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The Effect of Dosing Liquid Organic Fertilizer Coconut Water with Boobs on the Growth of Chilli Plants as a Biology Learning Resource in the form of student Worksheets

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Abstract: The aims of this research are: 1) to determine the effect of the dose of liquid organic fertilizer from coconut water with bamboo shoots on the growth of chili plants, 2) to find out the best dose of liquid organic fertilizer from coconut water with bamboo shoots on the growth of chili plants, and 3) to determine whether or not the results of this research are suitable for use. as a learning resource in the form of Student Worksheets (LKPD) in growth material. This type of research is experimental research using a Completely Randomized Design (CRD). This research contained 4 treatments and 8 replications. Control with no dose of liquid organic fertilizer with coconut water with bamboo shoots, 3 treatments with different doses of liquid organic fertilizer with coconut water with bamboo shoots, namely, P1 (30 ml of liquid organic fertilizer with coconut water with bamboo shoots), P2 (40 ml of liquid organic fertilizer with water coconut with bamboo shoots), P3 (60 ml liquid organic fertilizer coconut water with bamboo shoots). The parameters observed in this research were the height and branch growth of chili plants. Data were analyzed using One-Way ANOVA (Normality, Homogeneity, Hypothesis and BNJ Test). Based on the research results, there is an effect of giving a dose of liquid organic fertilizer from coconut water with bamboo shoots on the growth of chili plants. Hypothesis test results show Fhit > F daf. The BNJ test further showed that P3 treatment had the best effect on the growth of chili plants. Based on the validation analysis of learning resources, this research is suitable for biology learning in the form of Student Worksheets (LKPD).

Keywords: Growth, Liquid, Learning Resources, LKPD.

I. INTRODUCTION

Red chili (Capsicum annuum L.) is one of the horticultural agricultural products that is widely cultivated by farmers. Red chili is a vegetable commodity that is in great demand because its selling value is quite high, and is one of the raw materials that is really needed because it is widely consumed every day [1], [2].

Red chili is an annual plant that can grow in the highlands and lowlands. The contents found in red chilies include protein, lipids, fiber, mineral salts (Ca, P, Fe, K), vitamins (A, D3, E, C, K, B2, and B12), and capsaicin [3]. Apart from being used for household purposes, chilies can also be used for industrial purposes, including the cooking seasoning industry, food industry, and medicine or herbal medicine industry.

Coconut water is an endosperm fluid that contains organic compounds. These organic compounds include auxin and cytokinin. Coconut water is a source of nutrients for plants because it stores nutrients such as nitrogen, phosphorus, potassium, Mg, Ca, and a number of other macro elements so that it can increase soil productivity and crop production. The coconut plant is a plant with a multitude of benefits. All parts of the coconut plant, from the roots to the coconut fruit, have benefits for human life. Likewise with coconut water, not only does it refresh your thirst and make your body healthy, coconut water is also beneficial for plants.

Another benefit of using organic materials for agriculture is to reduce the use of chemical fertilizers. Another method that can be used to help speed up plant growth is using coconut water (Cocos nucifera L.) as a substitute for chemical fertilizer. Coconut water is a plant product that can be used to replace the use of urea in increasing plant growth[4]. To get good production results, plant growth must be considered, for example, the use of organic materials and the need for water[5].

Bamboo shoots are young shoots of bamboo tree saplings that grow from the roots. We know bamboo shoots as a food ingredient, for example, processed as a vegetable or as a filling for spring rolls. Apart from that, bamboo shoots are also

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used as material for making MOL (Local Micro Organisms). Providing MOL bamboo shoots can have a real influence and has a tendency to increase plant growth and yield [6]. Bamboo shoots MOL functions as a stimulant for plant vegetative growth. Namely the growth of shoots, leaves, roots, and stems in plants before entering the flowering period. Bamboo shoot MOL can also be used as a decomposer or decomposer in the process of making compost.

Based on the problem of increasing the growth and production of chili plants, as a solution, farmers can use artificial phytohormones from a mixture of coconut water and bamboo shoots, because artificial phytohormones can stimulate plant growth well [7], [8]. Utilize ingredients that we often encounter around so that it will be better for the plants we will consume later, and also not exposed to excess chemicals that can harm human health. Artificial phytohormones are also safe to use so they do not pollute the environment.

In order to make the nation's life more intelligent, improving the quality of education is very important for sustainable development in all aspects of human life. Various ways can be realized to minimize this problem, one of which is making a Student Worksheet to complete the implementation of learning which aims to strengthen students' memory. The purpose of using LKPD is to present tasks that increase students' mastery of the material provided and train students' learning independence.

It is hoped that the results of research on the use of artificial POC doses on the growth of chili plants can be used as a biology learning resource in the form of LKPD for high school students in class XII odd semester Growth material. It is hoped that learning resources in the form of LKPD will make students think critically and systematically in searching for and recognizing information independently or in groups. The results of the research relate to knowledge about growth regarding the relationship between giving artificial phytohormones to the growth of chili plants.

II. METHOD

The type of research used was experimental [9][10], namely treatment in the form of giving a mixture of coconut water and bamboo shoots to the growth of chili plants. The design that will be used is a Completely Randomized Design (CRD) because this research was conducted in homogeneous conditions. This design is used if you want to study the effect of several treatments (t) with a number of repetitions (r) to become experimental units (rt).

The control was a treatment without a dose of a mixture of coconut water and bamboo shoots. The first treatment was by administering a dose of a mixture of coconut water and bamboo shoots with a concentration of 30ml, the second treatment was by administering a dose of a mixture of coconut water and bamboo shoots with a concentration of 40ml, the third treatment was by administering a dose of a mixture of coconut water and bamboo shoots with a concentration of 60ml.

Making coconut water POC with bamboo shoots used in this research was obtained by selecting young coconuts that were 7 months old with green characteristics, and bamboo shoots that were around 1-2 months old. Growth is quantitative which can be measured by observing the growth of chili plants. The parameters observed are the height of the stem and the number of twigs of the chili plant.

Making liquid organic fertilizer from coconut water with bamboo shoots. The steps for making it are as follows:

1. Prepare coconut water, rice washing water, and bamboo shoots.
2. Mix 5 liters of coconut water, 3.5 liters of rice washing water, and 1.5 kg of mashed bamboo shoots.
3. Then give the pummakal starter.
4. Then close the container tightly and let it sit for 7-14 days, giving it 2-3 pieces of brown sugar as food for the microbes and they will multiply quickly.
5. Filter the results by mixing coconut water with bamboo shoots and put them into a new container.

Data collection was carried out every 15 times on the growth of stem height, while on the number of branches of chili plants, it was carried out only at the end of the research, namely 60 days old. The researchers collected data by measuring each replication of the chili plants by measuring the height of the stems in each replication and counting the number of branches of the chili plants. Counting the number of branches is done when the chili plant is 60 days old by counting the number of branches starting from the first branch.

III. RESULT

The results of this research are data from analysis of the growth in the number of pagoda mustard leaves and the wet weight of pagoda mustard greens after being given several treatments with different doses of fertilizer. The results of this research include descriptions of the growth of pagoda mustard plants in the form of tabulations and graphs as well as anava data analysis. The data from the research conducted are as follows:

1. Height Growth Data for Red Chili Plants (Capsicum annuum L.)

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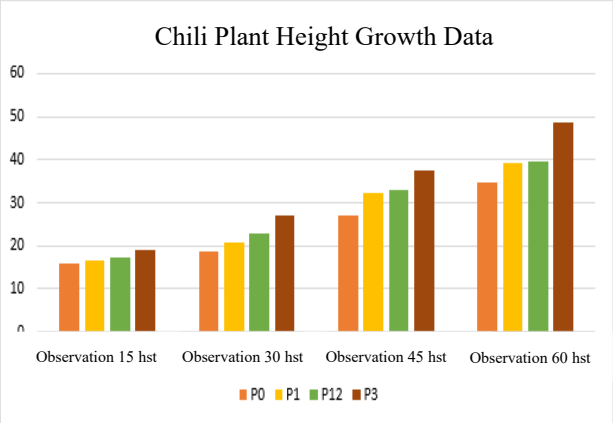
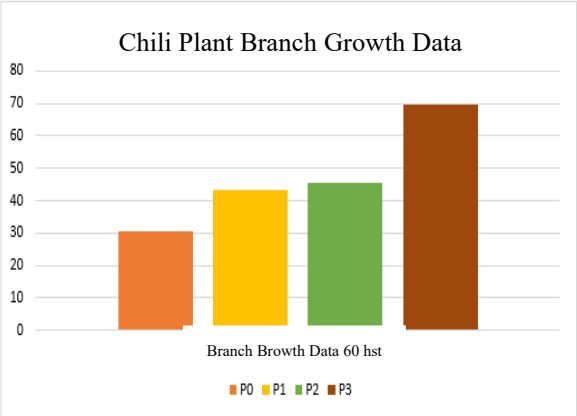


Based on the results data at the end of observing the growth of chili plants in treatment P0 (control) without giving a dose of coconut water with bamboo shoots, the stem height was an average of 34.6 cm, in treatment 1 using a dose of a mixture of 30 ml of coconut water and bamboo shoots, the average height was 34.6 cm. the chili plants were 39.2 cm than in the 2nd treatment using a 40ml dose of a mixture of coconut water and bamboo shoots the average height of the chili plants was 39.5 cm and in the 3rd treatment using a 60ml dose of a mixture of coconut water and bamboo shoots the chili plants had an average height of 39.2 cm. The average height of chili plants is 48.5 cm. From this data, several differences can be seen, with the highest average in the P3 treatment, namely with an average height growth of 48.5 cm.

2. Data on Branch Growth of Red Chili Plants (Capsicum annuum L.)



Based on the research data, it can be seen that from the 4 treatments tested, namely with each treatment using different doses of liquid organic fertilizer, coconut water, and bamboo shoots, each treatment had a different average growth ofplant branches, including P0 (Control) of (30.5), P1 is (43.3), P2 is (43.6), and P3 is (69.8).

IV. DISCUSSION

1. Effect of Dosing Liquid Organic Fertilizer with Coconut Water with Bamboo Shoots on the Growth of Red Chili Plants (Capsicum annuum L.)

a. Effect of Dosing Liquid Organic Fertilizer with Coconut Water with Bamboo Shoots on Height Growth of Red Chili Plants (Capsicum annuum L.)

The growth of chili plants with the first parameter observed was the height of the plant stem, based on the hypothesis test that had been carried out it was found that the first hypothesis was acceptable because the results of the test that had been carried out were Fhit 2.92 > F (0.05) (28.7) 2.36 So H0 is accepted and it can be concluded that giving a dose of liquid organic fertilizer from coconut water has an effect on the height growth of chili plants.

Based on the results of previous relevant research regarding the application of liquid organic fertilizer doses to the growth of chili plant height which was carried out by Ardianto and Jazilah, [11] concluded that there was an effect of providing liquid organic fertilizer on the growth of chili plants with the average plant height results red chilies of 42.2

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cm with rabbit urine liquid organic fertilizer treatment. This can prove that giving a dose of liquid organic fertilizer from coconut water and bamboo shoots can have a better influence on plant height growth with an average of 48.5 cm.
The growth in height of chili plants will influence the growth of subsequent plants, namely in the generative phase, chili seeds that will be planted in paddy fields or fields must, of course, have normal stem height so that it will trigger optimal chili growth after being transferred to the land or subsequent planting media, generally, chili seeds those that are ready to be transferred to the planting medium have a lifespan of 2-3 after sowing.

b. Effect of Dosing Liquid Organic Fertilizer with Coconut Water with Bamboo Shoots on Branch Growth of Red Chili Plants (Capsicum annuum L.)

The growth of chili plants with the second parameter observed was the growth of plant branches, based on the hypothesis test that had been carried out it was found that the first hypothesis was acceptable because the results of the test that had been carried out were Fhit 6.77 > F (0.05) (28.7) 2.36, So rejecting Ho and accepting H1 there is an influence of treatment on the growth of the wet weight of chili plants (Capsicum annuum L.).
Branching in plants is a form of part of the vegetative growth process which is influenced by several factors, including the availability of water and minerals and the uptake of organic materials in the soil [12]. The use of coconut water extract and also bamboo shoots contain growth-regulating substances so that they can optimize the growth of chili plant branches. The use of varying doses of coconut water extract and bamboo shoots in the research certainly resulted in different branch growth in each treatment given.

2. Effect of Dosing Liquid Organic Fertilizer with Coconut Water with Bamboo Shoots Which Gives the Best Influence on the Growth of Chili Plants (Capsicum annuum L.)

a. Dosing Liquid Organic Fertilizer with Coconut Water with Bamboo Shoots Which Has the Best Effect on the Height Growth of Chili Plants (Capsicum annuum L.)

The best treatment and the effect on stem height was the treatment with the highest dose, namely P3, with a dose of liquid organic fertilizer from coconut water and bamboo shoots of 60 ml with an average stem height of 48.50 cm.
Based on the results of the observations I have made, it can be seen from the growth graph that from the 15th, 30th, 45th, and 60th day after planting, the P3 treatment had a more significant growth in height than the other treatments.
By administering a dose of liquid organic fertilizer, it is proven that some plants need nutrients so that their biological growth can occur well. Bamboo shoot extract and coconut water contain nutrients, and minerals such as Calcium (Ca), Sodium (Na), Magnesium (Mg), Sulfur (S) and there are also 2 natural hormones that can support growth and cell division, namely cytokinin and auxin [13].

b. Dosing Liquid Organic Fertilizer with Coconut Water with Bamboo Shoots Which Has the Best Effect on Branch Growth of Chili Plants (Capsicum annuum L.)

The best dose is P3 treatment by administering a 60 ml dose of POC bamboo shoots and coconut water. This is proven by the average number of branches on the 60th day of HST of 69.8 branches, followed by P2 of 45.6 branches, then P1 of 43.3 branches, and P1 (control) of 30.5 branches. Based on these results, the same as measuring plant height parameters, Treatment 3 also provides an optimal influence on branch growth in chili plants.
The addition of pumakkal activator to the POC of coconut water with bamboo shoots was done because pumakkal itself has 15 bacterial isolates. Pumakkal itself is a local potential organic fertilizer from pineapple waste which can help with the fermentation process. So being able to break down the ingredients in the POC of coconut water and bamboo shoots becomes simpler and makes it easier for plants to absorb the nutrients that have been given[14].

3. Utilization of Research Results as Biology Learning Resources for Student Worksheets (LKPD).

The results of research on the growth and development of chili plants that have been carried out and analyzed will produce concrete learning material that will be suitable for use as a biology learning resource in the form of Student Activity Sheets (LKPD).
There are many advantages obtained in implementing LKPD as a learning resource. LKPD can make it easier for teachers to direct and encourage students to discover a science concept through experiments or investigations either individually or in groups [15]. Another advantage of LKPD compared to other teaching materials is that it can minimize the teacher's role in learning activities, make it easier for students to understand the material and also make the learning process easier.
Based on the results of the material expert validation carried out by Mr Suharno Zen as the material expert, it is known that the eligibility percentage for Student Worksheets reached 97.5%, while for the design expert validation carried out by Mrs. Triana Asih, the LKPD eligibility percentage was 100%. Based on the percentage results of the two expert validators, it is known that the learning resources developed based on the results of this research are suitable for use even though they have several notes and still need to be developed in order to provide the best results in the learning process.

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V. CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that:

1. There is a real effect of giving a dose of liquid organic fertilizer from coconut water with bamboo shoots on the growth of red chili plants (Capsicum annuum L.).
   a. Based on the results of the ANOVA analysis test on plant height parameters, namely Fhit 2.92 > F (0.05) (28.7) 2.36, then H0 is rejected so it can be concluded that there is an effect of giving a dose of liquid organic fertilizer from coconut water with bamboo shoots on growth chili plants.
   b. Based on the results of the ANOVA analysis test on plant branch parameters, namely Fhit 6.77> F (0.05) (28.7) 2.36, then H0 is rejected so it can be concluded that there is an effect of giving a dose of liquid organic fertilizer from coconut water with bamboo shoots on growth chili plants.
2. There is the best effect of giving a dose of liquid organic fertilizer from coconut water which affects the growth of red chili plants (Capsicum annuum L.), namely by giving a dose of liquid organic fertilizer from coconut water and bamboo shoots of 60 ml.
   a. Based on the research results, it is known that the best treatment for chili plant height parameters was produced by treatment 3, namely liquid organic fertilizer from coconut water with 60 ml of bamboo shoots with an average chili plant height of 48.50 cm.
   b. Based on the research results, it is known that the best treatment for chili plant branch parameters was produced by treatment 3, namely liquid organic fertilizer from coconut water with 60 ml of bamboo shoots with an average of 69.8 chili plant branches.
3. Learning resources in the form of Student Worksheets (LKPD) which were developed from research results after passing the validation and verification stages of design experts and material experts, learning resources are suitable as an alternative in the learning process for high school biology learning resources equivalent to class XII regarding growth and development.

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