



## Growth and Production of Sweet Corn (*Zea mays* var. *Saccharata* Strut.) at Various Doses of NPK 16-16-16 Fertilizer

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**Abstract.** Sweet corn is a high-value horticultural crop with steadily increasing demand for both fresh consumption and use as a raw material in the food industry. This study aims to evaluate the effectiveness of NPK 16-16-16 fertilizer on the growth and yield of sweet corn. The research was conducted at Sindangbarang Experimental Field, Faculty of Agriculture, IPB University from July to October 2025. This experiment used a Randomized Complete Block Design (RCBD) with a single factor, namely the dose of fertilizer application. Treatments were using fertilizer dosages of 0, 50, 0,75, 1,00, and 1,50 NPK 16-16-16, with a control treatment for comparison. During the vegetative phase, sweet corn exhibited similar growth responses across all fertilization levels relative to the control. However, all fertilizer doses significantly improved stover weight, cob weight with and without husk, cob length, cob diameter, yield per plot, and overall productivity compared to the control. The application of NPK 16-16-16 fertilizer at the recommended (1.0) rate achieved the highest relative agronomic effectiveness (103.11%), corresponding to a 1.03-fold yield increase over the control and outperforming the comparison treatment. Application of NPK 16-16-16 at the 1.0 recommended dose is suggested as the most efficient fertilization strategy for sweet corn production, as it maximizes yield and productivity without unnecessary increases in fertilizer input.

**Keywords:** Horticulture; Nutrient Management; Productivity; Relative Agronomic Efficiency; Yield

### 1. INTRODUCTION

Sweet corn (*Zea mays* *saccharata*) is one of the horticultural commodities with high economic value and steadily increasing market demand, both for fresh consumption and as raw material for the food industry. To achieve optimal productivity, sweet corn requires proper fertilization in terms of fertilizer type, dosage, and timing of application (Nindita et al., 2024; Amir et al., 2022). One type of compound fertilizer widely used in sweet corn cultivation is NPK fertilizer with a balanced formulation.

Fertilization with NPK has a significant impact on corn productivity. Studies have shown that the application of NPK fertilizer can substantially enhance corn growth and yield. In several studies, appropriate use of NPK fertilizer not only increased biomass and grain yield but also improved soil chemical properties, both of which are crucial for the success of corn cultivation (Purba et al., 2019; Sebetha and Mashele, 2019; Fauziah et al., 2023). Other studies have indicated that the effects of NPK fertilization across different corn species reveal that applying appropriate NPK fertilizer rates can significantly increase yield. The use of, and interaction between, corn varieties and NPK fertilizer doses result in optimal growth and higher yields (Musa et al., 2023). Furthermore, the combination of NPK fertilizer with organic

fertilizer has been proven to increase yields more effectively than the use of NPK fertilizer alone, offering greater advantages for sustainable agricultural systems (Fauziah et al., 2023; Maswar and Soelaeman, 2016).

NPK 16-16-16 fertilizer is a balanced formulation containing 16% nitrogen (N), 16% phosphorus (P), and 16% potassium (K). Each of these nutrients plays an important physiological role in plants. Nitrogen (N) is involved in chlorophyll formation, protein synthesis, and vegetative growth. Phosphorus (P) contributes to root development, flower and seed formation, and is essential for energy transfer through ATP compounds. Potassium (K) assists in photosynthesis, stomatal regulation, tolerance to abiotic stress, and seed filling and quality. Therefore, maintaining a balance among these three nutrients is crucial for achieving optimal sweet corn yields (Ramadhan, 2023; Nuraini and Aqila, 2020).

In cultivation practices, the effectiveness of NPK fertilizer is strongly influenced by the application method, soil conditions, and plant growth stages. In sweet corn, NPK fertilizer is generally applied in stages, namely at planting as a basal fertilizer and during the vegetative and generative growth phases as a supplementary fertilizer. This approach allows for continuous nutrient availability, thereby supporting the growth of roots, stems, and leaves, as well as cob and grain formation. Several studies have also shown that the use of NPK in granular or liquid forms produces different results depending on soil characteristics and irrigation systems; therefore, adjusting fertilization methods to field conditions is key to maximizing the effectiveness of NPK fertilizer (Sahputra et al., 2023). Therefore, this study aims to evaluate the effectiveness of NPK 16-16-16 fertilizer on the growth and yield of sweet corn.

## **2. LITERATURE REVIEW**

In corn and related cereals, NPK fertilization affect vegetative growth, biomass accumulation, and grain yield, with effects modulated by dose, timing, and interaction with soil properties. Studies indicate that higher NPK inputs can improve plant height, biomass, and yield components, while the response may saturate or decline if nutrients exceed crop demand or if other constraints (e.g., water, soil pH) limit uptake (Harahap, 2024).

Balanced nutrient supply via NPK fertilizers drives corn growth and yield, particularly for resources allocated to leaf area, photosynthetic capacity, and kernel development. In various corn contexts, inorganic NPK supplies readily translate into improved growth metrics and yield components when supply aligns with crop demand and is matched to soil conditions (Prasad & Hochmuth, 2016), (Moore et al., 2020), (El-Syed et al., 2023). Adequate NPK is known to

induce a positive response in corn; however, responses may saturate or decline if water, rooting, or pH constraints limit uptake (Prasad and Hochmuth, 2016; Moore et al., 2020). Various research findings indicate that the application of NPK 16-16-16 fertilizer at a rate of 300 kg/ha produces the best results in terms of plant height, number of leaves, cob with husk length, cob with husk length, cob weight with husk, and sugar content (Pribadi et al., 2023; Saputra et al. 2023). These findings complement the present study by indicating that well-balanced fertilization strategies are key to achieving maximum productivity in sweet corn (Mulyana et al., 2025).

### 3. RESEARCH METHOD

The experiment was conducted at the IPB Sindangbarang Experimental Field, Bogor Regency, West Java, from July to October 2025. The plant material used was sweet corn of the Exotic variety, NPK 18-18-18 fertilizer, urea, SP-36, and KCl. This study was arranged using a Randomized Complete Block Design (RCBD) with six replications. The treatment consisted of 1 factor with 4 levels of fertilization namely, control (P0), standard NPK (P1), 0,5 NPK (P2), 0,75 NPK (P3), 1,0 NPK (P4), and 0,5 1,5 NPK (P5). Each treatment was replicated four times, with replications serving as blocks. In total, 24 experimental plots were evaluated. The size of experimental plots used as experimental units was 5 m x 5 m.

The standard NPK fertilizer doses for N, P, and K requirements of sweet corn were 135 kg N ha<sup>-1</sup>, 72 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>, and 120 kg K<sub>2</sub>O ha<sup>-1</sup> equivalent to 300 kg ha<sup>-1</sup> urea, 200 kg ha<sup>-1</sup> SP-36, and 200 kg ha<sup>-1</sup> KCl. The nutrient content of standard NPK fertilizer (NPK- std) used were urea (45% N), SP-36 (36% P<sub>2</sub>O<sub>5</sub>), and KCl (60% K<sub>2</sub>O). Details of the treatments tried in this study are shown in Table 1.

**Table 1.** Details of fertilizer application rates of NPK 16–16–16 fertilizer.

Treatment	NPK 16-16-16 (kg ha <sup>-1</sup> )	Urea (kg ha <sup>-1</sup> )	SP-36 (kg ha <sup>-1</sup> )	KCl (kg ha <sup>-1</sup> )
P0	0	0	0	0
P1	0	300	200	200
P2	225	70	0	40
P3	338	105	0	60
P4	450	140	0	80
P5	675	210	0	120

Land preparation was conducted seven days prior to planting, followed by the incorporation of manure at a rate of 20 t ha<sup>-1</sup>. Sweet corn was planted at a spacing of 75 cm × 25 cm, with two seeds sown per planting hole along with an insecticide containing carbofuran

as the active ingredient. At four weeks after planting (WAP), seedlings were thinned to retain one plant per hole. SP-36 fertilizer was applied entirely at planting, whereas KCl fertilizer (as part of the standard NPK treatment) and calcium nitrate compound fertilizer were applied in two split applications, at planting and at 4 WAP, each at half of the recommended dose.

This study evaluated plant growth and yield components. Growth parameters, including plant height, number of leaves, and stem diameter, were recorded at 4, 6, and 8 weeks after planting (WAP) using 10 sample plants per experimental plot. Sweet corn was harvested at approximately 10 weeks after planting. Yield components measured from the same sample plants included stover weight, cob weight with husk, cob weight without husk, cob length, cob diameter, yield per plot and productivity. In addition to the sample plants, all fully developed cobs from each plot, including those from border plants, were harvested and weighed to determine total yield. The aggregate weight of marketable cobs per plot was then used to estimate productivity.

The subsequent analysis involved calculating the Relative Agronomic Effectiveness (RAE). NPK 16-16-16 fertilizer was considered effective when its performance was statistically comparable to or higher than that of the standard fertilizer treatment, or superior to the control treatment at the 5% significance level, with an RAE value equal to or greater than 95%. The agronomic effectiveness of the inorganic fertilizer was assessed using the Relative Agronomic Effectiveness (RAE) method as described by Machay et al. (1984), calculated using the following equation:

$$\text{RAE (\%)} = \frac{\text{Tested fertilizer yield} - \text{control}}{\text{Standard fertilizer yield} - \text{control}} \times 100$$

Data obtained from this study were subjected to analysis of variance (ANOVA) using the Statistical Analysis System (SAS). When significant treatment effects were detected, mean comparisons were performed using Duncan's Multiple Range Test (DMRT) at a 5% significance level ( $\alpha = 0.05$ )

## 4. RESULT AND DISCUSSION

### General conditions

The results in Table 2 indicate that the NPK fertilizer used in the study has a balanced and slightly enriched nutrient composition. The nitrogen content reached 16.27%, which is close to the labeled formulation and sufficient to support vegetative growth. Phosphorus

content, expressed as  $P_2O_5$ , was 18.40%, slightly higher than the nominal 16%, suggesting strong potential to support root development, flowering, and energy transfer processes. Potassium content ( $K_2O$ ) was 16.47%, indicating adequate availability for photosynthesis regulation, stress tolerance, and grain filling. The total macronutrient content ( $N + P_2O_5 + K_2O$ ) was 51.34%, exceeding the minimum requirement for compound NPK fertilizers, while the water content was low (0.99%), reflecting good fertilizer quality and stability. The purpose of the initial test was to assess the effectiveness of fertilizers containing NPK 16-16-16 compared to no fertilizer and the standard fertilizer treatment. The results of soil analysis are presented in Table 3.

**Table 2.** Analysis results of NPK fertilizer content.

Parameter	Unit	result
N	%	16,27
$P_2O_5$	%	18,40
$K_2O$	%	16,47
$N + P_2O_5 + K_2O$	%	51,34
Water content	%	0,99

The soil analysis before the experiment shows that the site is characterized by acidic soil conditions (pH 4.87) with low organic matter, a moderate nitrogen status, very high phosphorus availability, and moderate potassium availability. The acidic pH may limit nutrient uptake efficiency, while low C-organic content indicates reduced soil fertility buffering capacity, making crops more dependent on fertilizer inputs. Although total nitrogen is classified as medium, additional N is still required to support optimum corn growth. Phosphorus is present at very high levels, suggesting that P is unlikely to be a limiting factor, whereas potassium availability and reserves are moderate and may constrain yield under high production demands.

**Table 3.** Soil analysis results before the experiment.

Parameter	Unit	Value	Category*
pH $H_2O$	-	4,87	Sour
C-organic	%	1,98	Low
N-total	%	0,24	Medium
P-available	ppm $P_2O_5$	36,1	Very high
CEC	cmol $kg^{-1}$	17,5	Medium
K-dd	cmol K $kg^{-1}$	0,43	Medium
P-Potensial	mg $P_2O_5$ 100 $g^{-1}$	142	Very high
K-Potensial	mg $K_2O$ 100 $g^{-1}$	24,4	Medium

*Source: Balittanah (2023).*

The growth and yield characteristics observed included plant height, stem diameter, number of leaves, fresh stover weight, cob weight with husk, cob weight without husk, cob

length, cob diameter, plot yield, and productivity. Table 4 presents a summary of the effects of NPK 16-16-16 fertilizer on the observed variables. The coefficients of variation for the recorded parameters ranged from 2.91% to 18.88%. Application of NPK 16-16-16 fertilizer had a significant effect on all vegetative variables and production characteristics evaluated.

**Table 4.** Recapitulation of analysis variance.

Variable	Mean Square Error (MSE)	Pr>F	Coefficient of variance (%)
Growth component			
Plant height			
4 WAP	43.2737	*	9,39
6 WAP	51.4171	**	5,18
8 WAP	30.6114	**	2,91
Stem diameter			
4 WAP	2,4672	*	10,59
6 WAP	1,0116	**	6,14
8 WAP	0,6513	**	4,35
Number of leaves			
4 WAP	0,1370	**	5,55
6 WAP	0,0838	**	2,87
8 WAP	0,0357	**	1,53
Yield component			
Stover weight	0,0012	**	13,25
Cob weight with husk	0,0020	**	16,83
Cob weight without husk	0,0010	**	15,28
Cob lenght	0,5093	**	3,86
Cob diameter	11,2390	**	7,73
Yield per plot	11,1729	**	18,88
Productivity	4,5018	**	18,88

### Effect of NPK 16-16-16 Fertilizer on Growth Components

The results showed that application of NPK 16-16-16 fertilizer significantly affected plant height compared to the control at 4, 6, and 8 weeks after planting (WAP) (Table 5). At 4 WAP, the control treatment (P0) recorded the lowest plant height at 61.2 cm, whereas treatments P2, P3, and P4 showed no significant differences among themselves, with plant heights ranging from 72.1 to 73.6 cm. By the end of the observation period at 8 WAP, the control treatment still exhibited the lowest plant height at 129.7 cm, while treatment P3 produced the tallest plants, reaching 214.6 cm.

**Table 5.** Plant height at different application rates of NPK 16-16-16 fertilizer.

Treatment	Plant weight (cm)		
	4 WAP	6 MST	4 WAP
Control (P0)	61,2 <sup>b</sup>	97,3 <sup>c</sup>	129,7 <sup>c</sup>
NPK-Standart (P1)	70,5 <sup>ab</sup>	145,2 <sup>ab</sup>	204,8 <sup>b</sup>
0,5 NPK 16-16-16 (P2)	72,1 <sup>a</sup>	141,4 <sup>b</sup>	186,8 <sup>d</sup>
0,75 NPK 16-16-16 (P3)	73,1 <sup>a</sup>	154,1 <sup>a</sup>	214,6 <sup>a</sup>
1,0 NPK 16-16-16 (P4)	73,6 <sup>a</sup>	145,9 <sup>ab</sup>	207,6 <sup>ab</sup>
1,5 NPK 16-16-16 (P5)	69,6 <sup>ab</sup>	145,9 <sup>ab</sup>	195,7 <sup>c</sup>

Note: numbers followed by different letters in the same column indicate significant differences based on the results of DMRT  $\alpha$  5% test

The results indicated significant differences in stem diameter among all NPK 16-16-16 fertilizer treatments at 4, 6, and 8 weeks after planting (WAP), as shown in Table 6. Application of NPK 16-16-16 fertilizer was proven to increase sweet corn stem diameter compared to the unfertilized control. The doses of 0.75 NPK to 1.5 NPK were the most effective in consistently enhancing stem diameter growth up to 8 WAP. These findings highlight the importance of using balanced NPK fertilizer formulations in sweet corn cultivation to achieve optimal vegetative growth. The results are consistent with those reported by Amir et al. (2022), who found that NPK fertilization improved vegetative growth parameters of corn, including stem diameter. Furthermore, Sebetha and Mashele (2019) reported that appropriate combinations of NPK doses contributed to stronger stems and reduced the risk of lodging in corn.

**Table 6.** Stem diameter at different application rates of NPK 16-16-16 fertilizer.

Treatment	Stem diameter (cm)		
	4 WAP	6 MST	4 WAP
Control (P0)	12,40 <sup>c</sup>	13,8 <sup>d</sup>	15,9 <sup>c</sup>
NPK-Standart (P1)	14,4 <sup>bc</sup>	15,9 <sup>bc</sup>	18,7 <sup>ab</sup>
0,5 NPK 16-16-16 (P2)	14,5 <sup>bc</sup>	15,5 <sup>c</sup>	17,9 <sup>b</sup>
0,75 NPK 16-16-16 (P3)	17,1 <sup>a</sup>	18,8 <sup>a</sup>	19,9 <sup>a</sup>
1,0 NPK 16-16-16 (P4)	15,9 <sup>ab</sup>	16,9 <sup>bc</sup>	19,4 <sup>a</sup>
1,5 NPK 16-16-16 (P5)	14,5 <sup>bc</sup>	17,2 <sup>b</sup>	19,3 <sup>a</sup>

Note: numbers followed by different letters in the same column indicate significant differences based on the results of DMRT  $\alpha$  5% test

Application of NPK 16-16-16 fertilizer had a significant effect on the number of sweet corn leaves compared to the control (Table 7). A dose of 0.75 of the recommended NPK rate (P3) resulted in the highest and most consistent leaf number up to 8 WAP. These results highlight the importance of balanced availability of major macronutrients in supporting vegetative growth, particularly increasing leaf number as the main photosynthetic organ. In

contrast, Agustine et al. (2022) reported that applications of inorganic fertilizer, organic fertilizer, and combined fertilizers did not significantly affect leaf number.

**Table 7.** Number of leaves at different application rates of NPK 16-16-16 fertilizer.

Treatment	Stem diameter (cm)		
	4 WAP	6 MST	4 WAP
Control (P0)	5,9 <sup>b</sup>	7,3 <sup>c</sup>	8,8 <sup>c</sup>
NPK-Standart (P1)	6,8 <sup>a</sup>	10,0 <sup>b</sup>	13,1 <sup>ab</sup>
0,5 NPK 16-16-16 (P2)	6,8 <sup>a</sup>	10,4 <sup>b</sup>	12,9 <sup>b</sup>
0,75 NPK 16-16-16 (P3)	6,8 <sup>a</sup>	10,9 <sup>a</sup>	13,2 <sup>a</sup>
1,0 NPK 16-16-16 (P4)	6,9 <sup>a</sup>	10,9 <sup>a</sup>	12,9 <sup>ab</sup>
1,5 NPK 16-16-16 (P5)	6,6 <sup>a</sup>	10,9 <sup>a</sup>	13,0 <sup>ab</sup>

Note: numbers followed by different letters in the same column indicate significant differences based on the results of DMRT  $\alpha$  5% test

### Effect of NPK 16-16-16 Fertilizer on Sweet Corn Yield

All fertilizer dose treatments showed significant differences compared to the control for production characteristics, namely stover weight, cob weight with husk, and cob weight without husk (Table 8). The lowest values were observed in the control treatment compared to fertilized treatments. Meanwhile, analysis of yield components showed that the application of NPK 16-16-16 and standard NPK fertilizers did not result in significant differences in stover weight, cob weight with husk, or cob weight without husk among the fertilized treatments. Treatment P4 (1.0 NPK 16-16-16) resulted in stover weight, cob weight with husk, and cob weight without husk of 0.318 kg, 0.321 kg, and 0.258 kg, respectively (Table 9). Mutaqin et al. (2019), in their study on the effects of fertilizers on sweet corn production, reported that kernel formation and cob weight are influenced by the level of nutrient availability in the soil.

**Table 8.** Stover weight and yield components of sweet corn under different levels of NPK 16-16-16 fertilizer application

Treatment	Stover weight (kg)	Cob weight with husk (kg)	Cob weight without husk (kg)
Control (P0)	0,152 <sup>b</sup>	0,106 <sup>b</sup>	0,082 <sup>b</sup>
NPK-Standart (P1)	0,265 <sup>a</sup>	0,306 <sup>a</sup>	0,235 <sup>a</sup>
0,5 NPK 16-16-16 (P2)	0,281 <sup>a</sup>	0,278 <sup>a</sup>	0,217 <sup>a</sup>
0,75 NPK 16-16-16 (P3)	0,307 <sup>a</sup>	0,302 <sup>a</sup>	0,216 <sup>a</sup>
1,0 NPK 16-16-16 (P4)	0,318 <sup>a</sup>	0,321 <sup>a</sup>	0,258 <sup>a</sup>
1,5 NPK 16-16-16 (P5)	0,306 <sup>a</sup>	0,319 <sup>a</sup>	0,238 <sup>a</sup>

Note : numbers followed by different letters in the same column indicate significant differences based on the results of DMRT  $\alpha$  5% test.

The effects of fertilizer treatments on cob length and cob diameter showed significantly different results (Table 9). The lowest cob length was obtained from the control treatment, measuring 13.7 cm, whereas fertilized treatments did not differ significantly from

one another, with cob lengths ranging from 18.9 to 19.9 cm. The smallest cob diameter was also observed in the control treatment at 29.5 cm, while fertilized treatments showed no significant differences among themselves, with diameter values ranging from 45.7 to 47.7 cm.

**Table 9.** Cob length and diameter of sweet corn under different levels of NPK 16-16-16 fertilizer application.

Treatment	Cob length (cm)	Cob diameter (cm)
Control (P0)	13,7 <sup>b</sup>	29,5 <sup>b</sup>
NPK-Standart (P1)	19,9 <sup>a</sup>	46,1 <sup>a</sup>
0,5 NPK 16-16-16 (P2)	18,9 <sup>a</sup>	45,7 <sup>a</sup>
0,75 NPK 16-16-16 (P3)	18,9 <sup>a</sup>	45,5 <sup>a</sup>
1,0 NPK 16-16-16 (P4)	19,4 <sup>a</sup>	47,7 <sup>a</sup>
1,5 NPK 16-16-16 (P5)	19,9 <sup>a</sup>	45,7 <sup>a</sup>

Note : numbers followed by different letters in the same column indicate significant differences based on the results of DMRT  $\alpha$  5% test.

The analysis of plot yield and productivity showed significant differences among fertilization treatments compared with the control (Table 10). Balanced fertilization increased sweet corn productivity to a range of 11.79–13.59 t ha<sup>-1</sup>, whereas yields without fertilizer were very low, reaching only 2.65 t ha<sup>-1</sup>. NPK 16-16-16 fertilizer significantly increased the production and productivity of sweet corn compared to no fertilization. The 1.0 NPK dose (P4) was the most optimal treatment, resulting in a productivity of 13.953 t ha<sup>-1</sup>. Applying fertilizer beyond the optimal dose (1.5 NPK) did not provide a significant additional yield, indicating that fertilizer use efficiency should be considered to reduce costs and maintain the sustainability of the cultivation system.

**Table 10.** Yield per plot and estimated productivity of sweet corn under different levels of NPK 16-16-16 fertilizer application.

Treatment	Yield per plot (kg)	Productivity (t ha <sup>-1</sup> )
Control (P0)	4,17 <sup>b</sup>	2,65 <sup>b</sup>
NPK-Standart (P1)	21,44 <sup>a</sup>	13,61 <sup>a</sup>
0,5 NPK 16-16-16 (P2)	19,68 <sup>a</sup>	12,50 <sup>a</sup>
0,75 NPK 16-16-16 (P3)	18,57 <sup>a</sup>	11,79 <sup>a</sup>
1,0 NPK 16-16-16 (P4)	21,98 <sup>a</sup>	13,95 <sup>a</sup>
1,5 NPK 16-16-16 (P5)	20,34 <sup>a</sup>	12,91 <sup>a</sup>

Note : numbers followed by different letters in the same column indicate significant differences based on the results of DMRT  $\alpha$  5% test.

### Relative Agronomic Effectiveness

The Relative Agronomic Effectiveness (RAE) value represents the percentage increase in productivity achieved by a given technology compared with the productivity percentage obtained using standard or recommended technology. This value indicates the

level of effectiveness of a technology relative to the standard practice. An RAE value exceeding 100% indicates that the technology is more efficient than the standard technology (Riyanto et al., 2021). The RAE of NPK 16-16-16 fertilizer are presented in Table 11.

**Table 11.** Relative Agronomic Effectiveness (RAE) values under different levels of NPK fertilizer application

Treatment	RAE (%)
Control (P0)	-
NPK-Standart (P1)	-
0,5 NPK 16-16-16 (P2)	89,83
0,75 NPK 16-16-16 (P3)	83,37
1,0 NPK 16-16-16 (P4)	103,11
1,5 NPK 16-16-16 (P5)	93,60

## 5. CONCLUSION AND SUGGESTIONS

Sweet corn plants showed a similar response to all fertilization levels compared with the control during the vegetative growth phase. All fertilizer dose treatments resulted in significant differences compared to the control for stover weight, cob weight with husk, cob weight without husk, cob length, cob diameter, yield per plot, and productivity. Application of the 1.0 dose of NPK 16-16-16 fertilizer on sweet corn resulted in a higher RAE value than the comparison treatment, reaching 103.11%, or a 1.03-fold yield increase relative to the comparison treatment over the control. Application of NPK 16-16-16 at the 1.0 recommended dose is suggested as the most efficient fertilization strategy for sweet corn production, as it maximizes yield and productivity without unnecessary increases in fertilizer input.

## REFERENCES

- Agustine, L., Ramadhan, R. A. M., Manurung, R. 2022. Pengaruh pemberian pupuk organik, anorganik dan pupuk campuran terhadap tinggi tanaman dan jumlah daun pada tanaman jagung (*Zea mays* L.). *Jurnal Technopreneur (JTech)*, 10(2), 1-4.
- Amir, N., Marlina, N., Palmasari, B., Aluyah, C., Aminah, I. S., Rompas, J. P., & Rohman, N. (2022). Respon pertumbuhan dan hasil jagung manis (*Zea mays* saccharata sturt L.) terhadap pupuk organik cair asal limbah buahan dan npk di lahan kering. *Agro Bali: Agricultural Journal*, 5(3), 498-503. <https://doi.org/10.37637/ab.v5i3.1027>.
- Balai Penelitian Tanah. (2023). Petunjuk Teknis Analisis Kimia Tanah, Tanaman, Air, dan Pupuk Edisi 3. Bogor: Balittanah.
- El-Syed, N. M. M., Helmy, A. M., Fouda, S. E. E., Nabil, M., Abdullah, T. A., Alhag, S. K., & Elrys, A. S. (2023). Biochar with organic and inorganic fertilizers improves defenses, nitrogen use efficiency, and yield of maize plants subjected to water deficit in an alkaline soil. *Sustainability*, 15(16), 12223. <https://doi.org/10.3390/su151612223>
- Fauziah, L., Anggraeni, L., Latifah, E., Istiqomah, N., & Khamidah, A. (2023). Increased yield

- and quality of corn by inorganic fertilizers and utilization of corn as food to support food security. *IOP Conference Series Earth and Environmental Science*, 1253(1), 012129. <https://doi.org/10.1088/1755-1315/1253/1/012129>.
- Harahap, E. J. (2024). Nutrients and growing media effect on growth and physiological traits of pak choi plants (*Brassica rapa* L.). *SABRAO Journal of Breeding and Genetics*, 56(2), 652-659. <https://doi.org/10.54910/sabrao2024.56.2.17>
- Mackay AD, Syers JK, Gregg PEH. 1984. Ability of chemical extraction procedures to assess the agronomic effectiveness of phosphate rock materials. *Journal of Agricultural Research*. 27(2): 219-230. <https://doi.org/10.1080/00288233.1984.10430424>.
- Maswar, M. & Soelaeman, Y. (2016). Effects of organic and chemical fertilizer inputs on biomass production and carbon dynamics in a maize farming on ultisols. *Agrivita Journal of Agricultural Science*, 38(2). <https://doi.org/10.17503/agrivita.v38i2.594>.
- Mattjik AA, Sumertajaya IM. 2002. Perancangan Percobaan dengan Aplikasi SAS dan MINITAB. 2nd Ed. Bogor: IPB Pr.
- Moore, S. A., Wells, M. S., Gesch, R. W., Becker, R. L., Rosen, C. J., & Wilson, M. L. (2020). Pennycress as a cash cover-crop: improving the sustainability of sweet corn production systems. *Agronomy*, 10(5), 614. <https://doi.org/10.3390/agronomy10050614>
- Mulyana, E., Rosyad, A., Furqoni, H., Khairullah, A., Annas, S., & Suwanto. (2025). Growth and production of sweet corn at various doses of micro inorganic fertilizers. *Buletin Agrohorti*, 13(2), 88–97. <https://doi.org/10.29244/agrob.v13i2.64456>
- Musa, Y., Bdr, M., Iswoyo, H., Adzima, A., M, N., & Larasati, A. (2023). Growth and production of several corn varieties at various NPK fertilizer dosages. *Agrotech Journal*, 7(2): 121-127. <https://doi.org/10.31327/atj.v7i2.1875>
- Mutaqin, Z., Saputra, H., Ahyuni, D. (2019). Respons pertumbuhan dan produksi jagung manis terhadap pemberian pupuk kalium dan arang sekam. *J Planta Simbiosis*, 1(1): 39-50.
- Nindita, A., Ikhsan, L., & Suwanto, S. (2024). Pertumbuhan dan produksi tanaman jagung manis (*Zea mays* var. *saccharata* sturt.) pada berbagai dosis pupuk majemuk npk+mg (8-9-39+3). *Buletin Agrohorti*, 12(2), 236-245. <https://doi.org/10.29244/agrob.v12i2.56677>.
- Nuraini, Y. and Aqila, M. (2020). Peran trichokompos dan pupuk NPK 16-16-16 terhadap serapan dan residu hara n dan p, serta hasil jagung ketan (*Zea mays* ceratina). *Jurnal Tanah dan Sumberdaya Lahan*, 7(1), 93-100. <https://doi.org/10.21776/ub.jtsl.2020.007.1.12>.
- Nurchahyo, R. D., Pribadi, D. U., & Koentjoro, Y. (2023). Kajian dosis pupuk majemuk npk 16-16-16 dan ketebalan mulsa jerami terhadap pertumbuhan dan hasil tanaman jagung manis (*Zea mays* *saccharata* L.) pada sistem tanpa olah tanah (TOT). *Jurnal Agrotech*, 13(1), 18-28. <https://doi.org/10.31970/agrotech.v13i1.102>
- Prasad, R. and Hochmuth, G. (2016). Environmental nitrogen losses from commercial crop production systems in the suwannee river basin of florida. *Plos One*, 11(12), e0167558. <https://doi.org/10.1371/journal.pone.0167558>
- Purba, R., Irwan, S., & Putra, E. (2019). The effect of spent bleaching earth filler-based npk fertilization on proline, growth and yield of maize. *Caraka Tani Journal of*

*Sustainable Agriculture*, 35(1), 44. <https://doi.org/10.20961/carakatani.v35i1.34166>.

Ramadhan, N. (2023). Growth and production of two job's tears cultivars (*Coix lacrima jobi*-L.) at various doses of npk compound fertilizer (16:16:16). *Aijans*, 4(01), 61-67. <https://doi.org/10.25077/aijans.v4.i01.61-67.2023>.

Saputra, R., & Muliawan, A. (2023). Pengaruh Pupuk NPK 16-16-16 Mutiara dan EM4 (Effective Microorganisms4) Terhadap Pertumbuhan Varietas Tanaman Buah. *Jurnal Greenation Pertanian dan Perkebunan*, 1(2), 45-55. <https://doi.org/10.38035/jgpp.v1i2.136>

Sebetha, E. and Mashele, L. V. (2019). The growth performance of sweet corn under the influence of animal manure, NPL and soil type. *Indian Journal of Agricultural Research*, 53(6): 718-722. <https://doi.org/10.18805/ijare.a-425>.