

THE EFFECT OF APPLICATION OF VARIOUS FERTILIZERS ON COCOA PLANT GROWTH

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Abstract

Fertilizer divided becomes two, namely fertilizer organic and inorganic. According to USEPA, fertilizer organic is applied compost to plants as source nutrients. Fertilizer inorganic is fertilizer result of engineering process by chemical, physical and or biological and the results industry or factory maker fertilizer (Dewanto et al., 2013). Plant need fertilizer to reach production maximum. In research Roidah (2013) there is several of types of fertilizer the observed organic fertilizer cage contains 5 kg N, 3 kg P 2 O 5 and 5 kg K 2 O as well as other essential nutrients in relative amount small. This post aims to know the importance application fertilizer to growth plant cocoa. Based on some of the literature research described could be concluded that fertilizer inorganic and fertilizer organic have advantages as well as deficiencies in several parameters, namely content nutrients, duration nutrient availability, and cost. Application fertilizer inorganic takes to effect real to upgrade production plant cocoa faster and high but no sustainable whereas application fertilizer organic no take to effect real but sustainable. Then, the application of fertilizer on plants cocoa must be combined among fertilizer inorganic and fertilizer organic with composition certain. Application fertilizer inorganic and fertilizer organic in-unit tree plant cocoa need assessment more continue, study more carry on based on age, physiology, type soil, and method application. That thing is in tune with the condition geography in Indonesia which is an archipelagic country so every area has different traits.

Keywords: Effect; Application; Various Fertilizer, Cocoa Plants.

Introduction

Cocoa included commodity food commercial that has role urgent in economy national, in particular as provision fieldwork, source of state income and foreign exchange (Daryadi & Ardian, 2017). Indonesian cocoa occupies position third biggest after Ivory Coast and Ghana (Masni et al., 2016). Plant cocoa gives a significant contribution to the growth of economic sector plantations in Indonesia. Production of cocoa becomes a source of income main for millions of farmers small in Indonesia (Bachelor et al., 2021; Witjaksono & Asmin, 2016). However, in the Asian region itself occur drop production by 120 thousand tons, from 397 thousand tons to 277 thousand tons (Abdoellah, 2021). The expansion carries on from the production area no Possible occur because impact negative environment from conversion Forest tropical Becomes production plant commercial (Gockowski et al., 2013). The increased requests must be fulfilled with enhancement productivity per unit wide-land, than through expansion of border agriculture. Besides that, increase requests offer an opportunity for farmers who are this produce cocoa to increase eye livelihood through enhancing productivity cocoa quality taller (Hoffmann et al., 2020).

Fertilizer is one factor determinant of production plant cocoa. Cocoa plantations in Indonesia are partially big moment this status fertility soil low with N content below 0.30% (Prastowo & Baon, 2020) because of that, there is high N demand for support continuity

production cocoa with increased level fertility N, and explore potency source N with cost more operational low without effect environment (Prastowo et al., 2021). Fertilization needs to be conducted to replace lost nutrients in the soil consequence of washing as well as aim to fulfill the need for nutrients for plants so that could increase their productivity plant t (Susila et al., 2010).

Fertilizer divided Becomes two, namely fertilizer organic and inorganic. According to USEPA, fertilizer organic is applied compost to plants as source nutrients. Fertilizer inorganic is fertilizer result of engineering process by chemical, physical and or biological and the results industry or factory maker fertilizer (Dewanto et al., 2013). Plant need fertilizer to reach production maximum. In research Roidah (2013) there is several of types of fertilizer the observed organic fertilizer cage contains 5 kg N, 3 kg P 2 O 5 and 5 kg K 2 O as well as other essential nutrients in relative amount small. This post aims to know the importance application fertilizer to growth plant cocoa.

Research Method

The basic method in this writing is descriptive. The data used are the results of previous studies relating to the disease spotting leaf on coffee plants and their control.

Results and Discussion

Application fertilization must notice dose, time, cost, type, and method of application. Some studies previously have been tested for the influence of several content fertilizer nutrients organic and inorganic on growth plant cocoa so that could achieve optimal production. To reach production maximum plant cocoa, combination fertilizer must be based on circumstances plants and types of land, so that use fertilizer inorganic must be combined with fertilizer organic. If only use one type of fertilizer so no one could reach optimal results. The thing in tune with the results studies Tobing et al. (2019) shows that treatment gift fertilizer is capable help increase the growing plant if compared to without gift fertilizer.

Study Prastowo et al. (2021) show that there is an influence significant gift urea as a source of Nitrogen against enhancement content chlorophyll by 10-20%. However, at the same urea level, the content of chlorophyll down to below 10 % with an enhancement concentration of F-CPH (Fermentation Cocoa Pod Husk) to 0.50-1.00%. Not there is a correlation strong observed between SPAD readings and N content. Furthermore, an average increase in N uptake of about 40% was generated from conduct compared to with control observed. Enhancement was the highest significant, about 77% compared to control, caused by 25% urea application without F-CPH (Fermentation Cocoa Pod Husk) application. Found correlation strong positive _ with level N. Influence app the combination of urea and F-CPH (Fermentation Cocoa Pod Husk) showed NUE value ranges between 0.50 and 0.80. Value has increased by enhancing urea levels. REN data shows more value tall for treatment with level more urea applications low. This thing will down with enhancement urea level.

The optimal dose for seeds cocoa obtained starts from 0.5-1 gram of urea per pot which varies depending on the level of F-CPH (Fermentation Cocoa Pod Husk). With no presence of F-CPH (Fermentation Cocoa Pod Husk), estimates the optimal level of urea is about 1.20 grams per pot, and down close to 0.70 grams per pot with enhancement F-CPH (Fermentation Cocoa Pod Husk) levels. Although used as a source and drop close to 0.70 grams per pot with increased F-CPH (Fermentation Cocoa Pod Husk) levels. Phosphate (P) works for the transport of resulting energy metabolism in plants, stimulates flowering and fertilization, stimulates growth root, stimulates the formation of seeds, stimulates division of cell plant, and enlarges cell network. Potassium (K) works in the process of photosynthesis, transport results assimilation, enzymes and minerals including water. Increase power resistance / immunity plant to disease.

Research results Triastuti et al. (2016) state that gift fertilizer NPK compound with a dose of 7.5 g/ plant produce the highest average with tall seedling 31.83 cm. This thing because NPK fertilizer 7.5 g/ plant is dose best that can be fulfil need nutrients needed by seeds plant cocoa . However, excessive fertilization will make solution soil Becomes concentrated and inhibits the osmosis process, the disturbed osmosis process will causing disruption of physiological processes plants that cause growth plant not optimal. Addition excess nutrients through fertilization could character poison nor result in a reduced availability of Zn, Fe, and Cu as well as complicate absorption Mn elements so that the growing plant is obstructed. So in the use of fertilizer inorganic must notice the resulting impact from the use excessive and without being combined with fertilizer organic.

In research Sumarno state that the use of NPK Lodrin increases the production of cocoa by an average of 508 kg/ha/ year, taller compared to with without NPK Lodrin which is only 453 kg/ha/ year. Besides that, results from the analysis using OLS and MLE methods also show the use of NPK Lodrin takes an effect significant (level 10%) on the enhancement production of cocoa. The use of NPK Lodrin also increases the efficiency of technical, allocative, and economical business farmer cocoa. Usage and application of fertilizer inorganic take to effect real in increase production cocoa in longer-term short. Besides increasing the results of production plant cocoa, fertilizer inorganic can also increase the resistance of the plant to disease. But Besides having an advantage, the use of fertilizer excessive inorganic has some negative impacts including characteristic sustainable dependence, price continuous fertilizer increase, no friendly environment, lower productivity soil, nutrient fast covered by rainwater, and not contain complete nutrients like fertilizer inorganic. Some literature said that boiler ash contains sufficient K element height, that is could reach up to 30% (Thuti et al., 2017). Potassium content in Boiler ash also plays a very important role in increasing the total area of leaves, weight wet header, as well as weight dry header. Need Primary macronutrients are needed plant for the metabolism of plants. Besides that, the availability of Primary macronutrients also supports the availability of ingredient photosynthesis.

Giving fertilizer organic could fix characteristic physics, chemistry, and biology land. Giving fertilizer organic, good fertilizer cage nor compost could increase C- organic content soil, Ca and K, P available as well as capacity holding water, weathering fertilizer organic, other than releasing the nutrients it contains so that available for plants. Giving ingredient organic real increases plant nutrient uptake cocoa although big difference for every ingredient organic matter used and nutrients absorbed. Using fertilizer organic like compost husk rice (RHC), soil pH increases significantly from 4.0 to 5.2, depending on the level of application. Soil pH value still more tall for RHC treated land than treatment control after 24 months show effect long residue at soil pH. RHC application is considered to have the ability to increase regime humidity in the ground, which pushes many basal dissolutions leading to an increase in soil pH. Giving fertilizer applied organic through soil could be given with method put fertilizer on the stingray (groove) which is made in a circle around the tree and then closed back. Closing is meant to reduce missing fertilizer in effect evaporation (urea) and erosion. Fertilizer organic could be sprinkled around the tree or put in a ditch around the tree. Depth ditch about 30 cm and the fertilizer to be used then buried with soil 5 cm thick. Immersion fertilizer organic should just do if fertilizer organic they has ripe (already composted) marked with ratio between C and N between 10-15.

Fertilizer organic gives comparable results with fertilizer inorganic plant cocoa and properties chemistry soil especially empty bunches. Although fertilizer organic gives more many nutrients to soil for absorbed plants, their effects on the production plant are still comparable with fertilizer organic because increases soil pH and make nutrients available for absorption nutrients that last longer by plants cocoa. Because of that utilization of waste Agriculture, plantation cocoa worthy conducted because fertilizer organic capable increase production plant and improving

fertility soil in the cultivation of cocoa (Young et al., 2021). Besides, the application of fertilizer organic and inorganic explained in the study Dogbatse et al. (2021) mention integrated nutrients from soil marginal will be very useful for nutrition tree cocoa. Although N upgrade is available with SOA (Sulfur of Ammonium), the application of SOA (Sulfur of Ammonium) produces tree cocoa with TCSA (trunk cross-sectional area) smaller than other treatments that are changed with PM (poultry manure). Ingredient organic play a role in push absorption nutrition, resulting in TCSA (trunk cross-sectional area) which generally more height and continuity life tree Cocoa greatly improved in maintenance with PM amendment (poultry manure). Possibilities and benefits of nutrient supply for tree cocoa with combined fertilizer organic (PM) and fertilizer inorganic (SOA) have been shown clearly in the study. Growth rate and survival life best noted for T4 (75% recommended dose of SOA + PM. Of the advantages of other treatments in growth and survival living.

Fertilization plant cocoa by generally differentiated becomes two methods following. Method fertilization through the soil and method fertilization through leaves. Fertilization is usually conducted twice in one year. Fertilizer applied through leaf can be given it has looks symptom deficiency or loss or only done on fertilization element micro (such as Cu, Zn, Fe, or Mn). Element micro is often given through leaf because the gift conducted in huge amount a little so that if given through land, will many bound by the ground and not can be absorbed by plants.

The ideal time for doing fertilization is at the time season rainy season (March - April or October -November). Management of good fertilization is one factor determinant success fertilization, according to the results study Hoffmann et al. (2020) response expected fertilization and returns investment in fertilizer and energy work for applying it depends on management garden cocoa. For the part farmer, fertilizing is profitable when the price of cocoa height and condition weather support. However, when the price is low and conditions in bad weather support, farmers more good does not use more fertilizer or lower rates. However, management fertilization must be customized with location geography, conditions economic, social country.

Conclusion

Based on some of the literature research described could be concluded that fertilizer inorganic and fertilizer organic have advantages as well as deficiencies in several parameters, namely content nutrients, duration nutrient availability, and cost. Application fertilizer inorganic takes to effect real to upgrade production plant cocoa faster and high but no sustainable whereas application fertilizer organic no take to effect real but sustainable. Then, the application of fertilizer on plants cocoa must be combined among fertilizer inorganic and fertilizer organic with composition certain. Application fertilizer inorganic and fertilizer organic in-unit tree plant cocoa need assessment more continue, study more carry on based on age, physiology, type soil, and method application. That thing is in tune with the condition geography in Indonesia which is an archipelagic country so every area has different traits.

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