

## Utilization of Coffee Pod Waste as an Alternative Planting Medium for Anthurium (*Anthurium plowmanii* Scoat.)

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### Article Info

#### Article history:

Received :Feb 13, 2021

Revised :Mar 18, 2021

Accepted :Apr 27, 2021

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#### Keywords:

Coffee Fruit Peel Waste;  
Growing media;  
*Anthurium plowmanii* Scoat.

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### ABSTRACT

This research was conducted with the aim of getting the composition alternative growing media for *Anthurium plowmanii* Scoat. By utilizing the waste coffee fruit skin. The hypothesis proposed is that the composition of various planting media using coffee pod waste provides various growth responses for Anthurium plants. Anthurium (*Anthurium* sp.) is one type of ornamental leaf plant that needs attention to be developed in Indonesia. Fern chopped planting medium has the characteristics of easily binding water, having good aeration and drainage. Meanwhile, bamboo leaf humus media has the characteristics of easily binding and retaining water, contains high levels of nutrients, and has a high cation exchange capacity. Therefore, it is expected that the composition of this planting medium can maintain moisture, fertile, It is porous and has good aeration so it can support the growth of Anthurium plants. However, if the use of this type of planting media is often used, especially chopped ferns, then one day its availability in nature will decrease and it will likely be difficult to obtain. Therefore, efforts are needed to find new alternative media that can provide good growth for Anthurium plants in addition to chopped fern and bamboo leaf humus. The alternative planting media used can come from materials from agricultural waste either in the form of crop residues or crop residues which are widely available and thrown away without any utilization. One of the crop residues that has the potential to be used as a planting medium is coffee pod skin waste. Coffee pod waste contains high levels of Nitrogen and Potassium nutrients. In addition to containing nutrients, coffee pod waste also contains tannin compounds. These compounds can inhibit the growth and development of plants so that when using the coffee berry skin media, a soaking or washing process must be carried out so that it can be used.

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## 1. INTRODUCTION

Anthurium (*Anthurium* sp.) is a type of leaf ornamental plant that needs attention to be developed in Indonesia. This is because many Anthurium plants are found growing in wet tropical forests such as in Indonesia so that these plants can be easily developed in Indonesia. The environment in which it grows is shady, moist, has good drainage, and contains lots of humus from fallen leaves.

Anthurium grows well in the pH range between 6 - 7.5. Therefore, the conditions for growing media for Anthurium plants must be fertile, porous with good drainage and air circulation and able to maintain good humidity. Anthurium plants are very adaptive plants.

Anthurium plants easily grow on tree trunks that have decayed or grown on trees and are epiphytes (Ayutri, 2010). In the tropics, Anthurium plants require a warm environment with a temperature range of 18 - 31 °C. However, the ideal temperature for Anthurium plants to grow well is 25 - 30 °C. Anthurium plants can grow at an altitude of 0 - 1000 m above sea level (above sea level). sea) and grows in shaded areas with light intensity of 40-60% (Anonymous, 2007b).

Anthurium plants have the same parts as other plants such as roots, stems, leaves and flowers. Anthurium roots are very varied and have a relatively large size, namely 0.5 – 0.8 cm with a length of more than 30 cm. Healthy roots are white and grow straight if not obstructed. Anthurium plant roots can be branched. In conditions of nutrient deficiency and media will appear white and spiky roots 3-5 cm long on the stem. When the spiky roots are covered with media, the roots will grow normally. Small roots will accompany the stem and cover the base of the leaves up to a height of 1 m (Anonymous, 2007b).

Cultivation carried out in lowland areas requires a building with a 60-70% paranet roof. For medium plains use 50% paranet shade. Anthurium plant propagation by tissue culture is done to obtain seeds in large quantities. The advantage of this propagation is that the seeds produced will have a uniform shape and size. However, tissue culture propagation must be done in a sterile place (laboratory).

In principle, Anthurium plant propagation by tissue culture is carried out by multiplying buds on solid media containing macro and micro elements whose composition has been determined (Anonymous, 2007b). The alternative planting media used can come from agricultural waste materials either in the form of leftovers. plants or crop residues that are widely available and thrown away without any utilization. One of the crop residues that has the potential to be used as a planting medium is coffee pod skin waste. Coffee pod skin waste is available quite abundantly, especially in coffee plantation centers in Indonesia such as Malang (East Java).

## **2. METHOD**

### **2.1 Types of research**

The study used non-destructive observations including: when leaves appeared, the number of leaves increased, the length and width of the leaves increased, the increase in leaf area (LD), leaf chlorophyll and destructive observations consisted of: number of roots and root length.

### **2.2 Research variable.**

This study used the independent and dependent variables where the independent variable was the arturium plant and the dependent variable was the effect of coffee compost and bamboo leaves on the growth of the arturium plant.

### **2.3 Research design**

The study was conducted using RAK (Randomized Block Design) which consisted of 8 treatments and 3 replications. The composition of the planting medium used is:

( M0 ) humus of bamboo leaves + chopped fern ( 1 : 1 = v/v )

( M1 ) bamboo leaf humus + dried coffee pod skin ( 1 : 1 = v/v )

( M2 ) bamboo leaf humus + coffee pod husk compost + coffee berry husk charcoal ( 1 : 1 : 1 = v/v/v )

( M3 ) humus of bamboo leaves + coffee pod husk compost ( 1 : 1 = v/v )

( M4 ) compost of coffee pods + chopped ferns ( 1 : 1 = v/v )

( M5 ) coffee pod shell compost + coffee pod husk charcoal + fern scraps ( 1 : 1 : 1 = v/v/v )

( M6 ) coffee pod husk compost + coffee berry husk charcoal ( 1 : 1 = v/v )

( M7 ) coffee pod skin compost + dry coffee pod skin ( 1 : 1 = v/v ).

### **2.4 Sampling location**

This study used 8 variables with treatments where each treatment was repeated 3 times and for each repetition there were 4 plants so that the total number was 96 plants.

### **2.5 Time and Place of Research.**

The research was conducted at the Venus Orchid Nursery in Tegalweru Village, Dau District, Malang Regency, East Java. Altitude ± 750 m above sea level with temperatures between 25° C -

28° C. The research was conducted from December 2009 to March 2010. The research was conducted from February 2009 to May 2009. Implementation

## 2.6 Tools and materials

The tools used are a ruler with a length of 60 cm, a glass measuring, thermohygrometer, paranet 50%, digital camera, analytical balance, yellow trap sprayer, and tools for analyzing the physical and chemical properties of the planting medium.

The materials used are the seeds of the *Anthurium plowmanii* Scoat plant. 6 months old from planting seeds, pots with a diameter of 15 cm, fungicide (Dithane), molluscicide (Siputox), insecticide (Decis), Dekastar Plus fertilizer, and planting medium in the form of humus from bamboo leaves, chopped fern, dried coffee fruit skins, charcoal fruit skins coffee, coffee fruit skin compost.

## 2.7 Research procedure

Preparation of the research site was carried out 2 weeks before planting and preparation of planting material was carried out 2 weeks before. *Anthurium* plant seeds before being planted to the research site, must be adapted to suit the surrounding environmental conditions. This planting material is selected in order to obtain good planting material, supply of planting media and implementation of planting followed by safe maintenance. The maintenance process starts with watering, feeding and pest control and observation.

## 2.8 Data analysis.

Data obtained from observations were tested using the F test with an error rate of 5%. If the data shows a significant difference, continue with the BNT test with an error rate of 5%.

## 3. RESULTS AND DISCUSSION

### 3.1 Research result

The results of the research included the parameters of the physical properties of the growing media, the chemical properties of the growing media, and plant growth such as the appearance of leaves, increase in number of leaves, increase in leaf length, increase in leaf width, increase in leaf area, leaf chlorophyll, number of roots, and root length.

#### 3.1.1 Analysis of Planting Media Based on Physical Properties of Media.

The results of the analysis of the physical properties of the planting medium showed that the composition of the growing media for *Anthurium* plants which had a high bulk density with low porosity and low water holding capacity was the composition of the growing media compost of coffee pod husks + coffee pod charcoal (1:1). While the composition of the other planting media has a low bulk density with high porosity, and high water holding capacity.

**Table 1.** Results of Analysis of the Physical Properties of *Anthurium* Planting Media.

Growing media	Fill Weight (g.cm-3)	Porosity(%)	Water Resistance
Bamboo Leaf Humus + Fern Count (1:1)	) 0.22	59.98	0.60
Dried Coffee Fruit Peel (1:1)	0.23	59,44	0.59
Bamboo Leaf Humus + Coffee Fruit Peel Compost + Coffee Fruit Peel Charcoal (1:1:1)	0.25	53,28	0.53
Bamboo Leaf Humus + Coffee Fruit Peel Compost (1:1)	0.29	62,10	0.62
Coffee Fruit Peel Compost + Fern Count (1:1)	0.25	55,21	0.55
Coffee Fruit Peel Compost + Coffee Fruit Skin Charcoal + Fern Count (1:1:1)	0.25	52,92	0.53
Coffee Fruit Peel Compost + Coffee Fruit Peel Charcoal (1:1)	0.37	43,11	0.43
Coffee Fruit Peel Compost + Dried Coffee Fruit Peel (1:1)	0.30	55,57	0.56
BNT 5%	mr	mr	mr

Note: Physical analysis test of planting media at Soil Physics Laboratory, Department of Soil, Faculty of Agriculture, University of Brawijaya, Malang, 2010.

### 3.1.2 Analysis of Planting Media Based on the Chemical Properties of the Media

The results of the analysis of the chemical properties of the Anthurium planting media showed that coffee pod waste which had been treated differently, namely dried, composted, and charcoal had different percentages of N, P, K accompanied by different media pH. In the dry coffee pod skin and coffee pod compost media, the percentage of N elements was high, namely 1.60% and 1.20%, compared to the coffee pod charcoal media, which was 0.70%. For the percentage of element P, all media have a low percentage. As for the percentage of element K, all media have a high percentage. For the large pH value of the media, coffee pod skin media and coffee pod compost had a moderate pH, namely 6.01 and 6.49. whereas for coffee berry shell charcoal media it has a high pH ie 9.87 which means that the charcoal media from the coffee pods is alkaline.

### 3.1.3 Increase in number, width, length and leaf area.

Based on the results of the analysis of variance on the increase in the number of leaves, it showed that the composition of the planting medium had no significant effect on the increase in the number of leaves at the age of 2 – 6 weeks after planting (weeks after planting) but had a significant effect on the increase in the number of leaves at the age of 8 – 12 weeks after planting and the analysis of variance on the increase in leaf length shows that the composition of the planting medium has a significant effect on the increase in leaf length at 4 – 12 weeks after planting (weeks after planting) but the observational data on the increase in leaf width shows that the composition of the planting medium has no significant effect on the increase in leaf width at age 4 mst (week after planting) but had a significant effect on the increase in leaf width aged 6–12 mst (week after planting) and the analysis of variance on the observed data on leaf area increase The composition of the planting medium had no significant effect on the increase in leaf area at 4 weeks after planting (week after planting) but had a significant effect on the increase in leaf area at 6–12 weeks after planting.

### 3.1.4 Leaf Chlorophyll.

Based on the results of analysis of variance on leaf chlorophyll observation data, it was shown that the composition of the media had no significant effect on leaf chlorophyll at the end of the observation at 12 WAP (week after planting).

**Table 2.** Average leaf chlorophyll due to the influence of media composition.

Growing media	Leaf chlorophyll
Bamboo Leaf Humus + Fern Count (1:1)	64,48
Dried Coffee Fruit Peel (1:1)	65,12
Bamboo Leaf Humus + Coffee Fruit Peel Compost + Coffee Fruit Peel Charcoal (1:1:1)	62,97
Bamboo Leaf Humus + Coffee Fruit Peel Compost (1:1)	65,07
Coffee Fruit Peel Compost + Fern Count (1:1)	0,62
Coffee Fruit Peel Compost + Coffee Fruit Skin Charcoal + Fern Count (1:1:1)	59,72
Coffee Fruit Peel Compost + Coffee Fruit Peel Charcoal (1:1)	65,43
Coffee Fruit Peel Compost + Dried Coffee Fruit Peel (1:1)	60,82
	64,25

Note: tn shows no significant difference in the 5% BNT test

## 3.2 Discussion

Anthurium plants are found in wet tropical forests close to water sources. The environment where it grows is shady, moist, has good drainage, and contains lots of humus from fallen leaves (Anonymous, 2007b). Therefore, the conditions for growing media for Anthurium plants must be fertile, porous with good drainage and air circulation and able to maintain humidity properly. Good humidity in a planting medium can be maintained if the water holding capacity of a medium is also good.

Good water holding capacity is produced by planting media that has good bulk density so that it also affects its porosity. The results of the analysis of the physical properties of the planting media show that the composition of the planting media compost coffee pod skin + coffee pod

charcoal (1: 1) has a Bulk Density value (0.37 g.cm-3 ) with low porosity (43.11 %) and low water holding capacity (0.43 cm<sup>3</sup> cm-3).

While the composition of other planting media such as bamboo leaf humus + fern scraps (1:1), bamboo leaf humus + dried coffee pod skin (1:1) has a low Bulk Density value (0.22 - 0.23 g.cm- 3 ) with high porosity (59.44 – 59.98 %) and high water holding capacity (0.59 – 0.60 cm<sup>3</sup> cm -3 ). The media composition of bamboo leaf humus + coffee pod skin compost + coffee pod charcoal (1:1:1), bamboo leaf humus + coffee pod skin compost (1:1), coffee pod skin compost + fern scraps (1:1) , coffee pod skin compost + coffee pod skin charcoal + fern scraps (1:1:1), coffee pod skin compost + dried coffee pod skin (1:1) has a fairly low Bulk Density value (0.25 – 0.30 g.cm-3 ) with high porosity and high water holding capacity.

According to Hanafiah (2007), porous soil has a porosity value of  $\geq 50\%$ . Growth is the process of cell division and enlargement which is the result of interactions between internal factors (genetic) and external factors (climate and soil). Planting media as a place to grow plants is also very influential on the growth and development of plants. This rapid and large increase in the number of leaves will be followed by an increase in leaf length, leaf width, and high leaf area. According to Sugito (1999), the presence of sufficient N (Nitrogen) elements, the plant leaves will be more and more and grow wider so as to produce a large leaf area and expand the surface area for the process of photosynthesis. Gardner (1991) states that the element N (Nitrogen) has a significant effect on leaf expansion, especially on leaf width and leaf area.

#### 4. CONCLUSION

Composition of planting media compost coffee pod skin + dried coffee pod skin (1:1) can be used as an alternative planting medium and provides better growth compared to other media compositions and in addition to the composition of planting media compost coffee pod skin + dry coffee pod skin (1: 1), there are other alternative planting media compositions that provide good growth for Anthurium plants, namely coffee pod husk compost + coffee pod charcoal + chopped fern (1:1:1), coffee pod husk compost + fern scraps (1:1), bamboo leaf humus + coffee pod husk compost (1:1), bamboo leaf humus + coffee pod husk compost + coffee pod husk charcoal (1:1:1), bamboo leaf humus + dried coffee pod husks (1:1).

#### ACKNOWLEDGEMENTS

There is a need for further testing on the composition of the growing media of coffee berry skin compost and dried coffee berry skin with a ratio (1:1) to be tested on other types of plants.

#### REFERENCES

- Agoes, S.. 1994. Aneka Jenis Media Tanam dan Penggunaannya. Penebar Swadaya. Jakarta.
- Anonymous. 2000. Pakis pohon. www. Plantamor. Com/ index.php. Diakses 6 Maret 2010
- Anonymous. 2002. Anthurium plowmanii. www.plantamor.com/index.php. Diakses 14 Desember 2009
- Anonymous. 2005. Tannin. www.indobic.or.id/berita\_detail.php?id\_berita=124 Diakses 1 April 2009
- Anonymous. 2006a. Kulit Kopi. www.elearning.unej.ac.id. Diakses 23 Februari 2009.
- Anonymous. 2006b. Statistik Perkebunan Indonesia 2006-2008. Departemen Pertanian Direktorat Jenderal Perkebunan. Jakarta
- Anonymous. 2007a. Bahan Organik. www.kmit.faperta.ugm.ac.id/artikel Diakses 1 April 2009
- Anonymous. 2007b. Anthurium. PT. Trubus Swadaya. Jakarta
- Anonymous. 2007c. Media Tanam untuk Tanaman Hias. PT. Penebar Swadaya. Jakarta
- Anonymous. 2007d. Budidaya Anthurium Gelombang Cinta. www.tabloidgallery.wordpress.com/2007/0.. Diakses 16 Desember 2009
- Anonymous. 2007e. Media Tanam Untuk Tanaman Hias. Penebar Swadaya. Jakarta.
- Anonymous. 2008. Bahan Organik. www.damandiri.or.id/leanisuryaniipbbab2 Diakses 1 April 2009
- Ayutri. 2010. Anthurium plowmanii. www.anthuriumoflove.blogspot.com Diakses 10 Juni 2010.
- Putra, S. E.. 2008. Humus. www.chem-is-try.org/artikel\_kimia/kimia\_pangan/ humus-material-organik-penyubur-tanah/. Diakses 1 April 2009
- Reark, J. B. 1953. Cultivated of The Genus Alocasia in Florida. Florida State horticultural Society. www.fshs.orgProceedingsPassword%20Protected 1953%20Vol.%2066326-331%20(REARK)). Diakses 24 Februari 2009
- Ridwansyah. 2003. Pengolahan Kopi. www.library.usu.ac.id/teker-ridwansyah4 Diakses 23 Februari 2009
- Ruhnayat, A. 2002. Pengaruh Jenis Bahan Organik dan Disis Pupuk N terhadap Pertumbuhan dan Hasil Rimpang Muda Lempuyang. Buletin Tanaman Rempah dan Obat vol. XIII No. 1. CV. Sinar Jaya. Bogor.

- Sudiarto, dan Gusmini. 2004. Pemanfaatan Bahan Organik In Situ Untuk Efisiensi Budidaya Jahe yang berkelanjutan. *Jurnal Litbang Pertanian* 23
- Sugito, Y., Y. Nuraini, E. Nihayati. 1995. Sistem Pertanian Organik. Fakultas Pertanian Universitas Brawijaya. Malang
- Supari. 1999. Seri Praktek Ciputri Hijau Tuntutan Membangun Agribisnis. PT. Elex Media Komputindo. Jakarta.
- Suyoto, B. 2008. Rumah Tangga Peduli Lingkungan. PT. Prima Infosarana Media. Jakarta.
- Trisilawati, O., dan Gusmaini. 1999. Penggunaan Pupuk Organik bagi Pertumbuhan dan Produksi Jahe. *Buletin Gakuryoku*. Hlm. 251 – 257
- Yohana, I.. 2002. Pengaruh Komposisi Media Tanam Terhadap Pertumbuhan dan Hasil Bunga Dua Varietas Tanaman Melati (*Jasminum sambac*) Dalam Pot. Skripsi. Jurusan Budidaya Pertanian Fakultas Pertanian Universitas Brawijaya. Malang
- Yuwono, D. 2007. Kompos. Penebar Swadaya. Jakarta.