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Effect of local microorganisms (LOM) and growing media on growth of guava (*Psidium guajava* L.) at nursery stage

Effect of local microorganisms (LOM) and growing media on growth of guava (*Psidium guajava* L.) at nursery stage

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Abstract. Guava is a fruit that trade internationally. One of the problems in Indonesia is preparing the plant for a seedling. This research investigated the effect of local microorganisms and growing media on Guava's growth at the nursery stage. The experiment was conducted from June to August 2020, at the experimental site of agriculture faculty, University of Lampung. The design used was a Complete Randomized Design (CRD) with two factors: growing media and local microorganisms (LOM). Growing media consisting of 2 types, M1: combination soil and rice husk, M2: combination soil and baglog waste. Local microorganisms consisting of 4 types, P1: local microorganisms from EM4, P2: local microorganisms from rice fermentation, P3: local microorganisms from oil palm empty bunches fermentation, P3: local microorganisms from fruit and vegetable fermentation. The results showed that the treatment combination of local microorganismss and growing media did not show the dominant pattern. Growing media combination of soil and rice husk was better than a combination of soil and baglog waste to support Guava's growth. Local microorganisms from fruit and vegetable fermentation promote the high value on the growth of Guava.
Keywords: guava, local microorganisms, nursery stage, plant growth.

1. Introduction

Guava (*Psidium gujava* L.), the "*Apple of the tropics*" belongs to the family Myrtaceae. It is suitable for tropical and subtropical climate. It is one of the important species that can tolerate a wide range of soil and climatic conditions [1–3]. The guava tree is the most economically important crop in the genus Psidium (Myrtaceae). The guava fruit has high vitamin C content, expressive percentages of sugar, vitamin A and B, iron, phosphorus and calcium, and is both consumed in natural and used in the industry for the production of juices, sweets and derivatives. The species is native to Mexico and Central America, being cultivated in all tropical and subtropical regions of the world [4]. India is the main producer of guava in the world along with other countries important in the production of guava such as China, Thailand, Pakistan, Mexico, Indonesia, Brazil, and Bangladesh[5].

In 2016, Indonesian guava production recorded 206 985 tons, and a decline was recorded in 2018 with production of 200 495 tons of fruits [6]. There is need to improve production of guava fruit in Indonesia so as to meet the increasing demand stemming from the increasing population growth and the increasing awareness of healthy lifestyles which is recommending daily consumption of fruits at a rate of 150 g per day [7, 8].

Amongst the wide range of guava varieties, 'kristal' guava is the prominent fruit in Indonesia. The variety was introduced to Indonesia by the Taiwan Technical Mission, and it is mainly cultivated in Bogor [9]. The cultivation of the variety has since spread over both, low and high altitude, orchard, and back yard. 'Kristal' guava fruit is highly preferred to other Indonesian fruits due to its delicious crunchy taste, seedless and nutritious content, i.e., rich in antioxidants, natural fiber, and vitamin C [10, 11]. These properties give 'kristal' guava high potential to substitute the imported subtropical fruits, such as, pears and apples. The estimated cost of importing fruits was predicted to be IDR 6.9 trillion in 2018, creating a big market opportunity for domestic guava farmers to improve guava production and penetrate into the local market to replace fruit imports [7].

Previous studies have reported improvement of guava production through the pruning approach [12], strangulation approach [13], and studies on flowering and fruiting rhythms of guava. However, there are limited studies in regard to the quality of seedling of guava tree. Nusrsery is important stage to prepare the seedling plant in good quality. Growing media is key to support the plant growth optimum. Futhermore, In Indonesia organic waste be big problem in society. Where the organic waste have potential to be organic fertilizer to support plant growth. The aims of this study is to investigate the effect of growing media and biofertilizer from local organismen that found from organic waste fermentation.

2. Research Method

This research was conducted in experimental field Faculty of Agriculture, University of Lampung, Indonesia. The research began from June to Augus 2020. The materials used in this study were Crystal variety of Guava. There are several treatments that were applied in this research there are growing media and local microorganisms (LOM). Growing media consisting of 2 types, M1: combination soil and rice husk, M2: combination soil and baglog waste. Local microorganisms consisting of 4 types, P1: local microorganisms from EM4, P2: local microorganisms from rice fermentation, P3: local microorganisms from oil palm empty bunches fermentation, P3: local microorganisms from fruit and vegetable fermentation. This research was conducted using a Complete Randomized Design (CRD) which was arranged factorially 2 x 4 treatments and 3 replications resulted in 32 experimental units. In this study, it was using non-test research instrument types, namely observation and documentation. In this study, using one-way ANOVA analysis and the least significant difference test (LSD).

3. Results and Discussion

This study was designed using a Complete Randomized Design (CRD) with 32 plants were given treatments. In research activities, the data collection process was carried out every 4 weeks after the treatment. The variables observed in this study were increasing in plant height and stem diameter.

Based on the observations' results, it was shown that the treatment of planting media and local microorganisms did not affect increasing plant height. The highest increase in plant height was found in the M1P1 (combination soil with rice husk and EM 4) and M2P4 (combination soil with baglog waste and fruit and vegetable fermentation) treatments, namely 23.6 cm and 23.25 cm. Furthermore, the combination treatment of growing media and local microorganisms did not affect the increase in stem diameter.

The treatment of growing media (Figure 2 and 5) showed different results in increasing plant height and increasing stem diameter. At 4 weeks after the treatment, the increase in plant height in the combined growing media of soil and rice husk (M1) was 1.23 higher than that of the growing media from a combination of soil and baglog (M2). At 8 weeks after the treatment, the increasing plant height in the combined growing media of soil and rice husk (M1) was 1.24 higher than that of the plant media resulting from a combination of soil and baglog (M2). This results is in line with the previous research that the combination of soil and husk growing media is higher than the growing media from the soil on the variables of plant height and stem diameter in *Aquilaria malaccensis* Lamk. in the nursery [14]. A good composite growing media for the growth of Trembesi (*Samanea saman*) seedlings is soil + rice

husk (50% + 50%) which has a significant effect on root dry weight, shoot dry weight, root length and seed quality index [15].

This is because rice husks can improve soil properties compared to mushroom baglog waste it's completely decomposed. Where rice husks can improve the ability to hold water and sufficient aeration so that plant roots can grow well and can absorb nutrients maximally. In addition, the nutrient content of rice husks such as pH 6.91 (neutral), Nitrogen 1.17% (high), 0.08% phosphorus, 0.19% potassium, 19.95% C-organic (high) [15]. If it breaks down, it can increase the nutrient content that can be absorbed so that the plant grows well. The particles of organic matter constitute the pore space which functions as a source of water and air, as well as space for roots to penetrate. The more pore space will be able to expand the root system and the roots can more easily absorb nutrients and water in the soil, but the less pore space will hamper root development [16,17]. This characteristic is very important for seed roots because it is closely related to physical properties, chemistry and biology in plant roots (rhizosphere) [18].

Local microorganisms treatment affects increasing plant height and stem diameter. Based on Figure 3, the local microorganisms from fruit and vegetable fermentation (P4) treatment resulted in the highest increase in plant height, namely 11.97 cm at 4 weeks after treatment and 20.83 cm at 8 weeks after planting. While the effect of local microorganisms on stem diameter did not show a consistent pattern, however, the local microorganisms treatment from fruit and vegetable fermentation (P4) resulted in a high value in increasing stem diameter.

The results of the research show that the application of local microorganisms (MOL) of bananas and papayas with a dose of 75 cc L^{-1} of water has a significant effect on vegetative growth in sweet potato plants[19, 20]. Furthermore, Giving MOL of tomato waste and coconut water waste has an effect on increasing the growth and productivity of chili plants [21].

From the results of this study it was known that the local microorganisms from fruit and vegetable fermentation (P4) resulted in a good increase in height and stem diameter due to the good content of local microorganisms from fruit and vegetable fermentation (P4) such as beneficial bacteria content and also nutrient content. which can be absorbed by plants. The microorganisms contained in the LOM fermentation process from vegetable waste are three bacterial genera, namely the genus *Obesumbacterium*, *Megasphaera* and *Synthropococcus* and one type of fungus identified, namely *Aspergillus sp*. Cellulolytic bacteria produce enzymes that can hydrolyze cellulose glucoside bonds and cellobiose dimers, several types of bacteria included in cellulolytic bacteria, including *Syntrophococcus, sucromutans, and Ruminicoccus* species [22]. The LOM quality of vegetable waste in terms of physical parameters, namely odor and color, showed good results. While the chemical parameters are testing pH (3.75), organic matter (2.29%), C (1.33%), total N (0.08%), total P2O5 (0.04%) and total K2O (0.10%), and C / N ratio. (16.63%) [14].

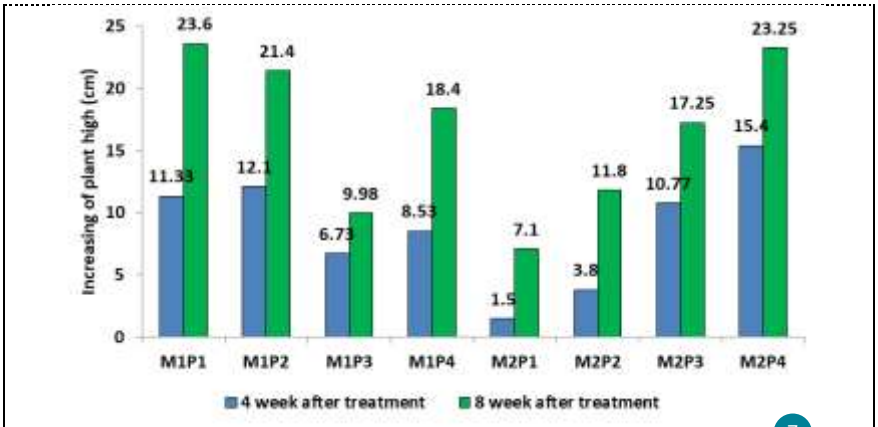
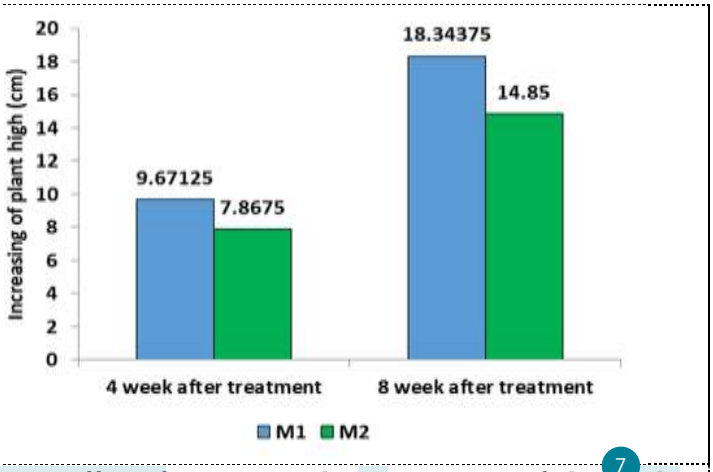


Figure 1. Effect of treatment combination on increasing of plant high.



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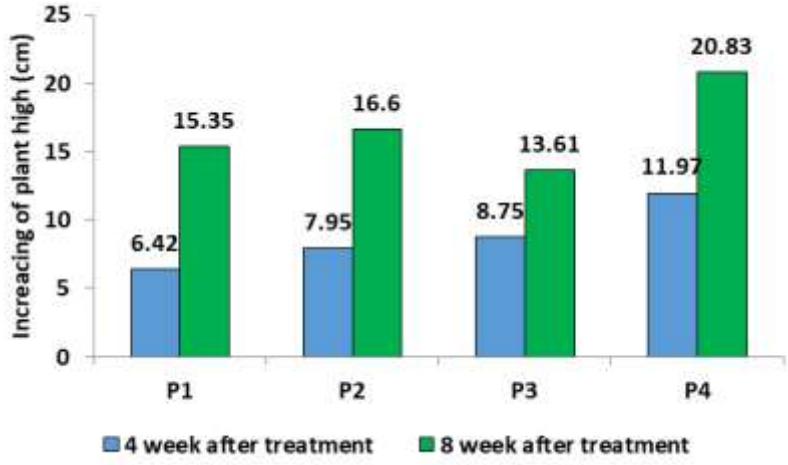

Figure 3. Effect of local microorganisms on increasing of plant high.

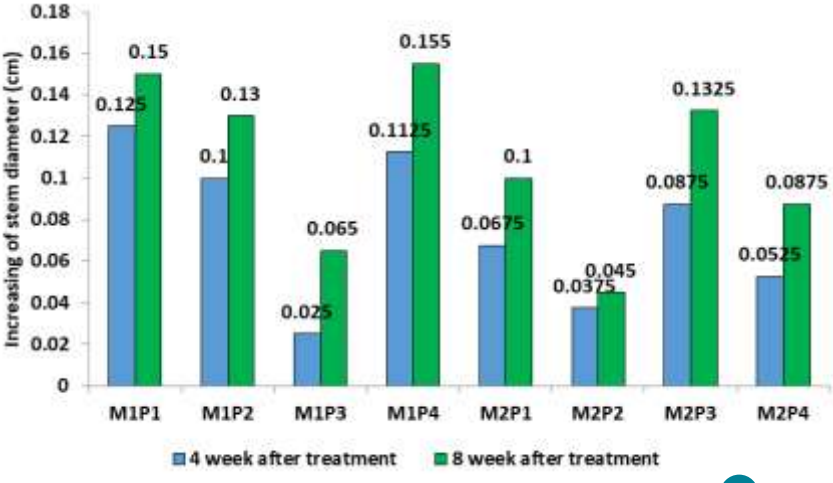

Figure 4. Effect of treatment combination on increasing of stem diameter.

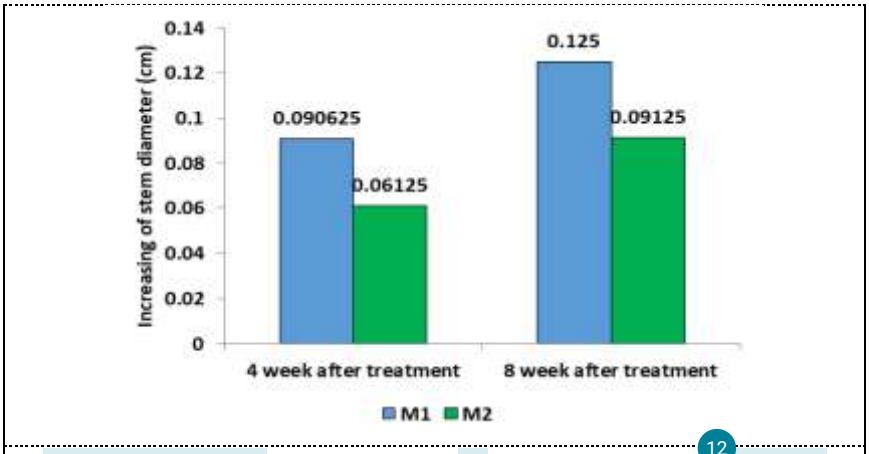

Figure 5. Effect of growing media on increasing of stem diameter.

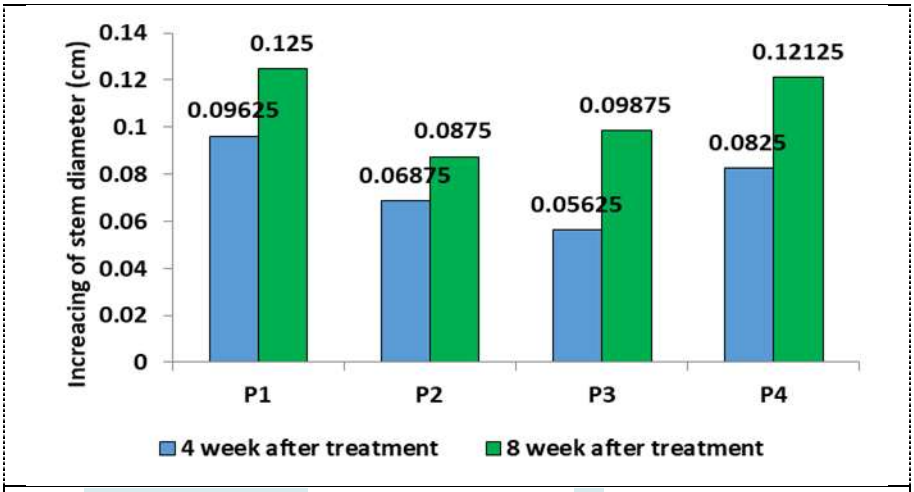

Figure 6. Effect of local microorganisms on increasing of stem.

4. Conclusions

Based on the research results, it can be concluded that that the treatment combination of local microorganisms and growing media does not show the dominant pattern. Growing media combination of soil and rice husk is better than a combination of soil and baglog waste to support Guava's growth because can increase the water holding capacity and aeration. Local microorganismss from fruit and vegetable fermentation promote the high value on the growth of Guava.

References

[1] Sujin G S, Muraleedharan A, Kumar S and Markandayan A 2020 Effect of pgr's on root and shoot parameters of hard wood cuttings in GUAVA (Psidium Guajava L.) CV. Lucknow-49 *Plant Arch.* **20** 3741–6

[2] Rahmat A, Khoiru Zaki M, Effendi I, Mutolib A, Yanfika H and Listiana I 2019 Effect of global climate change on air temperature and precipitation in six cities in Gifu Prefecture, Japan *Journal of Physics: Conference Series* vol 1155 (Institute of Physics Publishing)

[3] Murniati K and Mutolib A The impact of climate change on the household food security of upland rice farmers in Sidomulyo, Lampung Province, Indonesia

[4] da Silva W P, de Farias Aires J E, de Castro D S, Pereira da Silva e Silva C M D and Gomes J P 2014 Numerical description of guava osmotic dehydration including shrinkage and variable effective mass diffusivity *LWT - Food Sci. Technol.* **59** 859–66

[5] de Queiroz D L, Wrege M S, Künast T B S, Garrastazu M C and Burckhardt D 2018 Potential distribution of the guava psyllid Triozoida limbata (Hemiptera, Psylloidea), today and in global climate change scenarios *Turkish J. Zool.* **42** 330–336
[6] BPS 2018 *Statistik Tanaman Buah-buahan dan Sayuran Tahunan Indonesia 2017* (Jakarta: Badan Pusat Statistik)
[7] Musyarofah N, Susanto S, Aziz S A, Suketi K and Dadang D 2020 The diversity of ' k ristal ' guava (Psidium guajava) fruit quality in response to different altitudes and cultural practices *Biodiversitas* **21** 3310–3316
[8] Omayio D G, Abong G O, Okoth M W, Gachuiri C K and Ombe A W M 2019 Current Status of Guava (Psidium Guajava L .) Production , Utilization , Processing and Preservation in Kenya : A Review *Curr. Agric. Res. J.* **7** 318–331
[9] Pertanian K 2015 *Buku Lapang Jambu 'Kristal'* (Jakarta, Indonesia.: Direktorat Jenderal Hortikultura, Jakarta, Indonesia.)
[10] Jiménez-Escrig A, Rincón M, Pulido R and Saura-Calixto F 2001 Guava fruit (Psidium guajava L.) as a new source of antioxidant dietary fiber *J. Agric. Food Chem.* **49** 5489–5493
[11] Guntarti A and Hutami E N 2019 Validation and Vitamin C Testing in Crystal Guava (Psidium guajava L.) With Variations of Origin With the HPLC Method (High Performance Liquid Chromatography) *Int. J. Chem.* **11** 52–59
[12] Widyastuti R D, Susanto S, Melati M and Kurniawati A 2019 Effect of Pruning Time on Flower Regulation of Guava (Psidium Guajava) *J. Phys. Conf. Ser.* **1155** 1–6
[13] Susanto S and Melati M 2019 Pengaturan Pembungaan Tanaman Jambu Biji (Psidium Guajava l .) ' Kristal ' melalui Aplikasi Waktu Strangulasi yang Berbeda *J. Pengkaj. dan Pengemb. Teknol. Pertanian,* **22** 243–250
[14] Indrajaya A R and Suhartini S 2018 Uji kualitas dan efektivitas poc dari mol limbah sayuran terhadap pertumbuhan dan produktivitas sawi *J. Prodi Biol.* **7** 579–589
[15] Sofyan S E, Riniarti M and Duryat D 2014 Pemanfaatan Limbah Teh, Sekam Padi, Dan Arang Sekam Sebagai Media Tumbuh Bibit Trembesi (Samanea saman) *J. Syilva Lestari* **2** 61–70
[16] Hanafiah K . 2007 *Dasar-dasar Ilmu Tanah* (Jakarta: Raja Grafindo Persada)
[17] Kasam K, Iresha M F, Adytama A, Mutolib A, Umam R and Rahmat A 2020 Macronutrient Content of Dry Leaves Compost by Vermicomposting Method *Andalasian Int. J. Agric. Nat. Sci.* **1** 1–8
[18] Putri A I 2008 Pengaruh media organik terhadap indeks mutu bibit cendana (Santalum album). *J. Pemuliaan Tanam. Hutan* **21** 1-8.
[19] Parawansa I N and Ramli R 2014 Mikroorganisme Lokal (Mol) Buah Pisang dan Pepaya Terhadap Pertumbuhan Tanaman Ubi Jalar (Ipomea batatas L) *J. Agrisistem* **10**
[20] Rahmat A, Hamid M A, Zaki M K and Mutolib A 2018 Normalized difference vegetation index (NDVI) in the integration conservation education forest at Wan Abdul Rachman using modis data *Indones. J. Sci. Technol.* **3** 47–52
[21] Tambunan E 2018 Limbah Tomat Dan Limbah Air Kelapa Terhadap Pertumbuhan Tanaman Cabai (Capsicum annum L .) *KLOROFIL* **1** 64–8
[22] Hobson P N and Stewart C . 1997 *The rumen microbial eco-system* (lONDON: Blackie Academic and Professional)

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