Group Randomized Design (RAK) method, consisting of 5 (five) treatments and 6 (six) groups. The dose of organic fertilizer for chicken is a treatment, namely, 0g, 125g, 250g, 375g, 500g which is mixed in a treatment box measuring 30x30 cm until the total media becomes 1000g. Seeds are planted with a distance of 1x1 cm with a total of 100 seeds for each box, the planting medium is in moist condition, and covered with dark plastic in order to accelerate germination. The response variables observed were seed germination, plant height, root length, fresh weight of the plant, fresh weight of the root, and the ratio of root extinction. The data obtained were analyzed according to RAK and then further tested with the smallest Real Difference (BNT) test at the level of 0.05.

DISCUSSION

During the experiment, there was an increase in the pH value of the growing media, which was 6.6 (0g fertilizer), and increased to 6.9 (250g and 375g). The same results were obtained from the results of research by Walida et al., (2020), namely, the application of organic fertilizer chicken manure can increase soil pH and improve soil chemical properties in Janji village, West Bilah district, North Sumatra Province, Indonesia.

The results of statistical analysis of plant height response, root length, fresh weight of plants, and fresh weight of roots, are presented in Table 1 below.

Organic fertilizer dosage chicken manure g.2.10 ³ g media	Plant height (cm)	Root length (cm)	Fresh weight of plant (g)	Fresh weight of root (g)
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0	88.3 a	51.55 a	2.06 a	0.1 A
125	94.48 b	57.37 b	2.24 a	0.13 ab
250	98.7 b	63.12 C	2.91 b	0.19 bc
375	117.45 C	72.7 s	3.03 b	0.21 cd
500	119.05 C	74.5 s	2.89 b	0.21 s

Description: Numbers followed by the same letter in the same column, show no difference in the BNT test level 0.05.

Based on the statistical analysis presented in Table 1. shows that the application of 375g chicken loran organic fertilizer is best for the variables of plant height response, root length, fresh weight of plants, and fresh weight of roots for all dosing level treatments. The results of the BNT follow-up test at the level of 0.05% were different from the dose of 250g and very different from the dose of 125 g. Thus the application of organic fertilizer chicken manure is effective for promoting plant height, root length, fresh weight of the plant, and fresh weight of the roots. Nuryani et al., (2019) argue that organic fertilizer chicken manure has a good influence on plant growth and yield because there is a P element that supports root development so as to increase nutrient absorption by plants. P element in particular stimulates the growth of young roots so as to accelerate nutrients to be translocated to the upper part of the plant (Lingga & Marsono., 2007). The application of chicken manure organic fertilizer on microgreen planting media is good for plant root growth, proven without the application of chicken manure organic fertilizer (0g) fresh weight low roots. In the opinion of Janette & Jesper., (2020) the roots of *microgreens* plants are not consumed and should be discarded when harvesting, because the roots are susceptible to mold and mold, so it is feared to affect consumer health.

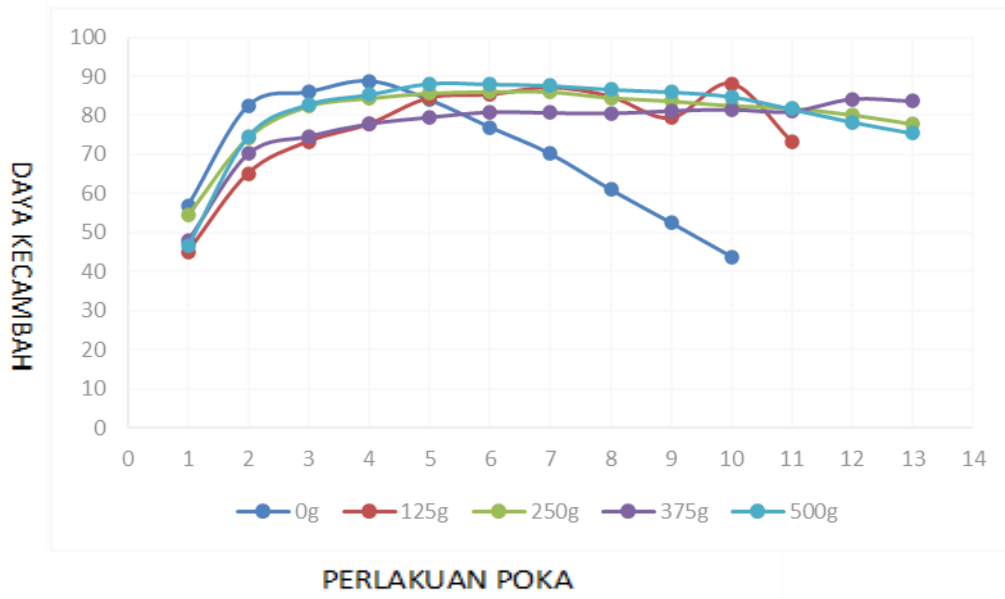
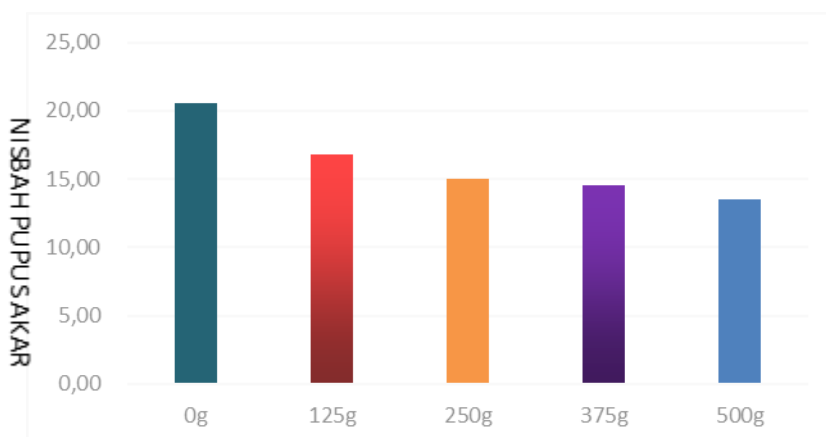


Figure 1. Germination curve for each fertilizer treatment organic chicken manure

Based on the observations presented in Figure 1., that the germination power of the highest eikun variety chicory seeds was obtained at a dose of 500g chicken manure organic fertilizer with an average of 80.5%, but this figure is not much different from the dose of 250g chicken manure organic fertilizer which is 80% and this figure is optimal for germination standards based on Indonesian National Standards is at least 80% (SNI, 2015), while other treatments did not reach the minimum limit.



PERLAKUAN POKA

Figure 2. Bar chart of root extinction ratio of each treatment of organic fertilizer dose of chicken manure

The Root Pupus Ratio is a value obtained from the ratio of the fresh weight of the plant and the fresh weight of the roots produced by a plant. Based on Figure 2 above, that treatment without organic fertilizer, the highest value is obtained, meaning that the fresh weight of the plant is much greater than the fresh weight of the roots. The more doses of organic fertilizer chicken manure given, the lower the value of the root extinction ratio, meaning that organic fertilizer affects the growth of roots of *microgreens* chicory plants. Overall, the application of organic fertilizer chicken manure leads to the growth of the upper part (stem and leaves) in balance with the root part in microgreen cultivation. Hendrawati et al., (2021) argue that chicken manure organic fertilizer has balanced makto nutrients so that it can improve soil structure, increase nutrient content, increase cation exchange capacity, so that nutrients are easily available to plants. Plants whose supply of N element is sufficient will form leaves with high chlorophyll so as to produce photosynthetes to maintain their vegetative growth. Lingga & Marsono (2001) also argue that the main function of element N is to stimulate overall growth, especially stems, branches and leaves of plants.

CONCLUSION

The application of organic fertilizer chicken manure has a good effect on plant growth and the yield of chicory plants of the Eikun variety. Giving a dose of 250 g in a mixed medium of soil, cocopyd and burnt husks up to 2000g per plot is the optimum dose, represented by the variable response of fresh weight of plants, and fresh weight of roots, while the dose of 375 g has the best effect on germination, plant height, and root length. Given the final result of chicory in microgreen cultivation, the part consumed is only the stem and leaves, it is recommended to apply 250g chicken manure organic fertilizer per area of 27.10-3 M 2,100-1 plants or equivalent to 9.25 kg. M-1 has met the optimum needs of organic fertilizer for chicory chicken manure cultivated by microgreens.

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