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Test the Solving of Seed Skin and Media Type Against Germination of Pumpkin Seeds (*Cucurbita Maschata*)

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ABSTRACT

Objectives of the research are (1) to test various treatments of seed skin breakdown and media types to pumpkin germination (2) to test various treatments splitting of seed skin on pumpkin germination, (3) To test various types of media treatments for pumpkin germination. Factorial research methods in Randomized Block Design (RBD), consisting of two factors, namely: Treatment of seed skin breakdown with 2 levels of treatment and treatment of media types with 4 levels of treatment. Each treatment combination was repeated three times and each treatment combination consisted of 20 pumpkin seeds. The first factor is the treatment of seed skin breakdown consisting of P_0 : without breaking the seed skin and P_1 : Breaking the seed skin. While the second factor is media type treatment consisting of M1: Merang paper; M2: Garden Land; M3: Sand and M4 : Fertilizer Cage. Observations carried out consisted of germination rate, germination percentage, plumula length and radicle length. The results of the study and discussion, can be concluded as follows: Overall the combination of the treatment of seed skin breakdown and the type of media on gourd seeds germination has not given a significant interaction effect, except for the significant growth of radicle length. no significant effect on the length of the radicles and the length of pumpkin plumula, very significant effect on germination rate, and on the percentage of germination significantly. In the treatment of the type of media it has a very real effect on all observation parameters. The combination of the treatment of seed skin cracking and paper planting media (P_1M_1) gave the highest yield on the average length of radicles, germination on the paper medium (M_1) gave the longest length of the radicle, the fastest germination rate, and the highest germination percentage obtained at skin stripping treatment (P1).

Keywords: Yellow Gourd; Skin breakdown; Media Type

1. INTRODUCTION

Yellow Pumpkin (*Cucurbita moschata*.) Is one of the plant sources of food and is a suitable agricultural commodity to be developed. This fruit has enough nutrients and is beneficial for health which is rich in vitamins A and C, minerals, and carbohydrates. This plant is widely found in North America, Central Europe, Australia, New Zealand, India and other countries.

Pumpkin is often also referred to as pumpkin or pumpkin for the species *Cucurbita moschata* and sweet pumpkin for species *Cucurbita maxima* and *Cucurbita pepo*. In some areas in Indonesia pumpkin has several regional names such as Labu Parang (Malay), Waluh (Javanese and Sundanese). In English it is generally referred to as pumpkin or Butternut squash (pumpkin) and Winter squash (sweet pumpkin) (Anonymous, 2009).

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This pumpkin is an agricultural commodity that is suitable to be developed as a food alternative. This fruit has enough nutrients and is beneficial for health (Purwanti, Hidayati, & Nurlina, 2017). As a food ingredient, Yellow Pumpkin is rich in vitamins A and C, minerals, and carbohydrates. This fruit also contains substances that are useful for health, including carotenoids in the form of beta-carotene. Therefore, this pumpkin is nicknamed "king of beta-carotene," which serves to protect the eyes from cataract attacks. Also attacks of cancer, heart disease, diabetes, dysentery, kidney, fever, and diarrhea. As well as containing antidotes and tapeworms.

Increasing numbers of population demands increasingly high fulfillment of needs. One of the needs that is now the international concern is the problem of adequate food. Indonesia as an agrarian country has a lot of potential to overcome this. Many sources of food can be produced, but so far not optimally optimized (Ali & Wulan, 2018). One source of these foods is pumpkin (*Cucurbita moschata* or *Pumpkin* (English).

Pumpkin plants have a very high nutrient content and are very likely to be used as alternative food, but the productivity produced at the level of farmers is still low. This is due to the lack of attractiveness and the low quality of seeds circulating in the market (Anonymous. 2012[b]).

2. MATERIALS AND METHODS

This experiment was carried out in the laboratory of the Faculty of Agriculture, Merdeka University, Surabaya, Jalan Ketintang Madya VII number 2 Surabaya. The height of the place is approximately 5 m above sea level.

The research materials and tools used are: germination, sprayer, pumpkin seeds, planting media consisting of paper, garden soil, sand, manure, nail cuttings (scissors) and measuring instruments

Experiment arranged in a randomized block design (RAK), consisting of two factors: Treatment of seed skin breakdown with 2 levels of treatment and treatment of media types with 4 levels of treatment. Each treatment combination was repeated three times and each treatment combination consisted of 20 pumpkin seeds. Factor I: Treatment of breaking the seed skin consists of P_0 : Without breaking the seed skin, P_1 : Solving the seed skin. Factor II: Treatment of media type, consisting of M1: paper, M2: Garden soil, M3: Sand, M4 : Manure,

To find out how far the effect of treatment is used analysis of variance (Test F) with a level of 5% and 1%, and to find out the differences and each treatment usedBNT test *5%.*

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3. RESULTS AND DISCUSSION

3.1. Radicle Length

The results of variance analysis showed that the interaction due to the treatment of seed skin breakage and type of media (PM) significantly affected the length of pumpkin radicles. Separately the treatment of seed skin breakdown no significant effect on the length of the radicles and the treatment of the type of media had a very significant effect

The average length of pumpkin radicles due to the treatment of seed skin breakdown and type of media can be seen in Table 1. Table 1 shows that the combination treatment of seed skin cracking and type of paper planting media (P_1M_1) gave the longest length of radicle 12.65 cm, followed by a combination of treatment P_1M_4 (11.72 cm), P_0M_1 (11.55 cm), P_0M_3 (10.56 cm), P_0M_2 (10.38 cm), P_0M_4 (10.1cm), P_1M_3 (8.36 cm) and P_1M_2 (8.15 cm). \

Table 1. Average Radicle Length (cm) Due to Combination Treatment Treatment of Skin Seed and Media Type

Treatment	Average(cm)	Notation
P0 M1	11.55	b
P0 M2	10.38	ab
P0M3	10.56	ab
P0M4	10.1	ab
P1 M1	12.65	b
P1 M2	8.15	a
P1 M3	8.36	a
P1 M4	11.72	b

Description: The numbers accompanied by the same letter in the same column showed no significant difference in the BNT test 5%

3.2. Plumula Length

The results of variance analysis showed that the interaction due to treatment of seed skin breakdown and type of media had no effect real to the length of pumpkin plumula. Separately the treatment of seed skin breakdown (P) no significant effect on the length of the plumula and the treatment of the type of media (M) has a very real effect (Appendix 2). The average length of pumpkin plumula due to the type of media treatment can be seen in Table 2.

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Table 2. Average Plumula Length (cm) Impact of Planting Media Treatment (M)

Treatment	Average(cm)	Notation
M1	15.68	a
M2	17.28	bc
M3	16.59	b
M4	17.99	c
BNT 5%	0.77	

Remarks: The numbers accompanied by the same letter in the same column showed no significant difference in the BNT test 5%

Table 2 shows that the treatment of the type of manure media (M_4) produced the longest plumula length of 17.99 cm, which was then followed by the type treatment garden soil media (M_2) of 17.28 cm, type of sand media of 16.59 cm and finally by the treatment of medium type of paper paper at 15.68 cm.

3.3. Germination rate

The results of the variance analysis showed that the interaction due to seed treatment and planting media did not significantly affect the pumpkin germination rate. Separately seed treatment (P) very significant effect on germination rate, as well as the treatment of media types (M) has a very real effect

The average pumpkin germination rate due to seed skin treatment and media type treatment can be seen in Table 3

Table 3. Average Germination Rate (days) Due to Treatment of Seed Skin Breaking (P) and Treatment of Media Types (M)

Treatment	Average(day)	Notation
M1	2.54	a
M2	2.84	b
M3	2.73	b
M4	2.76	b
BNT 5%	0.12	
P0	3.07	b
P1	2.37	a
BNT 5%	0.09	

Description: The numbers accompanied by the same letter in the same column show no significant difference in the test BNT 5%

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Table 3 shows that the treatment of the type of paper fertilizer media (M_1) produced the fastest germination rate of 2.54 days, followed by the treatment of garden soil media type (M_3) of 2.73 days, manure of 2.76 days and the last by Sand type media treatment is 2.84 days.

Treatment of skin breakdown (P_1) gives the fastest germination rate of 2.37 days, followed by treatment without skin breakdown (P_0) of 3.07 days.

3.4. Germination percentage

The results of variance analysis showed that the interaction due to the treatment of seed skin cracking and the type of media did not significantly affect the percentage of pumpkin germination. Separately the treatment of seed skin breakdown (P) very significant influence on the percentage of germination, and on the treatment of the type of media (M) significantly affected

the average percentage of pumpkin germination due to seed treatment and planting media treatment can be seen in Table 4. Table 4 shows that the paper media treatment (M_1) produces the highest percentage of germination is 78.32%, which is then followed by the treatment of media of manure (M_4) of 76.16%, Msand planting medium$_3$ of 73.60% and finally by the treatment of sand planting media of 70.12%. Whereas in the seed treatment, the highest percentage of germination was obtained on the skin stripping treatment (P_1), which was 76.32% which was then followed by seed treatment without stripping (P_0) of 72.78%.

Table 4. Average Germination Percentage (%) Due to Treatment of Seed Skin Breaking (P) and Treatment of Media Types (M) Before and After Transformation.

Treatment	Before Transformation		After Transformation	
	Average(%)	Notation	Average(%)	Notation
M1	95.00	c	78.32	b
M2	88.33	a	70.12	a
M3	91.67	b	73.60	ab
M4	94.17	bc	76.16	b
BNT 5%	2.87		3.85	
P0	90.83	a	72.78	a
P1	93.75	b	76.32	b
BNT 5%	2:03		2.72	

Description: The numbers accompanied by the same letter in the same column show that there is no significant difference in the BNT test 5%

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3.5. Discussion

Overall in general the combination of treatment Breaking the seed skin and the type of media against pumpkin seed germination has not given a real interaction effect, except in the long growth of significant influential radicles ..

Separately the treatment of seed skin breakage gives no significant effect on the length of the radicles and the length of pumpkin plumula, very significant effect on germination rate, and on the percentage of germination significantly (Ali, Hosir, & Nurlina, 2017). In the treatment of the type of media it has a very real effect on all observation parameters.

The average length of the longest pumpkin radicles due to a combination of the treatment of seed skin cracking and the type of planting medium was obtained in the treatment of seed skin cracking with the type of paper medium (P_1 M_1), which is 12.65 cm. In addition the treatment of skin breakdown gives the highest yield at germination rate (2.37 days) and germination percentage (76.32%). It is suspected that the seeds that are not broken down, water absorption is hindered, but by breaking the skin can accelerate germination, because seeds are easier to imbibe.

Sutopo, L. (1992), which says that seeds that have hard seeds take water are blocked by seed skin, so opening the skin will accelerate germination. Saleh, MS. (2003), said that the seeds given special treatment namely scarification can improve germination and speed of germination. Wirawan and Wahyuni (2002), also said that seed skins also become a barrier to the emergence of sprouts in this germination and dormancy process can be broken by treating the seed skin to make it easy to pass through water and gas, such as skin peels.

Germination on the paper medium (M_1) gives the longest length of the radicle, the fastest germination rate, and the highest percentage of germination, because the paper has a high absorption capacity, where seed germination needs water. In accordance with Sadjad's opinion (1980) that the medium of paper is very good to be used as a germination test media in the laboratory because it has high absorption power and is easy to control.

Water collection in seeds generally occurs in 3 phases: initial absorption quickly, and the second phase is taking water with the appearance of roots. Imbibisi is identified by the first phase of water uptake and is a physiological process, due to metabolic initiation before the seeds get food. Water collection is controlled by the strength of cell walls that lack water, carbonhydrate and protein (Arnold and Sandjez, 2004).

As it is known that the germination rate is influenced by humidity and temperature. In line with this, Kamil (1979) states that seeds need to absorb a certain amount of water before

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starting germination. others also said that light and temperature are basic needs that must be met during the germination process. According to Copeland (1976), seed germination requires water (humidity), oxygen and temperature, which is suitable for the seed needs of each type of plant.

The average length of pumpkin plumula due to the treatment of the growing media is obtained on the media treatment of manure (M_4) , which is 17.99 cm long. This is due to the subsequent growth of sprouts requiring nutrients, and the elements needed are in manure. In accordance with the opinion of Akbar (1992; Lakitan, 2004), that germination media is one of the factors that influence seed germination.

Sutopo (1984) states that the process of seed germination is a complex series of morphological, physiological and biochemical changes. The process consists of five stages. The first stage begins with the absorption of water by the seeds, softening of the seed coat, and hydration by the protoplasm. The second stage starts with cell activity and enzymes and increases the level of seed respiration. The third stage is the decomposition of ingredients such as carbohydrates, fats, and proteins into dissolved forms and translocated to growing points. The fourth stage is assimilation of the ingredients that have been described in the enzymatic area to the systematic area to produce energy to form components and the growth of new cells. The fifth stage is the growth of sprouts through the process of division and enlargement.

4. CONCLUSION

Overall the combination of seed treatment and type of media on gourd seeds germination has not given a real interaction effect, except for the significant growth of radicle length. Separately the seed treatment has no significant effect on the length of the radicles and the length of pumpkin plumula, very significant effect on germination rate, and on the percentage of germination significantly. In the treatment of the planting medium, the effect was very significant on all parameters of observation and the combination of treatment of seed skin cracking and paper planting media (P_1M_1) gave the highest yield on the average length of radicles, germination on the medium of paper (M_1) gave the length of radicles the longest, fastest germination rate, and the highest germination percentage obtained in the skin stripping treatment (P1).

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