GROWTH POTENTIAL OF JEUMPA PLANT (*Magnolia* sp) USING LIQUID ORGANIC FERTILIZER

Lina Rahmawati[1], Ulfa Nur[2], Kamaliah[3]

[1,2,3] Universitas Islam Negeri Ar-raniry Banda Aceh

Email : lina.rahmawati@ar-raniry.ac.id

ABSTRACT

Magnolia sp. is often called Jeumpa in Aceh. This plant has been designated as the regional puspa or flora identity of the province of Nangroe Aceh Darussalam, according to Ministry of Home Affairs No. 48 of 1989. This study aims to determine the ability of Jeumpa plants to grow by administering liquid organic fertilizer from Sagu. The experimental design in this study is a Completely Randomized Design consisting of 6 treatments. The treatments are concentrations of liquid organic fertilizer. Concentrations used are P0: 0% (without liquid organic fertilizer), P1: 10%, P2: 20%, P3: 30%, P4: 40%, and P5: 50%. The measured parameters are the day of growing shoot and the number of shoots. Treatments that give optimal values are P3 and P4, with liquid organic fertilizer rates of 30% and 40%.

Keywords: Jeumpa (*Magnolia* sp.), Sagu (*Metroxylon sagu*), Growth Parameters, Liquid Organic Fertilizer Concentration.

A. INTRODUCTION

Indonesia is a country with a tropical climate that is rich in diversity of flora with a variety of varieties of plants that are beneficial and can grow easily; one of them is the Jeumpa/cempaka plant (*Magnolia* sp.). The region of origin and spread of Jeumpe/campaka (*Magnolia* sp.), which originated in India, is believed to have entered Indonesia along with the arrival of Hinduism in the sixth-seventh century AD. The propagation of jeumpa plants covered the territory of China, Burma, and Southeast Asia. (Supartono, 2014).

Magnolia sp. is often called Jeumpa in Aceh. This plant has been designated as the regional puspa or flora identity of the province of Nangroe Aceh Darussalam, according to Ministry of Home Affairs No. 48 of 1989 (Pitojo, 1994). According to one of the figures at the Institute of Aceh Tradition and Culture in the province of NAD, the Aceh community very much appreciates Bungong Juempa. In Aceh, jeumpa flowers are used in various customary events. In addition, the cempaka flower, also known for its fragrance, beauty, and color, inspired the poet Aceh to create the famous poem in Aceh with the song of bungong jeumpa.

Jeumpa/cempaka Besides being known for the beauty of their flowers, these ornamental plants have many privileges, one of which is that they can be used as medicinal materials. These decorative plants only exist in certain areas. *Magnolia* sp. belongs to the family Magnoliaceae, known as ornamental plants because of its beautiful shape and color. Jeumpa plants' roots, stems, and flowers can be used as a cure for tonsils, throat inflammation, and acne. Therefore, Jeumpe plants need to be preserved.

Magnolia sp. is a tree that has a height of up to 30 meters. The leaves are egg-shaped, round, and up to 30.5 cm long and 10.2 cm wide, narrowing to a smooth point at the top. The fruit of *Magnolia sp* consists of 3–20 brown follicles that are dried when ripe and split on one side. Each follicle contains 2–6 redness seeds (Raja dan Ravindranadh, 2014).

The growth of a plant is influenced by several factors, one of which is the soil condition. The ideal soil for plant growth can be cultivated by fertilizing the soil. Fertilization is an important thing for a plant because it will determine the rate of growth and yield. The fertilizer contains the elements of the plant's harvest (Apriliani dkk, 2019). The advantage of using fertilizers that contain complete fertilizer elements, both macro and micro, is that they can boost growth. This condition does not belong to artificial fertilizer (Pracaya, 2007).

Fertilizer utilization is essential for the growth and production of plants. One of them is the use of some waste from the production of sagu. Sagu waste is sagu that has previously been taken from pati and then produces solid and liquid waste. Liquid waste is basically acidic and has a rotten smell.

The use of metroxylon sagu rott is still very limited. Usually, sagu waste is thrown into rivers or shelters around processing sites or production areas. Therefore, unused sagu ampas can cause environmental pollution. (La Teng dan Sutanto, 2010).

Until now, the use of organic fertilizer from sagu waste has been very little and not much done. Moreover, information from the community about the sagu plant processing environment and the benefits of sagu waste as livestock feed is still scarce. Therefore, it is necessary to study the ability of Jeumpa plants to grow with liquid organic fertilizer from Sagu.

This research aims to find out how the growth potential of Jeumpa plant (*Magnolia sp.*) with the administration of liquid organic fertilizer from sagu waste and find out if sagu waste can influence the growth of Jeumpa plants (*Magnolia sp*.)

B. RESEARCH METHOD

The research was conducted at the Garden of Biology, Islamic State University of Ar-Raniry. The research objects are Jeumpa plants (*Magnolia* sp.). The parts taken are stem cuttings of jeumpa plant. The design of this research is experimental design. The experimental design in this study is a Completely Randomized Design. This study used 6 treatments The treatments are concentrations of Liquid organic Fertilizer (LOF). Concentrations used are P0: 0% (without liquid organic fertilizer), P1: 10%, P2: 20%, P3: 30%, P4: 40%, and P5: 50%.

Preparation of stem cutting

The branches of the jeumpa/cempaka plant are selected to be planted in a cutting way. Plants that are cutted with a size of about 15–30 cm after cutting have the base of the rod applied growth hormone first. Then the stem cuttings is stamped into a polybag with a depth of about 3–5 cm.

Methods of Production of Sagu waste Fertilizer

Weighed 10 kg. in a large container that can hold 10 kg of container. Next, added 10 liters of water to ensure an even mixture. Next, evenly filtered the mixed container into the already prepared container, and mixed it with 1 liter of EM4. Then, added 1.2 kg of sand sugar to activate the EM4. Then covered with a cloth that is airtight so that the air can enter, then leave for 2 weeks or 14 days. Then the liquid organic fertilizer seed that has been fermented is used in the treatment P0 at 0%, in treatment P1 is 10% with the normal water content of 90 ml, in treatment P2 the fertilizer content is 20% whereas the water content is 80 ml and in treatment P3 the fertilizer content of 30% whereas that of water is 70 ml, in treatment P4 the fertility content is 40% whereas that of water is 60 ml, and in treatment P5 the fertility content is 50% while the water content is 50 ml.

Liquid organic fertilizer delivery

Irrigation with liquid organic fertilizer that has been fermented for 14 days then mixed with water adjusted to the percentage and irrigated into the plant.

Parameters observed

As for the observed parameters:

1. The day of a growing shoot. It is measured the first day of the gowing shoots.. 2. The number of buds is calculated from the number of shoots, that is, the number of young shoots growing. Every steak object is treated by counting every eye on the shoots that pop up. The number of shoots was observed at 15, 30, and 45 DAP.

Data Analysis

Data analysis uses statistical analysis to see between one variable and another; at least there are three groups of variables used. ANAVA tests a special form of statistical analysis according to the treatment used, namely variance analysis (ANAVA). This study uses the one-way ANAVA test.

C. RESULT AND DISCUSSION

A.The Day of growing shoot

Based on the observation data of the day the shoots appeared starting from the first day of observation until the 45th day, it is known that at the treatment P3 and P4 there was a growth

of shoots in Jeumpa plants. Below is the observation table of the day the first shoots appeared for 45 HST:

Table 1. The day of growing shoot in Jeumpa Plant

Treatment	The day of growing shoot		
	repetition		
	1	2	3
P0	0	9	0
P1	0	0	0
P2	0	12	0
P3	8	8	8
P4	9	8	10
P5	0	0	10

Based on Table 1, observations show that the growth in the day of growing shoot indicates a significant value. On treatment P3 and P4 showed higher results compared to other treatments. Treatment P3 with a concentration of 30% liquid organic fertilizer sagu waste and P4 with a concentration 40% organic liquid fertilizer sagu waste is capable of affecting the growth of Jeumpa .

B. Number of shoots: 15 Day After Planting (DAP)

Based on the observation data of the number of shoots appeared starting from the first day of observation until the 45th day, it is known that at the treatment P3 and P4 there was a growth of shoots in Jeumpa plants. Below is the observation table of the number of shoot appeared for 45 HST:

Table 2. Number of Shoots for 15 Day After Planting (DAP)

Period	Treatment	Number of Shoot			Mean	Percentage of growth Potential
		Repetition				
		1	**2**	**3**		
15 DAP	P0	0	1	0	0,33	30 %
	P1	0	0	0	0	0
	P2	0	1	0	0,33	30 %
	P3	3	2	2	2,33	99 %
	P4	2	2	1	1,67	97 %

	P5	0	0	1	0,33	30 %

Based on Table 4.2, observations show that the growth in the number of shoots at 15 DAP indicates a significant value. On treatment P3 and P4 showed higher results compared to other treatments. Treatment P3 with a concentration of 30% liquid organic fertilizer ampas sagu and P4 with a concentration 40% organic liquid fertilizer amps sagu is capable of affecting the growth of Jeumpa .

The observations using a completely random design showed that the sagu liquid organic fertilizer (Metroxylon sagu) had both a real and a fake effect on the growth of Jeumpa. This was shown by the analysis of variants (Anova). The results of the analysis of variants (anova) indicate that the value eliminated is significant or has a real effect of 0.01.

HSD test results showed that there are three columns and different values in each column. To determine the optimal value of some treatments, then to have to take the lowest concentration while yielding a high value, or the said optimal value. Seeing from the Tukey test table that the optimal value found in treatment P3 is 2.33 compared to P4 with a value of 1.67,.

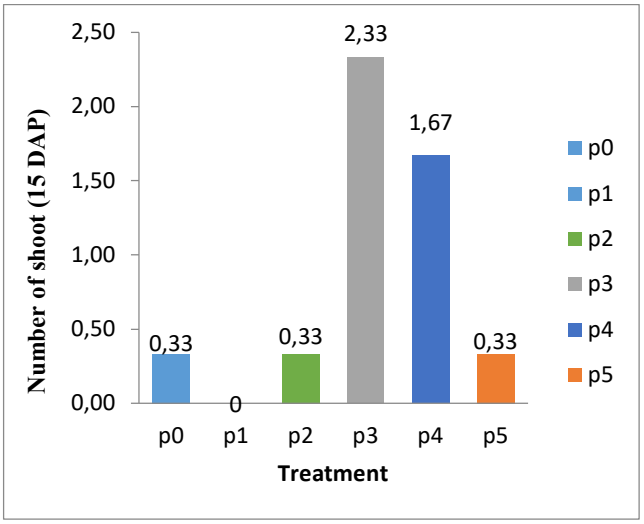

Figure 3. Number of Shoot of Jeumpa Plant for15 day After Planting

Based on the results of the study (2021), chart 4.1 Number of shoots for 15 DAP. The number of shoots shows that the influence of the administration of liquid organic fertilizer ampas sagu on the number of jeumpa shoots (*Magnolia* sp.) yields the best results at P3 concentration with an average value of 2.33. In the growth of the shoots in Jeumpa plants, shoots that grow green to brownish. Liquid organic fertilizers with treatments P0, P2, and P5 yield the same average value of 0.33. While the liquid organic fertilizer applied to treatment P1 has no effect,.

B. Number of shoots: 30 Day After Planting (DAP)
Based on the observation data of the number of shoots appeared starting from the first day of observation until the 45th day, it is known that at the treatment P3 and P4 there was a growth

of shoots in Jeumpa plants. Below is the observation table of the number of shoot appeared for 45 HST:

Table 3. Number of shoot for 30 Day after Planting (DAP)

Period	Treatments	Number of shoot			Mean	Percentage of growth Potential
		Repetition				
		1	**2**	**3**		
30 DAP	P0	0	2	0	0,67	30 %
	P1	0	0	0	0	0
	P2	0	1	1	0,33	60 %
	P3	4	3	5	4,00	99 %
	P4	3	3	4	3,33	97 %
	P5	0	1	1	0,67	60 %

Based on Table 3, observations of the number of shoots at 30 DAP showed that treatments P3 and P4 affected the plants of Jeumpa. The resulting mean values are not significantly different between the two. As for the treatment of P0, P2, and P5, they are also influential, but the mean value is so small that after further testing, only P3 and P4, with a concentration of P3 (30%) and P4 (40%) of liquid organic fertilizer, produce the optimal value.

The result of the HSD test is to find out the treatment that shows the optimal value, i.e., there are two columns with a difference of values that are not very different. Then, to determine the optimum value, the highest value with the lowest concentration that is aimed at the treatment P3 is an optimal value obtained at 4.00. Then, the treatment that has a real influence on the growth of Jeumpa Plant is P3.

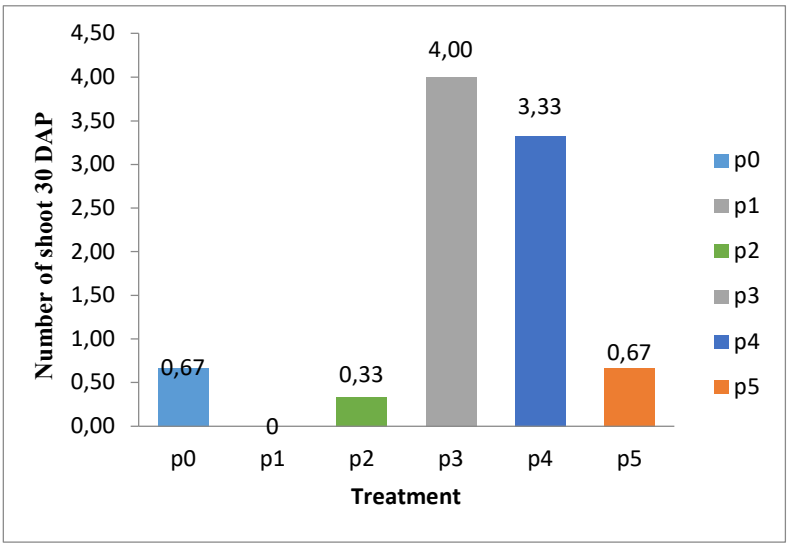

Figure 2. The average number of shoots at 30 DAP

Based on the results of the study , graph 2 shows that the average number of shoots shows that the administration of liquid organic fertilizer sago waste on the number of seedlings of jeumpa/cempaka (*Magnolia* sp.) gives the best results at P3 concentration. While P1 does not experience growth with the resulting value of 0,.

B. Number of shoots: 45 Day After Planting (DAP)

Based on the observation data of the number of shoots appeared starting from the first day of observation until the 45th day, it is known that at the treatment P3 and P4 there was a growth of shoots in Jeumpa plants. Below is the observation table of the number of shoot appeared for 45 HST:

TABLE 4. The number of shoot at 45 DAP

Period	Treatment	Number of shoot			Mean	Percentage of growth potential
		repetition				
		1	2	3		
45 DAP	P0	0	0	0	0	0
	P1	0	0	0	0	0
	P2	0	0	0	0	0
	P3	3	4	3	3,33	90 %
	P4	4	0	2	2,00	60 %

	P5	0	0	0	0	0

According to Table 4. the results of the observations made show that the number of shoots (45 DAP) in some treatments experienced growth. Treatments P3 and P4 experienced growth ieach recurrence. Then it can be said that the administration of liquid organic fertilizer, sago waste, against the number of shoots at 45 affects the good growth of jeumpa/cempaka plants. A descriptive test is then carried out to determine the mean of the treatment and the total recurrence.

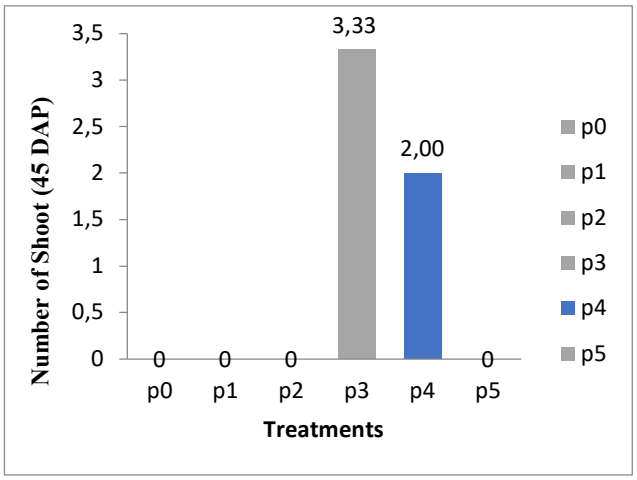

Figure 3. The number of shoot 45 Day After Planting

Based on the results of the study (2021), graph 3 shows that the percentage of diagram increase in treatment P3 is very good. Treatments P3 and P4 affect real growth. Administration of liquid organic fertilizer sago waste with a 30% concentration and treatment P4 with a 40% concentration can affect the increase in diagram stems.

Discourse

Liquid organic fertilizer contains the micro- and macro-elements that plants need as a process of growth and development. Organic fertilizer is a fertilizer composed of animal, human, and plant waste matter. One plant waste that can be used as organic fertilizer is sagu waste. Preference in using fertilizer that contains a complete element of charity against plants, both macro and micro charity elements that can help the process of growth of plants compared to plants that are not given any element (Ela, 2019).

Liquid organic fertilizer is a solution of the fermentation product, which includes plants, animals, and humans, and contains some elements that help the growth process of cempaka plants. According to Saimi (2014), the process of making liquid organic fertilizer is assisted by microorganisms that degrade complex organic material into simpler form, thus making it more easily absorbed by the roots of plants. The length of time it takes to make liquid organic

fertilizer depends on the material used. Fertilizers contain raw materials necessary for the growth and development of plants (Supartha, 2012).

Giving fertilizer in high doses can inhibit the process of continuation of the element. Research by Machrodania (2015) showed that the administration of liquid organic fertilizer made from banana peels that contains macroelements can provide a complete harvest for plants, so that the growth process of plants will be better and also more maximized.

According to Saimi (2014), the characteristics of the mineral element that should be present in liquid organic fertilizer according to the soil quality standards obtained are sodium >0.75% in the in the very high category, phosphorus >0.035% highly high category, and potassium >0.06% in the very high category. Based on the results of Machrodania's research, the elements N, P, and K in the organic fertilizer of the cabbage leather are able to provide the nutrients needed by plants.

According to Salfina (2017), the fertilizer supply has a strong influence on the growth of caterpillar crops. The scale of fertilization should also be taken into account. If the fertilizer used is less or more saturated, then it will interfere with the growth process of Jeumpa plants (*Magnolia sp*). It is seen in the treatment of P5 with a concentration of 50% that the growth of pumpkin crops is still not optimal. The factors that influence this are the excess or deficiency of the necessary nutrients.

The growing medium plays an important role in the growth and harvesting of its crops, as well as its habitat as a source of food for its growth. The formation of roots on the steak is an indication of the success of that steak. The environmental factors that influence the success of a steak are the burning medium, temperature, humidity, and light. Genetic factors include the content of food reserves in tissues, the availability of water, plant life, and endogenous hormones in the tissues. The macro element is the element that plants need in relatively large quantities (Zaimah, 2021).

Macro elements are needed in large quantities, consisting of the elements potassium (K), nitrogen (N), calcium (Ca), phosphorus (P), sulfur (S), and magnesium (Mg). Three of these elements are required for the growth of plants: potassium (K), phosphorous (P), and nitrogen (N). Nitrogen is an element required by plants. The parts that require this element are like the leaves, stems, and roots of plants.

The phosphorus element (P) has the function of stimulating the growth of young plant roots or seed roots, can strengthen or strengthen adult plants, and stimulates the development of body parts of generative breeding plants. Furthermore, the potassium element contributes to the formation of proteins and carbohydrates, increases plant resistance to disease, and improves seed and fruit quality. Potassium is abundant in the young cells of plants that are rich in protein; the nuclei of cells do not contain potassium.

The administration of metroxylon sagu rott liquid organic fertilizer on the growth of jeumpa (*Magnolia sp*) has a real effect. Anova tests performed on the observation of the day of growing shoot and the number of shoots, yield significant values, which means that the organic liquid fertilizer of white sagu has a real influence on the development of the Jeumpa plant (*Magnolia sp*). The further test used is the further test of Tukey, which is used to determine the optimal value of any treatment that has a real impact. To determine the optimal

value of each treatment, further testing is required. To determine further testing, it is adjusted to the results of the data analysis that has been performed.

Sangadji's (2008) research in various locations has confirmed the use of sagu waste as a growing medium for white squid mushrooms. The fiber content of sagu waste can provide nutrients for the growth of the needle fruit up to some time after harvest. The fermentation process is expected to alter the chemical tissue structure of the cell wall, dismantle the lignosellulosa bond, and increase protein.

Research conducted by Jalaluddin dkk. (2016) on the on the processing of organic garbage fruit into fertilizer using additional bioactivators and effective microorganisms (EM4). The results show that the longer the fermentation time and the more EM4 volumes used, the higher the N, P, and K values obtained. The best pH is obtained at a 9-day fermentation time with a 40-mL EM4 volume of 6.89. The best N concentration is 2.80% on a 70-mL Em4 volume with a 15-day fermenting time. The K concentration was 0.64% in an EM4 volume of 70 ml with a 15-day fermentation time.

D. CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that:

1. The potential to grow Jeumpa plants is quite good with the administration of liquid organic fertilizer sagu waste covers the parameters the day of growing shoot and the number of shoots.

2. Liquid organic fertilizer Sagu waste with concentrations of P3 and P4 has a real influence on the growth of the day of growing shoot and the number of shoots of Jeumpa plants. The most optimal value of all treatments is P3.

F. REFERENCES

Ade, F. Yuliana. (2013). Isolasi dan Identifikasi Jamur-Jamur Pendegradasi Amilosa pada Empelur Tanaman Sagu (*Metroxylon sagu rott*). *Jurnal Ilmiah Edu Research*. 2 (1), 27-28. https://e-journal.upp.ac.id/index.php/EDU/article/view/120

Anonim. (2010). Pupuk daun. Penebar Swadaya.

Apriliani, A. K., Pamungkasari, E. P., & Randita, A. B. (2019). Hubungan antara persepsi lingkungan belajar klinis dengan pilihan karir pada mahasiswa clerkship fakultas kedokteran universitas sebelas maret. *Jurnal pendidikan kedokteran indonesia* , *8* (1), 31. Https://doi.org/10.22146/jpki.44870

Banu, JR, Kaliappan, S., & Beck, D. (2006). Pengolahan air limbah sagu menggunakan reactoranaerobhibrid. *Jurnal Penelitian Kualitas Air Kanada* , *41* (1), 56 62. https://doi.org/10.2166/wqrj.2006.006

Badan Pusat Statistik Propinsi Papua. BSNI. 2004. Spesifikasi Kopos dari Sampah Organik Domestik. Online. https://sni.bsn.go.id. Accessed on 19 September 2015. Flach, M. 1983. The Sago Palm: Domestications, Explotation and Products. FAO, United Nations, Rome.

Dwicaksono, M.R.B., B. Suharti & L.D. Susanawati. (2013). Pengaruh penambahan effective microorganisme pada limbah cair industri perikanan terhadap kulitas pupuk cair organik. *Jurnal Sumberdaya Perairan,* 1 (2), 23-26. https://jsal.ub.ac.id/index.php/jsal/article/view/99/95

Hadisuwito, S. (2012). Membuat pupuk organik cair. Agromedia Pustaka.

Haryanto, & Pangloli. (1992). Budidaya tanaman dan pengelohan sagu. Kanisius.

La Teng, P.N. & Sutanto, S. (2010). Utilization of sago cake as a basic material for single cell protein (sep) production. *Journal of Plantantion Base Industry*. 5 (2), 77- 83.

Lingga, P & Marsono. (2002). Petunjuk penggunaan pupuk. Penebar Swadaya.

Maninggir, F., Warouw, V. R. C, & Sinolungan, M. T. (2019). Pengaruh pemberian pupuk kompos berbahan dasar ampas sagu terhadap pertumbuhan vegetatif tanaman jagung (*zea mays l.) In Cocos* 1 (2). https://doi.org/10.35791/cocos.v1i2.23424

Pitojo. (1994). Bunga Kutil. Kanisius.

Pracaya. (2007). Kol alias kubis. PT. Penebar Swadaya.

Raja S., & Ravindranadh K. (2014). A complete profile on Magnolia champaca - traditional uses, pharmacological activities and phytoconstituents. *IJPRS,* 3(2), 496-504. https:/ijprs.com/article/a-complete-profile-on-Magnolia-champaca-traditional-uses-pharmacological-activities-and-phytoconstituents/

Sangadji, I., Parakksi, A., Wiryawan, KG, & Haryanto, B. (2008). Perubahan Nilai Nutrisi Ampas Sagu selam pada Fase Pertumbuhan Jamur Tiram Putih (Pleurotus ostreatus) yang berbeda. *Jurnal Ilmu Ternak* , *8* (1). https://doi.org/10.24198/jit.v8i1.209

Siswati, ND, Theodorus, H., & S, PWE (2009). KAJIAN PENAMBAHAN mikroorganisme efektif (EM4) PADA PROSES DEKOMPOSISI LIMBAH PADAT INDUSTRI KERTAS. *BUANA SAINS* , *9* (1), 63–68. https://doi.org/10.33366/bs.v9i1.225

Supartono. (2014). Ekstraksi Minyak Kenanga Untuk Pembuatan Skin Lotion Penolak Serangga. *Jurnal MIPA*. 12 (1), 4-9. http://journal.unnes.ac.id/nju/index.php/JM

Zaimah, F., & Prihastanti, E. (2012). Uji Penggunaan Kompos Limbah Sagu terhadap Pertumbuhan Tanaman Strawberry (Fragaria vesca L) di Desa Plajan Kab. Jepara. *Buletin Anatomi Dan Fisiologi Dh Sellula* , *12* (1), 18–28. https://doi.org/10.14710/baf.v12i1.476