

# ***Development Effects of Hydroponic Systems Dft Contacting Green Brassica (Brassica Juncea L.) With Addition of Eggs***

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**Abstract.** A lot of people like eggs. Eating more eggs produces more egg shells. This study aims to determine how the yield of eggshell waste affects the growth of green sage (*Brassica juncea* L.) in a hydroponic system that uses the dynamics of growth factors. (DFT). The research site is a hydroponic farm managed by the Food Resilience Department of Kalianda District of Lampung South in April 2023. The total sample is 30 using Simple Random Sampling. This research is quantitative research with the kind of experimental research. Method used Complete Random Planning (RAL) with 5 treatments and 6 repetitions. Anova's one-way analysis with SPSS 25 and Duncan's further tests at the 5% level are used to analyze the data obtained. The results of the study showed that the P4 treatment, consisting of 300 milliliters of egg shell POC and 30,000 millilitres of water, had the best results compared to the treatment of the addition of other egg shells POC.

## **1 Introduction**

A lot of people like eggs. The more eggs are consumed, the more egg shells are produced. The production of lambung chicken eggs by 2021 reached 185,269.19 tons, so the number of egg shells produced, which cause unpleasant odors and diseases, will of course increase. This data is collected from the Central Statistical Authority (BPS).

The city of Kalianda, located in the district of South Lampung, is famous for its culinary UMKM "fish brains", which uses eggs as the main ingredient in its production. A salesman of fish brains says they can use 25 kilograms of eggs a day. In fact, egg shells can be reused as agricultural fertilizer because the amount of eggs used is just a pile.

The egg shell contains 95% calcium carbonate, 3% phosphorus, and 2% consisting of magnesium, sodium, potassium, zinc, manganese, iron, and copper, the calcium content and other nutrient elements can be used as organic fertilizer for agriculture. In addition to N, P, and K, calcium is a macro nutrient that is responsible for the formation and early growth of roots, increasing plant strength, lowering acidity, or increasing soil pH [1].

This egg shell can be used as a fertilizer or processed to give the plant additional nutrients. Egg shells can be used in fertilizer as a substitute for conventional or chemical fertilizers. In

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addition, using these egg shells in fertiliser can reduce the amount of waste produced from egg consumption.

*Brassica juncea* L. is one of the easiest to take care of and has a short-lived harvest. In addition, it is easy to obtain and cultivate. Green clams are rich in water, milligrams of vitamins A, B, C, fats, carbohydrates, and Ca. [2]. The hydroponic system produces many kinds of nutrients for salmon crops, which can be used to increase harvest yields. Hydroponics is a method of agriculture that is done without using soil media, using water as a soil replacement medium. Therefore, this method can use smaller lands.

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## 2 Methods

This experimental study uses the Complete Random Planning (RAL), which consists of one factor. The factor is the addition of waste of the egg shell processed into liquid fertilizer (POC) consisting of 5 phases. With 5 treatments, and 6 repetitions. P0 = AB Mix (positive control), P1 = POC egg shell 150 ml + 15000 ml water, P2 = 200 ml egg shelter POC + 20000 ml Water, P3 = Egg shell POC 250 ml + water 25000 ml, P4 = 300 ml eggshell POK + water 30000 ml. The data obtained from the study was analyzed statistically using the One Way Anova and Duncan tests at the level of 5%. Parameters observed include plant height, number of leaves, root length, and plant wet weight.

## 3 Result and Discussions

### 3.1 Plant Height

**Table 1.** The height of straw plants on various treatments

	Plant Height
P0	22,33 <sup>d</sup>
P1	19,66 <sup>bc</sup>
P2	17,35 <sup>a</sup>
P3	18,33 <sup>ab</sup>
P4	20,65 <sup>cd</sup>

*Description: The result of treatment followed by the same letter means showing the result does not differ.*

The plant's height is measured once a week from the base to the tip of the stem. The plants showed differences in their vegetative growth at the beginning of the high observation. Each treatment showed a different height, especially compared to the control treatment.

The results of the study showed that the treatment with the added nutrient POC of the egg shell had a real effect on the green shell plants. The analysis indicated that green shells on the treatment P0 (control), that is 22.3 cm, treatment P1, that is 20.35 cm, treat P2, that is 17.35 cm; treatment P3, that is 18.3 cm; and treatment P4, which is 20.65 cm, experienced significant growth.

Nitrogen, one of the essential nutrients for plant growth processes, forms proteins, compounds with the highest molecular weight consisting of amino acid chains bound by peptide bonds [3].



**Fig. 1.** The height of the green sawmills

### 3.2 Number of Sheets

**Table 2.** Number of leaves of various treatments

Treatment	Number of Sheets
P0	9,00 <sup>a</sup>
P1	7,50 <sup>b</sup>
P2	7,17 <sup>b</sup>
P3	7,33 <sup>b</sup>
P4	8,00 <sup>b</sup>

*Description: The result of treatment followed by the same letter means showing the result does not differ.*

Table 2 shows that treatment P0 (Control) AB Mix yields 9 leaves, and the fourth treatment POC of the egg shell does not show significant differences between them. Treatment POC ovum shell P4 produces the highest number of leaf, with 8 leaves; treatment P1 produces 7.50 leaf; treating P3 produces 7,33 leaves; and treatment P2 produces lowest number, with 7.17 leaves.

The best results of leaf growth with the addition of egg shells are obtained by P4 treatment. The amount of nitrogen and phosphorus given to the plant affects the number of leaves growing [4]. Nitrogen, the source element, is responsible for converting the carbohydrates produced by photosynthesis into proteins. As a result, plants have more leaves, longer and wider [5].



**Fig. 2.** Number of green Brassica

Because of the competition between the strawberries to use the elements N and P for plant growth and the formation of chlorophyll, treatment with POC of the egg shell reduces the color of the leaf. This results in a decrease in the quantity of chlorophyll and carotenoids in the plants. As a result, strawberry optimizes the content of n and P each treatment to accelerate the growth of plants, increase the number of offspring, and make plants healthier.

### 3.3 Root Length

**Table 3.** Root length of various treatments

Treatment	Root length
P0	36,17 <sup>c</sup>
P1	19,33 <sup>ab</sup>
P2	18,17 <sup>ab</sup>
P3	15,83 <sup>a</sup>
P4	23,17 <sup>b</sup>

*Description:* The result of treatment followed by the same letter means showing the result does not differ.

The length of the root of the green saffron plant indicates a significant difference. Treatment P0 (Control) shows the highest difference, which is 36.17 cm, and treatment P3 shows the lowest differential, that is 15.83 cm. Treatments P1 and P2 show significant differences, and treating P4 shows the greatest root length, that's 23.17 cm.



**Fig. 3.** Root Length Brassica

In terms of growth outputs, there is a significant difference between the level of potassium in hydroponic nutrients and sufficient levels of potassic elements. If the plant has low levels of Potassium, it will inhibit the number of roots and the volume of the root, but adequate levels of kalium can increase the absorption of N and K elements by the roots[6].

The phosphorus element in hydroponic nutrition is beneficial because it can stimulate root growth, especially in the early phases of plant growth. Plants that receive adequate amounts of nutrients will have a closer root density than plants that do not receive nutrients[6].

### 3.4 Plant Wet Weight

**Table 4.** Wet weight of plants of various treatments

Treatment	Plant Wet Weight
P0	41,00 <sup>a</sup>
P1	24,67 <sup>b</sup>
P2	24,67 <sup>b</sup>
P3	23,17 <sup>b</sup>
P4	28,33 <sup>b</sup>

*Description:* The result of treatment followed by the same letter means showing the result does not differ.

Table 4 shows the results that treatment P0 (Control) is not the same as treatment (P1), (P2), (P3) and (P4). Further testing results show that the treatment rate of egg shell POC is the same. Of the four treatment POC of eggshell, treatment P4 produces the highest wet weight, 28.33 grams.

The wet weight of plants is a growth measurement parameter that can be calculated at the time of harvest. The addition of the egg shell to the green saffron does not produce a significant difference in wet weight. However, treatment P4 yielded the highest wet weight yield, followed by P2, P1, and P3.



**Fig. 4.** Plant wet weight brassica

The wet weight of the plant is a parameter that indicates the accumulation of photosynthesis and water in the plant body. This parameter corresponds to the comparison of the high yield, the number of leaves, and the width of the leaves of the green saffron plant[7].

The availability of nitrogen harvesting elements affects the wet weight of plants, which affects growth and growth of plant leaves. The availability of sufficient fertilizer elements can also affect the growth and development of plants, which affects the fresh weight of the plants.

## 4 Conclusion

Based on the findings and discussions, it can be concluded that in hydroponics, the administration of egg shells on the growth of shell plants affects the development of green shell crops, but is ineffective as a nutrient. For green shelter crops (*Brassica juncea* L.), the treatment of P4 with a concentration of 300 milliliters of POC egg shell and 30,000 millilitres of water is a good concentration.

## References

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