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Effectiveness of eco enzyme administration and rhizobium isolation against the growth and production of onions red (*Allium ascolonicum* L)

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Abstract

Effectiveness of Eco Enzyme Administration and Rhizobium Isolation Against Growth and Production of Shallots (*Allium ascolonicum* L). The research aims to determine the effectiveness of eco enzyme administration and rhizobium isolation and eco enzyme interaction and rhizobium isolation against the growth and production of shallots (*Allium ascolonicum* L). This study uses Design Randomized Group (DRG) Factorial consisting of 2 factors, 16 treatments, and 3 blocks. The first factor is the effectiveness of giving eco enzymes that are given the symbol " T " which consists of 4 levels, namely: T0 = 0 ml / liter of water / plot, T1 = 75 ml / liter of water / plot, T2 = 150 ml/liter of water/plot, T3 = 225 ml/liter of water/plot. The second factor of rhizobium isolation consists of 4 levels, namely: S0 = 0 g / planting hole, S1 = 50 g / planting hole, S2 = 100g/planting pit, S3= 150 g/planting hole. Parameters observed in the study These are: plant height (cm), number of leaves (strands), number of tubers per sample (tubers), production of wet tubers per sample (g), production of wet tubers per plot (g), production of dried tubers per sample (g), production of dried tubers per plot (g). Result Research shows that the effectiveness of eco-enzyme administration and isolation rhizobium exerts an influence on the parameters of plant height (cm), number of leaves (strands), number of tubers per sample (tubers), production of wet tubers per sample (g), wet tuber production per plot (g), dry tuber production per sample (g), production dried tubers per plot (g). Interaction of the effectiveness of eco enzyme administration and isolation rhizobium does not exert an influence on the parameters of plant height (cm), number of leaves (strands), number of tubers per sample (tubers), production of wet tubers per sample (g), wet tuber production per plot (g), dry tuber production per sample (g), production dried tubers per plot (g).

Keywords: Design Randomized Group; Eco-Enzymes; Rhizobium Insulation; Shallot

1 Introduction

Shallot (*Allium ascolonicum* L) is one of the raw materials of high-quality vegetables that have long been intensively cultivated by farmers. Commodities here provide a great contribution to the development of an area because it has a high economic value. In addition to being a source of income and creating jobs, then onion entrepreneurs are scattered almost all over Indonesia (Simangunsong, et. al, 2017).

Increased population and consumption needs of shallots for The need for daily cooking seasonings continues to increase, causing the demand Shallots are increasing as well. Shallots contain carbohydrates, protein, Sodium, Potassium, and Fosophore which are beneficial as antioxidants, and antibacterial, as well as onion peel can be used as a raw material pesticides (Ariska and Rachmawati, 2017).

Based on production and national needs for onion commodities Red can be concluded that the domestic production of onion commodities Red can already meet domestic needs. In 2019 exports of local shallots abroad amounted to

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8,655,422 kg. The number of onion imports red in 2020 increased by 66% compared to the number of shallot exports the previous year. Indonesia's shallot exports throughout 2020 to December 2020 was 8,315,682 kg (Center for the Study of Domestic Trade 2021)

Preferably to increase fertility and onion production, wrong One way that can be done is by fertilizing using organic fertilizers. The benefit of organic fertilizers is that they improve the structure of the soil makes the soil loose and makes it easier for plant roots to absorb elements hara (Budianto, et.al, 2015)

The results showed that the application of eco enzymes to plants can increase soil pH by 7.82%, N uptake by 1.82%, and the amount of leaves by 7.33%, wet weight by 1.47%, dry weight by 1.64%. Manner its application increases soil pH by 1.94%, leaf count by 15.33%, and wet weight by 23.15%, dry weight by 2.39%, N uptake by 9.87%. The interaction of applying the concentration of liquid organic fertilizers and how they are applied increases soil pH by 10.02% and leaf count by 37.52%, wet weight by 23.37% and dry weight by 4.86%, N uptake by 23.57% in plants. The best combination treatment is 75ml eco enzyme + 25ml of water and 1/2 watered + 1/2 sprayed (Sembiring, 2019).

Efforts to increase shallot production to achieve self-sufficiency can be done by carrying out proper planting and utilization of inoculation rhizobium (Sri and Arief, 2017).

2 Material and methods

2.1 Research Material

2.1.1 This study used a Factorial Randomized Group Design (RAK). It consists of 2 factors, 16 treatments, and 2 replays, so there are 32 treatment plots. The first factor is the giving of eco enzymes given the symbol " T " which consists of 4 the degree of treatment is;

T0 = 0 ml/liter of water/plot
T1 = 75 ml/liter of water/plot
T2 = 150 ml/liter of water/plot
T3 = 225 ml/liter of water/plot

The second factor is the feeding of rhizobium insulation given the symbol " K " which consists of of the 4 levels of treatment, namely;

S0 = 0 g/planting hole
S1 = 50 g/planting hole
S2 = 100 g/planting hole
S3 = 150 g/planting hole

Treatment (t);
T0K0 T1I0 T2K0 T3K0
T0K1 T1I1 T2K1 T3K1
T0K2 T1I2 T2K2 T3K2
T0K3 T1I3 T2K3 T3K3

Block (n);
$(t - 1)(n - 1) \geq 15$
$(16 - 1)(n - 1) \geq 15$
$15(n - 1) \geq 15$
$15n - 15 \geq 15$
$15n \geq 15+15$
$15n \geq 30$
$n \geq 30/15$
$n \geq 2$ blocks

2.2 Data Analysis Methods

Data Analysis Methods used in this study to attract. The conclusions in this study are by linear method as follows:
$Ýijk = \mu + pi + \alpha j + \beta k + (\alpha\beta)jk + \varepsilon ijk$

Note:
Ýijk = The result of observations on the i-th block, the factor of the effectiveness of eco administration
Jth level enzymes, and the effectiveness of rhizobium insulation at the level to-k.
μ = Effect of middle value.
pi = I-th block effect.
αj = Effect of the effectiveness of eco enzyme administration at the j-th level.
βk = Effect of the effectiveness of rhizobium isolation administration at the k-th level.
(αβ)jk = Effect of interaction between factors of effectiveness of eco enzyme administration Jth and the effectiveness of applying rhizobium insulation at the K-th level.
εijk = Effect of error on i-th block, factor of effectiveness of eco enzyme administration on
J-th level and effectiveness factor of rhizobium insulation at the 1st level-k. (Mattjik and Sumertajaya. 2013)

2.3 Research Procedure

2.3.1 Land Preparation

The land used is flat, loose, close to a source of water and unprotected from the sun. The first stage of the land is cleared first from plant residues, weeds, and rocks than soil in hoe then in the bleach.

2.3.2 Plot Making

The creation of the plot is carried out using a hoe and then divided in 2 replays and each replay consists of 16 plots measuring 100 cm x 100 cm. The distance between replays is made 50 cm and the distance between plots is 25 cm. Function. The distance between the test and the plot is created for easy maintenance and observation later, as well as drainage channels to prevent excessive waterlogging on planting land, as excessive waterlogging can cause plants to be able to rot and die.

2.3.3 Eco Enzyme Making

The method done in making this eco enzyme is as follows: prepare the ingredients to be used such as pineapple skin, papaya skin, leather oranges, molasses, buckets, and water. Then put all the ingredients into a bucket in a ratio of 10: 3: 1 or 10 liters of water: 3 kg of fruit peel orange, pineapple, papaya (chopped as finely as possible): 1 liter of molasses. This molasses serves as a food source for bacteria that will ferment. After all the ingredients are put in the bucket is tightly closed so that no air enters, if there is air entering, it can interfere with the fermentation process that lasts. Then the bucket containing the mixture is stored in a place where not affordable for sunlight for approximately 3 months. In intervals of 1 the week the enzyme is opened and stirred well then closed again with a meeting.

2.3.4 Manufacture of Rhizobium Insulation

Selected plants that have been harvested abundantly contain root nodules, then roots the cut is cut separated from the base of the stem. After it is dredged air for 1 week. After drying the air for 1 week, then ground using lumping until the fineness of 10 mesh.

2.3.5 Manufacture of Vegetable Pesticides

For pesticide used in this study is onion extract white, in a ratio of 100 g garlic blended and then dissolved in 1 liters of water.

2.3.6 Seed Selection

The soybean seeds used are certified i.e. Anjasmoro for produces maximum growth and production, and is susceptible to pests and disease.

2.3.7 Polybag Filling

The polybag used is a 3 kg polybag, filled with planting media topsoil, compost and sand in comparison 2 : 1 : 1

2.3.8 Planting

Planting onion seeds inside the polybag is carried out in the morning, when the sun is not so hot, namely at 07.00 WIB. The spacing used is 50 cm x 50 cm. For each of its holes plant as much as 1 onion cloves. Onion bulbs are to be used first Selected to get good tubers. Next cut the ends of the onion about 0.5 cm It is used to accelerate the growth of shallots.

2.3.9 Eco Enzyme Giving

The application of eco enzymes is carried out 3 times, starting with plants aged 1 week after planting until 3 weeks after planting with the interval of administration once every 1 week by watering the soil around the plant soybeans according to the level of treatment of the first factor, namely E0 = 0 ml/liter of water / plot, E1 = 75 ml/liter of water/plot, E2 = 150 ml/liter of water/plot, and E3 = 225 ml/liter of water/plot. The tool used in the administration of eco enzymes is a measuring cup of 250 ml.

2.4 Observation Parameters

2.4.1 Plant Height (cm)

Measurement of onion plant height starts from standard pegs Up to the highest leaf tips are added with a standard peg height (5 cm). Measurements are made at a time when onion plants are 3, 4, and 5 weeks after planting with a time interval of once every 1 week.

2.4.2 Number of Leaves (strands)

Measurement of the number of leaves of onion crops by counting all perfectly grown leaves. Measurements are made at the time of onion plants aged 3, 4, and 5 weeks after planting at intervals once every 1 week time.

2.4.3 Number of wet tubers per sample (tubers)

Measurement of the number of bulbs per sample of onion crops is carried out at the end of the study by calculating all the tubers that are on each the sample.

2.4.4 Wet Tuber Production Per Sample (g)

Measurement of wet bulb production per onion crop sample (g) carried out at the end of the research using after harvesting then The production of each sample is weighed to determine its weight.

2.4.5 Production of wet tubers per plot (g)

Measurement of wet bulb production per plot of onion crops (g) carried out at the end of the research using after harvesting by the whole then the production of each plot is weighed to know its weight.

2.4.6 Dry Tuber Production Per Sample (Fruit)

Measurement of the production of dried tubers per sample is carried out at the end of research by way after harvesting many fruits per sample which is dredged air for 1 – 2 weeks.

2.4.7 Production of dried tubers per plot (tubers)

Measurement of dry tuber production per plot is carried out at the end of the study using after harvesting the entire plot crop, which is dredged by 1 – 2 weeks.

2.5 Place and Time of Trial

This research will be carried out in Klambir V Village, Hamparan Perak District, Deli Serdang Regency, North Sumatra Province with an altitude of 25 meters above sea level. This research will be carried out from October 2022 to January 2023.

2.6 Types and Scope of Research

This research is carried out in a field or open area, where natural conditions cannot be controlled by the researcher such as rainfall, climate, soil type, and sunlight. The scope of this study is growth including plant height, number of productive branches, and crop production, namely flowering age, number of pods contained, seed weight per sample, and weight of 100 seeds.

2.7 Data Techniques

The data in this study were taken by measuring, weighing, and calculating from a total of 96 plants sampled. The total plant population is 128 plants. The data obtained in the field is processed using the excel program.

2.8 Population and Sample

In this study, the total population of soybean crops was 256 crops. Where this figure is obtained from the number of treatments as many as 16 treatments, in 1 plot size 100 x 100 cm with a planting distance of 50 x 50 cm, the number of plants is 4 per plot, then multiplied by 32 plots, obtained from 16 treatments multiplied by 2 tests, then the total population of soybean plants is 128 plants.

The plant samples from this study were 96 plants, obtained from the results in each plot taken by 3 plants at random, then multiplied by the number of plots there were 32 plots.

3 Results and discussion

3.1 Plant Height (cm)

The results of the fingerprint analysis of the variety of onion plants due to the effectiveness of giving eco enzymes and rhizobium isolation did not affect the height of onion plants aged 2, 3, and 4 weeks after planting, but influenced the age of 5 weeks after planting.

The interaction of the effectiveness of eco enzyme administration and rhizobium isolation does not affect the height of onion plants aged 2, 3, 4, and 5 weeks after planting. The effectiveness of eco enzyme administration and rhizobium isolation against onion plant height aged 2, 3, 4, and 5 weeks after planting after statistical testing using the Duncan distance test can be seen in Table 1.

Table 1 Average Plant Height (cm) Shallots Effectiveness of Eco Enzyme (T) and Rhizobium Isolation (S) Age 2, 3, 4, and 5 Weeks After Planting

Treatment	**Plant Height (cm)**							
	2 MST		**3 MST**		**4 MST**		**5 MST**	
Eco Enzyme (T)								
T0 = 0 ml/liter of water/plot	17.5	aA	24.1	aA	29.8	aA	38.6	bA
T1 = 75 ml/liter of water/plot	20.1	aA	25.8	aA	32.2	aA	39.5	bA
T2 = 150 ml/liter of water/plot	20.1	aA	28.9	aA	33.6	aA	40.3	abA
T3 = 225 ml/liter of water/plot	20.8	aA	28.3	aA	37.4	aA	45.8	aA
Isolasi Rhizobium (S)								
S0 = 0 g/ planting pit	18.8	aA	23.5	aA	31.8	aA	38.7	bA
S1 = 50 g/ planting pit	19.1	aA	25.8	aA	32.4	aA	39.3	bA
S2 = 100 g/ planting pit	20.1	aA	28.8	aA	33.6	aA	39.8	bA
S3 = 150 g/ planting pit	20.4	aA	29.0	aA	35.1	aA	46.5	aA

Description: The numbers in the same column followed by unequal letters mean that they are significantly different at the 5% level (lowercase) and differ very noticeably at the 1% level (uppercase)

Table 1 can be explained the effectiveness of eco enzyme administration which has an effect on the height of onion plants aged 5 weeks after planting, where the highest plant height is found in the T3 treatment = 225 ml/liter of water/plot which is 45.8 cm which is not different from the treatment T2 = 150 ml/liter of water/plot which is 40.3 cm, but it is significantly different from the treatment T1 = 75 ml/liter of water/plot which is 39.5 cm and the treatment T0 = 0 ml/liter of water/plot which is 38.6 cm. T2 treatment = 150 ml/liter of water/plot which is 40.3 cm, with not real difference from T1 treatment = 75 ml/liter of water/plot which is 39.5 cm, and T0 treatment = 0 ml/liter of water/plot which is 38.6 cm. with T1 treatment = 75 ml/liter of water/plot i.e. 39.5 cm intangible difference from T0 treatment = 0 ml/liter of water/plot i.e. 38.6 cm

The effect of the effectiveness of eco enzyme administration on the height of onion plants aged 5 weeks after planting can be seen in Figure 1.

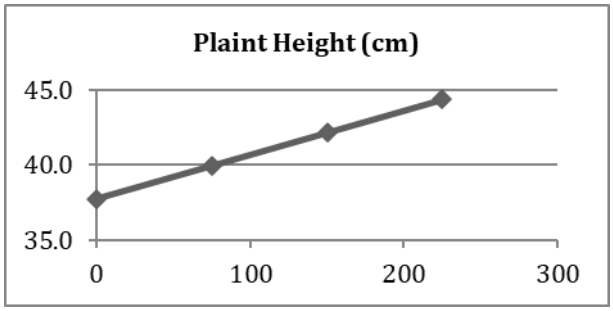

Figure 1 Graph of the Relationship between Onion Plant Height due to the Effectiveness of Eco Enzyme Administration 5 Weeks After Planting

From Figure 1, it can be explained that with the increase in the concentration of eco enzymes, the height of onion plants will be higher where the equation obtained Ý = 37,719 + 0.030 (T) with a value of r = 0.863, meaning that the more the eco enzyme concentration is increased, the higher the height of onion plants which forms a positive linear relationship.

Table 1 can be explained the effectiveness of applying rhizobium isolation to influence the height of onion plants aged 5 weeks after planting, where the highest onion plant height is found in the S3 treatment = 150 g / planting hole, which is 46.5 cm which is significantly different from the S2 treatment = 100 g / planting hole which is 39.8 cm, S1 treatment = 50 g / planting hole 39.3 cm and S0 treatment = 0 g / planting hole which is 38.7 cm. S2 treatment = 100 g / planting hole which is 39.8 cm, with a not real difference with S1 treatment = 50 g / planting hole 39.3 cm, and S0 treatment = 0 g / planting hole which is 38.7 cm. Treatment S1 = 50 g / planting hole 39.3 cm, the intangible difference from treatment S0 = 0 g / planting hole which is 38.7 cm

The effect of the effectiveness of applying rhizobium insulation on the height of onion plants aged 5 weeks after planting can be seen in Figure 2.

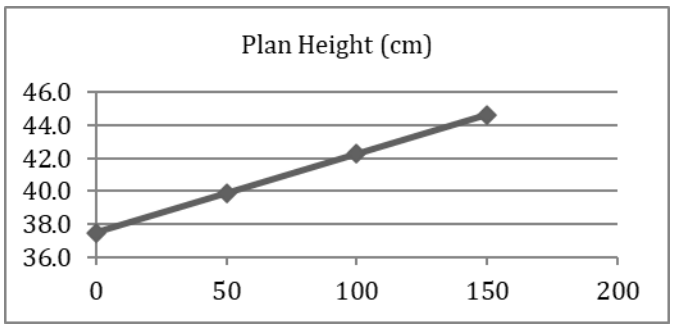

Figure 2 Graph of the Relationship between Onion Plant Height due to the Effectiveness of Applying Rhizobium Isolation 5 Weeks After Planting.

From Figure 2, it can be explained that with the increase in the dose of rhizobium isolation, the height of onion plants will be higher where the equation obtained Ý = 37,481 + 0.048 (S) with a value of r = 0.847, meaning that the more the rhizobium isolation dose is increased, the higher the height of onion plants which forms a positive linear relationship.

3.2 Number of Leaves (strands)

The results of the fingerprint analysis of the number of leaves of onion plants due to the effectiveness of giving eco enzymes and rhizobium isolation did not affect the number of leaves of onion plants aged 2, 3, and 4 weeks after planting, but influenced the age of 5 weeks after planting.

The interaction of the effectiveness of eco enzyme administration and rhizobium isolation does not affect the number of onion plants aged 2, 3, 4, and 5 weeks after planting. The effectiveness of eco enzyme administration and rhizobium isolation on the number of onion plant leaves aged 2, 3, 4, and 5 weeks after planting after statistical tests using the Duncan distance test can be seen in Table 2.

Table 2 Average Number of Leaves (strands) of Shallot Plants Effectiveness of Eco Enzyme (T) and Rhizobium Isolation (S) Aged 2, 3, 4, and 5 Weeks After Planting

Treatment	**Number of Leaves (strands)**							
	2 MST		**3 MST**		**4 MST**		**5 MST**	
Eco Enzyme (T)								
T0 = 0 ml/liter of water/plot	5.7	aA	11.4	aA	16.6	aA	19.0	bB
T1 = 75 ml/liter of water/plot	5.8	aA	12.1	aA	16.8	aA	23.3	abAB
T2 = 150 ml/liter of water/plot	5.9	aA	12.3	aA	17.3	aA	23.6	aA
T3 = 225 ml/liter of water/plot	6.5	aA	14.5	aA	17.9	aA	26.4	aA
Isolasi Rhizobium (S)								
S0 = 0 g/ planting pit	5.8	aA	11.8	aA	15.8	aA	20.3	bB
S1 = 50 g/ planting pit	6.0	aA	12.7	aA	17.0	aA	21.3	bAB
S2 = 100 g/ planting pit	6.0	aA	12.7	aA	17.8	aA	22.9	abAB
S3 = 150 g/ planting pit	6.1	aA	13.0	aA	18.0	aA	27.8	aA

Description: The numbers in the same column followed by unequal letters mean that they are significantly different at the 5% level (lowercase) and differ very noticeably at the 1% level (uppercase)

Table 2 can be explained the effectiveness of eco enzyme administration affects the number of leaves of onion plants aged 5 weeks after planting, where the highest number of plant leaves is found in the T3 treatment = 225 ml/liter of water/plot, which is 26.4 strands that are not different from the T2 treatment = 150 ml/liter of water/plot which is 23.6 strands, and T1 treatment = 75 ml/liter of water/plot which is 23.3 strands, however, it differs very markedly from the treatment T0 = 0 ml/liter of water/plot which is 19.0 strands. The treatment of T2 = 150 ml/liter of water/plot i.e. 23.6 strands is not different from the treatment of T1 = 75 ml/liter of water/plot which is 23.3 strands but differs very markedly from the treatment of T0 = 0 ml/liter of water/plot which is 19.0 strands. The treatment T1 = 75 ml/liter of water/plot i.e. 23.3 strands differs insignificantly from the treatment T0 = 0 ml/liter of water/plot i.e. 19.0 strands.

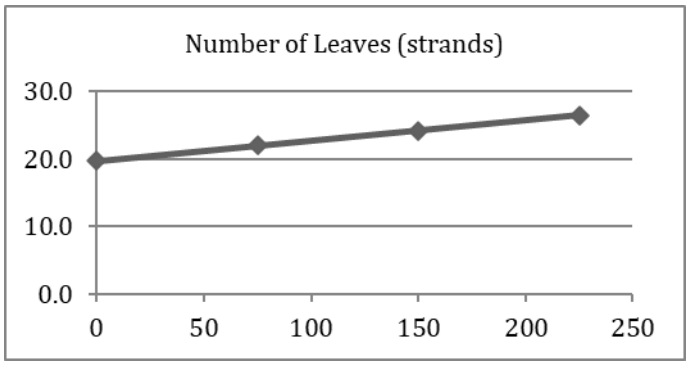

Figure 3 Graph of the Relationship between the Number of Shallot Leaves due to the Effectiveness of Eco Enzyme Administration 5 Weeks After Planting.

From Figure 3, it can be explained that with the increase in the concentration of eco enzymes, the number of leaves of onion plants will be more and more where the equation obtained Ý = 19,679 + 0.030 (T) with the value of r = 0.954, meaning that the more eco enzyme concentrations are increased, the more the number of onion plant leaves forms a positive linear relationship.

Table 2 can be explained the effectiveness of providing rhizobium isolation to influence the number of leaves of onion plants aged 5 weeks after planting, where the highest number of onion plant leaves is found in the S3 treatment = 150 g / planting hole, namely 27.8 strands that are not different from the S2 treatment = 100 g / planting hole, which is 22.9 strands, but it is significantly different from the S1 treatment = 50 g / planting hole 21.3 strands, and it differs markedly from the treatment S0 = 0 g/planting hole which is 20.3 strands. The treatment S2 = 100 g/planting hole i.e. 22.9 strands

differ insignificantly from the treatment S1 = 50 g/planting hole 21.3 strands, and the treatment S0 = 0 g/planting hole i.e. 20.3 strands. Treatment S1 = 50 g/planting hole 21.3 strands is not real difference from treatment S0 = 0 g/planting hole i.e. 20.3 strands.

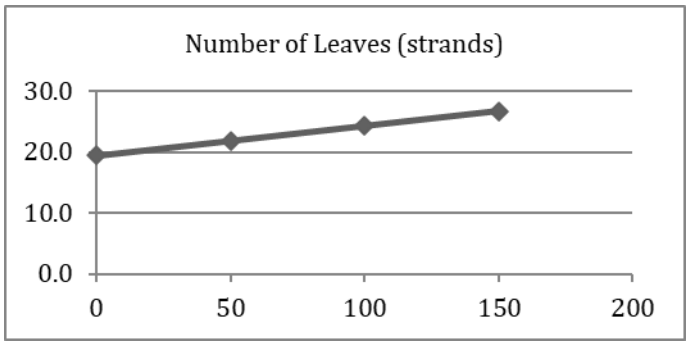

Figure 4 Graph of the Relationship between the Number of Leaves of Shallot Plants due to the Effectiveness of Applying Rhizobium Isolation 5 Weeks After Planting

From Figure 4, it can be explained that with the increase in the dose of rhizobium isolation, the number of leeks will be more and more where the equation obtained Ý = 19,479 + 0.048 (S) with a value of r = 0.933, meaning that the more the rhizobium isolation dose is increased, the more onion plant leaves form a positive linear relationship.

3.3 Number of wet tubers per sample (tubers)

The results of the fingerprint analysis of the number of fruit bulbs per sample of onion plants due to the effectiveness of giving eco enzymes and rhizobium isolation influence the number of wet bulbs per sample of onion plants.

The effectiveness of eco enzyme administration and rhizobium isolation of the number of wet bulbs per onion plant sample was carried out through statistical tests using the Duncan distance test can be seen in Table 3.

Table 3 Average Number of Wet Bulbs per Sample (umb) of Shallot Plants Effectiveness of Eco Enzyme Administration (T) and Rhizobium Isolation (S)

Treatment	**Number of wet tubers per sample (tubers)**	
Eco Enzyme (T)		
T0 = 0 ml/ liter of water/plot	4.3	bB
T1 = 75 ml/ liter of water/plot	4.6	bB
T2 = 150 ml/ liter of water/plot	4.9	bB
T3 = 225 ml/ liter of water/plot	6.8	aA
Isolasi Rhizobium (S)		
S0 = 0 g/ planting pit	4.7	bA
S1 = 50 g/ planting pit	4.7	bA
S2 = 100 g/ planting pit	5.0	bA
S3 = 150 g/ planting pit	6.3	aA

Description: The numbers in the same column followed by unequal letters mean that they are significantly different at the 5% level (lowercase) and differ very noticeably at the 1% level (uppercase)

Table 3 can be explained the effectiveness of eco enzyme administration influences the number of wet bulbs per onion plant sample, where the highest number of wet bulbs per plant sample is found in the T3 treatment = 225 ml/liter of water/plot which is 6.8 very noticeably different bulbs with T2 treatment = 150 ml/liter of water/plot which is 4.9 tubers, and T1 treatment = 75 ml/liter of water/plot which is 4.6 bulbs, and treatment T0 = 0 ml/liter of water/plot i.e. 4.3 tubers. T2 treatment = 150 ml/liter of water/plot i.e. 4.9 tubers, a not noticeable difference from T1 treatment = 75

ml/liter of water/plot i.e. 4.6 tubers, and T0 treatment = 0 ml/liter of water/plot i.e. 4.3 tubers. Treatment T1 = 75 ml/liter of water/plot i.e. 4.6 tubers differs unnoticeably from T0 treatment = 0 ml/liter of water/plot i.e. 4.3 tubers.

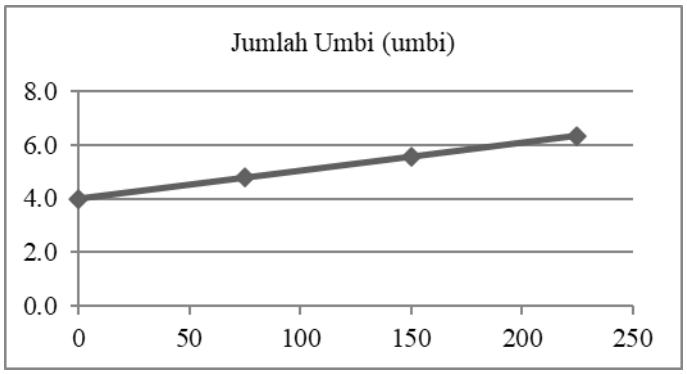

Figure 5 Graph of the Relationship between the Number of Tubers per Sample due to the Effectiveness of Eco Enzyme Administration

From Figure 5, it can be explained that with the increase in the concentration of eco enzymes, the number of wet bulbs per sample of onion plants will be more and more where the equation obtained Ý = 3,988 + 0.010 (T) with the value of r = 0.898, meaning that the more the eco enzyme concentration is increased, the more the number of wet bulbs per onion plant sample forms a positive linear relationship.

Table 3 can be explained the effectiveness of providing rhizobium insulation to influence the number of wet bulbs per sample of onion plants, where the highest number of wet bulbs per sample of onion plants is found in the S3 treatment = 150 g / planting hole, namely 6.3 bulbs that are significantly different from the treatment S2 = 100 g / planting hole which is 5.0 bulbs, treatment S1 = 50 g / planting hole 4.7 bulbs, and treatment S0 = 0 g / planting hole which is 4.7 tubers. S2 treatment = 100 g/planting hole i.e. 5.0 tubers differs insignificantly from S1 treatment = 50 g/planting hole 4.7 tubers, and S0 treatment = 0 g/planting hole i.e. 4.7 tubers. Treatment S1 = 50 g/planting hole 4.7 tubers differs unnoticeably from treatment S0 = 0 g/planting hole i.e. 4.7 tubers.

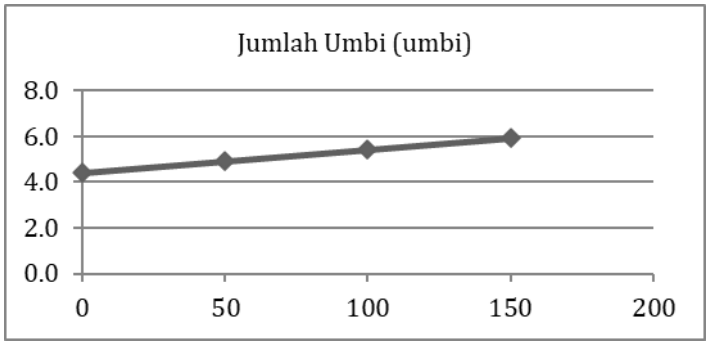

Figure 6 Graph of the Relationship between the Number of Wet Tubers per Sample due to the Effectiveness of Rhizobium Isolation

From Figure 6, it can be explained that with the increase in the dose of rhizobium isolation, the number of wet bulbs per sample of onion plants will be more and more where the equation obtained Ý = 4.388 + 0.010 (S) with a value of r = 0.862, meaning that the more the rhizobium isolation dose is increased, the more the number of wet bulbs per onion plant sample forms a positive linear relationship.

3.4 Production of Wet Tubers per Sample (g)

The results of the fingerprint analysis of the variety of wet bulb production per sample of onion plants due to the effectiveness of giving eco enzymes and rhizobium isolation influence the production of wet bulbs per sample of onion plants.

The interaction of the effectiveness of eco enzyme administration and rhizobium isolation does not affect wet bulb production per onion plant sample. The effectiveness of eco enzyme administration and rhizobium isolation against wet bulb production per onion plant sample was carried out statistical tests using the Duncan distance test can be seen in Table 4.

Table 4 Average Production of Wet Bulbs per Sample (g) of Shallot Plants Effectiveness of Eco Enzyme (T) and Rhizobium Isolation (S)

Treatment	**Production of Wet Tubers per Sample (g)**	
Eco Enzyme (T)		
T0 = 0 ml/ liter of water/plot	34.17	bB
T1 = 75 ml/ liter of water/plot	35.83	bB
T2 = 150 ml/ liter of water/plot	35.83	bB
T3 = 225 ml/ liter of water/plot	44.17	aA
Isolasi Rhizobium (S)		
S0 = 0 g/ planting pit	34.79	bB
S1 = 50 g/ planting pit	35.42	bAB
S2 = 100 g/ planting pit	36.25	bA
S3 = 150 g/ planting pit	43.54	aA

Description: The numbers in the same column followed by unequal letters mean that they are significantly different at the 5% level (lowercase) and differ very noticeably at the 1% level (uppercase)

Table 4 can be explained the effectiveness of eco enzyme administration which influences the production of wet bulbs per sample of onion plants, where the production of wet bulbs per sample of the heaviest plants is found in the treatment T3 = 225 ml/liter of water/plot which is 44.17 g which is very noticeable with the treatment T2 = 150 ml/liter of water/plot which is 35.83 g, and treatment T1 = 75 ml/liter of water / plot which is 35.83 g, and treatment T0 = 0 ml/liter of water/plot i.e. 38.17 g. The T2 treatment = 150 ml/liter of water/plot is 35.83 g, not significantly different from the T1 treatment = 75 ml/liter of water/plot which is 35.83 g, and the T0 treatment = 0 ml/liter of water/plot is 38.17 g. Treatment T1 = 75 ml/liter of water/plot i.e. 35.83 g is intangible different from treatment T0 = 0 ml/liter of water/plot i.e. 38.17 g.

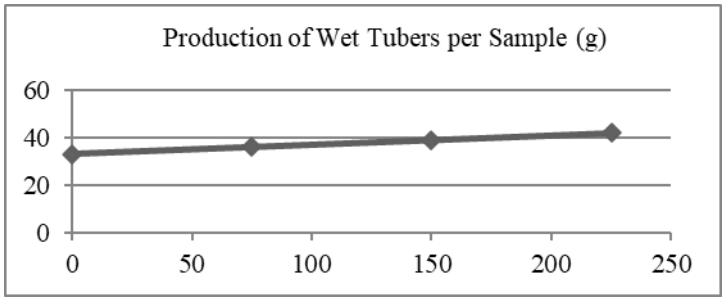

Figure 7 Graph of Wet Bulb Production Relationships per Onion Plant Sample

From Figure 7, it can be explained that with the increase in the concentration of eco enzymes, the production of wet bulbs per sample of onion plants will be heavier where the equation obtained Ý = 33,000 + 0.040 (T) with a value of r = 0.858, meaning that the more the concentration of eco enzymes is increased, the production of wet bulbs per sample of onion plants the heavier which forms a positive linear relationship.

Table 4 can be explained the effectiveness of providing rhizobium insulation to influence the production of wet bulbs per sample of onion plants, where the production of wet bulbs per sample of onion plants is found in the treatment S3 = 150 g / planting hole, which is 43.54 g, which is significantly different from the treatment S2 = 100 g / planting hole which is 36.25 g, and treatment S1 = 50 g / planting hole 35.42 g, however, it differs very markedly from the treatment

S0 = 0 g / planting hole which is 34.79 g. Treatment S2 = 100 g / planting hole which is 36.25 g, not real different from the treatment S1 = 50 g / planting hole 35.42 g, but it is significantly different from the treatment S0 = 0 g / planting hole which is 34.79 g. Treatment S1 = 50 g/planting hole 35.42 g, not real difference from treatment S0 = 0 g/planting hole i.e. 34.79.

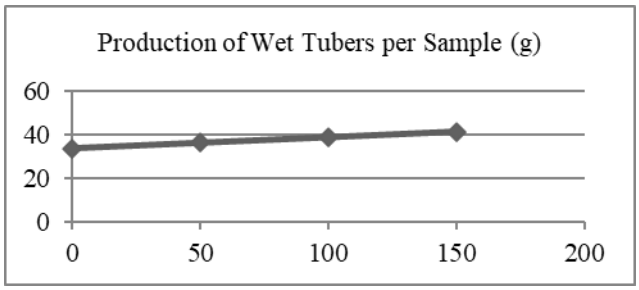

Figure 8 Graph of the Relationship between Wet Tuber Production per Sample due to the Effectiveness of Rhizobium Insulation

From Figure 8, it can be explained that with the increase in the dose of rhizobium isolation, the production of wet bulbs per sample of onion plants will be heavier where the equation obtained Ý = 33,688 + 0.051 (S) with a value of r = 0.806, meaning that the more the dose of rhizobium isolation is increased, the production of wet bulbs per sample of onion plants the heavier which forms a positive linear relationship.

3.5 Production of Wet Tubers per Plot (g)

The results of the fingerprint analysis of the variety of wet bulb production per plot of onion plants due to the effectiveness of eco enzyme administration and rhizobium isolation have an influence on the production of wet bulbs per onion plant plot.

Table 5 Average Production of Wet Bulbs per Plot (g) of Shallot Crops Effectiveness of Eco Enzyme (T) and Rhizobium Isolation (S)

Treatment	**Production of Wet Tubers per Sample (g)**	
Eco Enzyme (T)		
T0 = 0 ml/ liter of water/plot	162.50	bB
T1 = 75 ml/ liter of water/plot	170.00	bB
T2 = 150 ml/ liter of water/plot	175.00	bAB
T3 = 225 ml/ liter of water/plot	210.00	aA
Isolasi Rhizobium (S)		
S0 = 0 g/ planting pit	164.38	bB
S1 = 50 g/ planting pit	171.25	bAB
S2 = 100 g/ planting pit	177.50	bA
S3 = 150 g/ planting pit	204.38	aA

Description: The numbers in the same column followed by unequal letters mean that they are significantly different at the 5% level (lowercase) and differ very noticeably at the 1% level (uppercase)

The interaction of the effectiveness of eco enzyme administration and rhizobium isolation does not affect the production of wet bulbs per plot of onion crops. The effectiveness of eco enzyme administration and rhizobium isolation against wet bulb production per onion crop plot was carried out through statistical tests using the Duncan distance test can be seen in Table 5.

Table 5 can be explained the effectiveness of eco enzyme administration which influences the production of wet bulbs per plot of onion crops, where the production of wet bulbs per plot of the heaviest plants is found in the treatment T3 = 225 ml/liter of water/plot which is 210.00 g which is significantly different from the treatment T2 = 150 ml/liter of

water/plot which is 175.00 g, but it differs very markedly with the treatment T1 = 75 ml/liter of water/plot which is 170.00 g, and treatment T0 = 0 ml/liter of water/plot i.e. 162.50 g. T2 treatment = 150 ml/liter of water/plot which is 175.00 g, with not real difference from T1 treatment = 75 ml/liter of water/plot which is 170.00 g, and T0 treatment = 0 ml/liter of water/plot which is 162.50 g. T1 treatment = 75 ml/liter of water/plot which is 170.00 g, with not real difference from T0 treatment = 0 ml/liter of water/plot which is 162.50 g.

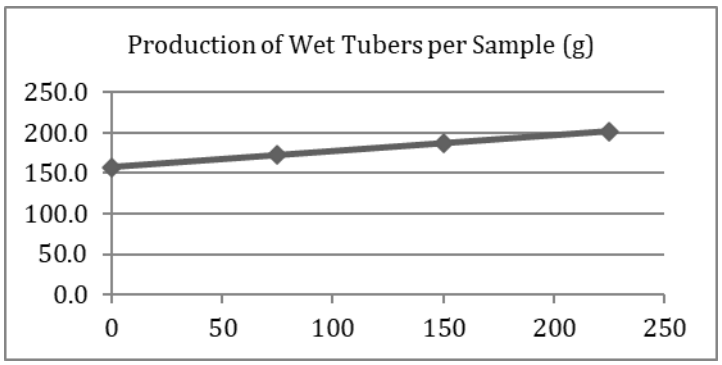

Figure 9 Graph of The Relationship of Wet Tuber Production per Plot due to the Effectiveness of Eco Enzyme Administration.

From Figure 9, it can be explained that with the increase in the concentration of eco enzymes, the production of wet bulbs per plot of onion plants will be heavier where the equation obtained Ý = 157,250 + 0.197 (T) with the value of r = 0.904, meaning that the more the concentration of eco enzymes is increased, the production of wet bulbs per plot of onion plants the heavier which forms a positive linear relationship.

Table 5 can be explained the effectiveness of providing rhizobium insulation to influence the production of wet bulbs per plot of onion plants, where the production of wet bulbs per plot of onion plants is found in the treatment S3 = 150 g / planting hole which is 204.38 g, which is significantly different from the treatment S2 = 100 g / planting hole which is 177.50 g, and treatment S1 = 50 g / planting hole 171.25 g, however, it differs very markedly from the treatment S0 = 0 g/planting hole, which is 164.38 g. Treatment S2 = 100 g / planting hole which is 177.50 g, not real different from treatment S1 = 50 g / planting hole 171.25 g, but significantly different from treatment S0 = 0 g / planting hole which is 164.38 g. Treatment S1 = 50 g/planting hole 171.25 g, not real difference from treatment S0 = 0 g/planting hole i.e. 164.38.

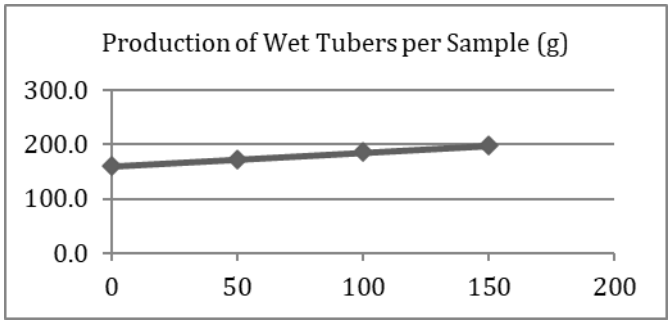

Figure 10 Graph of Wet Tuber Production Relationships per Plot due to Effectiveness of Rhizobium Isolation

From Figure 10, it can be explained that with the increase in the dose of rhizobium isolation, the production of wet tubers per plot of onion plants will be heavier where the equation obtained Ý = 160,438 + 0.253 (S) with a value of r = 0.931, meaning that the more the dose of rhizobium isolation is increased, the production of wet bulbs per plot of onion plants the heavier which forms a positive linear relationship.

3.6 Dry Tuber Production per Sample (g)

The results of the fingerprint analysis of the variety of dry bulb production per sample of onion plants due to the effectiveness of giving eco enzymes and rhizobium isolation influence the production of dried bulbs per sample of onion plants.

The interaction of the effectiveness of eco enzyme administration and rhizobium isolation does not affect the production of dried bulbs per sample of onion plants. The effectiveness of eco enzyme administration and rhizobium isolation against dry bulb production per onion plant sample was carried out through statistical tests using the Duncan distance test can be seen in Table 6.

Table 6 Average Production of Dried Bulbs per Sample (g) of Shallot Plants Effectiveness of Eco Enzyme (T) and Rhizobium Isolation (S)

Treatment	**Dry Tuber Production per Sample (g)**	
Eco Enzyme (T)		
T0 = 0 ml/ liter of water/plot	5.88	bB
T1 = 75 ml/ liter of water/plot	6.08	bB
T2 = 150 ml/ liter of water/plot	6.13	bB
T3 = 225 ml/ liter of water/plot	8.38	aA
Isolasi Rhizobium (S)		
S0 = 0 g/ planting pit	6.08	bB
S1 = 50 g/ planting pit	6.21	bAB
S2 = 100 g/ planting pit	6.21	bA
S3 = 150 g/ planting pit	7.96	aA

Description: The numbers in the same column followed by unequal letters mean that they are significantly different at the 5% level (lowercase) and differ very noticeably at the 1% level (uppercase)

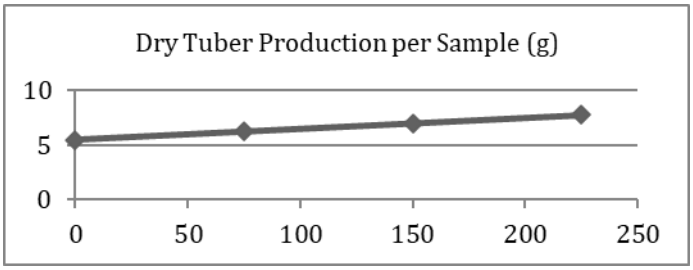

Figure 11 Graph of the Relationship between Dry Tuber Production per Sample due to the Effectiveness of Eco Enzyme Administration

Table 6 can be explained the effectiveness of eco enzyme administration which influences the production of dried bulbs per sample of onion plants, where the production of dried bulbs per sample of the heaviest plants is found in the treatment T3 = 225 ml/liter of water/plot which is 8.38 g which is very noticeably different from the treatment T2 = 150 ml/liter of water/plot which is 6.13 g, treatment T1 = 75 ml/liter of water/plot which is 6.08 g, and treatment T0 = 0 ml/liter of water/plot i.e. 5.88 g. T2 treatment = 150 ml/liter of water/plot which is 6.13 g, with not real difference from T1 treatment = 75 ml/liter of water/plot which is 6.08 g, and T0 treatment = 0 ml/liter of water/plot which is 5.88 g. T1 treatment = 75 ml/liter of water/plot which is 6.08 g, with not real difference from T0 treatment = 0 ml/liter of water/plot which is 5.88 g.

From Figure 11, it can be explained that with the increase in the concentration of eco enzymes, the production of dried bulbs per sample of onion plants will be heavier where the equation is obtained Ý = 5,483 + 0.010 (T) with a value of r = 0.826, meaning that the more the concentration of eco enzymes is increased, the production of dried bulbs per sample of onion plants the heavier which forms a positive linear relationship.

Table 6 can be explained the effectiveness of applying rhizobium isolation to influence dry bulb production per sample of onion plants, where the production of dried bulbs per sample of onion plants is found in the treatment S3 = 150 g / planting hole which is 7.96 g, which is significantly different from the treatment S2 = 100 g / planting hole which is 6.21 g, and treatment S1 = 50 g / planting hole 6.21 g, however, it differs very markedly from the treatment S0 = 0 g / planting

hole, which is 6.08 g. The treatment S2 = 100 g / planting hole is 6.21 g, it is not real different from the treatment S1 = 50 g / planting hole 6.21 g, but it is significantly different from the treatment S0 = 0 g / planting hole which is 6.08 g. Treatment S1 = 50 g/planting hole 6.21 g, not real difference from treatment S0 = 0 g/planting hole which is 6.08 g.

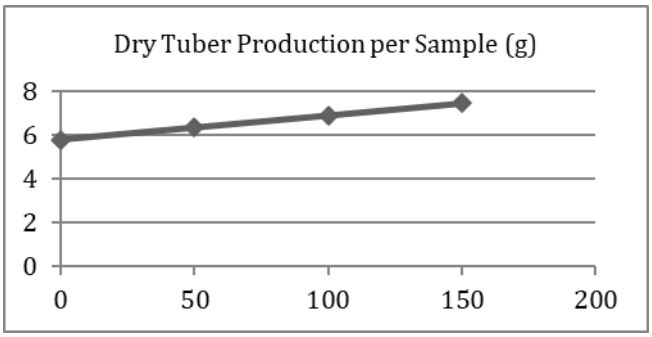

Figure 12 Graph of the Relationship between Dry Tuber Production per Sample due to the Effectiveness of Rhizobium Isolation.

From Figure 12, it can be explained that with the increase in the dose of rhizobium isolation, the production of dried tubers per sample of onion plants will be heavier where the equation obtained Ý = 5.771 + 0.011 (S) with a value of r = 0.809, meaning that the more the dose of rhizobium isolation is increased, the production of dried bulbs per sample of onion plants the heavier which forms a positive linear relationship.

3.7 Dry Tuber Production per Plot (g)

The results of the fingerprint analysis of the variety of dry bulb production per ploy of onion plants due to the effectiveness of giving eco enzymes and rhizobium isolation have an influence on the production of dried bulbs per onion plant plot. The interaction of the effectiveness of eco enzyme administration and rhizobium isolation has no effect on the production of dried bulbs per onion crop plot.

The effectiveness of eco enzyme administration and rhizobium isolation against dry bulb production per onion crop plot was carried out statistical tests using the Duncan distance test can be seen in Table 7.

Table 7 Average Production of Dried Bulbs per Plot (g) of Shallot Crops Effectiveness of Eco Enzyme (T) and Rhizobium Isolation (S)

Treatment	**Dry Tuber Production per Plot (g)**	
Eco Enzyme (T)		
T0 = 0 ml/ liter of water/plot	37.25	bB
T1 = 75 ml/ liter of water/plot	37.25	bB
T2 = 150 ml/ liter of water/plot	38.25	bB
T3 = 225 ml/ liter of water/plot	52.25	aA
Isolasi Rhizobium (S)		
S0 = 0 g/ planting pit	37.63	bB
S1 = 50 g/ planting pit	38.50	bB
S2 = 100 g/ planting pit	38.50	bB
S3 = 150 g/ planting pit	50.38	aA

Description: The numbers in the same column followed by unequal letters mean that they are significantly different at the 5% level (lowercase) and differ very noticeably at the 1% level (uppercase)

Table 7 can be explained the effectiveness of eco enzyme administration which influences the production of dried bulbs per plot of onion crops, where the production of dried bulbs per plot of the heaviest plants is found in the treatment T3 = 225 ml/liter of water/plot which is 52.25 g which differs very markedly with treatment T2 = 150 ml/liter of water/plot which is 38.25 g, treatment T1 = 75 ml/liter of water/plot which is 37.25 g, and treatment T0 = 0 ml/liter

of water/plot i.e. 37.25 g. T2 treatment = 150 ml/liter of water/plot which is 38.25 g, not significantly different from T1 treatment = 75 ml/liter of water/plot which is 37.25 g, and T0 treatment = 0 ml/liter of water/plot which is 37.25 g. T1 treatment = 75 ml/liter of water/plot i.e. 37.25 g, the not real difference from T0 treatment = 0 ml/liter of water/plot i.e. 37.25 g.

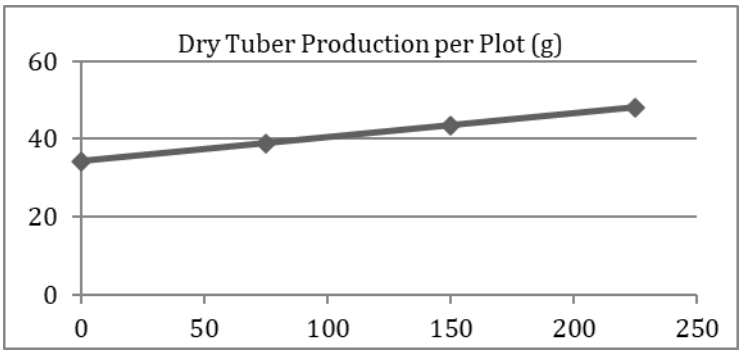

Figure 13 Graph of the Relationship of Dry Tuber Production per Plot due to the Effectiveness of Eco Enzyme Administration.

From Figure 13, it can be explained that with the increase in the concentration of eco enzymes, the production of dried bulbs per plot of onion plants will be heavier where the equation obtained Ý = 34,350 + 0.061 (T) with the value of r = 0.808, meaning that the more the concentration of eco enzymes is increased, the production of dried bulbs per plot of onion plants is heavier which forms a positive linear relationship.

Table 7 can be explained the effectiveness of providing rhizobium insulation to influence the production of dried bulbs per plot of onion plants, where the production of dried bulbs per plot of onion plants is found in the treatment S3 = 150 g / planting hole which is 50.38 g, which is a very noticeable difference from the treatment S2 = 100 g / planting hole which is 38.50 g, treatment S1 = 50 g / planting hole 38.50 g, however, it differs very markedly from the treatment S0 = 0 g / planting hole which is 37.63 g. Treatment S2 = 100 g / planting hole which is 38.50 g, intangible difference with treatment S1 = 50 g / planting hole 38.50 g, and treatment S0 = 0 g / planting hole which is 37.63 g. Treatment S1 = 50 g / planting hole 38.50 g, the intangible difference from treatment S0 = 0 g / planting hole which is 37.63 g.

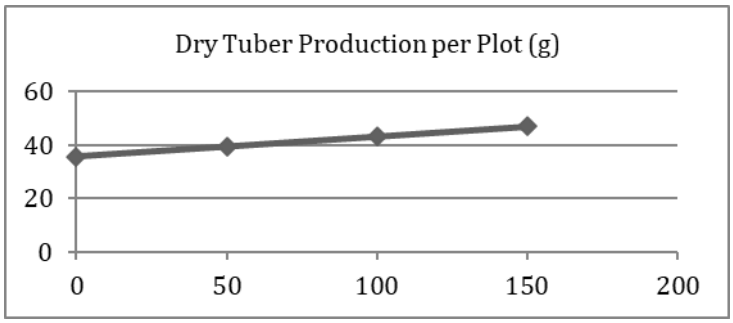

Figure 14 Graph of Dry Tuber Production Relationships per Plot due to Effectiveness of Rhizobium Isolation Administration.

From Figure 14, it can be explained that with the increase in the dose of rhizobium isolation, the production of dry tubers per plot of onion plants will be heavier where the equation obtained Ý = 35,513 + 0.077 (S) with the value r = 0.810, meaning that the more the dose of rhizobium isolation is increased, the production of dried bulbs per plot of onion plants the heavier which forms a positive linear relationship.

3.7.1 Effectiveness of Eco Enzyme Administration against Growth and Production of Shallot Crops (Allium ascolonicum L)

From the results of research and statistical tests, the effectiveness of giving eco enzymes has an influence on the parameters of plant height (cm), number of leaves (strands), number of tubers per sample (tubers), production of wet tubers per sample (g), production of wet tubers per plot (g), production of dry tubers per sample (g), production of dry tubers per plot (g).

The effect of the effectiveness of giving eco enzymes on plant height, and the number of shallots, because eco enzymes function in stimulating the growth of cells of a plant. According to Susanto (2020) states that eco enzymes can not only fertilize plants but can also accelerate plant growth. According to Dewi et.al (2020) that eco enzymes can help plant growth with all types of organic plants so that the plants given eco enzymes have more optimal growth compared to plants that are not given eco enzymes. This is because eco enzyme liquid can be used as a liquid organic fertilizer because it contains macro and micro nutrients (Pakki, et al. 2021).

3.7.2 Effectiveness of Rhizobium Isolation Against Onion Plant Growth and Production (Allium ascolonicum L)

The results of research and statistical tests that the effectiveness of giving eco enzymes has an influence on the parameters of plant height (cm), number of leaves (strands), number of tubers per sample (tubers), production of wet tubers per sample (g), production of wet tubers per plot (g), production of dry tubers per sample (g), production of dry tubers per plot (g).

The effectiveness of providing rhizobium isolation influences plant height, and the number of shallots, because the content of microorganisms in rhizobium isolation used appropriately in the organic farming system will have a positive influence on the availability of nutrients needed by plants. According to Ceng and Indra (2012), the application of biological fertilizers such as nitrogen fixation bacteria (rhizobium). Legume trees are a versatile (multi-functional) type of tree, with high growth speed, and able to fix Nitrogen.

3.7.3 Interaction of Effectiveness of Eco Enzyme Administration and Rhizobium Isolation against Onion Plant Growth and Production (Allium ascolonicum L)

From the results of research and statistical tests, the interaction of the effectiveness of eco enzyme administration and rhizobium isolation does not influence the parameters of plant height (cm), the number of leaves (strands), number of tubers per sample (tubers), production of wet tubers per sample (g), production of wet tubers per plot (g), production of dry tubers per sample (g), production of dry tubers per plot (g).

There is no interaction or relationship between the effectiveness of eco enzyme administration and rhizobium isolation due to the respective properties of the eco enzyme and rhizobium isolation, although each of them influences the growth and production of onion crops. Eco enzymes are to improve the environment that has been damaged due to the use of chemical fertilizers. While rhizobium insulation serves in fertilizing and loosening the soil. According to Steel and Torie (2013), if the interaction of one treatment with another has no real effect, it can be concluded that these factors act freely with each other.

4 Conclusion

From the results of the research and data processing and discussion, it can be concluded:

- The effectiveness of eco enzyme administration has an influence on the parameters of plant height (cm), number of leaves (strands), number of tubers per sample (tubers), production of wet tubers per sample (g), production of wet tubers per plot (g), production of dry tubers per sample (g), production of dry tubers per plot (g).
- The effectiveness of applying rhizobium insulation has an influence on the parameters of plant height (cm), number of leaves (strands), number of tubers per sample (tubers), production of wet tubers per sample (g), production of wet tubers per plot (g), production of dry tubers per sample (g), production of dry tubers per plot (g).
- The interaction of the effectiveness of eco enzyme administration and rhizobium isolation has no influence on the parameters of plant height (cm), a number of leaves (strands), number of tubers per sample (tubers), production of wet tubers per sample (g), production of wet tubers per plot (g), production of dry tubers per sample (g), production of dry tubers per plot (g).

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

This case study informed consent to the effectiveness of eco enzyme administration and rhizobium isolation and eco enzyme interaction and rhizobium isolation on the growth and production of shallots (*Allium ascolonicum* L). Conducted in Klambir V Village, Hamparan Perak District, Deli Serdang Regency, North Sumatra Province.

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