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Indigenous microorganisms from the corm of banana improve the growth and yield of three varieties of cucumber (*Cucumis sativus* L.)

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ABSTRACT

Introduction: Cucumber (*Cucumis sativus* L.) is a type of vegetable that is widely consumed by the public. Cucumber production is still low due to cultivation systems that are not by standard operating procedures and low soil fertility. Therefore it is necessary to improve cultivation techniques through the use of quality seeds and fertilization. The study aimed to determine the effect of various concentrations of indigenous microorganisms from the corm of banana on the growth and yield of three varieties of cucumber. **Methods**: The study used a randomized block design with two factors: cucumber variety (Hercules, Mercy, Harmony) and concentration of indigenous microorganisms from banana corm (0, 200, 400, 600) ml/L. Each treatment was repeated three times with eight plants per plot, totaling 288 plants. **Results**: There was an interaction between cucumber varieties and microorganism concentrations. The Harmony variety with 600 ml/L of microorganisms showed the best results: plant height (162.03 cm), number of leaves (31.92), branches (3.57), fruits (10.58), and fruit weight (156.28 g). **Conclusion**: The Harmony variety and 600 ml/L concentration of indigenous microorganisms from banana corms significantly improved cucumber growth and yield. This method can reduce production costs by using easily available and cheap materials, decreasing reliance on expensive synthetic fertilizers.

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INTRODUCTION

Cucumber (*Cucumis sativus* L) is a type of vegetable plant that is widely consumed by people, whether eaten as fresh fruit, vegetables or used to make juices and pickles (Abdurrazak *et al.*, 2013; Pane *et al.*, 2017). Cucumbers have low-calorie content and lots of vitamin C, as well as flavonoids which function as antioxidants (Berkel Kaşıkçı & Bağdatlıoğlu, 2022; Febriani, 2021). Also contains 15 calories, 0.8 g protein, 0.19 g starch, 3 g carbohydrates, 30 mg phosphorus, 0.5 mg iron, 0.02 g theanine, 0.05 g riboflavin, and 14 mg acid in 100 g fruit (Murthy *et al.*, 2022).

Cucumber production in Indonesia is still very low compared to its potential. Cucumbers are easy to cultivate because they can adapt to various climatic conditions. Cucumbers grow in dry climates with altitudes of up to 400 m above sea level, temperatures of 21.1–26.7 °C, not much rain, and loose soil texture with a pH of 6–7 (Amin, 2015). The decrease in cucumber yields in Indonesia is caused by several factors, including cultivation systems that do not comply with standard operational procedures for cucumber cultivation and low soil fertility. Therefore, it is necessary to improve cucumber cultivation techniques through the use of quality seeds or variety selection, pruning, spacing, and fertilization (Gustia, 2016). Variety is an important technological component that has a major contribution to increasing production. In principle, superior varieties are varieties that have better characteristics than other varieties (Wang *et al.*, 2020). The use of various varieties has a significantly different effect on the generative development of plants (Siswadi *et al.*, 2022).

Cucumber plants require nutrients for their growth which can be supplied through fertilization. Indigenous microorganisms from the corm of bananas are one type of organic fertilizer that can be used. Bacteria that decompose organic matter in banana humps, such as Bacillus sp., *Aeromonas sp*., and *Aspergillus nigger*, can decompose organic matter (Indrianti & Tuhuteru, 2019; Purba & Maulana, 2021). Bacteria in Indigenous microorganisms from the corm of bananas will destroy organic material into compost (Kesumaningwati, 2015). The advantages of indigenous microorganisms from corm of banana as liquid organic fertilizer include increasing leaf

chlorophyll formation, plant vigor, plant resistance to drought, stimulating the growth of production branches, and formation of flowers and fruit (Fadhilah *et al.*, 2021).

Mawarni & Juwita Sari (2023) reported that the use of Indigenous microorganisms from the corm of banana increased the growth of chili plants in a hydroponic wick system. Furthermore, Kartana *et al.* (2021) reported that Indigenous microorganisms from the corm of banana with a concentration of 300 ml/L increased the weight of sweet corn cobs by 303 g, and Fahmi *et al.* (2020) stated that liquid organic fertilizer from Indigenous microorganisms from the corm of banana added with AB mix produced a fresh weight of claim plants of 22.14 g. The results of this research focus more on the role of indigenous microorganisms from the corm of banana as a nutrient provider for plants. It is known that liquid organic fertilizer plays a major role in providing essential nutrients for plants, but its influence on various types of varieties has not been widely disclosed. This research, apart from examining the function of liquid organic fertilizer, and indigenous microorganisms from corm of banana as a nutrient provider for plants, is also to determine its effect on cultivated plant varieties, especially cucumber. The research aims to determine the effect of various concentrations of indigenous microorganisms from the corm of banana on the growth and yield of three varieties of cucumber.

METHODS

Study site and treatments

The research was carried out in Sidera Village, Sigi Biromaru District, Sigi Regency, Central Sulawesi Province, from September to November 2022. The materials used in the research were cucumber seeds of three varieties, namely the Hercules, Mercy, and Harmony varieties, black silver plastic mulch, banana tubers, sugar, rice washing water, and coconut water. The equipment used is wooden stakes, scales, buckets, knives, cameras, label paper, hectares, hand sprayers, ropes, scissors, tractors, hoes, meters, bamboo, and writing tools.

The research used a randomized block design with a factorial pattern. The first factor was the cucumber variety (V) which consists of 3 types, namely: V1 (Hercules variety), V2 (Mercy variety), and V3 (Harmony variety). The second factor was the concentration of Indigenous microorganisms from the corm of banana (M) consisting of 4 levels, namely M0 = 0 ml/L (control), M1 = 200 ml/L, M2 = 400 ml/L, and M3 = 600 ml/L. Each treatment combination was repeated 3 times and each treatment plot used 8 plants, so there were 288 plants.

Crop establishment and agronomic practices

The land is obtained by plowing using a tractor. After plowing, a bed is made with a length of 3 meters, a width of 1 meter, and a height of 30 cm with a distance between the beds of 30 cm. After the bed is formed, black and silver plastic mulch is placed on it and a planting hole with a diameter of 10 cm is made. The distance between planting holes in one row is 70 cm, while the distance between holes between rows is 50 cm, and in 1 bed it is made in 2 rows.

Seeds Planting seeds is done directly in the prepared hole by inserting 1-2 cucumber seeds into the prepared planting hole and then covering it with soil. Next, water regularly until the seeds start to grow. After the plant grows, a pole is installed so that the plant can climb on the pole provided.

Plant maintenance includes watering, fertilizing, weeding, and controlling pests and diseases. Watering is carried out every day using sprinkler irrigation until water needs are met, that is, there is no stagnant water. Fertilization is carried out by applying organic fertilizer and indigenous microorganisms from corm of banana in doses according to the treatment, while pest and disease control is carried out by applying the concept of integrated pest control.

Data collection

Observation variables include growth components such as plant height, number of leaves, number of branches, and leaf area, as well as yield components such as number of fruit, fruit length, fruit weight, and fruit diameter.

Statistical analysis

The observational data is analyzed using analysis of variance or the F test at the 5% level, if the variance has a real effect, then proceed with the Honestly Significant Difference Test (HSD) at the 5% level

RESULTS AND DISCUSSION

Plant height

Analysis of variance showed that the interaction of cucumber varieties and the concentration of indigenous microorganisms from the corm of banana had a significant effect on plant height 30 days after planting. The results of the 5% HSD test (Table 1) show that the Hercules variety gave the highest average plant height at a concentration of indigenous microorganisms from corm of banana of 200 ml/L (V1M1), namely 131.68 cm, significantly different from V1M2 and V1M3 but not significantly different from V1M0. The Mercy variety gave the highest average plant height at

a concentration of 600 ml/L (V2M3), namely 145.50 cm, and was significantly different from all other treatments. The Harmoni variety gave the highest average plant height at a concentration of 600 ml/L (V3M3), namely 147.47 cm, which was also significantly different from all other treatments.

The interaction between cucumber varieties and the concentration of Indigenous microorganisms from banana corm can affect plant height because it increases soil fertility, allowing plants to obtain essential nutrients such as nitrogen, phosphorus, and potassium. Adequate nutrients are essential for vegetative growth, including stem elongation, which affects plant height.

Table 1. The average height of cucumber (cm) in various cucumber varieties and the concentration of Indigenous microorganisms from the corm of banana 30 days after planting

Treatment	the concentration of Indigenous microorganisms from the corm of banana (M)				HSD 5%
	(M0) 0 ml/L	(M1) 200 ml/L	(M2) 400 ml/L	(M3) 600 ml/L	
V1 – Hercules variety	^{c}125.98±4.28^{qr}	^{c}131.68±6.83^{r}	^{a}103.28±6.22^{p}	^{b}114.18±5.71^{q}	10.74
V2 – Mercy variety	^{c}124.99±10.62^{qr}	^{c}127.22±7.95^{qr}	^{c}133.45±14.81^{rs}	^{d}145.50±15.23^{s}	
V3 – Harmony variety	^{c}126.25±12.28^{pq}	^{c}125.77±12.96^{qr}	^{ab}108.51±18.27^{p}	**^{d}147.47±14.45^{t}**	
HSD 5%	13.04				

Note: Numbers followed by the same letter in the same row (a, b, c, d) and the same column (p, q, r, s, t) are not significantly different in the 5% HSD test.

Number of leaves

The results of the 5% HSD test (Table 2) show that the Hercules variety gave the highest average number of leaves at a concentration of indigenous microorganisms from a corm of banana of 200 ml/L (V1M1), namely 22.42 strands, significantly different from the V1M0 treatment but not significantly different from the V1M2 and V1M3. The Mercy variety gave the highest average number of leaves at a concentration of 600 ml/L (V2M3), namely 20.42 strands, which was significantly different from all other treatments. The Harmony variety gave the highest average number of leaves at a concentration of 600 ml/L (V3M3), namely 31.92 strands, which was significantly different from all other treatments.

Table 2. The average number of leaves (strands) of cucumber in various cucumber varieties and the concentration of Indigenous microorganisms from the corm of banana 30 days after planting

Treatment	The concentration of Indigenous microorganisms from the corm of banana (M)				HSD 5%
	(M0) 0 ml/L	(M1) 200 ml/L	(M2) 400 ml/L	(M3) 600 ml/L	
V1 – Hercules variety	^{ab}16.17±1.42^{pq}	**^{d}22.42±0.76^{s}**	^{cd}19.58±1.28^{rs}	^{cd}18.83±2.01^{qr}	3.59
V2 – Mercy variety	^{bc}18.25±7.12^{qr}	^{a}13.42±0.63^{p}	^{ab}14.92±3.59^{pq}	^{d}20.42±5.82^{rs}	
V3 – Harmony variety	^{d}21.08±6.17^{s}	^{cd}19.75±1.64^{rs}	^{cd}19.25±4.12^{qr}	^{e}31.92±3.88^{t}	
HSD 5%	4.36				

Note: Numbers followed by the same letter in the same row (a, b, c, d) and the same column (p, q, r, s, t) are not significantly different in the 5% HSD test

The interaction between cucumber varieties and the concentration of Indigenous microorganisms from the corm of banana can affect the number of leaves because Indigenous microorganisms from the corm of banana can produce growth hormones such as cytokinins, which are known to stimulate cell division and the formation of shoots, including leaves. Different concentrations can affect the production of these hormones in the soil, which in turn can affect the number of leaves produced by the plant. Different cucumber varieties may have different sensitivities to these hormones, which contribute to differences in leaf number.

Number of branches

Analysis of variance showed that the interaction between cucumber varieties and the concentration of Indigenous microorganisms from the corm of banana had a significant influence on the number of branches 30 days after planting. The results of the 5% HSD test (Table 3) show that the Hercules variety gave the highest average number of branches at a concentration of indigenous microorganisms from corm of banana of 600 ml/L (V1M3), namely 3.57, significantly different from all other treatments. The Mercy variety gave the highest average number of branches at a concentration of 600 ml/L (V2M3), namely 2.75, significantly different from V2M1 but not significantly different from V2M0 and V2M2. The Harmony variety gave the highest average number of branches at a concentration of 600 ml/L (V3M3), namely 3.42, significantly different from all other treatments.

Table 3. The average number of branches (branches) of cucumber plants in various varieties and the concentration of Indigenous microorganisms from the corm of banana aged 30 days after planting

Treatment	The concentration of Indigenous microorganisms from the corm of banana (M)				HSD 5%
	(M0) 0 ml/L	(M1) 200 ml/L	(M2) 400 ml/L	(M3) 600 ml/L	
V1 – Hercules variety	$^{cd}2.83\pm0.29^{pq}$	$^{ab}2.25\pm0.25^{p}$	$^{ab}2.67\pm0.29^{pq}$	$^{e}3.57\pm0.28^{r}$	0.78
V2 – Mercy variety	$^{ab}2.17\pm1.04^{p}$	$^{a}1.92\pm0.38^{p}$	$^{ab}2.58\pm0.58^{pq}$	$^{bc}2.75\pm0.75^{pq}$	
V3 – Harmony variety	$^{ab}2.08\pm0.63^{p}$	$^{ab}2.00\pm0.66^{p}$	$^{ab}2.50\pm0.75^{pq}$	$^{de}3.42\pm0.38^{qr}$	
HSD 5%	0.94				

Note: Numbers followed by the same letter in the same row (a, b, c, d) and the same column (p, q, r, s, t) are not significantly different in the 5% HSD test

Overall, the interaction between cucumber varieties and concentrations of indigenous microorganisms from banana corm influences various aspects of plant physiology and ecology that contribute to leaf production. Genetic differences, increased nutrient availability, plant health, and resource use efficiency all play important roles in determining the number of branches produced by cucumber plants.

Leaf area

Analysis of variance showed that the interaction between cucumber varieties and concentrations of Indigenous microorganisms from the corm of banana had no significant effect on leaf area, but a single treatment of cucumber varieties and a single treatment of concentrations of Indigenous microorganisms from the corm of banana each had a significant effect on leaf area at 30 DAP and 40 days after plant. The results of the 5% HSD test (Table 4) show that the Hercules (V1) variety gave the highest average leaf area, namely 87.10 cm^2, significantly different from the Mercy (V2) variety, but not significantly different from the Harmony (V3) variety at 30 days after planting. The average leaf area of the Hercules variety (V1) was 122.38 cm^2 was significantly different from the Mercy variety (V2) and the Harmony variety (V3) 40 days after planting.

The concentrations of indigenous microorganisms from the corm of banana of 600 ml/L (M3) gave the highest average leaf area of 92.95 cm^2, significantly different from the control (M0) and the concentration of 200 ml/L (M1) but not significantly different from the concentration of 400 ml/L (M2) at 30 days after planting. The concentrations of indigenous microorganisms from the corm of banana of 600 ml/L (M3) also gave the highest average leaf area, namely 113.54 cm^2, significantly different from the control (M0) but not significantly different from the concentration of 200 ml/L (M1) and the concentration of 400 ml/L (M2) at 40 days after planting.

Table 4. The average leaf area (cm2) of cucumber plants in various varieties and the concentration of Indigenous microorganisms from the corm of banana aged 30 and 40 days after planting

Treatment	Day after planting (DAP)	
	30	40
Variety:		
V1 – Hercules variety	87.10 ± 6.37^{b}	122.38 ± 4.11^{b}
V2 – Mercy variety	75.93 ± 8.75^{a}	99.39 ± 12.11^{a}
V3 – Harmony variety	84.64 ± 4.03^{ab}	100.01 ± 3.55^{a}
HSD 5%	11.73	10.67
The concentration of Indigenous microorganisms from the corm of banana:		
M0 - 0 ml/L (control),	75.57 ± 3.62^{a}	110.96 ± 13.62^{ab}
M1 - 200 ml/L	78.65 ± 12.56^{a}	104.10 ± 18.64^{ab}
M2 - 400 ml/L	83.05 ± 5.54^{ab}	100.45 ± 11.22^{a}
M3 - 600 ml/L	92.95 ± 6.91^{b}	113.54 ± 9.97^{b}
HSD 5%	10.65	12.96

Note: Numbers followed by the same letter in columns (a, b) are not significantly different in the 5% HSD test.

The interaction between varieties and concentrations of native microorganisms from banana corms can produce unique results because each variety may respond differently to the environmental changes caused by the application of native microorganisms from banana corms. Some varieties may be more efficient at utilizing the additional nutrients provided by native microorganisms from banana corms, while others may be less responsive. This may lead to differences in leaf area between varieties applied with the same concentration of native microorganisms from banana corms. In addition, factors such as soil conditions, climate, and agricultural practices may also influence the effectiveness of these microorganisms.

Number of fruits

Analysis of variance showed that the interaction between cucumber varieties and concentrations of Indigenous microorganisms from the corm of banana had a significant effect on fruit number. The results of the 5% HSD test (Table 5) show that the Hercules variety gave the highest average number of fruits at a concentration of indigenous microorganisms from the corm of banana of 200 ml/L (V1M1), namely 8.33 not significantly different from all other treatments. The Mercy variety gave the highest average number of fruits at a concentration of 200 ml/L (V2M1), namely 7.20, which was significantly different from V2M0, but not significantly different from V2M2 and V2M3. The Harmony variety gave the highest average number of fruits at a concentration of 600 ml/L (V3M3), namely 10.58, which was significantly different from V3M0 and V3M2, but not significantly different from V3M1.

Table 5. The average number of cucumbers (fruit) in various cucumber varieties and the concentration of Indigenous microorganisms from the corm of banana

Treatment	The concentration of Indigenous microorganisms from the corm of banana (M)				HSD 5%
	(M0) 0 ml/L	(M1) 200 ml/L	(M2) 400 ml/L	(M3) 600 ml/L	
V1 – Hercules variety	^{p}7.50±1.50^{a}	p8.33±1.46^{a}	^{p}7.28±0.50^{a}	^{p}7.28±0.29^{a}	
V2 – Mercy variety	^{p}5.58±0.38^{a}	p7.20±0.82^{a}	^{p}6.73±0.28^{a}	^{p}6.83±0.63^{a}	4.47
V3 – Harmony variety	^{p}7.58±0.14^{a}	p8.17±0.92^{a}	^{p}7.92±076^{a}	^{pq}10.58±0.38^{a}	
HSD 5%		3.68			

Note: Numbers followed by the same letter in the same row (a, b, c, d) and the same column (p, q, r, s, t) are not significantly different in the 5% HSD test

Each cucumber variety has different genetic characteristics, including in terms of flowering and fruiting ability. Some varieties are naturally more productive in producing more flowers that develop into fruit. Therefore, when given the same treatment indigenous microorganisms from corm of banana, different varieties can show differences in the number of fruits produced Each cucumber variety has different genetic characteristics, including in terms of flowering and fruiting ability. Some varieties are naturally more productive in producing more flowers that develop into fruit. Therefore, when given the same treatment indigenous microorganisms from the corm of banana, different varieties can show differences in the number of fruits produced.

Fruit weight

Analysis of variance showed that the interaction between ±cucumber varieties and concentration of Indigenous microorganisms from the corm of banana had no significant effect on fruit weight. In a single treatment, cucumber varieties had no significant effect on fruit weight, but in a single treatment, the concentration of indigenous microorganisms from the corm of banana had a significant effect on fruit weight. The results of the 5% HSD test (Table 6) show that the highest average fruit weight was at indigenous microorganisms from corm of banana at a concentration of 400 ml/L (V2), namely 156.28 g, which was significantly different from the control (M0) and a concentration of 200 ml/L (M1) but not significantly different from a concentration of 600 ml/L (M3).

Table 6. The average fruit weight (g) of cucumber plants at various varieties and the concentration of Indigenous microorganisms from corm of banana

Treatment	Average
Variety:	
V1 – Hercules variety	295,50±8.83^{a}
V2 – Mercy variety	285,23±8.95^{a}
V3 – Harmony variety	310,73±22.02^{b}
HSD 5%	14,00
The concentration of Indigenous microorganisms from the corm of banana:	
M0 - 0 ml/L (control),	283,59±12.47^{a}
M1 - 200 ml/L	304,06±5.65^{bc}
M2 - 400 ml/L	310,91±13.71^{c}
M3 - 600 ml/L	290,05±22.08^{ab}
HSD 5%	17,00

Note: Numbers followed by the same letter in columns (a, b, c) are not significantly different in the 5% HSD test.

Analysis of variance showed that the interaction between cucumber varieties and concentrations of Indigenous microorganisms from the corm of banana had no significant effect on fruit weight. In a single treatment, the cucumber variety had no significant effect on fruit weight, but the concentration of indigenous microorganisms from the corm of banana had a significant effect on fruit weight. The results of the 5% HSD test (Table 6) show that the highest average

fruit weight was at concentrations of indigenous microorganisms from a corm of banana of 400 ml/L (V2), namely 156.28 g, which was significantly different from the control (M0) and a concentration of 200 ml/L (M1) but not significantly different from a concentration of 600 ml/L (M3).

The fruit-filling process is highly dependent on the availability and distribution of nutrients. Indigenous microorganisms from banana corm can play a role in ensuring that plants receive sufficient nutrients during this critical phase. Cucumber varieties may respond differently to indigenous microorganisms from banana corm treatments in terms of utilizing nutrients for fruit filling which will affect the final fruit weight.

Interactions between cucumber varieties and Indigenous microorganisms from the corm of banana

Analysis of variance showed that there was an interaction between cucumber varieties and indigenous microorganisms from the corm of banana when observing plant height, number of leaves, number of branches, and number of fruits. The Harmony variety with indigenous microorganisms from the corm of banana at a concentration of 600 ml/L (V3M3) provided the best growth and results compared to other treatments. This is because the three varieties show different responses to the application of indigenous microorganisms from corm of banana and the nutrient requirements of each variety are also different.

The higher the number of indigenous microorganisms from the corm of banana applied, the more cucumber growth will increase. Indigenous microorganisms from the corm of bananas are also a source of organic material containing macro and micronutrients that plants need for growth. Thus, the large amount of nutrient content in liquid fertilizer from indigenous microorganisms from the corm of banana can help plant growth (Bahtiar *et al.*, 2016).

The potassium and phosphorus content of indigenous microorganisms from the corm of banana increases plant yields. Increasing plant growth and yields, both in quality and quantity, can be achieved by providing the right fertilizer in terms of variety, dosage, time, and method of fertilization (Lasmini *et al.*, 2022a; Lasmini *et al.*, 2022b). This is also supported by the statement (Gustianty, 2016), that phosphorus functions to accelerate growth, strengthen young plants, and play a role in cell division, while potassium plays a greater role in increasing photosynthesis, saving water use, and accelerating the transformation and transportation of metabolic results from a part to another section.

Effect of varieties on plant growth and production

Cucumber varieties influence all observation parameters. The Harmony variety has the best influence on the growth and yield of cucumber plants, this is because the Harmony variety is suitable for this environment, and also responds well to indigenous microorganisms from the corm of banana. This is supported by the statement of Innark *et al.* (2013), that the adaptation of each variety to the local environment is a response to the environment. This also indicates that genetic traits are the dominant factor that determines differences in growth and yield components in each cucumber variety. These differences in genetic traits cause plants to respond to their environment in different ways (Wang *et al.*, 2020).

The differences in yield shown by several varieties are thought to be caused by genetic differences. Plants respond to the environment in different ways because of these differences in genetic traits. Genetic traits influence the shape of the plant, and the environment also influences it (Abdurrazak *et al.*, 2013; Kurniasari *et al.*, 2023). One of the factors that causes diversity in plant forms is differences in genetic composition (Innark *et al.*, 2013).

The interaction between genetics and environmental factors influences the ability of varieties. Apart from genetic factors, seed quality also influences the growth and production of cucumber plants. Other factors such as climate, soil, pests, diseases, and weeds can also influence plant growth and production (Rosmini *et al.*, 2020)

Effect of Indigenous microorganisms from the corm of banana on plant growth and production

Providing different concentrations of indigenous microorganisms from the corm of banana resulted in differences in the observed effects on cucumber growth. The results of the research showed that increasing indigenous microorganisms from the corm of banana, namely a concentration of 600 ml/L (M3), increased plant growth, namely the number of leaves, leaf area, number of fruit, fruit length, fruit weight, and fruit diameter. The indigenous microorganisms from the corm of banana solution contain macro and micronutrients, as well as microorganisms that can act as decomposers of organic material (Kurniawati *et al.*, 2015; Putra *et al.*, 2021). Thus, the application of indigenous microorganisms from the corm of banana can increase the nutrients in the soil. In acidic soil, local microorganisms in banana weevils break down organic matter to become available for plants. Thus, the use of indigenous microorganisms from the corm of bananas improves soil properties through the decomposition process of organic matter (Kesumaningwati, 2015; Taghipour & Jalali, 2019).

Indigenous microorganisms from the corm of bananas contain balanced nitrogen (N) and phosphorus (P), which are essential for vegetative and generative plant growth (Aini *et al.*, 2017; Rusnaini & Akbar, 2022). This is because Indigenous microorganisms contain microorganisms that come from carbohydrates in rice washing water, brown sugar, and banana tubers. The role of the N element for plants is to stimulate overall growth, especially stems,

branches, and leaves. In addition, nitrogen is very important for the formation of green leaves, which is very beneficial for photosynthesis, and the formation of proteins and fats. The role of the P element for plants is to stimulate root growth, especially the roots of seeds and young plants. Phosphorus also functions as a source of certain proteins (Andre *et al.*, 2015; Gustianty, 2016).

CONCLUSION

Based on the research results, it can be concluded that the Harmony (V3) variety of cucumber given Indigenous microorganisms from a corm of banana in a concentration of 600 ml/L of water had the best effect on plant growth and yield in all parameters, including plant height, number of leaves, number of branches, number of fruit, length. fruit and fruit weight. Thus, the use of Indigenous microorganisms from the corm of banana at this concentration can increase the growth rate of cucumber plants and can help reduce production costs because these microorganisms can be made with materials that are easy to find and cheap, thus reducing dependence on synthetic chemical fertilizers which are usually more expensive.

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