

## UTILIZATION OF RICE AND COCONUT WATER WASTE TO ACCELERATE THE GROWTH OF *SYZYGIVM MYRTIFOLIUM* (ROXB) WALP SEEDLINGS ON SEDIMENT MEDIA

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### ABSTRACT

*Rice water and coconut water is a liquid waste produced by households, markets and food industries. Sediment is a collection of mud that settles on the bottom of the body of water. Syzygium myrtifolium (Roxb) Walp is an ornamental plant with newly emerging leaf buds on the top of a bright red top. The aims of this research is to know the effect of rice water and coconut water waste toward the growth of Syzygium myrtifolium (Roxb) Walp on sediment media. Three month old of Syzygium myrtifolium (Roxb) Walp seedlings are grown on sediment media. The treatments were coconut water waste; rice water waste and water. Each waste of 150 ml is splashed on Syzygium myrtifolium (Roxb) Walp seedlings in the morning. Results of sediment analysis contained 40.6% of clay, 47.8% of sand, total N of 0.35%, P of 5.04mgkg<sup>-1</sup> and K of 1.05 me/100g. The coconut water waste contains total N of 0.017%; P of 7.6mgL<sup>-1</sup>, K of 0.018me/100mL and auxin and cytokinin. Rice water waste contains total N of 0.011%; P of 15.30mgL<sup>-1</sup>; K of 0.03me/mL and B1 Vitamine. Results of this study show high growth ranging from 11.6 to 15.1 cm, Stem diameter of 1,1 to 1.8mm, leaves number of 26 to 45 strand and root length of 9.0cm to 11,0cm for 3 months on sedimentary media. This study concludes that the utilization of coconut water waste accelerate the growth of Syzygium myrtifolium (Roxb) Walp seedlings on sediment media.*

**Keywords:** Rice water waste, coconut water waste, growth, sediment

### INTRODUCTION

Rice water and coconut water is a liquid wastes produced by households, markets and food industries. Rice water waste, high volume rice washing results, are generally discarded not utilized, whereas they contain nutrients that can be used as fertilizer. Citra et.al., (2011), the water waste of milk is milky white, it means that the protein and B1 vitamine found in rice are also eroded. Indirectly protein and B1 vitamine are contained in rice water waste. B1 Vitamine has a role in the metabolism of plants in terms of converting carbohydrates into energy to move the activity in the plant. While the waste of coconut water, some are utilizing for the food industry but most are discarded. Jayanegara (2010), the coconut water waste contains growth hormone: auksin and cytokines that are known to trigger plant growth. Kiswanto (2004), the coconut water waste contains N, P, K, Fe, Ca nutriens and the natural hormones: auksin and cytokinin.

*Syzygium myrtifolium* (Roxb) Walp is a type of ornamental plant belonging to the family myrtaceae. This plant known by the name of red buds because new leaf buds on the shoots are red. This plant is a popular of ornamental plant in Indonesia. Roseli et.al., (2012), *Syzygium myrtifolium* (Roxb.) Walp is an ornamental plant species grown also in malaysia. This plant should be often cut in order to add to the beauty of shoots. Slamet (2016), the seedlings media is generally made of topsoil material mixed with organic material. The use

of topsoil as a seedling media material is still the main alternative but if taken excessively can have a negative impact on the surrounding soil ecosystems. To meet the needs of seeds in the amount of 1 billion so required a lot of topsoil. If it uses about 50% of the topsoil then the soil will be eroded by about 5 million m<sup>3</sup>. Thus is investigated for the use of sediment as seedling medium. Sediment is a collection of mud that settles on the bottom of the body of water. Sediments containing clay, sand and organic material. This research was conducted to reduce the sediment causing siltation of drainage and utilizing the waste of coconut water and rice water waste as nutrition of seedling media. The objectives of this research is to know the effect of coconut water waste and rice water waste toward the acceleration growth of *Syzygium myrtifolium* (Roxb) Walp seedling on sediment media.

## MATERIALS AND METHODS

The research was conducted in experimental field of campus unhas baraya for 7 months, Makassar City. Materials and tools used are seed of *Syzygium myrtifolium* (Roxb) Walp, rice water waste, coconut water waste, sediment, soil spoon, plastics container and polybag. This study used a complete randomized design with 3 treatments. The treatments were rice water waste (AA); coconut water waste(BB) and water (CC). Each treatment consists of 5 units of *Syzygium myrtifolium* (Roxb) Walp seedlings.

The implementation of the research started from germination of *Syzygium myrtifolium* (Roxb) Walp on germinating media in plastic containers. The germinating media is made from a mixture of topsoil and organic matter. While the seedling media is only the sediment from panampu drainage at campus baraya unhas. The seedling media is inserted in polybag size of 20x15x15cm<sup>3</sup>. Three month old of *Syzygium myrtifolium* (Roxb) Walp seedlings are planted in the sediments media. Watering is done every day using of rice water waste, coconut water waste and water. Each treatment was tested as much as 150 ml in the morning per plant seed. Cultivation of *Syzygium myrtifolium* (Roxb) Walp is done for 3 months. The parameters observed were plant height, leaf number, stem diameter and root length. To know the real difference between treatments then tested continued using Duncan's Multiple Range Test (DMRT) at the 95% significance level.

## RESULTS AND DISCUSSION

The growth of plant is influenced by 2 factors, namely external and internal factors. External factors that influence, among others, light, air, water and growing media (soil). While the internal factors derived from the plant itself (genetic factors). Both factors are very influential on the process of plant growth and interconnected with each other, if one factor is not available for plants or its availability is not in a balanced state it will cause plant growth is disrupted and can even cause the plant to die (Nurkhasanah, et.al., 2013).

Table 1. *The content of coconut water and rice water waste*

Substances	Coconut water waste	Rice water waste
Protein (%)	0.2	0.019
Nitrogen (%)	0.017	0.011
Phosfor (mgL <sup>-1</sup> )	7.6	15.30
Potassium me/100mL	0.018	0.03
Vitamine	-	B1
Growth Hormone (mgL <sup>-1</sup> )	Auksin 0.09, cytokinin 4.7	-

Factors of growth media are including the availability of nutrients. The availability of nutrients in the seedling media can be derived from the materials used or the use of fertilizers.

The results of sediment analysis in this study obtained of clay of 40.6%, sand of 47.8%, total N of 0.35%, P of 5, 04 mg kg<sup>-1</sup> and K of 1.05 me/100g and others of 11%. While coconut water waste and rice water waste contain the above substances in Table 1.

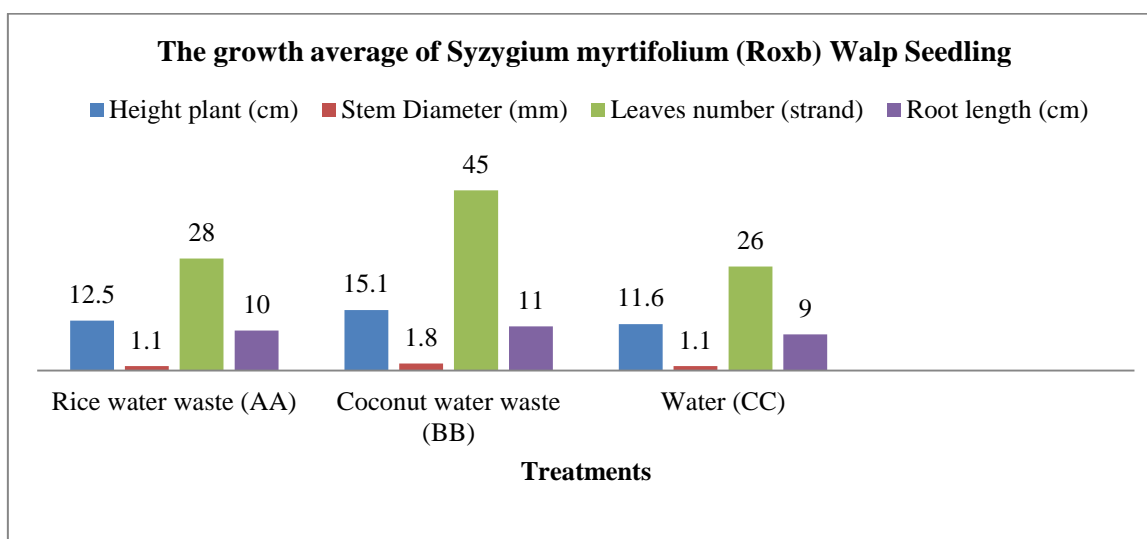
*Syzygium myrtifolium* (Roxb) Walp seedlings is grown on sedimentary media given with coconut water waste; rice water waste and water. However, the growth in 5 units of *Syzygium myrtifolium* (Roxb) Walp seedlings given with coconut water waste is better than rice water waste and water. The results of statistical analysis showed that the growth of *Syzygium myrtifolium* (Roxb) Walp on the sediment media that watered by the waste of coconut water was significantly different. The growth of *Syzygium myrtifolium* (Roxb) Walp seedlings average is height of 15.1 cm, the stem diameter of 1.8mm, the number of leaves of 45 strands and the root length of 11.1 cm on the sediment media which watered the waste of coconut water waste. Yusnida (2016), the coconut water waste contains N, P, K and growth hormone of auxin and cytokines. Setiawati et.al., (2010), the coconut water contains growth regulators such as auksin and cytokines that can stimulate the growth of plant seeds.

Route et.al., (2006), auxin is capable of stimulating protein synthesis in plant tissues that can lead to increased permeability of cell walls, thus stimulating cell division and elongation that will affect high growth. Stem elongation occurs because of the process of cleavage, elongation and enlargement of new cells that occur in apical meristem and stem segment, which causes the plant to grow taller. Cytokinin serves to stimulate protein synthesis, induce synthesis and chloroplast abundance, causing differentiation in shoot and root meristem tissues, contributing to leaf formation. Widiastutik (2014), the use of auksin and cytokinin in the growing medium causes more leaves. Zulkarnain (2007), auxin and cytokines are two types of plant growth regulators that are often used to induce morphogenetic. Route et.al., (2006), cytokines are often used in conjunction with auxin to induce plant roots. Lan et.al., (2009), auxin synergized with cytokines is important in the regulation of cell division and stimulates leaf growth, so the number of leaves increases. The number of leaves is closely related to the process of photosynthesis and plant metabolism, and the absorption of nutrients, because the leaves are the main organ of the process of photosynthesis.

The waste of rice water also accelerated the growth of *Syzygium myrtifolium* (Roxb) Walp seedlings compared to only water. The result of rice water waste analysis is contains of nutrients N, P, K and B1 Vitamine. Utilization of coconut water waste and rice water waste increases nutrients in sediment media but differs in encouraging the growth of *Syzygium myrtifolium* (Roxb) Walp seedlings. The growth of *Syzygium myrtifolium* (Roxb) Walp seedlings average is height of 12.5 cm, the stem diameter of 1.1mm, the number of leaves of 28 strands and the root length of 10.0 cm on the sediment media which watered the waste of rice water (Figure 1). Adrianto (2007), waste of rice water can stimulate growth of plant roots of Adenium. This is because the waste of rice water contains vitamin B1 that serves to stimulate root growth. Raw water waste has an effect on the increase of leaf number and height of plant. One of the waste water content of rice is phosphorus which is a macro nutrient that is needed by plants.

The results of observation growth on seedling media showed that *Syzygium myrtifolium* (Roxb) Walp too a long time for germination and development seed. Proliferation of *Syzygium myrtifolium* (Roxb) Walp that use the seeds is old but the result if planted in the field strong and sturdy. The results of this study show high growth ranging from 11.6 to 15.1 cm for 3 months on sedimentary media (Figure 1, 2). Raharjo, (2013), *Syzygium myrtifolium* (Roxb) Walp produce a height of only of 5-8 cm for 3 months. After being transferred to the seedling media, the high growth reached of 11.5-17.2 cm. Deselina et.al., (2015), *Syzygium*

*myrtifolium* (Roxb) Walp Seedlings are good to be moved to the field at least have a height of 20 cm.



**Figure 1.** The growth average of *S. myrtifolium* (Roxb) Walp seedlings on sediment media



**Figure 2.** Performance

## CONCLUSIONS

The research concludes that the utilization of coconut water waste further accelerate the growth of *Syzygium myrtifolium* (Roxb) Walp seedlings on sedimentary media of pannampu drainage.

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