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Response of two melon varieties to combination of growing media enriched with baglog waste compost

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Abstract. The purpose of this study was to determine the effect of a growing media combination with addition of baglog waste compost and several livestock manure on the growth and production of two varieties of melon (*Cucumis melo* L.). The research was designed with a Split Plot Design. The main plot was melon variety consisting of Action 434 and Glamor varieties. Subplots were planting media consisting of several combinations, namely soil + baglog waste compost (2:1), soil + baglog waste compost + chicken manure (2:1:1), soil + baglog waste compost + cow manure (2:1:1), and soil + baglog waste compost + goat manure (2:1:1). The results showed that the Glamor variety gave the best leaf area (108.66 cm²). Treatment of soil + baglog waste compost + chicken manure gave the best leaf area (122.01 cm²), highest leaf chlorophyll content (41.77 mg/cm²), longest root length (52.18 cm) and the largest fruit diameter (42.33 cm). The treatment of soil + baglog waste compost + cow manure gave the heaviest fruit weight (0.75 kg) and the highest fruit sweetness level (8.22 °brix).

1. Introduction

Melon (*Cucumis melo* L.) has been a favored fruit due to various advantages such as sweet taste and varied fruit flesh colors, in addition melon has economic value and promising prospects in local fruit markets [1]. Despite, the high demand for melon, often the domestic market is not fulfilled [2,3].

The productivity of fruit plants in the tropics is generally still lower than in the subtropics. Various obstacles in increasing the production of melon plants, melon culture management are related to environmental factors that are not easily controlled, as well as problems of nutrient requirements [4]. One of the problems in melon cultivation is the growing media. According to Poincelot [5], constant availability of water is needed by melons for plant growth and fruit formation. According to Acquaah [6] Nitrogen, Phosphate and Potassium supplies must be consistently available when required for melon growth and development. These conditions could be fulfilled by the use of proper growing media.

Edible mushroom production and cultivation has become popular and more people are interested to develop [7,8]. However there is also a problem i.e. the increasing waste in form of used baglogs out of this edible mushroom culture [9]. The baglogs only usable for one production cycle, since continuous use will reduce the productivity of the mushrooms, hence it is more profitable for farmers to replace it with new baglogs [10]. Baglog compost that are used as a planting medium in melon cultivation is one effort to reduce environmental pollution from mushroom farming that produces these baglog wastes.



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Iskandar [11] found that the use of white oyster mushroom media waste had a very significant effect on the wet weight of mustard plants (*Brassica juncea* L.)

2. Methodology

This study used two types of melon seed varieties namely Action 434 and Sakata Glamor varieties. The advantages of both types of varieties are resistant to changing environmental conditions, resistant to sooty mold, has a sweet taste, thick fruit flesh and adapts well in the lowlands to moderate with an altitude of 50-500 m above sea level and is widely consumed by the public. In addition to mushroom baglog compost, this study also used several types of manure, namely chicken, cow and goat manure. Manure used was a product derived from livestock business waste [12].

The research was carried out in the Experimental Garden (Exfarm) and in the Biofertilizer Laboratory of the Faculty of Agriculture, Hasanuddin University, Makassar. The experiment was designed with a Split plot Design. The main plot was variety (V) which consisted of two levels, namely: v1= Variety Action 434 and v2= Sakata Glamor variety. The subplots consisted of a composition of planting media (K) consisting of 4 levels, namely: k1= soil + baglog waste compost = 2:1 (v/v), k2= soil + baglog waste compost + chicken manure (v/v), k3= soil + baglog waste compost + cow manure (v/v), k4= soil + baglog waste compost + goat manure (v/v).

Observations consisted of leaf area parameters (cm²), leaf chlorophyll (mg/cm²), root volume (ml), root length (cm), wet root weight (g), oven dry root weight (g), fruit weight (g), fruit thickness (mm), sweetness level (°brix).

3. Result and Discussion

3.1. Leaf observation

3.1.1. Leaf area. Results of analysis of variance showed that the treatment of varieties had a significant effect while the treatment of planting media had a very significant effect on the melon leaf area. The interaction between variety treatments and planting media did not significantly affect the leaf area (table 1).

The results showed that leaf area in the Glamor variety (v2) produced the widest leaf area that was 108.66 cm² and significantly different from the variety of Action 434 (v1) which was 94.33 cm². The leaf chlorophyll content parameters showed that Action 434 (v1) varieties tended to be higher (39.43 mg/cm²) compared to Sakata Glamor (v2) which tended to be lower (39.01 mg/cm²).

The leaf area parameter in the planting media treatment showed that soil + baglog waste compost + chicken manure (k2) produced the highest value of 122.01 cm² which was significantly different from soil + baglog waste compost waste (k1) and soil + baglog waste compost + goat manure (k4) with leaf area of 76.57 cm² and 92.04 cm² respectively, but not significantly different from soil + baglog waste compost + cow manure (k3) which was 115.37 cm².

3.1.2. Leaf chlorophyll content. The results showed that the treatment of varieties did not have a significant effect while the treatment of planting media had a very significant effect on leaf chlorophyll content. The interaction between variety treatment and planting media treatment showed no significant effect (table 1).

For leaf chlorophyll content parameter, soil + baglog waste compost + chicken manure (k2) produced the highest leaf chlorophyll content of 41.77 mg/cm² and was significantly different from soil + baglog waste compost waste (k1) with leaf chlorophyll of 33.77 mg/cm², but was not significantly different from soil + baglog waste compost + cow manure (k3) i.e. 40.71 mg/cm² and soil + baglog waste compost + goat manure (k4) which was 40.74 mg/cm².

Table 1. Average leaf area and leaf chlorophyll content

Treatment	Leaf Observation	
	Leaf area (cm ²)	Leaf chlorophyll content (mg/cm ²)
Varieties (V)		
v1	94.33 ^b	39.43 ^{ns}
v2	108.66 ^a	39.01 ^{ns}
LSD 5%	11.73	5.25
Growing media (K)		
k1	76.57 ^b	33.67 ^b
k2	122.01 ^a	41.77 ^a
k3	115.37 ^a	40.71 ^a
k4	92.04 ^b	40.74 ^a
LSD 5%	21.22	3.98

Note: Numbers followed by the same letter indicates significant difference and letters that are not the same indicates insignificant difference at LSD Test level of 5%.
ns=insignificant

The results shown on table 1 might relate with adequate nutrient uptake during photosynthesis in melon plants, such as nutrients N and P which can affect leaf area. The Nitrogen and Phosphate also play a role in photosynthesis which contribute to photosynthates production which will be transported to the leaves during the cell enlargement stage [13]. Nitrogen is an essential element for plants for assisting the process of photosynthesis which is then used to form new cells, cell elongation, and thickening of tissue during the vegetative growth phase [14].

3.2. Root observation

3.2.1. Root Length. The results showed that the treatment of varieties had no significant effect while the treatment of planting media had a very significant effect on root length. The interaction between variety treatments and planting media did not significantly affect the root length parameters (table 2).

The results show that soil + baglog waste compost + chicken manure (k2) produced the highest root length of 52.18 cm which was significantly different from the soil + baglog waste compost waste (k1) and soil + baglog waste compost + cow manure (k3) with root length respectively 42.00 cm and 34.30 cm but not significantly different from soil + baglog waste compost + goat manure (k4) which was 44.71 cm.

3.2.2. Root Volume. The results showed that the treatment of varieties and planting media had no significant effect. While the interaction between variety treatment and planting media treatment did not significantly affect root volume parameters (table 2).

The results showed that the treatment of soil + baglog waste compost + chicken manure (k2) tended to produce the highest root volume of 19.83 g, while the soil + baglog waste compost waste (k1) tended to produce the lowest root volume of 18.27 g

3.2.3. Root weight. Results showed that the treatment of varieties and planting media did not have a significant effect on the weight of roots. The interaction between variety treatments and planting media showed no significant effect as well (table 2).

The results showed that soil + baglog waste compost + chicken manure (k2) tended to produce the highest wet root weight of 7.48 g, whereas soil + baglog waste compost waste (k1) tended to produce the lowest root wet weight which was 6.00 g.

3.2.4. *Weight of dried root.* The results showed that the treatment of varieties and planting media had no significant effect on the dried root weight. The interaction between variety treatment and planting media treatment also showed no significant effect on oven dried root weight parameters (table 2).

The treatment of soil + baglog waste compost + cow manure (k3) tended to produce the highest oven dried root weight which was 1.66 g and the soil + baglog waste compost + goat manure (k4) tended produced the lowest oven dried root weight of 1.21 g.

Table 2. Average root length, root volume, root weight, and dried root weight.

Treatment	Root observation			
	Root length (cm)	Root volume (ml)	Root weight (g)	Dried root weight (g)
Varieties (V)				
v1	41.73 ^{ns}	17.85 ^{ns}	5.65 ^{ns}	1.04 ^{ns}
v2	44.37 ^{ns}	19.81 ^{ns}	7.68 ^{ns}	1.75 ^{ns}
LSD 5%	21.96	11.84	1.92	0.84
Growing media (K)				
k1	42.00 ^{bc}	18.10 ^{ns}	6.00 ^{ns}	1.28 ^{ns}
k2	52.18 ^a	19.83 ^{ns}	7.48 ^{ns}	1.45 ^{ns}
k3	44.71 ^{ab}	19.12 ^{ns}	6.91 ^{ns}	1.66 ^{ns}
k4	34.30 ^c	18.27 ^{ns}	6.27 ^{ns}	1.21 ^{ns}
SD 5%	8.00	3.97	2.47	0.43

Note: Numbers followed by the same letter indicates significant difference and letters that are not the same indicates insignificant difference at LSD Test level of 5%.
ns=insignificant

3.3. Fruit Observation

Results of observation on melon fruit consisted of flesh thickness, fruit weight, fruit circumference and levels of sweetness. These results are presented in table 3.

Table 3. Average fruit flesh thickness, fruit weight, fruit circumference, and sweetness level.

Treatment	Fruit Observation			
	Fruit thickness (mm)	Fruit weight (kg)	Fruit circumference (cm)	Level of sweetness (°brix)
Varieties (V)				
v1	21.83 ^{ns}	0.68 ^{ns}	39.95 ^{ns}	7.09 ^{ns}
v2	22.27 ^{ns}	0.63 ^{ns}	40.21 ^{ns}	7.13 ^{ns}
LSD 5%	7.77	7.03	1.85	1.92
Growing media (K)				
k1	20.24 ^{ns}	0.52 ^c	35.22 ^b	5.76 ^b
k2	22.78 ^{ns}	0.72 ^{ab}	42.33 ^a	8.04 ^{ab}
k3	22.50 ^{ns}	0.75 ^a	41.86 ^a	8.22 ^a
k4	22.69 ^{ns}	0.63 ^{bc}	40.91 ^{ab}	6.43 ^b
SD 5%	5.02	0.12	2.90	1.44

Note: Numbers followed by the same letter indicates significant difference and letters that are not the same indicates insignificant difference at LSD Test level of 5%.
ns=insignificant

The results of analysis of variance showed that the variety treatment did not significantly affect the fruit on all parameters, while the treatment of the growing media did not significantly affect the

thickness of the fruit flesh. The interaction between the varieties and the planting media **did not significantly affect the thickness of the** fruit flesh (table 3).

The results showed that the treatment of the Glamor variety (v2) tended to produce the highest thickness of fruit flesh that was 22.27 mm, the highest fruit diameter of 40.21 cm, and the highest sweetness level was 7.13 °brix. While the Action 434 (v1) gave the lowest fruit flesh thickness which was 21.83 mm, and the lowest fruit sweetness level of 7.09 °brix. The Action 434 (v1) variety tended to produce the highest fruit weight parameter, which was 0.68 kg, while the Sakata Glamor (v2) tended to produce the lowest fruit weight, which was 0.63 kg.

The treatment of soil + baglog waste compost + chicken manure (k2) tended to produce the highest thickness of fruit flesh that was 22.78 mm while the soil + baglog waste compost waste (k1) tended to produce the lowest fruit flesh thickness that was 20.24 mm.

Fruit weight on soil + baglog waste compost + cow manure (k3) produced the highest fruit weight that was 0.75 kg which was significantly different from soil + baglog waste compost waste (k1) i.e. 0.52 kg and soil + baglog waste compost + goat manure (k4) i.e. 0.63 kg. **Yet it was not significantly different from the treatment of** soil + baglog waste compost + chicken manure (k2) with a fruit weight of 0.72 kg.

For fruit circumference parameter, the soil + baglog waste compost + chicken manure (k2) produced the highest fruit diameter of 42.33 cm which **was significantly different from the treatment of** soil + baglog waste compost waste (k1) and soil + baglog waste compost + goat manure (k4) each produced a fruit diameter of 35.22 cm and 40.91 cm respectively. This however was not significantly different from soil + baglog waste compost + cow manure (k3) with 41.86 cm of fruit diameter.

Parameter of sweetness level of fruit showed that the soil + baglog waste compost + cow manure (k3) produced the highest sweetness level which was 8.20 °brix and it was significantly different from soil + baglog waste compost waste (k1) i.e. 5.80 °brix and soil + baglog waste compost + goat manure (k4) i.e. 6.40 °brix. However it was not significantly different from soil + baglog waste compost + chicken manure (k2) with sweetness level of 8.00 °brix.

3.4. Brief discission

Based on the results of variance the treatment of soil planting media + baglog waste compost + chicken manure gave a very significant effect on the leaf area, leaf chlorophyll content, root length, and fruit diameter. This presumably due to a combination of nutrients between soil, mushroom baglog waste, and chicken manure, where the N nutrients present in both types of organic material are quite high, so that growth and development in plants is better. Lingga [15] described that chicken manure has relatively higher levels of N nutrients than other manure as well as mushroom baglog compost. This nutrient level is strongly influenced by the amount of application. Chicken manure decomposes relatively quickly and has sufficient levels of nutrients as well when compared to the same number of units with other manure [16]. In addition to nutrient factors, melon growth and development are also influenced by soil reaction (pH) of the soil since it is a factor influencing the availability of P for plants [17]. Adequacy of phosphorus nutrients in the form of food reserves on the stem will help stimulate fruit formation [18]. The low availability of element K in plants can reduce fruit quality and production such as sugar content and fruit size. The fruit that is growing is a sugar storage area. Growing fruit requires a lot of nutrients available in the growing media to increase the sugar content in melons [19].

The results on the parameter of fruit weights and fruit sweetness levels showed that the treatment of soil planting media + baglog waste compost + cow manure had very significant effect. This is presumably due to fulfillment of N nutrients required in plants. Based on the laboratory analysis of the mushroom baglog waste compost and cow manure, both contained high N contents.

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4. Conclusion

Based on the results of research, there was no interaction between variety treatment and planting media treatment. Treatment of soil + baglog waste compost + chicken manure showed the best results on leaf area (122.01 cm), leaf chlorophyll content (41.77 mg/cm²), fruit diameter (42.33 cm) and the longest root length (51.18 cm). Whereas the treatment of soil + baglog waste compost + cow manure showed the best results on fruit weight (0.75 kg) and sweetness level of the melon fruit (8.22 °brix). Sakata Glamor variety showed good results on the observation parameters of leaf area, namely 108.66 cm².

References

- [1] Sudiyarto S 2011 Strategi Pemasaran Buah Lokal Jawa Timur *JSEP (Journal Soc. Agric. Econ.* **5** 65–73
- [2] Wijaya R 2015 Respon pertumbuhan dan produksi tanaman melon (*Cucumis melo* L.) terhadap kombinasi biodegradable super absorbent polymer dengan pupuk majemuk NPK di tanah miskin hara *AGRIUM J. Ilmu Pertan.* **17**
- [3] Rasilatu F, Musa N and Pembengo W 2016 Respon Produksi Dua Varietas Tanaman Melon (*Cucumis melo* L.) Terhadap Waktu Pemanjangan Pucuk *Skripsi 1*
- [4] Rohmawati U 2007 Evaluasi Status Unsur Hara Nitrogen, Fosfor dan Kalium dengan Teknik Uji Cepat dan Karakter Morfologi Tanaman Melon (*Cucumis melo* L.). *Skripsi. Univ. Lampung. Bandar Lampung.* 58 Hlm.
- [5] Poincelot R P 2004 *Sustainable horticulture: today and tomorrow*
- [6] Acquaaah G 2015 Conventional plant breeding principles and techniques *Advances in plant breeding strategies: breeding, biotechnology and molecular tools* (Springer) pp 115–58
- [7] Ismulia J, Zikri I and Fauzi T 2019 Analisis Kelayakan Finansial Pada Budidaya Jamur Tiram (*Pleurotus treatus*) Melalui Pemanfaatan Instalasi Kabut di Desa Limpok Aceh Besar *J. Ilm. Mhs. Pertan.* **4** 30–9
- [8] Yulliawati T 2016 *Pasti Untung Dari Budi Daya Jamur: Tiram, Kuping, Merang, dan Champignon* (AgroMedia)
- [9] Kusuma W 2014 *Kandungan Nitrogen (N), Fosfor (P) dan Kalium (K) Limbah baglog jamur tiram (Pleurotus ostreatus) dan jamur kuping (Auricularia auricula) guna pemanfaatannya sebagai pupuk* (Universitas Hasanuddin)
- [10] Hadi M A 2017 pengaruh pemberian Kompos Limbah Baglog Jamur dan Pupuk Kandang Domba terhadap pertumbuhan dan hasil Kacang Tanah (*Arachis hypogaea* L.) Varietas Domba
- [11] Iskandar I 2017 Pemanfaatan Limbah Media Jamur Tiram Putih sebagai Kompos pada Pertumbuhan Tanaman Sawi (*Brassica Juncea* L.)
- [12] Setiawan B S 2010 Membuat Pupuk Kandang Secara Cepat *Penebar Swadaya. Jakarta* **67**
- [13] Srivastava L M 2002 *Plant growth and development: hormones and environment* (Elsevier)
- [14] Febrian I F 2016 Pengaruh Pupuk Nitrogen terhadap Pertumbuhan dan Produktivitas Tembakau (*Nicotiana tabacum* L.) Varietas Prancak pada Kepadatan Populasi 36000/Ha di Kabupaten Pamekasan, Jawa Timur
- [15] Lingga P 2001 *Petunjuk penggunaan pupuk* (Niaga Swadaya)
- [16] Widowati L R, Widati S, Jaenudin U and Hartatik W 2005 Pengaruh kompos pupuk organik yang diperkaya dengan bahan mineral dan pupuk hayati terhadap sifat-sifat tanah, serapan hara dan produksi sayuran organik *Lap. Proy. Penelit. Progr. Pengemb. Agribisnis, Balai Penelit. Tanah, TA*
- [17] Ardika R, Utami S N H and Purwanto B H 2008 Pengaruh Seresah Dan Takaran Pupuk P Terhadap P Tersedia Dan Serapan P Jagung Pada Tanah Napalan Bangunjiwo Bantul *J. Ilmu Tanah dan Lingkungan.* **8** 114–20
- [18] Kushendarto and P. D H 2009 Pengaruh Pemupukan Fosfor dan Kalium Terhadap Pertumbuhan

- dan Produksi Buah Naga. *Seminar Hasil penelitian dan Pengabdian Masyarakat* (Lampung: Universitas Lampung)
- [19] Pantastico E B 1975 *Postharvest physiology, handling and utilization of tropical and subtropical fruits and vegetables*

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