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Growth and Production of Cabbage Plantation Lowland Against Concentration and the Length of Immersion with Kolkisin

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ABSTRACT

The study aims to determine the growth and production of the lowland cabbage plant to concentration and the length of immersion with kolkisin and the interaction between the two treatments. The research was conducted in environment VI Street Rambe No 6 martudude subdistrict Medan Labuhan which started in August until December 2019. This study uses the group Random Design (RAK) factorial with two treatments, namely: Kolkisin (0 "K0", 0.1% "K1", 0.2% "K2") and the length of immersion (without immersion "P0", 2 Hours "P1", 4 Hours "P2"). The results showed that the concentration of colkisin and the interaction of both influential treatments were not noticeable on all parameters whereas in the prolonged treatment of immersion was a real effect on the parameters of the diameter of the krop and the effect is not noticeable on the high parameters of the plant, the number.

Keywords: Growth, Production, Cabbage, Kolkisin, Soaking

INTRODUCTION

The cabbage plant-the ordination (Brassicaceae) is one of the many cultivated vegetable commodities. Cabbage-plant-ordination has many benefits for human health. Benefits that can be obtained from the cabbage plant-the ordination of which is the source of vitamins (A, B1, and C), mineral sources (calcium, potassium, clenbuterol, phosphorus, sodium, and sulfur), and contain anti-cancer compounds. This vegetable is widely used for food sources, both in Indonesia and in other countries, such as Singapore, Brunei Darussalam, China, and Malaysia (Setiawan, 2011). In addition to the cabbage-ordination plant is also one of the vegetable commodities that have a high economic value, although the selling value is strongly influenced by the quality of the harvest, especially the visual appearance of the product (Fuad, 2010).

Procurement of new varieties can be obtained through various ways one of them through the way of breeding crops such as crosses, mutations and so forth. The plant leaders are able to assemble new cultivars that are more superior and resistant to pests, diseases or environmental factors that are less supportive so it will not cause a decrease in productivity. Crop breeding by crossing is able to assemble a superior new varieties. However, crop breeding by means of crosses takes a very long time and requires superior varieties that will be used as the parent or plant elders. So now it takes another way of breeding plants that require shorter time in the assembly of new Varieta that is superior by means of genetic mutation (Lestari, 2015).

Kolkisin is one of the reagents for mutations that cause polyploid where the organism has three sets or more chromosomes in the Sel-selnya, while the general nature of the polyploid plant is becoming more unky, the plant part is larger, so later the properties of less good will be better, than that Kolkhisin also can change the composition of proteins, vitamins, or carbohydrates (Sulistianingsih, 2006).

Kolkhisin administered on the part of the plant that is doing cleavage is at a vegetative growing point for example on the seed, sprouts and tip of the stem of the plant (Samadi, 1997). Cholechloricin is used to inhibit the stage of the metaphase, preventing the polymerization of tubulin into Microtubulin, preventing such tubules into functional yarn fibers (spindle yarn) so that the level of Anaal for chromosome separation does not occur. Without the bobbin thread, the separator wall failed to form so that the chromosomes and the duplicates remained inside the same cell. Consequently the cell division did not last, so its defence began with diploid cells terminated with the formation of appear cells (Nasir, 2002). Next, the concentration and the length of immersion with cholinularity affect the induction of polyploidy (Jauhariana, 1995; Permadi et al., 1991; Space, 2006).

METHODS

Methodology

The research was conducted in environment VI tax Rambe No 6 Kelurahan martudude subdistrict Medan Labuhan which started in August until December 2019. The ingredients used in this study are the seeds of cabbage plants, kolkisin, aquadest, and water. The tools used are Polybek, hand sprayer, labels, scissors, gloves, cameras, pacak samples, stationery and other tools that support this research. This experiment uses the group Random Design (RAK) factorial with two treatments, namely: Kolkisin (0 "K0", 0.1% "K1", 0.2% "K2") and the length of immersion (without immersion "P0", 2 Hours "P1", 4 Hours "P2"). In this study there were 9 combinations of treatment and each repeated treatment 3 times so there are 27 plants. The observation parameters are the height of the plant (cm), the number of leaves (strands), Weight of krop (g), and the diameter of the fruit (cm).

The implementation of research includes land preparation, seed preparation, seed immersion with colkisin, seed seedlings, plant moving, insertion and maintenance of crops. Data is analysed using various print analyses. If there is a significant influence of the treatment factor then the data analysis is followed by the Duncan Multiple Range Test.

RESULT AND DISCUSSION

Plant Height (Cm)

From statistical test results can be seen that the concentration of colkisin and prolonged immersion as well as the interaction of the two influential treatment factors is not real on the high parameter of the plant seen in table 1.

Based on table 1 it is known that the concentration of 0.2% is the most high cabbage crop than the control treatment and 0.1% for crop height parameters. The highest plant height is at 0.2% concentration of 41.50 cm and the lowest in the control treatment is 13.67 cm, while in the old treatment of immersion seed soaked for 2 hours shows the highest crop height of 41.00 cm and the lowest on the treatment without immersion ie 14.06 cm.

This research shows that the concentration of kolkisin and the length of immersion given to the cabbage plant has not given any real influence. Each plant requires a concentration of colkisin and a different immersion length to induce poliploidi. Cell Ploization is a chromosome doubling process aimed at increasing the number of plant cell chromosomes two, three, or four times more than the initial plant. By having a double chromosome, the plant is expected to have a greater demonstration than the original plant's demonstration (Glowacka et al. 2010, Wiendra et al. 2011, Anggraito 2012).

Table 1. High Crop (cm) Cabbage Plant Against The Concentration Of Kolkisin And Prolonged Immersion

Treatment	Plant Height (cm)		
	2 MST	4 MST	6 MST
Kolkisin (K)			
K0 (control)	6.84 a	10.22 a	13.67 a
K1 (0.1%)	21.00 a	29.33 a	41.00 a
K2 (0.2%)	19.33 a	28.50 a	41.50 a
Long Immersion (P)			
P0 (No Immersion)	6.83 a	9.78 a	14.06 a
P1 (2 Hours)	19.67 a	29.83 a	41.00 a
P2 (4 Hours)	20.70 a	29.33 a	40.33 a

Number of leaves (strands)

The results of the variegated test showed that the concentration of colkisin and the prolonged immersion and the interaction of the two influential treatment factors were not apparent to the parameter of the Leaf (strands) listed in table 2.

Table 2 shows the most number of leaves at 0.2% kolkisin concentrations of 35.33 strands and the lowest in control treatment of 12.11 strands, while in the long treatment immersion the most number of leaves in the seeds soaked for 4 hours is 36.00 strands and the lowest found in the treatment without immersion ie 11.89 strands.

Table 2. Number Of Leaves (Strands) Of Cabbage Plant Against The Concentration Of Kolkisin And Prolonged Immersion

Treatment	Number of Leaves (Strands)		
	2 MST	4 MST	6 MST
Kolkisin (K)			
K0 (control)	5.78 a	9.22 a	12.11 a
K1 (0.1%)	16.00 a	26.33 a	34.33 a
K2 (0.2%)	17.00 a	26.33 a	35.33 a
Long Immersion (P)			
P0 (No Immersion)	5.67 a	8.78 a	11.89 a
P1 (2 Hours)	17.00 a	27.00 a	34.33 a
P2 (4 Hours)	16.33 a	27.00 a	36.00 a

The results showed that the concentration treatment of kolkisin and prolonged immersion of the cabbage plant has not been precise so that it has not been able to induce the tetraploid plant. If the concentration of cholechloricin solution and the length of treatment time is less achieving the right conditions, then Polyploidi can not be obtained. Conversely if the concentration is too high or the treatment time is too long, then Kolkhisin will show the negative influence that the appearance of the plant becomes ugly, many cells damaged or even cause the death of the plant (Suryo, 1995). Jauhariana Research (1995) on the influence of Cholechloricin on the change in the number of chromosomes, the anatomical structure of the leaves on the plant cuttings Rebaudiuana Bertoni M. Indicates that the immersion treatment for one hour at a solution concentration of 0.04% can already induce tetraploid onset, but obtained the best result of the growth of S. Rebaudiuana cuttings at a two-hour immersion treatment of a solution concentration of cholechloricin 0.02%

Weight Krop (g)

The results of data analysis showed that the concentration of colkisin and the prolonged immersion and the interaction of the two influential treatment factors were not apparent to the weight parameter of the Krop (g) listed in table 3.

Based on table 3 showed that the highest krop weight found in the concentration of 0.2% kolkisin is 407.00 G and the lowest in the control treatment is 135.33 g, while the treatment of long-lasting weight of the highest krop in the seed soaked for 4 hours ie 430.00 g and the lowest found in the treatment without immersion ie 127.11 g.

The results showed that the concentration treatment of kolkisin and long immersion of cabbage plants has not been able to induce the process of multiplication of chromosomes so that the cabbage plants form a high production. Polyploid induction is utilized in crop breeding, as the harvest becomes higher (Alam et al, 2011). The general nature of the polyploid plant among other plants becomes more kekar, the larger plant parts include the roots, stems, leaves, flowers and fruit (Escadon et al., 2003).

Table 3. Weight Krop (g) Cabbage plant against the concentration of Kolkisin and prolonged immersion

Treatment	Weight Krop (g)
Kolkisin (K)	135.33 a
K0 (control)	406.00 a
K1 (0.1%)	407.00 a
K2 (0.2%)	
Long Immersion (P)	127.11 a
P0 (No Immersion)	407.67 a
P1 (2 Hours)	430.00 a
P2 (4 Hours)	

Diameter Of Krop (Cm)

Based on the results of statistical tests showed that the concentration of colkisin and the interaction of both treatment factors was not real, whereas in the prolonged treatment of immersion has a noticeable effect on the parameters of the diameter of the Krop (cm) shown in table 4.

Table 4 shows that the highest diameter of the krop is at 0.2% kolkisin concentration of 19.40 cm and the lowest in the control treatment of 6.36 cm, while in the old treatment of immersion the highest diameter of the seed soaked for 4 hours, 19.23 cm and the lowest found in the treatment without immersion ie 6.50 cm.

The results showed that the treatment of the influence of kolkisin effect is not real against the diameter of the krop caused by Kolkisin has not given its influence on the diameter of the cabbage plant Krop while the length of immersion has a noticeable effect on the crop diameter of cabbage plant. The Diameter of the cabbage plant Krop is greater than the control plant. Chromosome multiplication in plants can be done by chemical induction using anti-mitosis compounds such as kolkisin (Chen et al., 2009). If at the treatment of such cholechloricin the initial cells are affected then the chromosomes in the plant cells will all be echoed and if only partially affected then some cells will remain diploid (Barnabas et al., 1999).

Table 4. Diameter of Krop (cm) cabbage plant against the concentration of Kolkisin and prolonged immersion

Treatment	Diameter of Krop (cm)
Kolkisin (K)	6.36 a
K0 (control)	19.23 a
K1 (0.1%)	19.40 a
K2 (0.2%)	
Long Immersion (P)	6.50 c
P0 (No Immersion)	18.97 b
P1 (2 Hours)	19.23 a
P2 (4 Hours)	

CONCLUSION

The best treatment of the concentration of Kolkisin 0.2% and the length of immersion for 4 hours.

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