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Application of Natural Growth Regulator on Viability of Soursop Seeds (Annona Muricata **Linn**.).

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ABSTRACT

Soursop (Annona Muricata **Linn.**) is a plant that has hard seeds that inhibits germination. One way that can be done to accelerate the process of germination of soursop is by scarifying and using natural growth regulators. This research aim was to identify the effect of scarification and immersion of natural growth regulators on the viability of soursop seeds. This research was conducted at the USU Faculty of Agriculture from July to September 2018 by using a Completely Randomized Design of two treatment factors namely, (1) Scarification (without scarification / control and scarification) and (2) Immersion of Natural Growth Regulators (No Immersion / Control, Immersion with young coconut water; red onion extract and young coconut water). The scarification treatment and immersion of young coconut water and/or red onion extract gave the highest yield, significantly on plant height, leaf number and vigor index.

Keywords: Scarification, Regulating substances, natural growth, Soursop, seed

INTRODUCTION

Soursop plants originating from Tropical America, namely around Peru, Mexico and Argentina then spread to the Philippines and Indonesia. Soursop fruit yield is still for domestic consumption because processing plants or home industries still cannot meet their needs. Until now, home industries still have difficulty collecting quality soursop fruit to be processed into fruit juice drinks (Rukmana, 2015).

Based on the data of the directorate general of horticulture (2015), soursop production in Indonesia in 2014 was amounted to 53,059 tons with an average production of 10.83 tons/ha. This is very far compared to bananas which are the main contributor of Indonesia fruit production, which is 6,862,558 tons.

The process of soursop seed germination is quite difficult because the seeds have hard skin. Soursop seeds require certain treatments to speed up germination. One treatment for accelerating germination that can be done is scarification (Juniati, 2017).

The way to overcome the hard seed coat on the seeds is by mechanical treatment, chemical treatment, immersion, application of a certain temperature and treatment with light. Scarification is the most often used treatment to weaken hard skin by filing or rubbing the seed coat with sandpaper, making it more permeable to water or gas. In addition, growth regulators can be used to break hard seed shells in the form of cytokinins, gibberellins and auxin (Sutopo, 1993).

According to the research results of Juhanda et al. (2013), the scarification treatment in saga fruit increased germination by 87.56% while in the control it was only 11.78%. In addition, in the research of Andriani et al., (2013) immersion with young coconut water on soursop seeds without scarifying did not show any significant effect. This showed that the need for scarification of seeds that have hard seed coat.

Red onion extract is a natural growth regulator that contains auxin. In Darojat et al., (2014) research, the application of growth regulator onion extract at a concentration of 40% and immersion time for 6 hours increased

the percentage of germination by 90.22% while with no immersion only 53.89%.

Based on the description above, the authors were interested in conducting research on scarification and immersion of some natural growth regulators on soursop seeds.

MATERIALS AND METHODS

This research was conducted at the Seed Technology Laboratory of the Faculty of Agriculture, the University of Sumatera Utara, Medan with an altitude of + 32 meters above sea level, started in May 2018 until completion.

The materials used in this research were soursop seed as a research commodity, Delsene MX 80 WP as a fungicide, cardboard as a storage container, sand as a germination medium, red onion extract as an immersion solution, sprout tub as a germination container.

The tools used in this research were stationery, beaker glass, analytical scales, labels, buckets, knives, paper sheets, calculators and cameras.

This research used a Completely Randomized Design (CRD) with 2 treatment factors, the first factor was scarification with 2 levels, namely without scarification and scarification. The second factor was the immersion of natural growth regulators with 4 levels, namely control, immersion with young coconut water (concentration 60%), immersion with red onion extract (concentration 60%) and immersion with a combination of young coconut water and red onion extract (concentration 60%).

The observed parameters were vigor index, plant height, number of leaves, wet weight and dry weight.

RESULTS AND DISCUSSION

Plant height

The height of the soursop plant in the scarification treatment had a significantly different effect with the control with an average scarification treatment of 7.98 cm compared to the control treatment with an average of 3.95 cm (table 1).

In the treatment of growth regulators of coconut water plus red onion extract application had a significant effect compared to other treatments with an average of 8.42 cm. In the treatment of coconut water and the treatment of onion extract had significantly different results than the control treatment, with an average treatment of 6.20 cm (coconut water) and the treatment of red onion extract of 5.69 cm while the control was 3.55 cm.

In the treatment of scarification and application of growth regulators (coconut water plus onion extract) gave a significantly different effect with other treatments with an average of 11.85 cm. In the treatment of scarification and application of coconut water growth regulator showed an average of 7.62 cm that was not significantly different from the scarification treatment and the application of onion extract growth regulator with an average of 7.39 cm but significantly different from the control treatment with an average of 5.08 cm.

Vigor Index

The Vigor index on the scarification treatment had a significantly different effect compared to the control with an average scarification treatment of 0.50 and the control treatment with an average of 0.25 (table 2).

The application treatment of coconut water plus red onion extract growth regulators gave a significantly different effect with other treatments with an average of 0.55. In the application treatment of coconut water and red onion extract showed significantly different results than the control treatment with the average treatment of coconut water were 0.40 and the treatment of red onion extract was 0.36 while the control was 0.21.

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Table 1. The average height of soursop plants in the treatment of scarification and application of natural growth regulator in 6-8 Weeks After Planting

Weeks After Planting	Scarification	Application of Natural Growth Regulator				Average
		P0(Control)	P1(Coconut Water) (60%)	P2(Onion Extract) (60%)	P3(Coconut Water + Onion Extract) (60%)	
6	S0(Control)	0,91d	3,46c	2,11cd	3,35c	2,46
	S1(Scarification)	3,14c	5,30b	5,47b	8,88a	5,7
	Average	2,02	4,38	3,79	6,12	
7	S0(Control)	1,5d	4,05c	3,17cd	4,26c	3,25
	S1(Scarification)	4,2c	6,79b	6,50b	10,73a	7,05
	Average	2,85	5,42	4,84	7,49	
8	S0(Control)	2,02d	4,78c	4,00cd	4,98c	3,95
	S1(Scarification)	5,08c	7,62b	7,39b	11,85a	7,98
	Average	3,55	6,20	5,69	8,42	

Description: The numbers followed by the same letter in the column or row showed no significant difference based on Duncan Multiple Range Test at the level of α = 5%.

Number of Leaves

The number of leaves in the scarification treatment had a significantly different effect with the control with an average (scarification treatment) of 1.40 more than the control treatment with an average of 0.58. Application treatment of coconut water plus red onion extract (growth regulator) had a significantly different effect with other treatments with an average of 1.51. In the treatment of coconut water and red onion extract application showed significantly different results compared with the control treatment with the average treatment of (coconut water) 0.98 and the treatment of red onion extract was 0.90 while the control was 0.57. The interaction treatment of scarification and the application of growth regulators (coconut water plus onion extract) gave a significantly different effect with other treatments with an average of 2.25.

Table 2. The average of Vigor Index of soursop plants on the scarification treatment and natural growth regulator application at 1-8 Weeks After Planting

scarification	natural growth regulator application				Average
	P0(Control)	P1(Coconut water) (60%)	P2(Onion extract) (60%)	P3(Coconut water + Onion extract) (60%)	
S0(Control)	0,12e	0,31d	0,25d	0,33d	0,25
S1(scarification)	0,30d	0,49b	0,47c	0,76a	0,50
Average	0,21	0,40	0,36	0,55	

Description: The numbers followed by the same letter in the column or row showed no significant difference in the Duncan Multiple Range Test at the level of α = 5%.

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Wet weight

The scarification treatment had a significantly different effect compared to the control in the wet weight parameter. The average scarification treatment was 1.01 while the control treatment is 0.46. The application treatment of coconut water plus red onion extract (growth regulator) gave a significantly different effect compared to other treatments with an average of 0.98.

Table 3. The average dry weight of soursop plants in the scarification treatment and application of natural growth regulator at 1-8 weeks after planting

scarification	application of natural growth regulator				Average
	P0(Control)	P1(Coconut water) (60%)	P2(Onion extract) (60%)	P3 Coconut water + Onion extract) (60%)	
S0(Control)	0,07	0,17	0,14	0,18	0,14b
S1(scarification)	0,25	0,26	0,30	0,41	0,31a
Average	0,16c	0,21bc	0,22b	0,30a	

Description: The numbers followed by the same letter in the column or row showed no significant difference in the Duncan Multiple Range Test at the level of $\alpha = 5\%$.

Dry weight

The dry weight (Table 3) showed that the scarification treatment had a significantly different effect compared to the control with an average (scarification treatment) of 0.31 more than the control treatment with an average of 0.14. The application treatment of coconut water plus red onion extract (growth regulator) gave a significantly different effect compared to other treatments with an average of 0.30 g. In the application treatment of onion extract as a growth regulator showed an average yield of 0.22 g which was significantly different from the control of 0.16 g but not significantly different from the immersion treatment of coconut water with an average of 0.21 g.

CONCLUSION

The scarification treatment and natural growth regulator application had a significant effect on the parameters of vigor index, dry weight, wet weight, number of leaves and height of the soursop plant. The interaction of scarification treatment and natural growth regulator immersion significantly affected the parameters of plant height, number of leaves and vigor index of soursop plants.

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