PENGARUH PEMBERIAN POC URIN SAPI DAN KOMPOS LIMBAH TEH TERHADAP PERTUMBUHAN DAN PRODUKSI TANAMAN TERUNG HIJAU TELUNJUK (SOLANUM MOLONGENA L.)

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ABSTRACT

The aims of the study was invstigating the effect of POC from Cow Urine and Tea Compost on Production of Green Eggplant. The research was conducted by performing factory randominzed block designconsisting two factor, namely: 1) the treatment factor for bovine urine concentration (U) which consisted of 4 levels, namely: U0 = without giving POC cow urine (control); U1 = administration of cow urine POC with a concentration of 40 ml / l of water; U2 = administration of POC cow urine with a concentration of 80 ml / l of water; U3 = administration of cow urine POC with a concentration of 100 ml / l of water, and 2) The tea waste dose treatment factor (T) which consists of 4 levels, namely: T0 = without the administration of tea waste compost (control); T1 = administration of tea waste compost at a dose of 1 kg / plot; T2 = administration of tea waste compost at a dose of 2 kg / plot; T3 = administration of tea waste compost at a dose of 3 kg / plot, each treatment was repeated 2 times.

The parameters observed in this study were plant height, number of branches, production per sample, number of fruits per sample and production per plot. From this research conclusions can be drawn, namely: 1) Giving cow urine has a significant effect on plant height, number of branches, production per sample, number of fruits per sample and production per sample of green index eggplant plants. In this case, the results showed that giving cow urine with a concentration of 80 ml / l of water was the best treatment in supporting the growth and production of index green eggplant plants. 2) The application of tea waste compost had no significant effect on plant height, number of branches, production per sample, number of fruits per sample and production per sample of forefinger green eggplant plants.

Keywords: green eggplant, cow urine, tea waste

CHAPTER I

INTRODUCTION

1.1 Background of Study

Eggplant (Solanum melongena L.) is native to the tropics. This plant originally came from the Asian continent, namely India and Burma. The spread of eggplant was originally in several countries (regions), including: the Caribbean, Malaysia, West Africa, Central Africa, East Africa, and South America. This plant spreads throughout the world, both countries with hot (tropical) and temperate (sub-tropical) climates. The development of eggplant cultivation is the fastest in Southeast Asia, one of which is in Indonesia (Firmanto, 2011).

Eggplant is a type of vegetable that is very popular and liked by many people because it tastes good, especially as an ingredient in vegetables or fresh vegetables. In addition, eggplant also contains high enough nutrients, especially the content of Vitamin A and Phosphorus. This eggplant commodity has the potential to be developed as a contributor to the diversity of nutritious vegetable ingredients for the population. According to Sunarjono (2013), every 100 grams of raw eggplant contains 26 calories, 1 gram of protein, 0.2 grams of carbohydrate, 25 IU of vitamin A, 0.04 grams of vitamin B and 5 grams of vitamin C. It has medicinal properties because it contains alkaloids, solanine and solasodine.

According to the Central Statistics Agency (2014), the productivity of eggplant in Indonesia from 1997 to 2012 was 518,827 tons/ha, an increase of 1.43%. National eggplant production every year tends to increase. This is due to the small area of eggplant

cultivation area and the form of cultivation culture which is still secondary and not intensive (Simatupang, 2014).

Cow urine is an alternative to increase the availability, adequacy, and efficiency of nutrient uptake for plants containing microorganisms so as to reduce the use of inorganic fertilizers (N, P, K) and increase crop yields maximally. The presence of organic matter in biourine can improve the physical, chemical, and biological properties of the soil. Distribution of liquid organic fertilizers such as biourine is one way to get healthy organic plants with sufficient nutrient content without the addition of inorganic fertilizers (Dharmayanti, 2013).

The use of liquid organic fertilizer as the basic ingredient of organic fertilizer is one solution that can provide added value for farmers. With certain handling of waste that previously could cause environmental pollution, now it can be used as a basic material for making liquid fertilizer to increase the supply of nutrients for plants that are useful for increasing growth and production as well as increasing farmers' income. The advantages of organic fertilizers are that they can precisely overcome nutrient deficiencies, are not problematic in nutrient leaching, and are able to provide nutrients quickly (Hadisuwito, 2012).

Tea dregs from beverage factories, which are usually just thrown away and only become waste, can actually be used as a mixture of soil media. This tea dregs are commonly used in all types of plants. For example, vegetable plants, ornamental plants, and medicinal plants. According to Dwidjoseputro (1994) tea dregs can be used or utilized because it contains carbohydrates that play a role in the formation of chlorophyll in leaves that grow in dark places. (Ningrum, 2010) added that tea dregs also contain

various kinds of minerals that can help plant growth such as organic carbon, copper (Cu), magnesium (Mg), and calcium. In addition, tea dregs also contain crude fiber, cellulose and lignin which can be used by plants for growth.

Based on the description above, the researcher is interested in conducting a research on the effect of cow urine and tea dregs compost and their combination on the growth and yield of green eggplant.

1.2 The Formulation of Problems

Based on the background above, the formulation of the problem in this research is whether the distribution of POC in cow urine and tea dregs compost gives a response to growth and it can increase production in green eggplant (Solanum molongena L).

1.3. The Aim of Study

The aims of this research are:

1. To determine the response of giving POC cow urine and tea dregs compost to the growth and production of green eggplant (Solanum melongena L).
2. To obtain the concentration of POC cow urine and the appropriate dose of tea dregs compost for green eggplant (Solanum melongena L.).

1.4. Hyphotheses

1. Giving POC cow urine has a significant effect on the growth and production of green eggplant (Solanum melongena L.).

2. Giving tea dregs compost has a significant effect on the growth and production of green eggplant (Solanum melongena L.).

3. The combination of POC cow urine and tea dregs compost has a significant effect on the growth and production of green eggplant (Solanum melongena L.).

1.5 The Significance of Study

1. Provide information on efforts to increase the productivity of green eggplant by giving POC cow urine and tea dregs compost and can add insight to the community.

2. Utilizing POC cow urine and tea dregs compost that is not utilized by the community becomes economic value.

3. As one of the requirements to complete undergraduate studies at the Faculty of Agriculture, University of Medan Area.

CHAPTER II

LITERATURE REVIEW

2.1 An Overview of Green Eggplant

Eggplants are located in Asia, namely India and Burma. Eggplant initially only grows wild. But then after being known delicious and many benefits, eggplant then began to be cultivated in the area. In Africa also found germplasm (genetic source) eggplants. So essentially the eggplant is native to the tropics (Eriyandi, 2008). Then this plant spread to other Asian regions such as Malaysia, also to East Africa, Central Africa, West Africa, South America, the Caribbean, and Spain. Meanwhile, in Indonesia, eggplants are concentrated on the islands of Java and Sumatra. But now eggplant has been cultivated in various regions in Indonesia, as well as other areas in various parts of the world (Eriyandi, 2008).

The area spread to various regions in Indonesia, also causes the mention of different names. The eggplant in Sunda and Madura is known as *cokrom*. While other names are encong or eggplant (Java), trueng (Aceh), tiung (Lampung), roteng (Batak), downg (Ambon), Bodong-bodong (Makassar), antibu (Gorontalo), kaduwi (Bima/Sumbawa), tuung or cung (Bali), kaumenu (Timor), fofoki (ternate), papao or turium (Irian Jaya). While in Japan, eggplant is known as nashubi, while in English it is known as eggplant or aubergin. While the scientific name is Solanum melongena L. (Eriyandi, 2008).

The research results of Naswir et al. (2009) showed that the use of liquid organic fertilizer of cow urine with a micro fertigation system could promote better growth and

root propagation, as well as increase the yield of chili plants. The results of another study conducted by Hariadi (2011) showed that giving cow urine at a dose of 1,200 ml per plant gave the best growth of roselle plants.

In order to increase production, proper fertilization is needed, both artificial fertilizers and natural fertilizers, but another problem with artificial fertilizers used so far is that it causes damage to the soil structure due to continuous use of artificial fertilizers so that plant root development becomes imperfect and reduces production, the use of fertilizers. Man-made products continuously cause dependence and land becomes more difficult to cultivate. Samekto (2006) said that organic fertilizers do not cause bad effects on health because the basic ingredients are natural, so they are easily absorbed by plants.

There are differences between the macro content of animal manure (horses, goats, cows, pigs, and chickens) in solid and liquid forms. Solid manure contains nitrogen and potassium which is smaller than the total percentage in liquid manure (Hadisuwito, 2007).

2.2 Botanical Overview of Eggplant

2.2.1. Eggplant Nutrient Content

Eggplant is an important agricultural commodity needed in Indonesia. This is because eggplant has a fairly complete nutritional content and has a high economic value, usually used as a food ingredient, therapeutic agent, and natural cosmetic ingredient. Eggplants contain lots of potassium and vitamin A which can be useful for the body. Chemical composition of eggplant per 100 grams, namely 92.70 grams of water; ash (mineral) 0.60 grams; iron 0.60 mg; carbohydrates 5.70 grams; fat 0.20 grams; fiber 0.80

grams; calories 24.00 cal; phosphorus 27.00 mg; potassium 223.00 mg; calcium 30.00 mg; 1.10 grams of protein; sodium 4.00 mg; vitamin B3 0.60 mg; vitamin B2 0.05 mg; vitamin B1 10.00 mg; vitamin A 130.00 SI; and vitamin C 5.00 mg (Budiman, 2008).

2.2.2. Eggplant Plant Classification

According to Gembong (2009), eggplant classification is:

Class: Dicotyledonae

Order: Tubiflorae

Family: Solanacae

Genus: Solanum

Species: Solanum melongena L.

2.3 Morphology of Eggplant

2.3.1 Root

According to Rukmana (2002), eggplants have taproots and root branches that can penetrate the soil depth of about 80-100 cm. Roots that grow horizontally can spread at a radius of 40-80 cm from the base of the stem, depending on the age of the plant and soil fertility.

2.3.2 Stem

According to Soetasad et al., (2003) eggplant stems are divided into two types, namely the main stem (primary stem) and branching (secondary stem). The main stem is the support for the establishment of the plant, while the branching is the part of the plant

that will produce flowers. Eggplant leaves include stemmed leaves consisting of a petiole (petiolus) and leaf blade (lamina). The petiole is cylindrical in shape with slightly flattened sides and thickened at the base, ranging in length from 5-8 cm. The leaf blade consists of mother bones, branch bones, and leaf veins. The leaf blade is an extension of the petiole which tapers off towards the leaf tip. The width of the leaf blade is 7-9 cm or more according to the variety. The length of the leaves is between 12-20 cm, the shape of the leaves is rhombus to oval, the tip of the leaf is blunt, the base of the leaf is tapered, and the sides are incised (Soetasad et al., 2003). The location of the eggplant leaves alternately and the leaf surface is covered with fine hairs. The number of leaves is 8 – 15 in each one stem.

2.3.3 Leaves

Eggplant leaves are green, slightly oval rhombus-shaped, the base of the leaf is blunt and the tip is tapered. The length and width of the leaf blade varies depending on the variety. Eggplant leaves consist of petioles and leaf blades. The petiole is cylindrical and thickened at the base, ranging in length from 5-8 cm (Samadi, 2001).

2.3.4 Flowers

Eggplant flowers are star-shaped, bright blue or mauve to a darker color. Eggplant flowers do not bloom simultaneously and flower pollination can occur cross-pollination or self-pollination (Rukmana, 2003). The flower ornaments that are owned are flower petals, flower crowns, and flower stalks. At the time of bloom, the average flower diameter is 2.5-3 cm, it is hanging. The flower crown is 5-8 pieces and will fall when the

fruit develops. Stamens numbered 5-6 pieces. The position of the pistil is generally higher than the stamen, although some are of the same height. Eggplant flowers are included in sissy flowers or androgynous flowers because in one flower there are stamens and pistils (Soetasad et al., 2003). According to (Samadi, 2001), eggplant flowers will appear for the first time after about 28 DAP.

2.3.5 Fruit

Eggplant fruit is very diverse, both in terms of shape and size as well as skin color. In terms of fruit shape, there are round, elliptical, and half round. The size of the fruit is between small, medium to large. While the color of the fruit skin is generally dark purple, light purple, green, whitish green, white and purplish white. Eggplant fruit produces seeds that are small in size, flat and light brown in color. This seed is a means of reproduction or generative plant propagation. Eggplant seeds are free in a soft sheath that is protected by the flesh of the fruit. The eggplant is a single true fruit and has thick flesh, soft and juicy. The petals are attached to the base of the fruit, and are green or purplish in color. The fruit hangs on each fruit stalk. Generally on one stalk there is one eggplant. However, there are also more than one. Eggplant fruit shape varies according to the variety. The first harvesting of eggplant is when the eggplant is about 49 DAP (Samadi, 2001).

2.4. Eggplant Plant Varieties

The variety used in this study is a single-cross hybrid variety BEP 110 A (F) x BEP 110 B (M) which is able to adapt well in the lowlands with an altitude of 150-300 m above sea level.

Most farmers use seeds from their own selection, which often results in a very different variety of crops and fruit types. Therefore, in eggplant plantations there can be five types of fruit. Some local varieties of eggplant that are recommended for vegetables are purple eggplant, while those to be eaten raw are Bogor and Gelatik eggplant.

The green eggplant is elliptical, green in color, or with white spots, about 1-1.5 cm in diameter and 10-15 cm in length. However, as far as the author observes, not all traditional markets provide this type of eggplant, sometimes it can be found in supermarkets (Samadi, 2001).

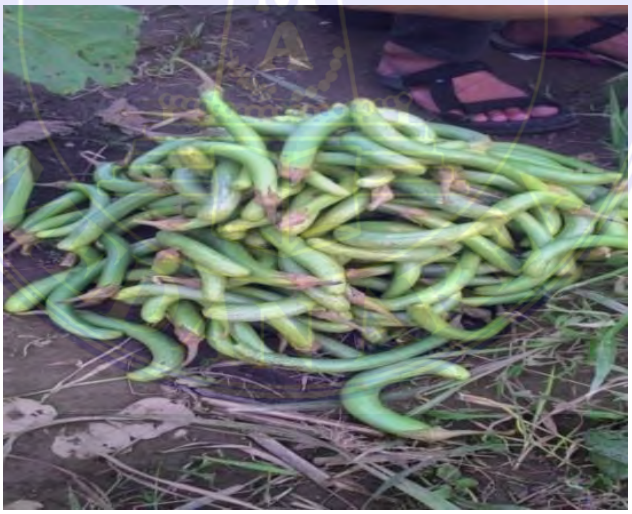

Figure 2. Green Eggplant
Source: Research Result (2019)

2.5. Terms of Growing Eggplant Plants

2.5.1. Climate

According to Firmanto (2011), green eggplant can grow and produce both in the highlands and in the lowlands ± 1,000 meters above sea level. This plant requires sufficient water to support its growth. During its growth, green eggplant requires air temperature conditions between 22º C - 30º C, hot weather and dry climate, making it suitable for planting in the dry season. In hot weather conditions will stimulate and accelerate the process of flowering or fertilization. However, if the air temperature is high, the flowering and fruiting of green eggplant will be disturbed, namely the flowers and fruit will fall.

The green eggplant plant is classified as resistant to disease and bacteria. However, planting green eggplant in areas with high rainfall can affect its sensitivity to disease and bacteria. To get high production, the green eggplant planting site must be open (getting sunlight) enough. In a protected place, the growth of green eggplant will be thin and less productive.

2.5.2. Land

According to Rukmana (2002), green eggplant can grow in almost any type of soil. The best soil conditions for green eggplant plants are sandy loam types, fertile, rich in organic matter, good aeration and drainage, and at a pH between 6.8-7.3. In acid-reacting soils (pH less than 5), liming is necessary. Lime materials for agriculture are generally in the form of calcite (CaCO3), dolomite or lime (CaO). The amount of lime

needed to raise the pH of the soil depends on the type and degree of acidity of the soil itself. Liming is usually done about two weeks before planting.

2.5.3. Sunlight

The intensity of sunlight that is sufficient, can make eggplants have enough energy for the process of photosynthesis. Sufficient sunlight can increase plant fegetative growth, such as the formation of roots, stems, and leaves. It also increases the generative growth of plants, in seeds, fruit, and flowers. For a good process, a period of sunlight is needed between 350 cal / m² - 400 cal / m² or 12 - 14 hours / day. If the intensity is less, it will cause stunted plant growth and reduce its production power. Plant growth looks thin, weak, pale, and can fall / wither / die. The fruit is not fresh, and the color of the fruit is not shiny, and uneven (Eriyandi, 2008).

2.6. Eggplant Pests

2.6.1. Earthworm

This type of pest attacks plants at night, while during the day hides in the ground or behind PHP mulch. Earthworms attack young plant stems by cutting them, so they are often called cutting caterpillars. The way to control it is by giving 1 gram of insecticide with the active ingredient carbofuran in the planting hole.

2.6.2. Grayak caterpillar

Armyworms attack plant leaves together in very large numbers, these caterpillars usually attack at night. Control that can be done is by spraying insecticides with active

ingredients like cypermethrin, deltamethrin, profenofos, chlorpyrifos, methomyl, cartophydrochloride or dimehipo at the dosage as directed on the package.

2.6.3. Fruit caterpillar

The caterpillar attacks the green eggplant by drilling the fruit while eating it. Infected fruit eventually perforated. Control is by spraying insecticides with active ingredients cypermethrin, deltamethrin, profenofos, chlorpyrifos, metomil, cartophydrochloride or dimehipo with doses according to the instructions on the package.

2.6.4. Aphids

Aphids suck plant fluids, especially on young leaves, the droppings of these lice have a sweet taste, so they attract ants. Affected leaves experience chlorosis (yellow), curl and curl, eventually the plant becomes stunted. Control is by spraying insecticides with the active ingredients of abamectin, imidacloprid, tiamethoxam, acetamiprid, chlorphenapir, cypermethrin or lamdasihalothrin with doses according to the instructions on the package.

2.6.5. Whitefly

This pest is white, has wings and its body is covered with white powder like wax. The whitefly attacks and sucks the leaf cell fluid, so that the cells and leaf tissue are damaged. Control of this pest by spraying insecticides with active ingredients abamectin, imidacloprid, acetamiprid, chlorphenapir, cypermethrin or lamdasihalothrin with doses according to the instructions on the package.

2.6.6. Yellow Beetle

Green eggplant plants become the host of this beetle. The beetle is yellow with the whole body covered like thorns. Control is by spraying insecticides with active ingredients cypermethrin, deltamethrin, profenofos, chlorpyrifos, metomil, cartophydrochloride or dimehipo with doses according to the instructions on the packaging.

2.6.7. Fruit Flies

Fruit flies attack purple eggplant fruit by injecting their eggs into the fruit, then the eggs turn into larvae, these eggs which eventually eat away at the purple eggplant fruit, causing the fruit to rot. Control of fruit flies can use a fly trap (sexpheromone) by using fruits that smell like flies (eg jackfruit, cucumber), then mixed with an insecticide with the active ingredient metomil. Control can also be done by spraying using insecticides with active ingredients cypermethrin, deltamethrin, profenofos, chlorpyrifos, metomil, cartophydrochloride or dimehipo with doses according to the instructions on the packaging.

2.7. Eggplant Plant Disease

2.7.1 Falling Seeds

Falling seedlings usually attack purple eggplant plants in the seedling phase. The method of control is by spraying a systemic fungicide with the active ingredients of propamocarb hydrochloride, simoxanil, kasugamycin, phosphoric acid or dimethomorph with a dose of 1/2 of the lowest dose listed on the package.

2.7.2 Bacterial Wilt

This disease often thwarts crops, its attack is caused by bacteria. Control efforts that can be carried out include increasing soil pH, destroying infected plants, crop rotation and chemical spraying using a bactericide from the antibiotic class with the active ingredients casugamycin, streptomycin sulfate, oxolinic acid, validamycin or oxytetracycline with the appropriate dose on the package.

2.7.3 Fusarium wilt

The symptoms caused by fusarium wilt are almost the same as bacterial wilt, the only difference being the cause. Fusarium wilt is caused by fungal attack. Control efforts that can be carried out include increasing soil pH, destroying affected plants, rotating crops and chemical spraying using fungicides with active ingredients benomyl, metalaxyl or propamocarb hydrochloride at the appropriate dose on the package.

2.7.4 Phytopthora

Phytopthora rot attacks all parts of the plant. Affected stems are characterized by blackish brown spots and wetness. Serious attacks cause plants to wither. Purple eggplant leaves are attacked like scalded by hot water. Attacks on fruit are characterized by wet spots that turn blackish brown and soft. Chemical control using systemic fungicides, the active ingredients that can be used are metalaxyl, propamocarb hydrochloride, simoxanil, or dimethomorph and contact fungicides with active ingredients copper, mankozeb, propineb and ziram.

2.7.5 Leaf Spots

This disease is caused by bacterial attack, growing rapidly especially in the rainy season. The attack is characterized by the presence of white and angular spots because it is limited by the leaf bones. The spots turn gray brown and the undersides of the leaves secrete fluid, eventually the leaves dry up. The control uses a bactericide from the antibiotic class with the active ingredients kasugamycin, streptomycin sulfate, oxolinic acid, validamycin, or oxytetracycline or from inorganic groups such as copper. Dosage according to the package.

2.7.6 Anthracnose

Anthracnose is a disease that attacks all parts of the plant which is characterized by the presence of slightly round spots of light brown color, then turning dark brown to blackish. The longer the spots widen and coalesce, eventually the leaves dry up. Another symptom is yellow or brown elongated round patches. Affected fruit will appear slightly rounded and dark brown indented spots, the fungus will form a pink mass of spores. Chemical control using systemic fungicides.

2.7.7 Virus

Viruses are diseases that have the potential to cause failure, especially in the dry season. Symptoms of attack are generally characterized by stunted plant growth, curling leaves and yellow wet spots. So far, no antidote has been found for this viral disease. This disease is transmitted from one plant to another through vectors or transmitters. Some pests that have the potential to be a virus transmitter.

These include whitefly, aphids, thrips and mites. Humans can also act as virus transmitters, either through agricultural tools or hands, especially during perempelan. Several efforts to deal with the virus include: cleaning weeds (because weeds have the potential to become virus hosts), controlling virus-transmitting pests/insects, and destroying plants that have been infected with the virus.

2.8 Liquid Organic Fertilizer (POC) Cow Urine

Liquid organic fertilizer is a solution from the decomposition of organic materials derived from plant residues, animal waste (faeces and urine), and humans which contain more than one nutrient element. Urine is substances that are secreted through the kidneys, substances obtained in it are food substances that have been digested, absorbed and even metabolized by body cells and then excreted through the kidneys and urinary tract. Urine has growth regulators and has plant pest or disease repellent properties (Setiawan, 2010). In the world of manure, the terms hot fertilizer and cold fertilizer are known. Hot manure is manure whose decomposition process takes place quickly so that heat is formed, for example manure from horses, goats, sheep, and chickens. In cold manure the opposite occurs, a high C/N ratio causes the manure to decompose longer and does not generate heat, for example in cow, buffalo, and pig manure. Cow manure contains a lot of decomposing microorganisms that are useful for increasing the type and population of soil microorganisms. The characteristics of good manure can be seen physically or chemically. Its physical characteristics are blackish brown, quite dry, does not clot, and

does not have a strong odor. Its chemical characteristics are a small C/N ratio (the constituent materials are not visible) and the temperature is relatively stable.

Fertilization using fermented cow urine can increase the production of vegetable crops. Cow urine contains elements of N, P, K and Ca which are quite high and can increase plant resistance to disease (Phrimantoro, 2002).

In the manufacture of liquid organic fertilizer, fermentation is carried out for 14 days with the addition of urine as a fermenter. Fermentation is organic material that is destroyed by microbes in a certain temperature range and conditions. Fermentation aims to break down complex compounds into simpler compounds. During the fermentation process there is a process of N fixation from the air by microorganisms present in cow urine (Indriani, 2013).

Liquid fertilizer can be used after going through several processes for 14 days with the indicator that the smell of urea in the urine has reduced or disappeared. Temperature and pH also affect the fermentation process (Soleh in Jainurti, 2016). Temperature and pH are factors that can affect the occurrence of anaerobic fermentation. The degree of acidity at the beginning of the composting process will decrease because a number of microorganisms involved in composting convert organic matter into organic acids. In the next process, converting organic acids that have been formed so that the material has a high degree of acidity and is close to neutral (Sinaga, 2010 in Susetyo, 2013).

The physical characteristics of liquid organic fertilizer that have matured perfectly are brownish yellow in color and smell of rotting constituent material and the presence of white spots (the more the better). A good pH range for organic fertilizers is

around 6.5 – 7.5 (neutral). Usually the pH drops slightly at the beginning of the composting process due to the activity of bacteria that produce acid, with the appearance of other microorganisms in the decomposed material, the pH of the material will rise after a few days and then be in a neutral condition (Indriani, 2003).

Based on the results of research by Widyati (2004), it was found that tea dregs had a very significant effect on increasing the production of corn husks. Tea dregs compost can partially replace nitrogen sources for sweet corn plants.

In the research of Mappanganro, et al. (2010) who used liquid organic fertilizer of cow urine on strawberry plants on the parameters of plant height, number of leaves and production, with the result that the addition of cow urine 50 ml/l gave the best results for strawberry plant production. While in this study, liquid organic fertilizer of cow urine was used with the addition of molasses and empon-empon (ginger, turmeric, kencur, galangal) to make the distinctive aroma of cow urine slightly less than the previous aroma. Liquid organic fertilizer of cow urine was applied to green spinach plants with parameters of plant height and number of leaves, obtained results with a concentration of 10% which could affect the average plant height (23.15 cm) and number of leaves (19.15 strands).

2.9 Tea Dregs Compost

Tea dregs is one of the household wastes and solid waste as a by-product of the bottled tea industry production process from the extraction process. Tea dregs contain nitrogen that is easily absorbed by plants so it is very good for fertilizing plants. Nitrogen

is needed for the formation or growth of plant vegetative parts, such as leaves, stems, and roots (Slamet, 2005).

Utilization of tea leaf waste aims to change the chemical composition of fresh tea leaves in a controlled manner so as to produce preparations that can bring out the desired properties in the brewed water such as color, taste and special and favorable aroma. In the brewing process, in one day it produces 400 kg of tea leaf waste, which in a month can total up to 12 tons. The potential for a large amount of waste allows for an opportunity to use it as a source of organic matter for plants. The large amount of waste has not been utilized properly, but based on the results of the analysis, it shows that tea dregs contains many important elements for plants such as N, K, Mg, Ca and S (Slamet, 2005).

The nutrient content of tea according to Peksen et al. (2009), containing 47.49% organic C-, 1.96% total nitrogen, and 24.18 C/N ratio. Not only that, tea dregs also contain magnesium, zinc, fluoride, nitrogen, potassium and minerals that help maintain plant health and contain vitamins A, B1, B2, B6, B12, C, E and K. Tea dregs can be ground first to break down the leaves so that the nutrients contained can come out faster (Wardon, 2011).

CHAPTER III

RESEARCH METHOD

3.1 Research Location and Time

This research was conducted in the experimental field of the Faculty of Agriculture, University of Medan. The time of conducting the research started from January to April 2018.

3.2 Research Materials and Tools

The materials used in this study were green eggplant seeds, cow urine, tea dregs, EM4, molasses, Curacron 500 EC.

The tools used in this study were hoe, meter, plastic rope, machete, bucket, measuring cup, scales, stationery, gembor, caliper.

3.3 Research Method

This research was conducted using a factorial randomized block design (RAK) consisting of two factors, namely:

1. Treatment factor of cow urine concentration (U) which consists of 4 levels, namely:

U0 = Without giving POC cow urine (control)

U1 = Giving POC cow urine with a concentration of 40ml/l water

U2 = Giving POC cow urine with a concentration of 80 ml/l water

U3 = Giving POC cow urine with a concentration of 100 ml/l water

2. Treatment factor dose of tea dregs (T) which consists of 4 levels, namely:

T0 = Without giving tea dregs compost waste (control)

T1 = Giving tea dregs compost at a dose of 1 kg/plot

T2 = Giving tea dregs compost at a dose of 2 kg/plot

T3 = Giving tea dregs compost at a dose of 3 kg/plot

The number of treatment combinations is 4 x 4, namely:

U_0T_0	U_0T_1	U_0T_2	U_0T_3
U_1T_0	U_1T_1	U_1T_2	U_1T_3
U_2T_0	U_2T_1	U_2T_2	U_2T_3
U_3T_0	U_3T_1	U_3T_2	U_3T_3

Research unit:

Number of repetitions = 2 replications

Number of experimental plots = 32 plots

Experimental plot size = 150 cm x 160 cm

Number of sample plants = 4 plants

Number of plants per plot = 9 plants

Total number of plants = 288 plants

Total number of sample plants = 128 plants

Distance between experimental plots = 100 cm

Planting distance = 50 cm x 60 cm

Distance between tests = 50 cm

3.4 Analysis Method

After the research data is obtained, data analysis will be carried out using a factorial randomized block design (RAK) with the formula as follows:

$$Y_{ijk} = \mu + \rho_i + \alpha_j + \beta_k + (\alpha\beta)_{jk} + \sum_{ijk}$$

where :

Yijk = Observation results from each experimental plot that received treatment for factor 1 stage j and factor two levels placed in group i replication

μ = Effect of the general mean/average

ρi = The effect of the i-level test

α_j = Effect of giving Water Hyacinth Compost at level j

β_k = Effect of Arbuscular Mycorrhizal Fungi at level k

$(\alpha\beta)jk$ = Effect of treatment combination between giving water hyacinth compost at level j and Arbuscular Mycorrhizal Fungi factor at level k

$\sum_{ijk}$ = Effect of error from treatment with water hyacinth compost at level j and asrbuscular Mycorrhizal Fungi treatment at level k and replication at level i

If the results of this study have a significant effect, then further testing is carried out with the Duncan distance test (Gomes and Gomes, 2005).

3.5. Research Implementation

3.5.1. Land Preparation

Land preparation begins with processing and shaping the soil into beds. Firstly, the land is cleared, with the left and right being dredged to cover the trench so that a new

plot (bed) is formed above the trench. After processing and forming the land, it is left for 5 days before planting.

3.5.2. Cow Urine POC Making

One of the ingredients that can be used to make liquid organic fertilizer is cow urine. Utilization of cow urine as liquid organic fertilizer must pass the fermentation stage first, mixed with several other ingredients to get more benefits.

How to make cow urine POC:

1. Herbs (turmeric, ginger, kencur, or galangal) as much as kg pounded until smooth, then boiled with 4 liters of water until boiling.
2. Let the boiled herbs to cool, then mix with 20 liters of cow urine, 1 kg of brown sugar, 250 ml of soybean soaking water and add decomposer bacteria.
3. Put all the ingredients that have been mixed into a closed container or can use a jerry can. Then close tightly and let stand for 3 weeks.
4. In this fermentation process, open the lid of the container once a day to remove the gas produced in the container.
5. After 3 weeks, the fermented liquid organic fertilizer is ready for use. Filter first if you want to use it with a plant sprayer.

3.5.3. Tea Dregs Compost Making

Tea dregs weighing 40 kg taken from a beverage company in Tanjung Morawa as tea dregs compost material. Tea dregs weighing 40 kg is added with 50 ml of EM4 and added 50 grams of molasses dissolved in 5 liters of water and sprinkled on the tea

dregs evenly, then put into a composting container that has been prepared, namely a hole measuring 1 x 1 m with a tarp base.

Figure: The Making Process of Tea Dregs Compost
Source: Research Implementation (2019)

The tea dregs compost is turned once a week to speed up the decomposition process evenly so that it can be used. This is done with the aim of controlling so that the microbes contained in these materials continue to work within that time interval, the air circulation in the container must be guaranteed so that the microbes can work optimally. After 4 weeks of ripening, the tea dregs compost can be harvested. It is characterized by reduced volume, color that changes from brown to black, odorless and crumbly texture. Based on the results of the analysis of tea dregs compost conducted at the PT. Socfindo Indonesia (2018) where the results obtained, namely the C/N ratio = 7.37 which is classified as very low.

This is supported by Sari (2005) who reported that raw tea dregs that has not been decomposed contains C-Organic as much as 5.23%, N : 0.11%, P available 125ppm, K : 13,85 ppm, Mg : 1.119 ppm, C/N Ratio : 47,54.

Figure 4: Tea Dregs Compost
Source: Research Result (2019)

3.5.4. Planting

Before planting, seeding is done first by making beds 1 x 1 wide and 20 cm high. The beds were made with a mixture of soil, rice husk charcoal and chicken manure compost in a ratio of 1:1:1 and shaded the beds. Then the seeds are sown and covered with a thin layer of soil. Flush with water to keep the nursery moist.

After 2-4 days the sprouts begin to grow into plants and are watered every day. After 10-15 days, transfer the plant seeds into small polybags (9 x 10 cm), one polybag per plant. Fill the polybag with soil and rice husk charcoal in a ratio of 1: 1. Water the plants in the polybag every day. After the plants are 1 – 1.5 months old or more the plants will have at least 4 leaves and the plants are ready to be transferred to open land or experimental plots.

The land for the cultivation of the green eggplant is processed using a hoe with a depth of 30 cm. The form of beds or plots with a size of 150 cm x 160 cm, a height of 30 cm and a distance between beds of 50 cm.

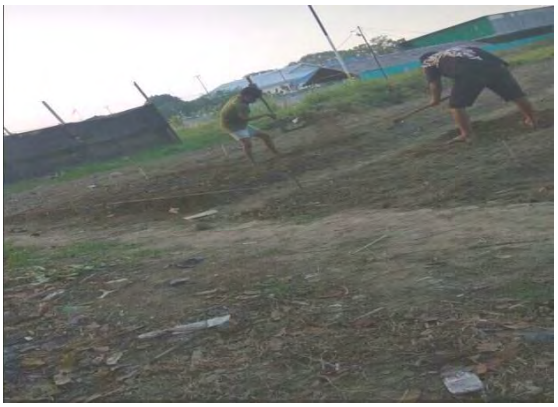

Figure 5. Land Cultivation
Source: Research Implementation (2019)

Make planting holes in a row, the distance between the planting holes is 50 cm and the distance between rows is 60 cm. The width and depth of the planting hole are adjusted to the size of the seed polybag. Before transplanting the seedlings, the beds or plots are watered with water. Move the plant seeds one hole one plant seed carefully in moving the plants to keep the plant roots from breaking and being damaged. After planting, then watered it to maintain soil moisture.

3.5.5. Eggplant Plant Maintenance

3.5.5.1. Watering

Watering is done in the morning and evening, according to the condition of the soil where the plant grows. The tool used for watering is gembor which sprays water more evenly so it does not damage plants, especially seeds and young plants.

3.5.5.2. Stitching

Stitching is done on plants that die from disease, done one week after planting. After finishing the stitching, the plants are watered so that the plants are not stressed after moving to the field.

3.5.5.3. Weeding

Weeding is done according to weed conditions to avoid competition with weeds by pulling or using a hoe. Weeding is usually done 3-4 times during the planting period or according to the condition of the presence of weeds. Eradication of diseases and pests is carried out after the plants experience symptoms of attacks that may interfere with plant growth.

3.5.5.4. Hoarding

Hoarding is done to provide microclimate conditions in the soil around the plant by hoeing, so that the dense soil becomes loose and crumbly.

3.5.5.5. Basic Fertilizer Application

Fertilizer application is done after the land has been processed, and then the fertilizer is sown evenly on the experimental plot and allowed to stand for a week. The basic fertilizer used is Urea at a dose of 20 grams/plot for all plots.

3.5.6. Pest and Disease Control

Pest control in this study was carried out manually, namely by quoting pests one by one from the affected plants. But for severe attacks, control is carried out using the insecticide Curacron 500 EC at a dose of 10 ml/l water. As for the diseased plants, the same thing was done, namely by removing the diseased plant parts, and if the plants died at the age of 0 – 2 MST, the plants were immediately embroidered with new seeds in good condition.

3.5.7. Harvest

The first fruit can be picked after the eggplant is 45-60 days after planting. The fruit looks fresh, the color of the fruit is shiny, the fruit is still young, 12-15 days after the flower blooms.

Harvesting eggplant is quite simple, namely picking the fruit directly, using a knife or cutting shears. Picking with scissors or a knife is done on a stalk 3-4 cm long from the base of the fruit.

3.6. Parameter Observation

Prior to observations, a random sample of 4 plants was determined.

3.6.1. Plant Height (cm)

Eggplant height was measured at the age of 15, 30, and 45 days after planting, by measuring the plants from the marked soil surface to the plant growth point on the main stem (primary) of 4 sample plants/plot.

3.6.2. Number of Branches (branches)

Observations were made by counting the number of productive lateral branches. The calculation is done when the plant has formed branches until the next branching phase stops.

3.6.3. Number of Fruits per Sample (fruit)

The number of fruits is calculated per sample plant, the number of fruits is totaled from the first harvest to the end of harvest.

3.6.4. Production per Sample (g)

To obtain the weight of fresh fruit for each plant, it is done by weighing the weight of the fruit of each plant at the time of the first harvest, until the third harvest then the weight of the fruit weighed at each harvest is added up by weight, it will obtain the weight of fresh fruit for each plant.

3.6.5. Production per Plot (kg)

Fruit production per plot was calculated by weighing all the fruit in each plot, which was carried out at the last harvest.

CHAPTER V

CONCLUSION AND SUGGESTION

5.1 Conclusion

From the results of this study, several conclusions can be drawn as follows:

1. Cow urine distribution had a significant effect on plant height, number of branches, production per sample, number of fruits per sample and production per sample of green eggplant.
2. Tea dregs compost had no significant effect on plant height, number of branches, production per sample, number of fruits per sample and production per sample of green eggplant.
3. The combination of cow urine and tea dregs compost had no significant effect on plant height, number of branches, production per sample, number of fruits per sample and production per sample of green eggplant.

5.2 Suggestion

It is recommended to do a re-examination using POC Cow Urine and Tea Dregs Compost with various levels of treatment to increase growth and production of green eggplant (Solanum melongena L,)