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The Impact of Liquid Organic Fertilizer on Growth and Production of Melon (*Cucumismelo* L.)

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ABSTRACT
Melone (Cucumismelo L.) is one of the most popular fruit commodities in Indonesia due to its sweetness, nutritional contain. Consumer demand for melons is very high, both locally and internationally. A melon is a herbaceous annual plant that grows on vines and is a member of the cucumber family. This study aimed to determine the optimum concentration of cow urine used to improve melon growth and productivity. The method used in this research was Complete randomized design (CRD) with one factor, namely the concentration of 6-level bio urine, namely B0 = 0 percent bio urine, B1 = 10 percent bio urine, B2 = 20 percent bio urine, B3 = 30 percent bio urine, B4 = 40 percent bio urine, and B5: 50 percent bio urine from 100 ml/plant recommendation. The research findings found that application of bio-liquid organic fertilizer to cow urine increased in several parameters namely: plant length, stem diameter, number of male flowers, and number of female flowers with the best 10 percent POC bio-cow urine.
Keyword: Cucumismelo L., Bio Urine, Complete Randomize Design

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1. Introduction

Melon (*Cucumis melo* L.) is one of the most popular fruit commodities in Indonesia. Consumer demand for melons is very high, both locally and internationally, although the sugar level of this particular melon is not too sweet. A melon (*Cucumis melo* L.) is an herbaceous annual plant that grows on vines and is a member of the cucumber family [Evizal&Prasmatiwi, 2019]. Because of the fluctuation of melon demand, hence some efforts are required to maintain or escalate melon output.

Melon production declines due to less fertile soil, necessitating the application of POC fertilization, particularly POC bio urine, to increase output. Growing output and reducing imports could be fulfilled by using organic fertilizers, which have little effect on the agricultural business environment and are ecologically conscious. Agriculture is being affected by the changing lifestyles of people, who are beginning to consume organic goods to live healthier lives. Farmers are starting to decrease the usage of inorganic [Sudita et al., 2018] materials in agricultural production.

Farmers have become more reliant on inorganic fertilizers because of the extensive use of inorganic fertilizers in recent years. Overuse of chemical fertilizers can have negative consequences, such as leaching, pollution of water sources, destruction of beneficial microorganisms, insects, and the development of disease-resistant plants. On the other hand, excessive use of inorganic fertilizers can cause soil fertility and organic matter content to decrease [Ning et al., 2017]. One of the attempts to improve the production of melon plants is the selection of better seeds and the application of appropriate fertilizer. Fertilization suplies additional nutrients

to the soil, either directly or indirectly, to provide plants nutrition. Fertilization is a vital component of their care [Bell & Dee, 2017].

Fertilization is beneficial for increasing the output of melon plants since it helps to compensate for the lack of nutrients in the soil throughout[u3] the plant development phase [Smith et al., 2016]. Organisms such as plants and animals that have gone through decomposition process produce organic fertilizers, which are fertilizers made up of organic elements derived from those plants and animals. Liquid organic fertilizers, such as cow urine, goat urine, horse urine, buffalo urine, and sheep pee, are examples of liquid fertilizers [Wang et al., 2019]. The use of biological urine as an alternate method of boosting nutrition in melon plants has been investigated. Biological cow urine (also known as bio cow feces) is an organic substance produced by anaerobic fermentation of fresh cow urine and feces that may be utilized to promote plant development [Syafira et al., 2020]. Cow pee POC is defined as the process of enriching cow urine via the microbial-adding fermentation of liquid organic fertilizer to enhance the biological quality of cow urine. Meanwhile, after fermentation, it has a pH of 8.7, contains 2.7 percent nitrogen, 2.4 percent phosphorus, 3.8 percent calcium, is black, and has no unpleasant odor. [u4]

Following Girsang&Sulastri [2019], cow urine has a high nutritional content and includes growth regulators that are essential for plant development. It also contains repellent chemicals that are used to prevent attacks by pests and plant diseases, among other things. In addition to the growth regulator auxin, which is an organic molecule that acts actively and is converted throughout the plant, giving cow urine also includes a loosening or bending of plant cell walls, which allows H+ ions to be transported into the cell walls. The nutrients included in cow urine also help to speed up the regenerative development of plants [Nugraha et al., 2020]. Fresh cow urine is seldom used as a source of plant nutrients since it smells terrible and pollutes the environment. Thus, it must first be fermented for three weeks before being used. It turns out that the fermentation products, in addition to decreasing the disagreeable strong odor, are also of higher quality than fresh cow urine, indicating that the fermentation process is more efficient [Ariyanto&Wisuda, 2019].

According to test results, unfermented cow urine has a pH of 7.2; 1.1 percent N; 0.5 percent P; 1.5 percent K; 1.1 percent Ca; yellow color; and a more pungent odor, whereas after fermentation it has a pH of 8.7; 2.7 percent N; 2.4 percent P; 3.8 percent K; 5.8 percent Ca; and black color with no pungent odor. According to the findings of Tarmizi's study [Tarmizi, 2020], providing melon plants with cow urine at a concentration of 80 percent (as opposed to the recommended 100 ml/plant) may enhance fruit weight, fruit diameter, and wet weight (*Cucumis melo* L.). According to the findings of Alfendari's study [Alfendari, 2017], soybean plants produced the greatest outcomes when fed cow urine in the form of increased pod production and increased seed production when the ratio of urine to water was 1:2.[u5]

This study aimed to determine the optimum concentration of cow urine for development (Cucumismelo[u6] L.).

2. Materials and Methods

Universitas Taman Siswa Padang in Ampang, Kuranji District, was chosen as the location for the experiment because of its elevation of 10 meters above sea level.

Melon seeds of the Gracia F1 type, Bio Urine/ (human waste), and husk charcoal were utilized, as were a hoe, machete, meter, polybag, pH meter, label board, stationery, and an electronic camera.

An entirely random design (CRD) with one factor, namely, the concentration of bio urine with six levels, namely B0 = zero percent bio urine, B1 = ten percent bio urine, B2 = twenty percent bio urine, B3 = thirty percent bio urine, B4 = forty percent bio urine, and B5: fifty percent bio urine from the recommended 100 ml/plant, was used in this experiment. Each treatment was repeated four times, resulting in a total of 24 experimental units in the study. Each experimental unit consisted of three polybags, resulting in a total of 72 polybags being produced. If the observed data had a statistically significant impact on the 5 percent significance threshold, the variance was used to evaluate the data. Duncan's Multiple Range Test is then performed. Afterwards, the Duncan's Multiple Range Test is performed (DMRT).

Manual methods, such as hand hoeing or macheteing, were used to clear the experimental fields of weeds, plant remnants, and trash. The planting media consists of urban soil that has been mixed with husk charcoal in a one-to-two ratio and is placed in a 40 cm × 50 cm polybag large enough to accommodate the roots of the melon plant. Each treatment contains three polybags, for a total of three to six polybags. Stake are put adjacent to the plant at a height of up to 10 cm above the surface of the planting media in order to support the plant.

Giving biological urine may be done as much as five times before it reaches the generative phase of the process. The administration of Bio Urine to plants was done every 14 days, with the plants being aged at 0 MST, 2 MST, 4 MST, 6 MST, and 8 MST, respectively. Depending on the treatment (0 percent, 10 percent, 20 percent, 30 percent, 40 percent, and 50 percent of the required 100 ml/plant), the plant will produce different results. Saturating the leaves with the substance until they are moist is how Bio Urine is administered.

The seeds utilized were melon seeds from the Gracia F1 variety; seed selection may be accomplished by soaking the seeds in water for a short period of time. Submerged seeds may be utilized, while floating seeds should be thrown away completely.

Nurseries are established following seed selection by curing and germinating the seeds using wet tissue paper, watering the seeds twice a day in the morning and evening, and continuing this process until possible roots develop from the seeds.

In order to determine treatment, labels are installed in each polybag, and stakes are installed when the plant is ready to be transplanted. Spaciousness is used as a basis for measuring plant height, and markers installed at a height of 50 cm above the ground are marked. Labeling is also done in order to prevent errors in planting and counting when the plant is ready to be transplanted to the field. It is possible to plant melon seeds 7 days (a week) after the seedlings have emerged and have established strong roots in the planting media by transferring them into the planting medium with each polybag containing 2 melon seeds. When a plant does not develop well, is afflicted by illness, or dies, it is enclosed to commemorate the event. Meanwhile, plant thinning was done on plants aged 14 HST by inserting the best plant stem from one of the plants that did not grow well, which was obtained by cutting one of the plants that did not grow well.

Weeding is done on a regular basis throughout the plant's development cycle by manually removing weeds that have grown around the base of the plant. Meanwhile, hoarding is accomplished by encircling the plant with planting media and securing the plant roots that emerge from the soil surface with a hoarding tape.

Watering is done every day if it is not raining, and it is done using a device called a "gembor." When the plant is still young, it is possible to handle it with care so that the plant is not harmed in the process.

Pest and disease control is carried out throughout the growing season, from planting to harvesting. Whenever the attack level exceeds a certain threshold, chemical control is implemented via the use of pesticides in accordance with established protocols.

Melon fruit is typically harvested at the age of sixty-five HST when there is evidence of a hoop-like crack between the bottom of the fruit stalk and the melon [Musfira&Mantja, 2019]. The fruit has a fragrant aroma and the pores and skin are a yellowish-green color on the outside, with the pores and skin being yellowish-green on the inside. Using scissors, the selection process is carried out while the weather is still sunny.

In addition to stem length and diameter, the following parameters were measured: age of the first flower, number of male flowers, number of female flowers, harvest age, fruit length and circumference, average fruit weight, and fruit weight per plant, as well as the leaf area index (ILD). To calculate the ILD, you must first determine the leaf area using the following formula:

$$\boldsymbol{LD = P\ x\ L\ x\ C}$$

$$\mathbf{ILD} = \boldsymbol{LD}/(\boldsymbol{Planting\ Distance})$$

LD = Leaf Area
P = Leaf Length
L = Leaf Width
C = Melon Leaf Constant (1.09)

3. Results

3.1. Plant Length

The results of variance and further testing of melon plant length with the application of liquid organic fertilizer bio cow urine showed a significant effect (Table 1).

The results of the variance analysis and subsequent melon plant length tests related to the application of liquid organic fertilizer bio cow urine showed a statistically significant connection (Table 1).

Table 1. With the application of liquid organic fertilizer bio cow urine, the length of melon plantsincreased significantly

Treatment	Plant Length (cm)
B0 : 0% Bio Urine	43,04 b
B1 : 10% Bio Urine	58,08 a
B2 : 20% Bio Urine	51,64 a
B3 : 30% Bio Urine	55,50 a
B4 : 40% Bio Urine	53,67 a
B5 : 50% Bio Urine	54,50 a
KK = 9,58%	

Note: KK stands for Coefficient of Diversity

3.2. Stem Diameter

According to Table 2, the variance and subsequent test of melon stem diameter with the application of liquid organic fertilizer bio cow urine revealed a very significant impact, which is shown in the graph.

Table 2. Using liquid organic cow urine fertilizer, the diameter of melon plant stems grew

Treatment	Rod Diameter (mm)
B0 : 0% Bio Urine	7,08 b
B1 : 10% Bio Urine	8,42 a
B2 : 20% Bio Urine	8,00 a
B3 : 30% Bio Urine	8,08 a
B4 : 40% Bio Urine	7,92 a
B5 : 50% Bio Urine	8,33 a
KK = 5,31%	

Note: KK stands for Coefficient of Diversity column numbers followed by lowercase letters are identical, and there is no uniqueness in accordance with the DMRT 5 percent rule

3.3. Leaf Area Index

The application of liquid organic fertilizer bio cow urine was shown to have no significant effect on the variance index of melon plant leaf area index in this experiment. As indicated in Table 3, the leaf area index is computed.

Table 3. After applying liquid organic fertilizer bio cow urine to melon plants, the leaf area index of the plants increased

Treatment	Fruit Weight (kg)
B0 : 0% Bio Urine	0,87
B1 : 10% Bio Urine	1,07
B2 : 20% Bio Urine	1,40
B3 : 30% Bio Urine	1,06
B4 : 40% Bio Urine	1,04
B5 : 50% Bio Urine	1,06
KK = 22,44%	

Note: KK stands for Coefficient of Diversity

3.4. Planting Fruit Weight

The application of liquid organic fertilizer from cow pee to melon plants had no statistically significant effect on plant fruit weight variation. Table 4 illustrates melon fruit weights collected from different melon plants.

Table 4. With the use of liquid organic fertilizer bio cow urine to melon plants, the weight of the fruit increased

Treatment	Fruit Weight (kg)
B0 : 0% Bio Urine	0,87
B1 : 10% Bio Urine	1,07
B2 : 20% Bio Urine	1,40
B3 : 30% Bio Urine	1,06
B4 : 40% Bio Urine	1,04
B5 : 50% Bio Urine	1,06
KK = 22,44%	

4. Discussion

POC bio urine on 10% can increase the plant's length by 58.08 cm, compared to control. The presence of auxin in cow urine has a variety of beneficial effects on plant development. Cow urine contains several nutrients, namely 1.00 percent N; 0.50 percent P; 1.50 K. The blooming age of a plant is determined by the genetic elements that the plant inherits from its parents as well as the environmental circumstances in which the plant develops. Melon may produce more male flowers if they are fertilized with liquid organic fertilizer derived from biological cow urine.

The ability to provide auxin, which may increase the number of flowers, is beneficial to plants. The failure of melon plants to increase ILD may be caused by a variety of factors, including temperature, the availability of water and environmental factors. The age at which a plant begins to bloom is determined by the genetic elements passed down from its parents as well as the environmental circumstances in which it develops. Melon fruit development is affected by a variety of environmental and external variables, including sunshine, temperature, and humidity. The fruit circle is affected not just by the availability of nutrients, but it is also influenced by variables associated with the individual's genotype.

The failure of melon plants to produce fruit circles may be attributed to environmental variables such as the availability of water for the plants. Plants that are stressed by water will produce abscisic acid inhibitory hormones and growth- stimulating hormone inhibitors. Water stress conditions decrease plant nutrient availability because the quantity of water in the soil will influence the concentration of nutrients in the soil solution. Plants can absorb more water and nutrients if they have a high number of roots.

5. Conclusion

Based on the outcomes of the debate, it can be determined that the use of liquid organic fertilizer (POC) derived from bio cow urine has no major impact on the environment (increases ILD), accelerates flower emergence and harvest age, increases fruit length, fruit circle, average fruit weight, and fruit weight per plant). However, with the optimum concentration of 10 percent POC bio cow urine, it may greatly enhance the development of plant length, stem diameter, number of male flowers, and number of female flowers.

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