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The Effect of Monosodium Glutamate (MSG) and Rice Washing Water as Liquid Fertilizer on *Ipomea reptans* L. Poir Plant Height

Dwi Nur Rikhma Sari¹, Septarini Dian Anitasari^{2*}, Zulfa Nur Hakiki³, Meilita Faridatus Solehah⁴

*Corresponding Author: Septarini Dian Anitasari

Email Corresponding Author: septarinidian87@gmail.com

¹²³⁴Program Studi Biologi (Fakultas Sains dan Teknologi, Universitas PGRI Argopuro Jember)

ABSTRAK

Tanaman angkung Darat (*Ipomea reptans* L. Poir) merupakan salah satu tanaman hortikultura yang mengandung gizi tinggi dan sangat digemari oleh kalangan masyarakat. Monosodium Glutamat (MSG) merupakan garam natrium yang sangat penting dalam pertumbuhan vegetative dan generative tanaman. Air cucian beras merupakan salah satu limbah domestic yang jarang dimanfaatkan dan memiliki kandungan sangat baik untuk pertumbuhan tanaman sebagai pupuk cair organic. Penelitian ini disusun berdasarkan Rancangan Acak Kelompok (RAK) dengan perlakuan konsentrasi MSG yang dikombinasikan dengan air cucian beras yaitu perlakuan I (MSG 5 gram + Air Cucian beras 200 mL) dan perlakuan II (MSG 5 gram + Air Cucian beras 200 mL) yang dilakukan pengulangan sebanyak 3 kali. Parameter yang diamati dalam penelitian ini yaitu pertumbuhan tinggi tanaman *Ipomea reptans* L.Poir. Pemberian MSG yang dikombinasikan dengan air cucian beras terbaik yang dapat meningkatkan pertumbuhan tinggi tanaman *Ipomea reptans* yaitu MSG 7,5 gram + Air Cucian Beras 200 mL yang terlihat dengan tinggi tanaman sebesar 33 cm (usia 6 minggu).

Kata kunci: MSG, Air Cucian Beras, Tinggi Tanaman, *Ipomea reptans* L. Poir

ABSTRACT

The *Ipomea reptans* L. Poir plant is a horticultural plant that contains high nutrition and is very popular among the public. Monosodium Glutamate (MSG) is a sodium salt which is very important in the vegetative and generative growth of plants. Rice washing water is one of the domestic wastes that is rarely used and has very good properties for plant growth as an organic liquid fertilizer. This research was prepared based on a Randomized Block Design (RAK) with treatment of MSG concentration combined with rice washing water, namely treatment I (MSG 5 grams + 200 mL rice washing water) and treatment II (MSG 5 grams + 200 mL rice washing water) were carried out repetition 3 times. The parameters observed in this research were the height growth of *Ipomea reptans* L.Poir plants. Giving MSG combined with rice washing water is the best way to increase the height growth of *Ipomea reptans* plants, namely MSG 7.5 grams + 200 mL Rice Washing Water which can be seen with a plant height of 33 cm (6 weeks).

Key Words: MSG, Rice Washing Water, Plant Height, *Ipomea reptans* L. Poir

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Corresponding Author*
Septarini Dian Anitasari
E-mail:
septarinidian87@gmail.com
om
No. HP/WA: 085338123232

I. INTRODUCTION

Water spinach is a type of vegetable that grows annually, has a short growth

time and is popular with the public. Apart from that, kale plants also have good nutritional content such as iron, vitamin B, vitamin A, vitamin C, protein content and high fiber content (Edi and Bobihoe 2014).

The *Ipomea reptanas* plant is a type of plant that belongs to the **family: Convolvulaceae**, the same as other types of plants, namely *Ipomoea Aquatic* Forsk (Water Water Spinach), *Ipomoea crassiculatus* (Forest Water Spinach) (Suratman *et al.*, 2000). *Ipomoea reptans* is a type of vegetable that has quite high economic value and is widely consumed by Indonesian people in various food menus (Rukmana 1994). The advantages of *Ipomea reptanas* include that it is resistant to several environmental conditions, very easy to maintain, and has a very short harvest time (Suratman *et al.*, 2000).

The nutritional content of *Ipomea reptanas* includes fat, protein, carbohydrates, calcium, phosphorus, iron, potassium, several vitamins, and can cure several hemorrhoids/constipation (Sawasemaria, 2012). According to other research, *Ipomea reptanas* also contains vitamin A, vitamin C, iron, calcium, potassium and phosphorus (Sofiari, 2009).

The *Ipomea reptanas* plant has good nutritional content and is important for health, so water spinach production needs to be increased in quality and quantity. Plant growth and production of *Ipomea reptanas* condition of the environment where it grows. One effort to regulate this environment is by adding fertilizer for growth (Higa and Wididana, 1991). The implementation of fertilization in the field is often a problem in cultivating *Ipomea reptanas* (Samandi *et al.*, (1969); Abidin *et al.* (1991)).

By increasing the growth of the *Ipomea reptanas* plant, production results increase (Gardner, 1991), one of which is by providing fertilizer which is very

effective in increasing the growth and productivity of a plant, one of which is by providing organic fertilizer which is safe for the community and the environment.

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Organic fertilizer, also known as biological fertilizer, is microbes that are applied to the soil. The microbes contained in biological fertilizer are very important for increasing the availability of P in the soil (Jumadil, 2013). Apart from being a source of nutrients and energy for microbial activity in the soil, organic fertilizer also has advantages, namely that it can improve the physical, chemical and biological fertility of the soil (Hartatik, 2006).

Monosodium Glutamate (MSG) is in crystal form, soluble in water, and white in color. MSG is the sodium salt of glutamic acid (Food Standards Australia New Zealand, 2018), which can accelerate growth (Ana, 2015). Several elements that are very important in growth include sodium (Na) which is needed to help the

vegetative and generative growth of plants.

Rice washing water is one of the domestic wastes that is rarely used (Kusumo, 2019), even though it contains good ingredients for plant growth as liquid fertilizer (Millawati Lalla, 2018). Based on the results of other research, it also shows a good influence on the potential of rice washing water as a supplement for oil palm seeds (Zistalia *et al.*, 2018).

Based on this background, it is necessary to conduct research on the combination of MSG and rice washing water as a liquid organic fertilizer in increasing the growth of *Ipomea reptanas*.

II. METHODOLOGY

This research is experimental research, namely the provision of liquid organic fertilizer containing MSG and Rice Washing Water. This research was conducted at the Biology Laboratory, University of PGRI Argopuro Jember, in June 2023.

Tools and Material

The tools used are sprayer, baglog, measuring cup, ruler, marker, spatula, bucket, sickle, stirrer and hoe.

The materials used in this research were *Ipomea reptanas* seeds, soil, MSG and rice washing water.

Procedure Research

This research used a Randomized Group Design (RGD) consisting of 3 treatments which were repeated 3 times, where each treatment consisted of 2 polybags.

I: Control (Without Treatment)

II: MSG 5 grams + Rice Washing Water 200 mL

III: MSG 7.5 grams + Rice Washing Water 200 mL

Seed Preparation

Seeds are one of the factors that determine the success of cultivating a plant. Commercially, the plant density is 50,000 plants/ha of seed. For the planting method by spreading seeds, the seeds required are (5-10) kg/H (Hidayat, 2011).

Planting and Maintenance

Planting in this study was carried out in the morning. The seeds of the *Ipomea reptanas* plant are planted in prepared polybags. Plant seeds are inserted into the soil in polybags with holes made in each of them. Seeds that are 1 week old are selected to obtain the best growing plants. Maintenance is carried out by sprinkling water in the morning or evening to maintain the humidity of the media and weeding.

Application of MSG and Rice Washing Water

MSG and Rice Washing Water are given when the kale plants are 1 week old, where MSG and rice washing water are sprinkled around the stem according to the dosage for each stiffener in each polybag.

Growth Observation and Analysis

The parameter observed was the height growth of *Ipomea reptans* water spinach plants. Analysis was carried out using the Anova (5%) and continued with the Duncans test.

III. RESULTS AND DISCUSSION

Plant height growth shows the results of the Normality and Homogeneity tests. The results of statistical analysis using the ANOVA test (5% level) showed that the treatment of MSG combined with rice washing water showed significant results on the height growth of *Ipomea reptanas* plants (sig. 0.00) (Table 1). Based on the results of plant height measurements and analysis, it shows that the treatment of giving MSG combined with rice washing water was highest in

treatment II (MSG 7.5 grams + 200 ml rice washing water), namely 32.67 ± 1.03^c .

Table 1. Anova analysis

ANOVA					
Plant Height Growth					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	56,333	2	28,167	26,134	,000
Within Groups	16,167	15	1,078		
Total	72,500	17			

Table 2. Averages of Plant Height Growth

Treatment	Averages
Control	28.33 ± 1.03^a
MSG 5 gram + Rice Washing Water 200 mL	30.50 ± 1.04^b
MSG 7.5 gram + Rice Washing Water 200 mL	32.67 ± 1.03^c



Figure 1. Plant Growth of *Ipomea reptanas*

Figure 2 shows that giving 7.5 grams of MSG added to 200 mL of rice washing water showed better plant growth from week to week (for 6 weeks) compared to giving 5 grams of MSG combined with 200 mL of rice washing water and control treatment. And at the end of the observation, namely at 6 weeks of age, the treatment of giving MSG with a combination of rice water washing showed higher results compared to the control. This shows that MSG and rice washing water have an effect on the high vegetative growth of *Ipomea reptanas*.

MSG (Monosodium Glutamate) contains nutrients, namely 7.5% nitrogen, which plays an important role in

increasing plant vegetative growth, one of which is plant height. The element nitrogen is the main nutrient for plant growth, which is generally needed for the formation or growth of vegetative parts of plants such as leaves, stems and roots (Agustina, 1990). Nitrogen is the macro nutrient that plants need most and the nitrogen element plays a very important role in the vegetative phase of plants (Jumin, 2002).

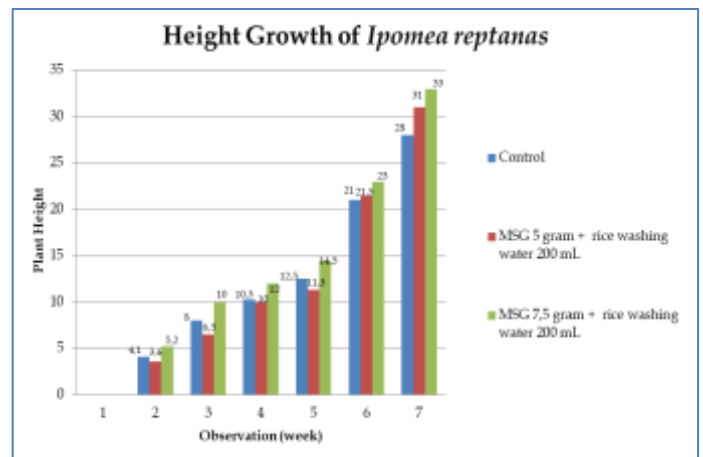


Figure 2. Height Growth of *Ipomea reptanas* for 6 weeks.

The availability of sufficient nutrients in plants by administering Monosodium Glutamate (MSG) can also increase the number of cells in plants so that they can increase the fresh weight of plants. These nutrients also increase the photosynthesis process of plants, causing photosynthesis to also increase and be translocated to other organs (Anas *et al.*, 1978).

MSG containing the elements C, H, O, N, Na is needed for the growth of the *Ipomea reptanas* plant. The benefit of the N element content is to increase plant vegetative growth, namely the number of leaves and plant leaf area. In some plants, sodium functions functionally in stomatal physiology and chlorophyll synthesis, therefore enhancing photosynthetic activities for plant growth (Wakeel *et al.*,

2011). This is supported by research by Novi (2016), giving MSG a different effect on the vegetative growth of *Brassica rapa* L. plants including plant height, number of leaves and leaf length when compared to the control. This is in accordance with the opinion of Pratiwi and Garsetiasih (2007), MSG contains the element N, where N is the element most plants need to form proteins, fats and various other organic compounds in plants.

Research by Firmansyah (2017) states that the elements N, P, K also influence plant height, stem diameter, number of productive branches, number of leaves, and harvest yields, so that MSG affects the growth and yield of flowering cabbage plants. This is also in line with research by Purnami (2014) which states that providing sufficient amounts of nutrients will increase the genetic potential of plants such as the shape, size and weight of the organs produced.

Providing rice washing water in this research also has an important role in the availability of plant nutrients. The availability of nutrients for plants depends on the type and amount of nutrients in the soil according to plant growth. Buckman and Brady (1982). In addition, plants can fulfill their life cycle by using nutrients. The nutrient content contained in rice washing water can stimulate the growth of roots, stems and leaves (Wulandari, 2012).

Rice washing water is given regularly every 2 (two) days and watered little by little into the planting medium evenly, thought to be absorbed slowly by the plant roots, so that the plant's nutritional needs during the vegetative growth period are met. Another thing that causes plant growth to show very good symptoms is that the rice washing water provided is thought to be maximally absorbed by the plants, because the research took place in the summer so the

risk of losing nutrients contained in rice washing water mixed with rainwater does not occur.

Leonardo's research (2009) shows that the concentration of rice washing water affects the number of leaves and height of eggplant and tomato plants where a rice washing water concentration of 100% gives the largest average and is significantly different from a rice washing water concentration of 0%, 25%, 50% and 75%. Likewise with the research results

Based on research results from Istiqomah (2012), rice washing water has an effect on the growth of tomato and eggplant plants and has the most effective influence on the height and number of leaves of tomato and eggplant plants. Istiqomah (2010), also stated that the concentration of brown rice washing water showed a very real influence on the plant height and number of leaves of celery plants.

Wardiah *et al.*, (2014) stated that the provision of rice washing waste water had a significant effect on the height of water spinach plants at the ages of 10 and 20 HST. This is also in line with research by Rosmarkam *et al.*, (2002) which also stated that waste water from rice washing can meet the nutrient needs of plants so that it can support plant metabolic processes and have a good influence on plant growth.

IV. CONCLUSION

Giving MSG combined with rice washing water is the best way to increase the height growth of *Ipomea reptans* plants, namely MSG 7.5 grams + 200 mL Rice Washing Water which can be seen with a plant height of $32,67 \pm 1,03^{\circ}$ (6 weeks).

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