THE EFFECT OF DIFFERENT POTASSIUM CONCENTRATIONS ON THE GROWTH RATE OF SEA GRAPES (*Caulerpa lentillifera)*

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ABSTRACT

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| Seaweed is a food commodity that has the potential to become various healthy food diversifications. Seaweed has various species, one of which is Caulerpa lentillifera. This study aims to analyze the effect of potassium concentration on the growth rate content in seaweed (Caulerpa lentillifera). The research method used was a completely randomized design (CRD) consisting of four treatments and three replications. The treatments used with different doses, namely A (0 ppm), B (1.5 ppm), C (3 ppm), D (4.5 ppm) with three replications. Seaweed C. lentillifera was maintained for 15 days using a 35 cm container media with a water volume of 10 liters. The parameters observed were specific growth rate, chlorophyll content, biomass residue, biomass decline rate and water quality. The results showed that the specific growth rate (SGR) ranged from 3.8-5.2%, the biomass decline rate ranged from 4.0-9.6%, biomass residue ranged30.67-66.76%,chlorophyll content ranged from 19.89-30.87 mg/L, and the results of water quality checks were classified as optimal. The results of the research analysis showed that the concentration of potassium fertilizer doses had a significant effect (p<0.05) on the rate of biomass and biomass residue decline so that further testing could be carried out. Meanwhile, the results of the research analysis showed that the concentration of potassium fertilizer doses did not have a significant effect (p>0.05) on the specific growth rate so that further testing could not be carried out. |

*Keywords:Concentration K₂O, Growth of C. lentillifera; Specific growth rate;*

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1. INTRODUCTION

Sea grapes (*C. lentillifera*) is a green seaweed that is most widely distributed in tropical to subtropical sea waters.*C. lentillifera*found in several coastal waters in Indonesia and used as a vegetable salad by the community.Sea grapes contain vitamins that function as antioxidants, such as vitamins A, C, and E are vitamins that have antioxidant content. Antioxidants are compounds that function to prevent and repair cell damage in body cells, especially caused by exposure to free radicals.Sea grapes that have the potential to support the economy and have benefits for the body. Given that sea grapes contain vitamins that are rich in antioxidants such as vitamin C.Vitamin C acts as an antioxidant in human body fluids and cell fluids, while vitamins A and E act in lipophilic areas and cell membranes.Some macro minerals found in C. lentillifera seaweed are potassium (K), calcium (Ca), magnesium (Mg), sodium (Na), while the micro minerals are iron (Fe), zinc (Zn), and manganese (Mn). (Syahputro et al., 2024).

K₂O isone of the important nutrients that plants need to grow and develop. K₂O is needed by plants to regulate the mechanisms of photosynthesis, protein synthesis,physiological processes of plants, such as regulating water balance, nutrient movement, and strengthening plant structure. If there is a K₂O deficiency in plants, it can cause leaf segments to shorten, leaf edges to turn brown and plants cannot grow taller.(Sundari et al.,2014).

The role of K₂O in biophysics to regulate osmotic pressure and turgor pressure in plant cells. Optimal turgor pressure allows cells to grow and develop well. Role in biochemistry K₂O acts as an activator of enzymes involved in protein synthesis and photosynthesis. This element also helps in the formation and distribution of photosynthesis products, such as carbohydrates, from leaves to other parts of the plant. K₂O deficiency can cause symptoms such as yellowing or drying leaf edges, stunted plant growth Plants also become more susceptible to environmental stress. Thus, K₂O is very important for maintaining water balance, supporting metabolic processes, and increasing plant resistance to unfavorable environmental conditions. Therefore, it is important to conduct this study to determine the effect of different potassium concentrations on the growth rate of sea grapes (C. lentillifera).

1. research methods
   1. Research Material

This study uses materials consisting of primary and secondary data. Primary data is the main data in the study and is obtained directly during sampling activities during the study. The primary data used are water samples and C. lentillifera seaweed. While secondary data is complementary data in the study and the data used in this study is water quality (temperature, pH, salinity, DO and light intensity).

**2.2 Research methods**

This research will be conducted for 15 days in November - December 2024 at the Aquaculture Study Program, Department of Fisheries and Marine Sciences, Faculty of Agriculture, University of Mataram. Chlorophyll-a test was conducted at the Analytical Chemistry Laboratory, Faculty of Mathematics and Natural Sciences, University of Mataram. The tools used were containers, aeration, refractometer, pH meter, lux meter, ruler, analytical balance, scissors, C. lentillifera, NK fertilizer.

This research method is experimental using a Complete Randomized Design (CRD) consisting of 4 treatments and 3 replications, so that there are 12 total experiments, namely P1 (Control): Without ConcentrationK₂O; (P2): ConcentrationK₂O1.5 ppm; (P3): ConcentrationK₂O3 ppm; (P4): ConcentrationK₂O4.5 ppm;. ContentK₂Owhich is obtained from NK fertilizer which contains 13% nitrogen and 46%K₂O.The research procedures carried out are as follows:

The seaweed cultivation procedure C. lentillifera begins with the preparation of a container using a tiered rack equipped with a container with a volume of 10 liters of water aerated using an aerator with an average stocking density of 67.7 grams of sea grapes. The sea grapes used are of the C. lentillifera type. The sea grapes used are first subjected to an acclimatization stage, where the sea grapes are acclimatized for 1 to 2 days before being put into a test container so that the sea grapes can adapt to the new environment, then put into a test container and the sea grapes are planted on a substrate in the form of a basket.

The fertilizers used in this study were NK, Urea, and TSP fertilizers. NK fertilizers contain chemical compounds in the form of Nitrogen (N), and potassium (K).₂O). Fertilizer is weighed using a digital scale.

* 1. **Test Parameters**

1. Specific Growth Rate

Specific growth rate is a parameter used to determine the percentage of weight growth of C. lentillifera in a certain time during the maintenance period. The specific growth rate is obtained from the formula derived by Huisman (1976).

**S= [(Wt/Wo)^⁽⅟***t*⁾**-1]\*100%**

Where:

S : Daily specific growth rate (% per day)

Wt : Final weight (gr)

Wo : Initial weight (gr)

T : Observation time interval (days)

### 2. Rate of Biomass Decline

The biomass decline rate is a quantity that describes the level or speed of the decline in the total mass of living organisms (biomass) per unit time due to biological or environmental processes, such as respiration, physiological stress, nutrient deficiency, cell death, or tissue degradation. The biomass decline rate can be calculated using the formula:

**R= [(Wf/Wp)^⁽⅟***t*⁾**-1]\*100%**

R : Biomass Decline Rate (% per day)

Wf : Final weight at the end of observation (g)

Wp : Weight achieved at peak growth (g)

T : Observation time interval (days)

### Biomass Residue

Biomass residue is the remaining biomass that remains after a decrease in the amount of biomass after growth, calculated using the following formula:

**Biomass residue (%)**

Information:

Wf = Final weight at the end of observation (g)

Wp = Weight achieved at peak growth (g)

1. Chlorophyll Content

Chlorophyll levels are determined by making a standard chlorophyll a solution and measuring it at a certain wavelength. According to Mahardika et al., (2018) inZunnuraini et al., (2023)The calculation uses the formula:

Chlorophyll-a (mg/L) 11.93 (A664)-1.93 (A647)

Description: A Absorbance at each wavelength

1. Water Quality

Water quality observations are carried out once a week, including temperature, salinity, pH, light intensity, dissolved oxygen (DO). In addition, salinity is checked every day to prevent excessively high salinity values ​​during the maintenance process. Temperature measurements use a measuring instrument in the form of a pH meter connected to a water temperature indicator, pH is measured using a pH meter, dissolved oxygen (DO) is measured using a DO meter, salinity is measured using a Refractometer, and light intensity measurements use a Lux meter.

3. RESULTS

3.1Wet Weight Data of C. Lentillifera During Maintenance

The results of this study, used green seaweed C. lentillifera with an initial average weight of 67.6 ± 5.7 grams per unit, placed in a 40 L container filled with 10 L of seawater with a salinity of 30–35 ppt. During the 15-day maintenance period, the media was enriched with NK fertilizer, which provides nitrogen for vegetative growth and potassium for fruit formation, resistance, and regulation of plant water balance. The potassium concentration level consisted of three treatments, namely 1.5 ppm (B), 3 ppm (C), and 4.5 ppm (D), with media without additional potassium (A) as a control. Measurement of wet weight every three days showed an increase in weight until the 3rd day, followed by a decrease in the following days.

Based on the results of observations that have been made, all treatments showed an increase in wet weight on the third day of maintenance. This phenomenon indicates that C. lentillifera received sufficient potassium supply to support optimal growth rates in the early phase. This condition extends the maintenance period of the plant. On the other hand, the level of K concentration₂Lower O, or no potassium addition, tends to inhibit growth rates and slow down the maintenance period. The increase in weight at the beginning of the maintenance period is thought to be due to the optimal nutrient absorption process. However, in the following weeks, all treatments showed a decrease in wet weight, indicating that the growth of C. lentillifera peaked in the first week. This decrease is likely due to factors such as decreased nutrient availability in the media, accumulation of metabolites that inhibit growth, or changes in environmental conditions that are less supportive of the growth of C. lentillifera.

**Figure 1The wet weight of C. lentillifera was observed every 3 (three) days on media with various potassium concentrations. Description: A=0 ppm (control); B = 1.5 ppm; C = 3 ppm; and D = 4.5 ppm.**

* 1. **Specific Weight Growth Rate**

Rate resultsgrowthspecific C. lentillifera with different fertilizer concentrations maintained for 15 days showed that the specific growth rate of C. lentillifera ranged from 3.8-5.2%/day. The results of the specific weight growth rate aimed to determine the growth of C. lentillifera per day.

Based on the results of the Anova test, the specific growth rate of C. lentillifera with different fertilizer concentrations on the growth rate did not have a significant effect (P>0.05). The results showed that treatment (P2) had an average growth value of 5.2 ± 2.41%/day, followed by treatment P4 3.71.50%/day, then P1 had a specific growth of 4.52.36%/day, while P3 had an average value of 3.81.59%/day. The results of the Anova test analysis obtained were not significantly different so that further testing could not be carried out. The test results stated that all treatments did not have any real or significant differences. The results in the graph show that treatment (P2) had the highest growth value.

In this study, the best specific weight growth rate was obtained in the P2 treatment, namely 5.2%. According to Cokrowati et al., (2018) inAdam et al., (2023)la specific growth rate of more than 3% of the increase in seaweed weight per day will be said to be quite profitable. The high specific growth rate in the first week is because the seaweed is still in a growing condition.The growth rate of C. rasemosa decreased with increasing maintenance age. Growth was rapid at the beginning of the experiment and slowed down along with the maintenance age.

**Figure 2 Specific Weight Growth of Seaweed C. lentillifera at K concentration₂O is different.**

* 1. **Rate of Biomass Decline of C. lentillifera**

The results of measuring the rate of biomass decline of C. lentillifera which was maintained for 15 days experienced a decline in growth ranging from 4.0% to 9.6% per day, which showed that (treatment C) with a concentration of nitrogen 30 ppm + Phosphorus 3 ppm + Potassium 3 ppm was significantly different from (treatment B) with a concentration of nitrogen 30 ppm + Phosphorus 3 ppm + Potassium 1.5 ppm, (Treatment D) with a concentration of nitrogen 30 ppm + Phosphorus 3 ppm + potassium 4.5 ppm, and the control without potassium. One of the causes of seaweed experiencing a decline in growth is the process of adjusting C. lentillifera seaweed to a controlled environment is not optimal so that sea grapes die at the beginning of the study and cause a decline in growth.

Based on the results of further tests on the specific growth rate of C. lentillifera using the One-Way ANOVA method, it was shown that treatment with a concentration of K₂O had a significant effect (P<0.05). Environmental adjustment at the beginning of the study was only carried out for one day, which caused physiological stress in C. lentillifera. This was seen especially in the treatment with NK fertilizer (containing nitrogen and potassium), where in the first week, precisely on the sixth day, there was a change in the color of the thallus to white, then changed to greenish yellow. This color change is related to the difference in photosynthetic pigment content and osmotic pressure disturbances in the cells between the treatment group given fertilizer and the control group without fertilizer. Osmotic pressure disturbances can have a negative impact on the photosynthesis process and the efficiency of nutrient absorption, thus contributing to a decrease in the rate of biomass growth in C. lentillifera.

**Fig. 3The rate of decline of Caulerpa biomass from the peak on day 6 to day 15**

* 1. **Biomass Residue**

The results of the analysis of C. lentillifera biomass residue with different fertilizer concentration treatments maintained for 15 days showed that the biomass residue value of C. lentillifera ranged from 30.67-66.76%.

Based on the results of the Anova test, the biomass residue value of C. lentillifera with different fertilizer concentrations on the growth rate had a significantly different effect (P <0.05). The results showed that treatment (P1) with biomass residue had an average value of 35.28% 9.88, followed by treatment P2 54.79% 6.73, then P3 had a biomass residue value of 30.67% 9.11, while P4 had a biomass residue value of 66.76% 14.60. The results of the Anova test analysis obtained were significantly different so that further testing could be carried out using the DUNCAN test. The results of the Duncan test stated that treatment P1 was not significantly different from treatments P2 and P3. While treatment P4 was significantly different from treatments P1 and P3.According toTogatorop et al., (2017)that the early period of seaweed growth is called the adaptation process phase in seaweed where growth is inhibited because some of the energy is used to stay alive. This is thought to be due to physiological changes in habits such as photosynthesis and nutrient absorption.

**Fig. 4Biomass Residue*Caulerpa*at Various K Concentrations₂O Who Lived Until the End of Post-Growth Research**

### **Chlorophyll-a content**

Chlorophyll content analysis is an important parameter because it is a direct indicator of photosynthetic efficiency and health of C. lentillifera. Increasing chlorophyll content is correlated with increasing photosynthetic capacity, which in turn can affect the growth, productivity, and nutritional quality of sea grapes. Thus, understanding the optimal dose of K₂O to maximize chlorophyll production becomes valuable information for the development of efficient Caulerpa cultivation technology.

The results of the chlorophyll content analysis that has been carried out, obtained a range of values ​​between 19.89 mg/g to 30.87 mg/g with each value sequentially based on the treatment, namely 19.89 mg/g (A), 30.87 mg/g (B), 28.84 mg/g (C) and 28.9 mg/g (D). The data obtained showed variations between treatments with the highest results found in treatment B (K concentration₂O of 1.5 ppm) while the lowest was in treatment A (control, without potassium addition). These data were obtained from the analysis of one sample per treatment, so further research with adequate repetition is needed to confirm the consistency of the observed effects and produce more statistically representative results. Despite the limitations in the number of samples, the results of this study provide an initial indication that a concentration of 1.5 ppm K₂O has a tendency to approach the optimal level to increase chlorophyll content in C. lentillifera under the given cultivation conditions.

**Fig. 5Chlorophyll-a content of C. lentillifera seaweed at concentrationsK₂Odifferent.**

### **Water Quality**

Water quality parameters observed during the research activities were pH, temperature, DO, salinity, and light intensity. Measurements were carried out 2 times during the cultivation period. The results obtained during the study from all parameters were optimal. Water quality data can be seen in Table 1.

Table 1Water Quality During Research

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No | Parameter | Day 0 | Day 15 | Range Value | Reference |
| 1 | Temperature (°C) | 26.8 | 26.7 | 26.7-26.8 | 26 - 30 °C(Darmawati & Jayadi, 2016) |
| 2 | pH | 8 | 7.9 | 7.9-8 | 8.0-8.7(Safitri*et al.,*2022) |
| 3 | Salinity ( PPT ) | 33 | 35 | 33-35 | 30-35 ppt(Rosdiana & Ratnawati, 2023) |
| 4 | Dissolved oxygen (mg/L) | 8 | 8.6 | 8-8.6 | >5(As-Syakur & Wiyanto, 2016) |
| 5 | Light Intensity (Lux) | 3.140 | 3,700 | 3.140-3.700 | 5000 lux(Novianti et al., 2015) |

## The measurement results showed that the water temperature during the study was relatively stable, ranging from 26.7-26.8°C. This temperature range is in optimal conditions for the growth of C. lentillifera, which generally grows well at temperatures of 26-30°C.The water pH parameter ranges from 7.9-8.0, indicating conditions that tend to be mildly alkaline and are very suitable for the maintenance of marine macroalgae. This pH range is ideal for nutrient availability and supports the physiological processes of sea grapes, including the absorption of potassium elements added through K treatment.₂O.The salinity of the maintenance water is in the range of 33-35 ppt, which is in accordance with the natural habitat of C. lentillifera in marine waters..Good salinity for sea grape growth ranges from 30-35 ppt.The light intensity during the study was recorded between 3,140-3,700 Lux. This lighting level is sufficient to support the photosynthetic activity of sea grapes, considering that C. lentillifera generally grows well at moderate light intensity. The availability of adequate light is very important for the process of photosynthesis, where chlorophyll acts as a pigment that captures light energy.

**4. Discussion**

**InfluenceK₂O on the Biomass Growth Rate of C. lentillifera**

The results of the research that has been carried out show that the addition of K₂O had an effect on the growth rate of C. lentillifera biomass, although the effect was not statistically significant (p > 0.05). Treatment B with K concentration₂O 1.5 ppm produced the highest daily specific growth rate of 5.16% per day, higher than the control treatment without the addition of K2O (A) which reached 4.47% per day. The concentration of K₂The higher O in treatments C (3.0 ppm) and D (4.5 ppm) actually showed a decrease in growth rate to 3.79% and 3.71% per day.

This non-linear treatment response indicates that the addition of potassium nutrients to sea grape C. lentillifera does not follow the pattern of "the more the better". Potassium plays an important role in various metabolic processes of algae, including enzyme activation, nutrient transport, and osmoregulation. According toNurfebriani*et al.*(2017)which states that the difference in growth values ​​between treatments is also thought to be due to different cell osmoregulation processes in C. lentillifera absorbing nutrients. Osmoregulation is a condition in which cells are maintained through several mechanisms that are able to change the intracellular concentration of solutes at optimal concentrations (1.5 ppm), potassium can support metabolic processes efficiently.

**Effect of K₂O on the Rate of Biomass Decline of C. lentillifera**

Analysis of the data on the decline in Caulerpa lentillifera biomass after the growth phase revealed interesting and statistically significant (p < 0.05) findings regarding the role of K concentration.₂O in maintaining biomass. Treatment D with K concentration₂The highest O (4.5 ppm) proved to be the most effective in suppressing the rate of biomass decline, with an average of only 3.96% per day and statistically significantly different from other treatments, expressed by the notation a in further tests. These results indicate that at high concentrations, potassium makes a significant contribution to strengthening the structural resistance of C. lentillifera cells and tissues. An equally interesting phenomenon is the ability of treatment B (1.5 ppm K₂O) in showing quite good performance with an average biomass reduction rate of 5.36% per day and received the notation ab in the further test, indicating that this treatment was not significantly different from the best treatment (D). These results reveal a non-linear dose-response relationship between K concentrations.₂O with the biomass resistance of C. lentillifera. These findings underscore the complexity of the physiological responses of macroalgae to nutrients, where multiple threshold effects play a role in potassium metabolism. According toGinting et al. (2017)which states that seaweed requires various nutrient compositions to grow such as macronutrients (N, P, K), micronutrients (Fe, Zn, Cu, Mn, Mo) and vitamins. These nutrients are very important in the growth of seaweed because nitrogen (N) is used to stimulate the growth of a plant so that it can grow rapidly and if there is a lack of N, it will inhibit growth because the photosynthesis process is disrupted. While phosphorus (P) plays an important role in plants as a limiting factor in the photosynthesis process and potassium (K) is used by plant cells during the assimilation process of energy produced by the photosynthesis process.

**Effect of K₂O on C. lentillifera Biomass Residue**

The results of the study showed that treatment D with a concentration of K₂The highest O (4.5 ppm) produced the best percentage of biomass residue with an average of 66.75%. This result was statistically significant (p < 0.05) and obtained the notation a in the BNT further test. The superiority of treatment D shows that at the concentration of K₂At higher O, C. lentillifera was able to maintain more than two-thirds of its initial biomass after the decline phase. Compared to the control treatment (A) which only reached 35.31% and treatment C which was even lower (30.67%), treatment D showed an almost two-fold increase in biomass maintenance ability, indicating the important role of K.₂O at a concentration of 4.5 ppm in maintaining the structural and functional stability of Caulerpa cells.

There was a clear consistency between the biomass decline rate and final biomass residue across all treatments. Treatment D showed the lowest decline rate (3.96% per day) and also produced the highest percentage of residue (66.75%). A similar pattern was seen in treatment B (1.5 ppm K₂O) with a moderate decline rate (5.36% per day) and a fairly high biomass residue (54.79%). In contrast, the C (3.0 ppm) treatment showed the highest decline rate (9.58% per day) and the lowest residue (30.67%). This consistency strengthens the validity of the research findings and indicates a non-linear response of C. lentillifera to K concentration.₂O, where the lowest and highest concentrations give a positive effect in maintaining biomass. According toTogatorop et al. (2017)which states that the seaweed adaptation process can slow down the growth rate. This is because the energy in the thallus is allocated to defend itself from environmental stress. Energy reduction can also be due to changes in its physiological processes. Seaweed growth is also determined by the ongoing physiological process when adapting to media conditions.

**Relationship between Growth, Biomass Decrease, Biomass Residue, and Chlorophyll Content in C. lentillifera**

A thorough analysis of the data obtained in this study revealed interesting patterns of relationships between growth parameters, biomass reduction, biomass residue, and chlorophyll content in relation to K treatment.₂O at various concentrations. From the data presented, there is a tendency for a positive correlation between chlorophyll content and biomass growth rate. Treatment B (1.5 ppm K₂O) consistently showed superior performance in two key parameters: the highest daily specific biomass growth rate (5.16% per day) and the highest chlorophyll content (30.87 mg/g). This indicates that at the concentration of K₂O of 1.5 ppm, there was an increase in photosynthesis efficiency which was marked by an increase in chlorophyll concentration, which in turn supported higher biomass accumulation. Control treatment (A) without the addition of K₂O showed the lowest chlorophyll content (19.89 mg/g) and lower growth rate (4.47% per day) compared to treatment B. This strengthens the assumption that the availability of potassium at a certain level plays an important role in chlorophyll biosynthesis and photosynthetic efficiency of C. lentillifera. According to Mlodzinska (2009) inMahfudh et al., (2021)which states that plants growing in low light contain less chlorophyll-a and more chlorophyll-b. A higher proportion of chlorophyll-b is beneficial for growth under low light. Chlorophyll-b absorbs short-wavelength light more effectively than chlorophyll-a. Plants change the amount of pigments according to the ambient light field, indicating that species can physiologically adapt to environmental conditions at a certain distance.

**Water Quality**

Based on the results of the research that has been done, temperature measurements were carried out twice during the cultivation process, namely at the beginning and end of the maintenance of C. lentillifera which was measured using a pH meter connected to a water temperature indicator. The temperature conditions in the cultivation media are classified as optimal because they allow C. lentillifera to grow and develop well. According to Indriani & Sumiarsih (2003) inEnglish*et al.*(2020)that stateSeaweed grows and develops well in waters with a temperature range of 26-30°C, and at temperatures of 25-30°C.

pH greatly affects the survival rate of C. lentillifera. Based on research that has been conducted, pH measurements are carried out every day during the maintenance process of C. lentillifera using a pH meter to determine the acidity level of the seawater in the cultivation media so that the water pH does not become too high or too low so that the water pH remains in normal conditions to support the growth process of C. lentillifera, especially in the metabolic process. This is in line with researchAsriani et al. (2024)which states that waters that have low and high acidity levels will cause low survival rates for organisms because they can disrupt the metabolism and respiration processes. According toSunaryo et al. (2015)which states that the pH range for seaweed life is 6 – 9 with an optimum range of 6.8 – 8.2.

The results of dissolved oxygen measurements during maintenance showed that the dissolved oxygen of the C. lentillifera maintenance medium ranged from 8-8.6 mg/l. This value is optimal for the growth rate of C. lentillifera. This shows that dissolved oxygen is very important for aquatic biota and plants to maintain their metabolic and physiological systems. This is in accordance with the statementArdiansyah et al. (2020)which states the DO standard value for seaweed is more than 5 mg/l. This means that if a body of water has dissolved oxygen of 5 mg/l or more, then seaweed metabolism can run optimally.

The salinity of the water decreases or increases drastically due to too much fresh water entering the cultivation container due to rain, which will result in a decrease in the quality of seaweed and cause many plant cells to die. Based on the research that has been done, the results of salinity measurements range from 33-35 ppt. This shows that this value is optimal for the cultivation of C. lentillifera. According to(2016)which states that a good salinity range for Caulerpa sp seaweed is in the range of 28 – 35 ppt.

The results of light intensity measurements during the study ranged from 3,140-3,700 lux. This shows that the values ​​obtained are still classified as good or optimal in maintaining C. lentillifera. The obstacles faced during the study were the lack of light entering the cultivation media so that some of the C. lentillifera cultivation media were not exposed to sunlight, which caused some of the containers to have a slow growth rate, resulting in a lack of light entering and the rate of photosynthesis not being optimal. This shows the importance of light entering the cultivation container so that the light requirements are met so that photosynthesis can be carried out optimally. This is in line with researchNovianti et al., (2015)which states that good light intensity for cultivation is around 5000 lux. The light intensity value is influenced by the depth of the water. The deeper the water, the lower the light intensity.

5. Conclusion

Based on the results of the ANOVA that have been carried outthat concentrationK₂Othe different tested did not have a significant effect on the specific weight growth rate.The highest specific growth rate was found in the p2 treatment with a dose of 1.5 ppm.The highest biomass residue was found in the p4 treatment with a value of 66.76%, the highest biomass decline rate was found in the p3 treatment 9.6%. While the biomass residue and biomass decline rate had a significant effect on each treatment.

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