Effectiveness of macro compound NK fertilization on growth and yield of corn

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Abstract. This research aimed to know the effectiveness of macro compound NK fertilization on growth and yield of corn. The experiment was conducted in dryland of Banjararum Village, Singosari Subdistrict, Malang Regency on dry Season 2016. This experiment was using experimental plot 6 m x 4 m and it was designed in randomized block with 6 combinations of fertilization, and repeated 4 times, namely: (1) A (0 kg Urea/ha + 0 kg SP-36/ha + 0 kg Ponska/ha + 0 kg NK/ha), (2) B (300 kg Urea/ha + 50 kg SP-36/ha + 200 kg Ponska/ha + 0 kg NK/ha), (3) C (300 kg Urea/ha + 50 kg SP-36/ha + 0 kg Ponska/ha + 200 kg NK/ha), (4) D (275 kg Urea/ha + 50 kg SP-36/ha + 0 kg Ponska/ha + 300 kg NK/ha), (5) E (250 kg Urea/ha + 50 kg SP-36/ha + 0 kg Ponska/ha + 400 kg NK/ha), and (6) F (225 kg Urea/ha + 50 kg SP-36/ha + 0 kg Ponska/ha + 500 kg NK/ha). The results showed that macro compound NK fertilization is giving 500 kg NK/ha with 225 kg of Urea/ha and 50 kg SP-36/ha (treatment of F) obtained the highest yield than other of 11.2 t/ha dry seeds with the profit of corn farming IDR. 1,905,000 per hectare.

1. Introduction

Corn is a food supplement for rice and raw materials for the animal feed industry, and other processed industrial raw materials [1]. In accompany with the increasing demand for corn, efforts are needed to escalate corn production, including balanced fertilization, so that nutrient requirements for the growth of corn can be fulfilled. Balanced fertilization is intended so that the absorption of nutrients by plants takes place in a balanced manner. Consequently, there is no accumulation of nutrients from the use of one type of fertilizer based on location-specific recommended doses [1]. The concept of site-specific nutrient management considers the ability of soil to provide natural nutrients and nutrient recovery [2,3].

So far, nutrient needs for plants are only fulfilled by giving fertilizers containing macronutrients, especially N-inorganic continuously and without efforts to restore the elements absorbed by plants so as to reduce soil fertility and imbalanced by an increase in production inproportionally [4,5]. The advantages of fertilizing aside from being a waste of funds, also disrupt the balance of nutrients in the soil and environmental pollution [6-8], while fertilizer application is too little can provide an optimal level of rice production. The use of inorganic fertilizers in high doses does not always provide benefits to plant growth and yields and even tends to reduce soil quality [9]. Humberto and Alan added that the provision of inorganic fertilizers excessively in the long term will have a serious impact on the soil, namely the occurrence of soil hardening and reduced soil aggregate stability [10].

Efforts to use fertilizers efficiently include fertilizing doses, how to administer and the form of fertilizers that are used appropriately [11], and proper crop management [12]. The provision of adequate and balanced fertilizer is a key factor in increasing corn productivity and production [13]. Plants need
nutrients, especially N, P, K, during the vegetative and generative phase to increase corn yield [14,15]. Deficiencies of nutrient elements N, P and K often occur in the soil, so that additional fertilizer is needed, the amount of which depends on environmental conditions and crop management [12]. The balance of the combination of N, P, and K fertilizers influences the efficiency of nutrient use added that the provision of basic NPK fertilizer could increase corn production [12,16,17]. Researcher [18-20] stated that the need for plants for nitrogen and potassium is quite high, where nitrogen is needed in the formation of proteins, leaves and various other organic compounds, while potassium is associated with healthy plant growth. Excessive N or K fertilization on corn plants causes vegetative growth to be more dominant than generative, resulting in a decrease in corn yield [21]. The provision of N fertilizer increased cob size, seed weight, seed-cob weight ratio, harvest index, and seed yield [12,22]. K uptake affects the level of production of corn plants because in the absorption process K is a metabolic process in plants that is in the synthesis of proteins from ammonium ions [23]. This study aimed to determine the effectiveness of macro compound NK fertilizer on the growth and yield of corn.

2. Methods
The experiment was carried out at the farmer's land of Banjararam Village, Singosari Sub-district, Malang Regency at Dry Season (DS) 2016 (October 2016 until January 2017), using 6 mx 4 m experimental plot with 6 treatments arranged based on Randomized Block Design and quadruplicate. Then, ANOVA was continued by Duncan's Multiple Range Test (DMRT 5%) [24]. The treatment was a combination of a macro compound dosage NK fertilizer, ie: (1) \( A \) (0 kg Urea/ha + 0 kg SP-36/ha + 0 kg Ponska/ha + 0 kg NK/ha), (2) \( B \) (300 kg Urea/ha + 50 kg SP-36/ha + 200 kg Ponska/ha + 0 kg NK/ha), (3) \( C \) (300 kg Urea/ha + 50 kg SP-36/ha + 0 kg Ponska/ha + 200 kg NK/ha), (4) \( D \) (275 kg Urea/ha + 50 kg SP-36/ha + 0 kg Ponska/ha + 300 kg NK/ha), (5) \( E \) (250 kg Urea/ha + 50 kg SP-36/ha + 0 kg Ponska/ha + 400 kg NK/ha), and (6) \( F \) (225 kg Urea/ha + 50 kg SP-36/ha + 500 kg NK/ha). The analysis of macro compound NK fertilizer “Tawon” with N content of 10.50% and K\(_2\)O 40.11% (Table 1).

| Parameter                  | Unit | Test result                  | Testing Method               |
|----------------------------|------|------------------------------|------------------------------|
| Nitrogen (N)               | %    | 10.50                        | SNI 2803-2012                |
| Total P\(_2\)O\(_5\)       | %    | Undetectable (detection limit 0.0242 mg/ml) SNI 2803-2012 |
| K\(_2\)O                    | %    | 40.11                        | SNI 2803-2012                |
| Water                      | %    | 0.08                         | SNI 2803-2012                |
| Number of N, P, K          | %    | 50.60                        | SNI 2803-2012                |
| Cadmium metal (Cd)         | ppm  | Undetectable (detection limit 0.0029) SNI 2803-2012 |
| Lead metal (Pb)            | ppm  | Undetectable (detection limit 0.00369) SNI 2803-2012 |
| Metallic levels of Mercury (Hg) | ppm | Undetectable (detection limit 0.000102) SNI 2803-2012 |
| Arsenic (As)               | ppm  | Undetectable (detection limit 0.0035) SNI 2803-2012 |

Source: UPT Testing of Tobacco-Goods Quality Certification "Testing Laboratory No. 0575 / RA / V / 2016.

All doses of NK, Ponska, and SP-36 and Urea as much as one-third of the fertilizer doses as per treatment were given after 10 days of corn by way of planting holes at a distance of 5 cm next to the corn crop, then the hole was covered with soil. Two thirds of the remaining Urea fertilizer dose is given to the 25 Day After Plant (DAP) corn crop. Plot is made with size 6 m x 4 m. The plot is limited by a drainage channel with a width of 20 cm and a depth of 20 cm. Corn seed Pioneer 21 varieties are planted in a planting holes way at a spacing 70 cm x 20 cm, as much as 1 seed per hole.

Observations included:
(a) soil nutrient status before the experiment,
(b) plant height aged 30, 60 and 90 DAP,
(c) number of leaves per plant age 30, 60 and 90 DAP,
(d) number of cobs per plant.
(e) diameter and length of cob,  
(f) weight of 100 seeds,  
(g) cob weight per plot,  
(h) seed weight (t/ha dry grain harvest),  
(i) farming analysis, and  
(j) analysis of plant growth, namely:

\[
\text{Leaf area (LA)} = \text{length x width x constanta (0.75)x number of leaves per plant} 
\]

\[
\text{Leaf Area Index (LAI)} = \frac{\text{leaf area}}{\text{area of land (ha)}} \times \text{plant population each area of land (ha)} 
\]

\[
\text{Crop Growth Rate (CGR)} = \frac{w_1 - w_2}{p(t_2 - t_1)} \text{ (mg cm}^{-2}\text{days}^{-1}) 
\]

\[
\text{Net Assimilation Rate (NAR)} = \frac{w_2 - w_1 (\log_e \frac{A_2}{A_1})}{(t_2 - t_1)(t_2 - t_1)} \text{ (mg cm}^{-2}\text{days}^{-1}) 
\]

Which

\[w_1 = \text{dry weight of plant at time } t_1\]
\[w_2 = \text{dry weight of plant at time } t_2\]
\[p = \text{land area for one plant/clump}\]
\[t_2 = \text{next observation time after } t_1\]
\[t_1 = \text{initial observation time of a given period}\]

3. Results and Discussion

3.1. Agroecology Research Location

The location of fertilization experiment on corn in Banjararum Village, Singosari Subdistrict, Malang Regency, had soil clay texture with low organic C content (1.50%), low N-total (0.19%), very high P\textsubscript{2}O\textsubscript{5} (113 ppm), low K (0.31 me.100 g\textsuperscript{-1}), and other compound that can be seen at Table 2.

| Analysis Content Category | Table 2. Results of soil nutrient analysis before macro compound NK fertilizer experiment on corn, Singosari-Malang. |
|---------------------------|---------------------------------------------------------------------------------------------------|
| Texture :                |                                                                                                  |
| Sand (%)                  | 23                                                 |
| Dust (%)                  | 47                                                 |
| Clay (%)                  | 30                                                 |
| Class                     | Clay loam                                          |
| pH : H\textsubscript{2}O  | 5.00                                               |
| C-organic (%)             | 1.50                                               |
| N-total (%)               | 0.19                                               |
| C/N ratio                 | 7.89                                               |
| P\textsubscript{2}O\textsubscript{5}-Olsen (ppm) | 113.00                              |
| K (me.100 g\textsuperscript{-1}) | 0.31                                               |

Source: Result of analysis of Soil Laboratory of AIAT East Java, 2017

3.2. Growth and Plant Results

The macro compound NK fertilizer treatment significantly affects the height of the plant of corn aged 60 and 90 DAP (Table 3).

At the age of 30 DAP, the height of the corn plant did not show any significant difference, whereas at the age of 60 DAP and 90 DAP there was an increase in the height of corn, especially with the fertilization of 250 kg Urea/ha + 50 kg SP-36/ha + 400 kg NK/ha (treatment E) and fertilization 225 kg
Urea/ha + 50 kg SP-36/ha + 500 kg NK/ha (treatment F). At the age of 60 DAP, corn crops in standard fertilizers (treatment B) and NK (treatment C, D, E, and F) had higher cobs than corn not fertilized, whereas between standard fertilization and NK has the same high cob position. By contrast, at the age of 90 DAP, the height cob between fertilization treatments was the same (Table 4).

Table 3. Heigh plant of corn with macro compound NK fertilizer treatment, DS 2016, Singosari-Malang.

| Treatment | Urea kg/ha | SP-36 kg/ha | Ponska kg/ha | NK kg/ha | 30 DAP | 60 DAP | 90 DAP |
|-----------|------------|-------------|--------------|----------|--------|--------|--------|
| A         | 0          | 0           | 0            | 0        | 39a    | 126.3c| 139.3c|
| B         | 300        | 50          | 200          | 0        | 47a    | 143.0b| 151.6bc|
| C         | 300        | 50          | 0            | 200      | 46a    | 147.8b| 157.3b|
| D         | 275        | 50          | 0            | 300      | 41a    | 154.0ab| 159.1b|
| E         | 250        | 50          | 0            | 400      | 44a    | 162.3a| 176.0a|
| F         | 225        | 50          | 0            | 500      | 43a    | 162.1a| 164.8ab|

C V (%) 14.32 5.38 5.74

The numbers followed by the same letter in the same column are not significantly different from the DMRT at the 5%

Table 4. Height cob of corn with macro compound NK fertilizer treatment, DS 2016, Singosari-Malang.

| Treatment | Urea kg/ha | SP-36 kg/ha | Ponska kg/ha | NK kg/ha | 60 DAP | 90 DAP |
|-----------|------------|-------------|--------------|----------|--------|--------|
| A         | 0          | 0           | 0            | 0        | 45.7b | 48.0a |
| B         | 300        | 50          | 200          | 0        | 52.8ab| 58.6a |
| C         | 300        | 50          | 0            | 200      | 56.1ab| 62.9a |
| D         | 275        | 50          | 0            | 300      | 56.3ab| 58.6a |
| E         | 250        | 50          | 0            | 400      | 59.1a | 60.3a |
| F         | 225        | 50          | 0            | 500      | 59.1a | 60.7a |

C V (%) 12.48 14.48

The numbers followed by the same letter in the same column are not significantly different from the DMRT at the 5%

From the age of 60 DAP, the number of leaves per plant is affected by the macro compound NK fertilizer treatment (Table 5). In plants 60 DAP, standard fertilizer (treatment B) and NK (treatment C, D, E, and F) significantly increased the number of leaves per plant compared with no fertilizer. In plants 90 DAP, corn with fertilizer 225 kg Urea/ha + 50 kg SP-36/ha + 500 kg NK/ha (treatment F) has the highest number of leaves per plant marked with unmodified corn crops (treatment A) and corn crops in standard fertilizer (treatment B).

The leaf area is the multiplication of the length and width of the leaf as well as the constant with the number of leaves per plant. In this experiment, the age of 60 DAP leaf area was affected by macro compound NK fertilizer treatment (Table 6). At the age of 60 DAP and 90 DAP, unrefined corn crops (treatment A) and those in standard fertilizer (treatment B) have the same area, while those in the fertilizer with 250 kg Urea/ha + 50 kg SP-36/ha + 400 kg NK/ha (treatment E) has different leaf area with non-fertilized corn crop (treatment A) and in standard fertilizer (treatment B).

Leaf area index is multiplication of leaf area per hectare, from age 60 DAP, was influenced by macro compound NK fertilizer treatment (Table 7). Both at the age of 60 DAP and the age of 90 DAP, corn plants in the fertilizer 250 kg Urea/ha + 50 kg SP-36/ha + 400 kg NK/ha (treatment E) had higher number compared to corn plants without fertilizer added. The rate of growth of corn per day showed a significant difference between fertilization treatments, while the rate of net assimilation did not show any significant difference between fertilization treatments (Table 8). The rate of plant growth showed a marked increase in the presence of an increase in NK fertilizer, and the highest was found in fertilization
of 225 kg Urea/ha + 50 kg SP-36/ha + 500 kg NK/ha (treatment F), but not significantly different with NK 300-400 kg/ha with Urea 250-275 kg Urea/ha and 50 kg SP-36/ha (treatment D and E). The net assimilation rate of various fertilization treatments showed no significant difference.

Table 5. The number of leaves per plant with macro compound NK fertilizer treatment, DS 2016, Singosari-Malang.

| Treatment | Urea  | SP-36 | Ponska | NK | Number of leaves per plant |
|-----------|-------|-------|--------|----|---------------------------|
|           | kg/ha | kg/ha | kg/ha  | kg/ha | 30 DAP  | 60 DAP  | 90 DAP  |
| A         | 0     | 0     | 0      | 0    | 7.7a    | 9.8b    | 10.5c   |
| B         | 300   | 50    | 200    | 0    | 8.3a    | 10.3ab  | 10.8bc  |
| C         | 300   | 50    | 0      | 200  | 8.5a    | 10.5ab  | 11.3abc |
| D         | 275   | 50    | 0      | 300  | 8.3a    | 10.1ab  | 11.6abc |
| E         | 250   | 50    | 0      | 400  | 8.3a    | 12.2a   | 11.8abc |
| F         | 225   | 50    | 0      | 500  | 8.4a    | 12.2a   | 12.2a   |
| C V (%)   |       |       |        |      | 10.18   | 7.59    | 15.35   |

The numbers followed by the same letter in the same column are not significantly different from the DMRT at the 5%

Table 6. Leaf area per plant with macro compound NK fertilizer treatment, DS 2016, Singosari-Malang.

| Treatment | Urea | SP-36 | Ponska | NK | Leaf Area per plant (cm²) |
|-----------|------|-------|--------|----|--------------------------|
|           | kg/ha| kg/ha | kg/ha  | kg/ha | 30 DAP | 60 DAP | 90 DAP |
| A         | 0    | 0     | 0      | 0    | 1.334 | 3.919 | 4.694 |
| B         | 300  | 50    | 200    | 0    | 1.500 | 4.898 | 5.459 |
| C         | 300  | 50    | 0      | 200  | 1.626 | 5.192 | 5.776 |
| D         | 275  | 50    | 0      | 300  | 1.482 | 5.185 | 5.806 |
| E         | 250  | 50    | 0      | 400  | 1.514 | 6.310 | 7.043 |
| F         | 225  | 50    | 0      | 500  | 1.570 | 5.779 | 6.595 |
| C V (%)   |      |       |        |      | 46.2  | 13.74 | 15.01 |

The numbers followed by the same letter in the same column are not significantly different from the DMRT at the 5%

Table 7. Corn leaf area index with macro compound NK fertilizer treatment, DS 2016, Singosari-Malang.

| Treatment | Urea | SP-36 | Ponska | NK | Leaf Area Index |
|-----------|------|-------|--------|----|----------------|
|           | kg/ha| kg/ha | kg/ha  | kg/ha | 30 DAP | 60 DAP | 90 DAP |
| A         | 0    | 0     | 0      | 0    | 0.89a  | 2.78b  | 2.96c  |
| B         | 300  | 50    | 200    | 0    | 1.00a  | 3.30ab | 3.64bc |
| C         | 300  | 50    | 0      | 200  | 1.08a  | 3.59ab | 3.79bc |
| D         | 275  | 50    | 0      | 300  | 0.99a  | 3.45ab | 3.84b  |
| E         | 250  | 50    | 0      | 400  | 1.01a  | 4.21a  | 4.71a  |
| F         | 225  | 50    | 0      | 500  | 1.05a  | 4.05a  | 4.18ab |
| C V (%)   |      |       |        |      | 21.66 | 17.03 | 13.62 |

The numbers followed by the same letter in the same column are not significantly different from the DMRT at the 5%

Inorganic fertilizing treatment of NK in corn plants did not show differences in number of cobs per plant but showed a significant difference in the diameter and length of cob (Table 9). The corn of Pioneer 21 varieties has an average of 1 cob, although treated fertilizer. Treatment of fertilization with different doses only affects the diameter and length of cob. The fertilized on corn crops (treatment B, C, D, E, and F) have significantly larger and longer cobs than those without fertilizer (treatment A).
Table 8. Crop growth rate and net assimilation rate of corn crops with macro compound NK fertilizer treatment, DS 2016, Singosari-Malang.

| Treatment | Urea SP-36 Ponska NK | CGR (mg cm\(^{-2}\) days\(^{-1}\)) | NAR (mg cm\(^{-2}\) days\(^{-1}\)) |
|-----------|-----------------------|-----------------------------------|-----------------------------|
| A         | 0 0 0 0 0             | 4.06\(^a\)                        | 1.14\(^a\)                  |
| B         | 300 50 200 0         | 4.47\(^c\)                        | 1.02\(^a\)                  |
| C         | 300 50 0 200         | 4.57\(^bc\)                       | 1.01\(^a\)                  |
| D         | 275 50 0 300         | 4.75\(^bc\)                       | 1.06\(^a\)                  |
| E         | 250 50 0 400         | 4.90\(^b\)                        | 0.96\(^b\)                  |
| F         | 225 50 0 500         | 4.99\(^d\)                        | 1.01\(^b\)                  |
| C V (%)   |                       | 4.95                              | 18.91                       |

The numbers followed by the same letter in the same column are not significantly different from the DMRT at the 5% level.

Table 9. The number of cobs per plant, diameter and length of cob with macro compound NK fertilizer treatment, DS 2016, Singosari-Malang.

| Treatment | Urea SP-36 Ponska NK | Number of cobs per plant | Diameter of cob (cm\(^2\)) | Length of cob (cm) |
|-----------|-----------------------|--------------------------|----------------------------|--------------------|
| A         | 0 0 0 0 0             | 1.0\(^a\)                | 4.7\(^b\)                  | 15.5\(^b\)         |
| B         | 300 50 200 0         | 1.0\(^a\)                | 5.1\(^a\)                  | 17.8\(^a\)         |
| C         | 300 50 0 200         | 1.1\(^a\)                | 5.0\(^b\)                  | 16.7\(^ab\)        |
| D         | 275 50 0 300         | 1.2\(^a\)                | 5.1\(^a\)                  | 17.9\(^a\)         |
| E         | 250 50 0 400         | 1.3\(^a\)                | 5.2\(^a\)                  | 18.0\(^a\)         |
| F         | 225 50 0 500         | 1.1\(^a\)                | 5.1\(^ab\)                 | 18.1\(^a\)         |
| C V (%)   |                       | 20.57                    | 4.01                       | 7.30               |

The numbers followed by the same letter in the same column are not significantly different from the DMRT at the 5% level.

The inorganic fertilizing treatment of NK showed no significant difference in the weight of 100 corn seeds, while the weight per cob and the seed yield showed significant differences compared with no fertilization (Table 10). The weight of 100 seeds between fertilization treatments was not significantly different, while the lowest weight per cob was indicated by corn plants that were not fertilized. Similarly, the results of seed yield of 700-1,500 kg/ha. By the results of the study by Nurdin [25], the best combination of fertilizers to increase corn growth and production is NK or NPK fertilizer.

Table 10. Weight of 100 seeds, weight per cob, and seed yield with macro compound NK fertilizer treatment, DS 2016, Singosari-Malang.

| Treatment | Urea SP-36 Ponska NK | Weight of 100 seeds (g) | Weight per cob (g) | Seed yield wc. 14% (t/ha) |
|-----------|-----------------------|-------------------------|-------------------|--------------------------|
| A         | 0 0 0 0 0             | 34.5\(^a\)              | 211.9\(^b\)       | 6.8\(^b\)                |
| B         | 300 50 200 0         | 37.3\(^a\)              | 272.7\(^a\)       | 9.7\(^b\)                |
| C         | 300 50 0 200         | 36.0\(^a\)              | 274.3\(^a\)       | 9.6\(^b\)                |
| D         | 275 50 0 300         | 37.8\(^a\)              | 291.8\(^a\)       | 10.4\(^ab\)              |
| E         | 250 50 0 400         | 37.8\(^a\)              | 294.5\(^a\)       | 10.7\(^b\)               |
| F         | 225 50 0 500         | 35.0\(^a\)              | 301.3\(^a\)       | 11.2\(^a\)               |
| C V (%)   |                       | 10.12                   | 8.18              | 9.69                      |

The numbers followed by the same letter in the same column are not significantly different from the DMRT at the 5% level.
3.3. Farming Analysis

Analysis of corn farming with macro compound NK fertilizer treatment was based on the cost of fertilizer released with corn yield obtained was shown in Table 11.

Table 11. Financial analysis of macro compound NK fertilizer treatment to corn farming in the dryland area of Banjararum Village, Singosari Subdistrict, Malang Regency, DS 2016.

| Treatment | The cost of NK fertilizer + inorganic fertilizers (IDR/ha) | The cost to standard inorganic fertilizers (IDR/ha) | Seed yield (kg/ha) | Seed yield value (IDR/ha) | Δ Seed yield to standard inorganic fertilizers (IDR/ha) | Δ Yield value (IDR/ha) | Δ Fertilizer cost (IDR/ha) |
|-----------|-----------------------------------------------------------|---------------------------------------------------|-------------------|--------------------------|------------------------------------------------------|-----------------------|---------------------------|
| A (No fertilizer) | 0 | -1,100,000 | 6,800 | 25,160,000 | -10,730,000 | -11,830,000 | |
| B (Standard fertilizer) | 1,100,000 | 0 | 9,700 | 35,890,000 | 0 | 0 | |
| C | 2,240,000 | 1,140,000 | 9,600 | 35,520,000 | -370,000 | -1,510,000 | |
| D | 2,995,000 | 1,895,000 | 10,400 | 38,480,000 | 2,590,000 | 695,000 | |
| E | 3,750,000 | 2,650,000 | 10,700 | 39,590,000 | 3,700,000 | 1,050,000 | |
| F | 4,505,000 | 3,405,000 | 11,200 | 41,200,000 | 5,310,000 | 1,905,000 | |

Spec: Price of fertilizer: Urea = IDR. 1,800/kg; SP-36 = IDR. 2,000/kg; Ponska = IDR. 2,300/kg; NK = IDR. 8,000/kg; Price of seed corn: IDR. 3,700/kg

The addition of macro compound NK fertilizers containing 10% N and 40% K with reduced use of Urea and SP-36 fertilizers increased seed yield could be seen in Figure 1.

The macro compound NK fertilizers of 500 kg/ha accompanied by 225 kg of Urea/ha and 50 kg SP-36/ha (treatment E, F) required fertilizer cost IDR. 4,505,000, or there is additional fertilizer cost IDR. 3,405,000 compared to standard fertilization (treatment B) but obtained the results of dry seed reached 11,200 kg/ha or increased by 1,500 kg/ha. Thus, the addition of macro compound NK fertilizer of 500 kg/ha obtained a profit of IDR. 1,905,000 per hectare.

4. Conclusion

The macro compound fertilizers of 300-500 kg NK/ha (treatment D, E, and F) obtained results that did not differ significantly from the standard fertilization (treatment B). The macro compound fertilizers of 500 kg NK/ha accompanied by 225 kg Urea/ha and 50 kg SP-36/ha (treatment F) requires additional
fertilizer cost, but with increased yield of seed obtained profit of IDR. 1,905,000 per hectare compared to standard fertilization (300 kg Urea/ha + 50 kg SP-36/ha + 200 kg Ponska/ha) is recommended for fertilization in corn crops.

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