

## DAFTAR PUSTAKA

- Achmad & Pratomo, R. (2009). Pengaruh Macam pH dan Penggoyangan Media Terhadap Pertumbuhan Cendawan *Rhizoctonia*. *Jurnal Littri*. Vol. 15(4) : 192-206.
- Agrios, GN. (2005). *Plant Pathology*. Ed ke-5. San Diego: Academic Press.
- Aimon, H., and Satria, A. (2016). Utilitazion of Organic Fertilizer to Increase Paddy Growth and Productivity Using System of Rice Intensification (SRI) Method in Saline Soil. *Journal of Degraded and Mining Lands Management*. Vol. 3(2) : 543-549.
- Alexopoulos CJ, Mims CW, Blackwell M. (1996). *Introductory Mycology*. Ed ke-4. New York: John Wiley & Sons, Inc.
- Aniszewski, T. (2007). *Alkaloids-Secrets of Life*. Elsevier, Oxford.
- Bena, L. M. A. A., & Falah, S. (2017). Aktivitas Antifungi Ekstrak Daun Picung Terhadap Cendawan *Botryodiplodia theobromae* Penyebab Mati Pucuk Bibit Jabon Merah Antifungal Activity of Picung Leaf Extracts Against *Botryodiplodia theobromae* A Dieback Fungus of Jabon Merah Seedling. *Jurnal Silvikultur Tropika*, 8(2) : 110-115.
- Bruneton, J. (1999). *Pharmacognocny, Phytochemistry Medicinal Plants*. Lavoisier Publishing Inc., Paris.
- Buffo, R.A. & Holley, R.A. (2006). *Effects of Food Processing on Disease Agents*. Dalam: Riemann, H.P. & D.O. Cliver. *Foodborne Infections and Intoxications*, Elsevier, Amsterdam.
- Cowan, M.M. (1999). Plant Products as Antimicrobial Agents. *Clinical Microbiology Reviews*, 12(4) : 564-582.
- Cruz, G., Pirila, M., Huuhtanen, M., Carrion, L., Alvarenga, E., & Keiski, R.L. (2012). Production of Activated Carbon From Cocoa (*Theobroma cacao*) Pod Husk. *Journal of Civil Environment Engineering*, Vol. 2(2) : 1-6.
- Departemen Kesehatan RI. (1989). *Materia Medika Indonesia*. Jakarta : Departemen Kesehatan RI.
- Dewi, R. C. (2009). Uji Aktivitas Antijamur Ekstrak Buah Pare Belut (*Trichosanthes anguina* L.). Surakarta: Universitas Sebelas Maret.
- Direktorat Jenderal Perkebunan. (2020). *Produksi Kakao Menurut Provinsi di Indonesia*. Jakarta : Direktorat Jenderal Perkebunan.
- Dwiastuti, ME, Agustina, D & Triasih, U. (2016). Keanekaragaman Hayati Penyakit Busuk Batang Jeruk (*Botryodiplodia theobromae* Pat.) di Jawa Timur. Prosiding Seminar Nasional II Tahun 2016, Kerjasama Prodi Pendidikan Biologi FKIP dengan Pusat Studi Lingkungan dan Kependudukan (PSLK), Universitas Muhammadiyah Malang, Jawa Timur, pp. 94–109.

- Dwiastuti, M. E., Budiarta, G. N. K., & Soesanto, L. (2017). Perkembangan Penyakit Diplodia pada Tiga Isolat *Botryodiplodia theobromae* Path dan Peran Toksin Dalam Menekan Penyakit pada Jeruk (*Citrus* spp.)/Diplodia Disease Development and Toxin of Three Isolates *Botryodiplodia theobromae* Path. on Citrus (*Citrus* spp). *Jurnal Hortikultura*, 27(2) : 231-240.
- Ellis D. (2015). *Lasiodiplodia theobromae*. Adelaide (AUS): University of Adelaide
- Ellis D, Davis S, Alexiou H, Handke R, Bartley R. (2007). *Description of Medical Fungi*. Adelaide: School of Molecular and Biomedical Science University of Adelaide.
- Falah, S., Achmad, A., & Winara, A. (2015). Aktivitas Antifungi Ekstrak Akar Mahoni terhadap Isolat *Botryodiplodia theobromae* Pat. Penyebab Mati Pucuk pada Bibit Jabon (Antifungal Activity of Mahogany Root Extracts against *Botryodiplodia theobromae* Pat. Isolate Causing Dieback on Jabon Seedling). *Jurnal Ilmu dan Teknologi Kayu Tropis*, 13(1) : 1-10.
- Gharnita, Y. S., Lelyana, S., Sugiaman, V. K. (2019). Kadar Hambat Minimum (KHM) Dan Kadar Bunuh Minimum (KBM) Ekstrak Etanol Daun Ketepeng Cina (*Cassia Alata* L.) Terhadap Pertumbuhan *Candida Albicans*. *Sound Of Dentistry e-ISSN 2685-1822*. 4 (1) : 1- 57.
- Harbone, J.B. (1987). *Metode Fitokimia Penuntun Cara Modern Menganalisis Tumbuhan. Edisi 4, terjemahan Kosasih P dan Soediro L*. Bandung : Institut Teknologi Bandung.
- Intiaj A. dan Lee, S. T, (2008). *Antagonistic of Three Trichoderma Species on The Alternaria porri Pathogen of Onion Boltch*. Departement of Biology. University of incheon. Korea.
- Isenring, R. (2010). *Pesticides And The Loss Of Biodiversity, How Intensive Pesticide Use Affects Wildlife Populational And Species Diversity*. Pesticide Action Network, Europe. 26 pp. Development House 56-64 Leonard Street, London EC2A 4LT.
- Iswanto, E.H., U. Susanto, dan A. Jamil. (2016). Perkembangan dan Tantangan Perakitan Varietas Tahan Dalam Pengendalian Wereng Cokelat di Indonesia. *Jurnal Penelitian dan Pengembangan Pertanian*. Vol. 34(4) : 187-193.
- Kardinan, A. (1998). *Pestisida Nabati, Ramuan dan Aplikasi*. Jakarta: Penebar Swadaya.
- Kayaputri, I. L., Sumanti, D. M., Djali, M., Indiarso, R., & Dewi, D. L. (2014). Kajian Fitokimia Ekstrak Kulit Biji Kakao (*Theobroma cacao* L.). *Chimica et Natura Acta*, 2(1).
- Kokate, C.K., Purohit, A.P. and Gokhale, S.B. (2008). *Pharmacognosy*. Maharashtra : Nirali Prakashan.
- Kumalasari, E. dan Sulistyani, N. (2011). Aktivitas Antifungi Ekstrak Etanol Batang Binahong (*Anredera cordifolia* (Tenore) Steen.) terhadap *Candida*

- albicans* serta Skrining Fitokimia. *Jurnal Ilmiah Kefarmasian*. Vol. 1(2) : 59-60.
- Kurian, A. and Sankar, M.A. (2007). *Medicinal Plants* : Vol. 02. Horticulture Science Series. New Delhi : New India Publishing Agency (NIPA).
- Lawalata, V.N. (2012). Rekayasa Proses Ekstraksi Kulit Buah Langsung (*Lansium domesticum* var. langsung) sebagai Bahan Antibakteri dan Antioksidan. [Disertasi]. Bogor (ID): Program pascasarjana, Institut Pertanian Bogor.
- Marhawati, M. (2019). Analisis Karakteristik dan Tingkat Pendapatan Usahatani Jeruk Pamelon di Kabupaten Pangkep. *JEKPEND: Jurnal Ekonomi dan Pendidikan*, Vol.2(2) : 39-44.
- Matsumura, F. (2009). *Toxicology of Insecticides*. New York: Plenum Press.
- Mulyatni. A.S., Budiani. A, & Taniwiryono. D. (2012). Aktivitas Antibakteri Ekstrak Kulit Buah Kakao (*Theobroma cacao L.*) Terhadap *E.colli*, *B.ubtilis*, dan *S.aureus*. *Menara Perkebunan*. Vol 80(2) : 77-84.
- Naufalin, R., Jenie, B.S.R., Kusnandar, F., Sudarwanto, & M., Rukmini, H. (2005). Aktivitas antibakteri ekstrak bunga Kecombrang terhadap bakteri patogen dan perusak pangan. *Jurnal Teknotan dan Industri Pangan*, Vol. 16(2) : 119-125.
- Nurhasanah, Y. S. (2012). Karakterisasi Cendawan *Botryodiplodia theobromae* dan *Rhizoctonia solani* dari Berbagai Tanaman Inang Berdasarkan Morfologi dan Pola RAPD-PCR. *Skripsi*. Fakultas Pertanian Institut Pertanian Bogor. Bogor.
- Nurhayati. (2010). *Senarai Istilah-Istilah Mikologi*. Palembang : Universitas Sriwijaya Press.
- Okigbo RN, Emeka AN. (2010). Biological Control of Rot-inducing Fungi of Water Yam (*Dioscorea alata*) with *Trichoderma harzianum*, *Pseudomonas syringae* and *Pseudomonas chlororaphis*. *Journal of Stored Prod Postharvest Res*. Vol. 1(2):18-23.
- Pascapanen, DB (2010). *Profil Komoditas Jeruk, Direktorat Budidaya dan Pasca Panen Buah*. Direktorat Budidaya dan Pascapanen Buah, Direktorat Jenderal Hortikultura, Kementerian Pertanian.
- Poedjiwidodo, M.S. (1996). *Sambung Samping Kakao*. Jawa Tengah : Trubus Agriwidya.
- Pujiasmanto, B and Widyatmani. (2019). Effect Balance of Bokashi and Inorganis Fertilizer on Growth, Simplicita Yield and Content ff Sinensetin Of Kumis Kucing (*Orthosiphon aristatus* (Blume) Miq.). *Journal of Soil Science and Agroclimatology*. Vol. 16(1) : 13-23.
- Purnamawati, H & Utami, B. (2014). Pemanfaatan Limbah Kulit Buah Kakao (*Theobroma cacao L.*) Sebagai Adsorben Zat Warna *Rhodamin B*. Prosiding Seminar Nasional Fisika dan Pendidikan Fisika Universitas Sebelas Maret. Vol. 5(1) : 12-18. ISSN: 2302-7827.

- Purwitasari, P. (2012). Pengaruh Perendaman Berbagai Konsentrasi Ekstrak Limbah Kulit Buah Kakao (*Theobroma cacao L.*) Sebagai Bahan Pembersih Gigi Tiruan Plat Resin Akrilik Terhadap Pertumbuhan *C.albicans*. *Skripsi*. Fakultas Kedokteran Gigi Universitas Jember, Jember.
- Rachmawaty, R., Mu'nisa, A. M. N. A., & Hasri, H. (2017). Analisis Fitokimia Ekstrak Kulit Buah Kakao (*Theobroma cacao L.*) Sebagai Kandidat Antimikroba. In *Seminar Nasional LP2M UNM* (Vol. 2, No. 1).
- Rusdianto, A.S., Wiyono, A.E., Kurniawati, N.D., dan Rukmasari, D. (2020). Effectiveness Test Of Tobacco Leaves Extract in Resolving Growth of *Colletotrichum gloeosporiodes* and *Lasiodiplodia theobromae*. *Gontor AGROTECH Science Journal*, Vol. 6(3) : 473-488.
- Sartini, Asri R.M., dan Ismail. (2017). Pengaruh Perlakuan Sebelum Pengeringan Sinar Matahari dari Kulit Buah Kakao Terhadap Kadar Komponen Fenolik. *Jurnal Biologi Makassar*. Vol. 2(1):15-20. ISSN:2339-076.
- Semangun, H. (1996). *Pengantar Ilmu Penyakit Tumbuhan*, pp 67-203. Yogyakarta : Gadjah Mada University Press.
- Setiawan, A. I. (1993). *Usaha Pembudidayaan Jeruk Besar*. Yogyakarta : Penebar Swadaya.
- Shah MD, Verma KS, Singh K, Kaur R. (2010). Morphological, pathological and molecular variability in *Botryodiplodia theobromae* (Botryosphaeriaceae) isolates associated with die-back and bark canker of pear trees in Punjab, India. *Gen. Mol. Res* Vol. 9(2): 1217-1228.
- Shanmugam, S., Kumar, T.S. and Selvam, K.P. (2010). *Laboratory Handbook on Biochemistry*. New Delhi : PHI Learning Private Limited.
- Sjam, S., Surapati, U., Rosmana, A., dan Thamrin, S. (2011). Teknologi Pengendalian Hama Dalam Sistem Budidaya Sayuran Organik. *Jurnal Fitomedika*, Vol. 7 (3): 142 – 144.
- Sortino M, Derita M, Svetaz L, Raimondi M, Di Liberto M, Petenatti M, Gupta M, Zacchino S. (2012). The Role of Natural Products in Discovery of New Anti-Infective Agents with Emphasis on Antifungal Compounds. Di dalam: Valdir Cechinel-Filho V, editor. *Plant Bioactives and Drug Discovery Principles, Practice and Perspectives*. Brazil (BR): J Wiley. hlm 205-239.
- Sudibyo,D. (1994). *Petunjuk Praktis Cara Menghitung Jumlah Kerapatan Dan Viabilitas Spora Jamur*. Jawa Timur : Dinas Perkebunan Provinsi Jawa Timur.
- Suherlina, Y., Yaherwandi, Y., & Efendi, S. C. (2020). Sebaran dan Tingkat Serangan Hama Penggerek Buah Kakao (*Conopomorpha cramerella* Snellen) pada Lahan Buka-an Baru di Kabupaten Dharmasraya. *Jurnal Agronida*, Vol.6(1) : 44-54.
- Sulistyowati, E & Wiriyadiputra, S. (2010). *Buku Pintar Budi Daya Kakao, Pusat Penelitian Kopi dan Kakao Indonesia*. Jakarta : Agromedia Pustaka.

- Surjowardoyo, P., Tri E.S., dan Vasco B. (2016). Daya Hambat Dekok Kulit Apel Manalagi (*Malus Sylvestris* Mill) Terhadap Pertumbuhan *Escherichia coli* dan *Streptococcus agalactiae* Penyebab Mastitis Pada Sapi Perah. *Jurnal Ternak Tropika*. Vol. 17, No.1: 11-21
- Susilawati, Y. (2007). *Flavonoid Tanin-Polifenol*. Jatinagor : Universitas Padjadjaran.
- Tarwiyah, F. (2017). *Pengaruh Berbagai Konsentrasi Ekstrak Kulit Buah Kakao (Theobroma cacao L.) Terhadap pertumbuhan bakteri S.mutans Sebagai Bahan Pengayaan Praktikum Mikrobiologi*. Artikel Ilmiah Pendidikan Biologi FKIP Universitas Jambi: 1-9.
- Tengo, N. A., Bialangi, N., dan Suleman, N. (2013). Isolasi dan Karakterisasi Senyawa Alkaloid dari Daun Alpukat (*Persea americana* Mill). *Jurnal Sainstek*, 7(01).
- Triwiratno, A. (2012). *Pengendalian Penyakit Diplodia / Blendok Pada Jeruk (Citrus sp.)*. Jawa Timur : Balai Penelitian Tanaman Jeruk dan Buah Subtropika.
- Twumasi dan Ohene. 2014. The Rot Fungus *Botryodiplodia theobromae* Strains Cross Infect Cocoa, Mango, Banana and Yam With Significant Tissue Damage and Economic Losses. *African Journal Of Agricultural Research*, Vol. 9(6) ; 613 – 619.
- Wahyuni, S., Mukarlina, dan Yanti, A. H. (2014). Aktivitas Antifungi Ekstrak Metanol Daun Buas-Buas (*Premna serratifolia*) terhadap Jamur *Diplodia* sp. pada Jeruk Siam (*Citrus nobilis var. microcarpa*). *Jurnal Protobiont*. Vol. 3(2) : 274-279.
- Wardlaw, C. W. (2014). Observations on the Pycnidium of *Botryodiplodia theobromae*, Pat. *Annals of Botany Journals*. Vol 114: ISSN 1095-8290 – Oxford University Press. Print ISSN 0305-7364, Pp 226-238. Tanggal akses 10 Mei 2014.
- Watanabe T. (2002). *Pictorial Atlas of Soil and Seed Fungi Morphologies of Cultured Fungi and Key to Species*. Ed ke-2. USA: CRC Press.
- Winara, A., & Falah, S. (2014). Influence of Culture Medium and Mahogany Seed Extract on The Growth of *Botryodiplodia* sp. Isolate Causing Dieback on Jabon Seedling. Pengaruh Media Kultur dan Ekstrak Biji Mahoni Terhadap Pertumbuhan Isolat *Botryodiplodia* sp. Penyebab Mati Pucuk. *Jurnal Silvikultur Tropika*, Vol. 5(3) : 137-142. ISSN : 2086-8227.
- Wiyono, S. (2011). *Pembunuh Jeruk Bernama Blendok*. Jakarta : Trubus.

## LAMPIRAN

### Lampiran 1. Observasi Lapangan dan Pengambilan Sampel



(b)



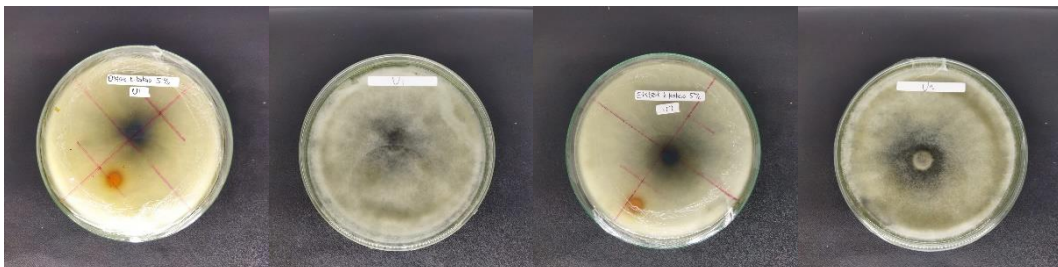
(b)

Keterangan :

- (a) = Pengambilan Sampel Gejala Penyakit Diplodia
- (b) = Pengambilan Sampel Kulit Kakao

### Lampiran 2. Pengujian Pada Media PDA (*Potato Dextrose Agar*)

#### A. Uji Pendahuluan Pada Konsentrasi 5%



(a)

(b)

(c)

(d)



(e)

(f)

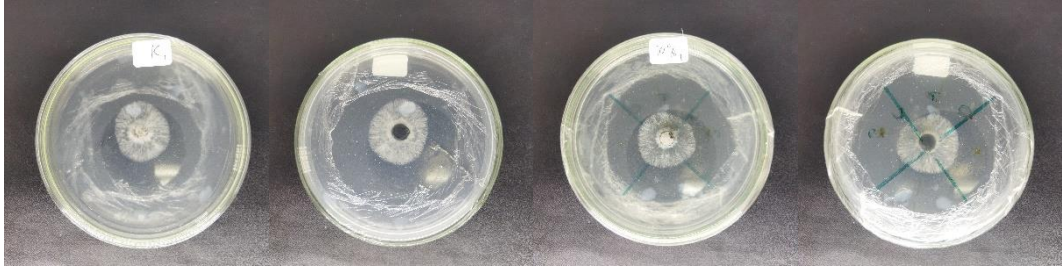
Keterangan :

- Gambar a – b = Ulangan I (belakang-depan)
- Gambar c – d = Ulangan II (belakang-depan)
- Gambar e – f = Ulangan III (belakang-depan)

B. Pengujian Ekstrak Kulit Kakao Pada Media PDA

Dokumentasi Hari Pertama

a) Ulangan I

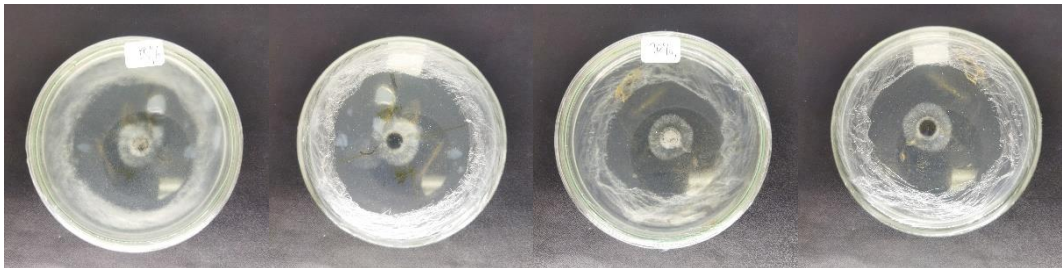


(b)

(b)

(c)

(d)

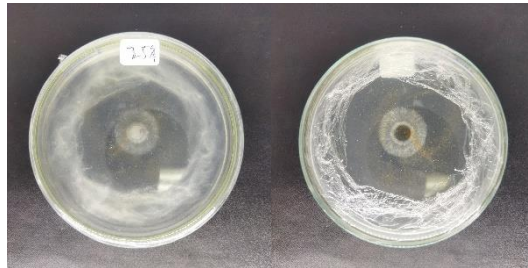


(e)

(f)

(g)

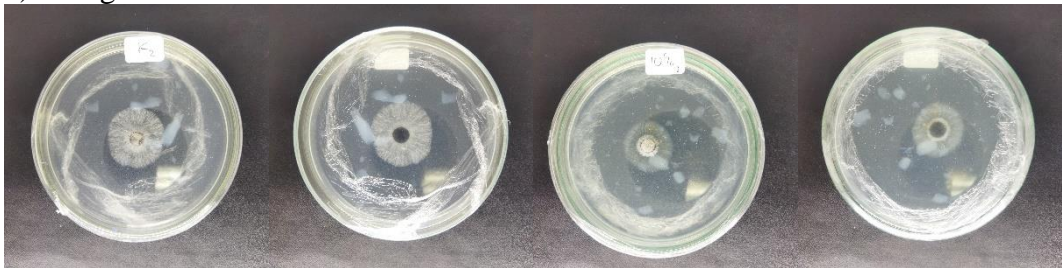
(h)



(i)

(j)

b) Ulangan II

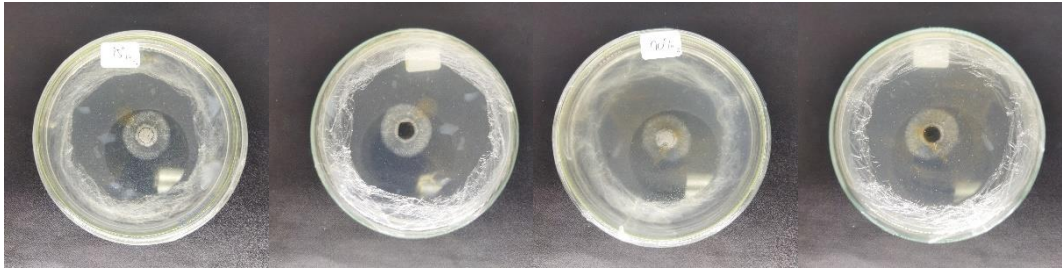


(a)

(b)

(c)

(d)



(e)

(f)

(g)

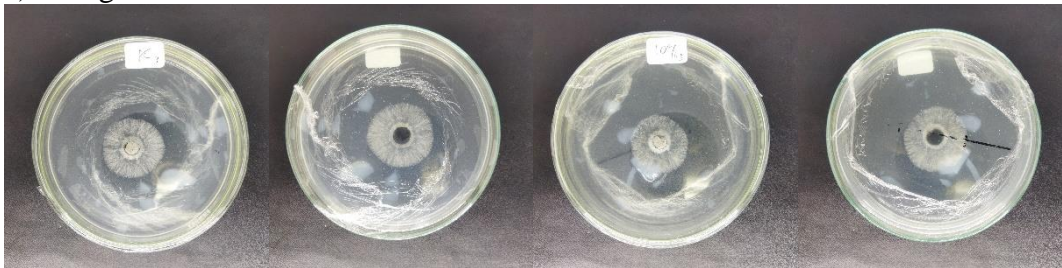
(h)



(i)

(j)

**c) Ulangan III**



(a)

(b)

(c)

(d)

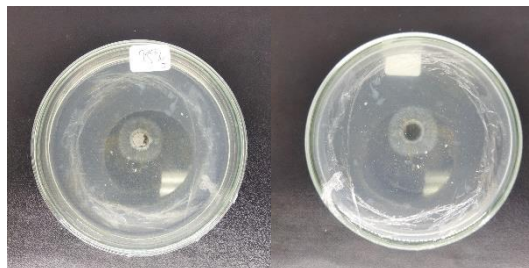


(e)

(f)

(g)

(h)



(i)

(j)



Dokumentasi Hari Kedua

a) Ulangan I

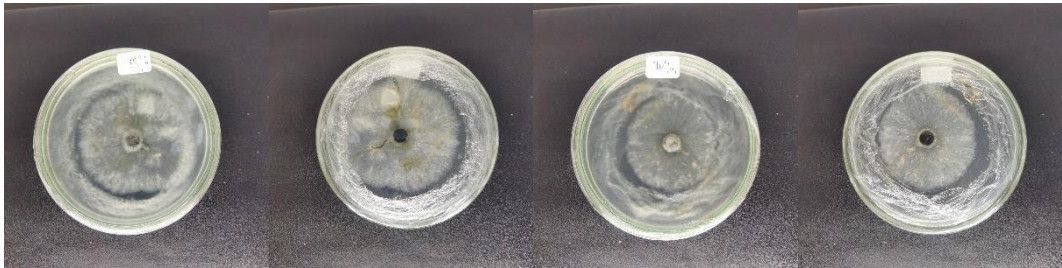


(a)

(b)

(c)

(d)



(e)

(f)

(g)

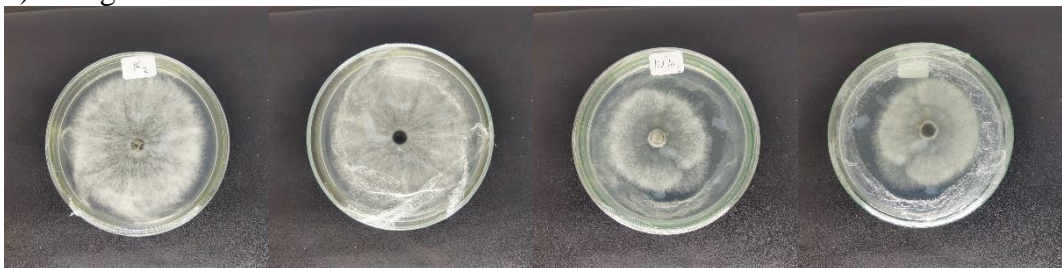
(h)



(i)

(j)

b) Ulangan II

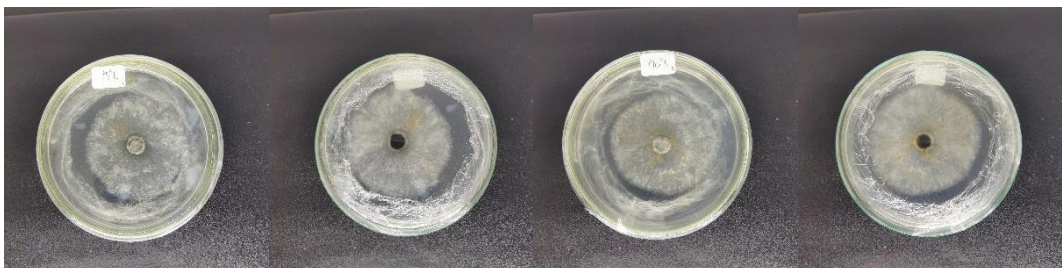


(a)

(b)

(c)

(d)



(e)

(f)

(g)

(h)



(i)

(j)

c) Ulangan III

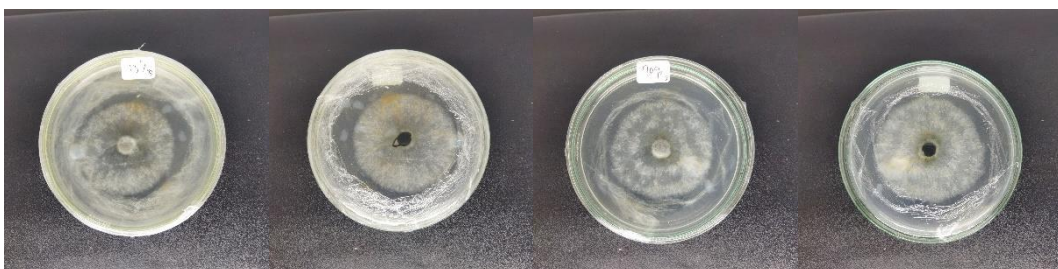


(a)

(b)

(c)

(d)

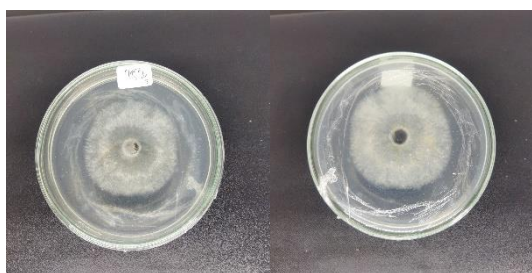


(e)

(f)

(g)

(h)



(i)

(j)

Dokumentasi Hari Ketiga

a) Ulangan I

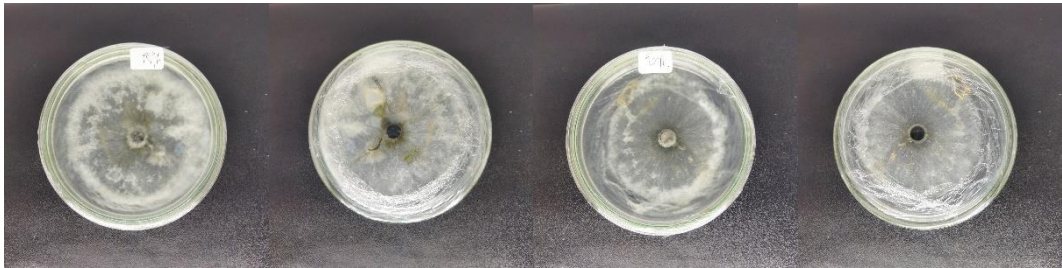


(a)

(b)

(c)

(d)



(e)

(f)

(g)

(h)



(i)

(j)

b) Ulangan II



(a)

(b)

(c)

(d)

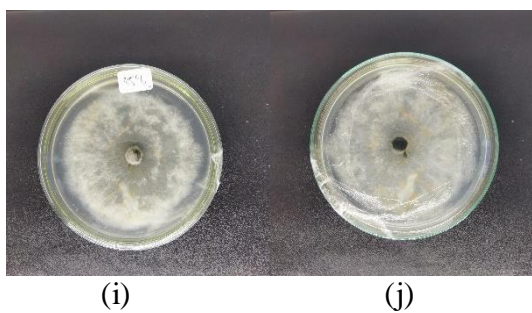


(e)

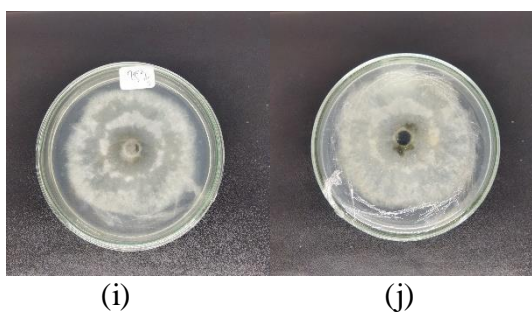
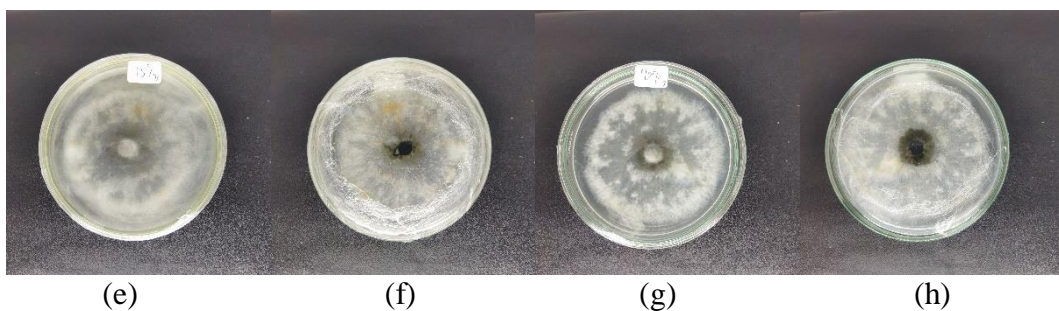
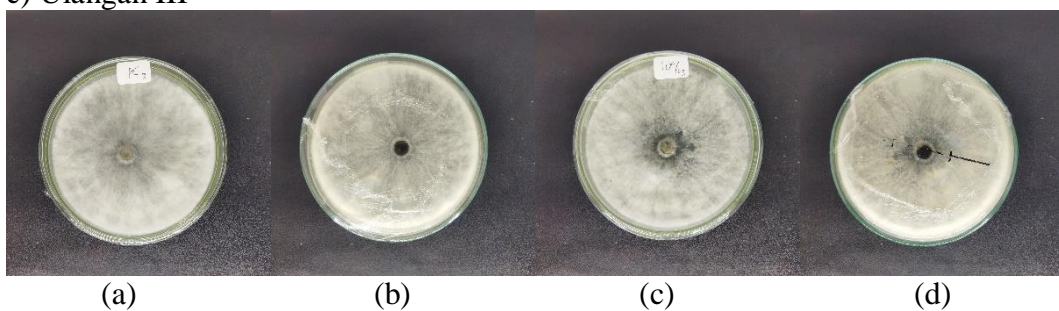
(f)

(g)

(h)



c) Ulangan III

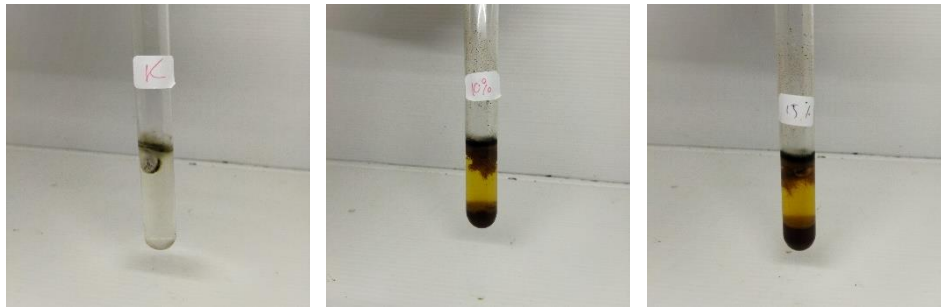


Keterangan :

- Gambar a – b = Perlakuan kontrol (depan-belakang)
- Gambar c – d = Perlakuan ekstrak 10% (depan-belakang)
- Gambar e – f = Perlakuan ekstrak 15% (depan-belakang)
- Gambar g – h = Perlakuan ekstrak 20% (depan-belakang)
- Gambar i – j = Perlakuan ekstrak 25% (depan-belakang)

**Lampiran 3. Pengujian Pada Media PDB (*Potato Dextrose Broth*)**

**a) Ulangan I**



(a)

(b)

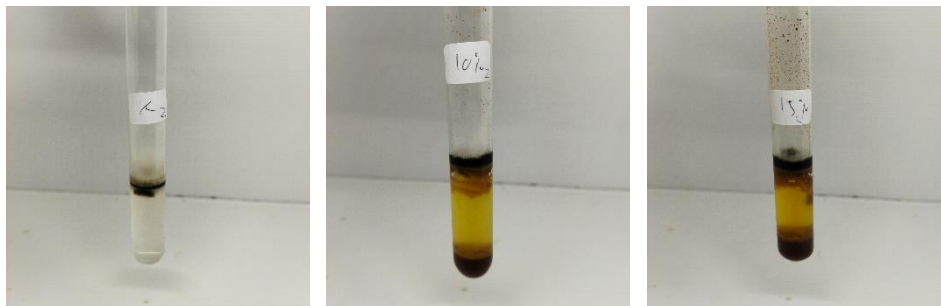
(c)



(d)

(e)

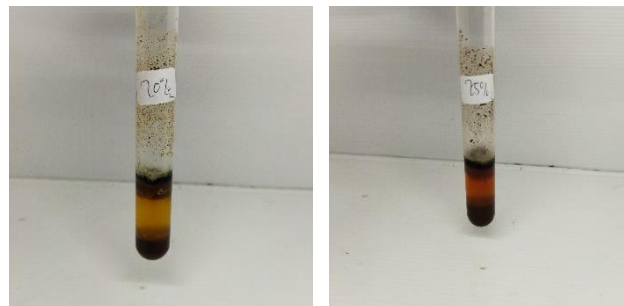
**b) Ulangan II**



(a)

(b)

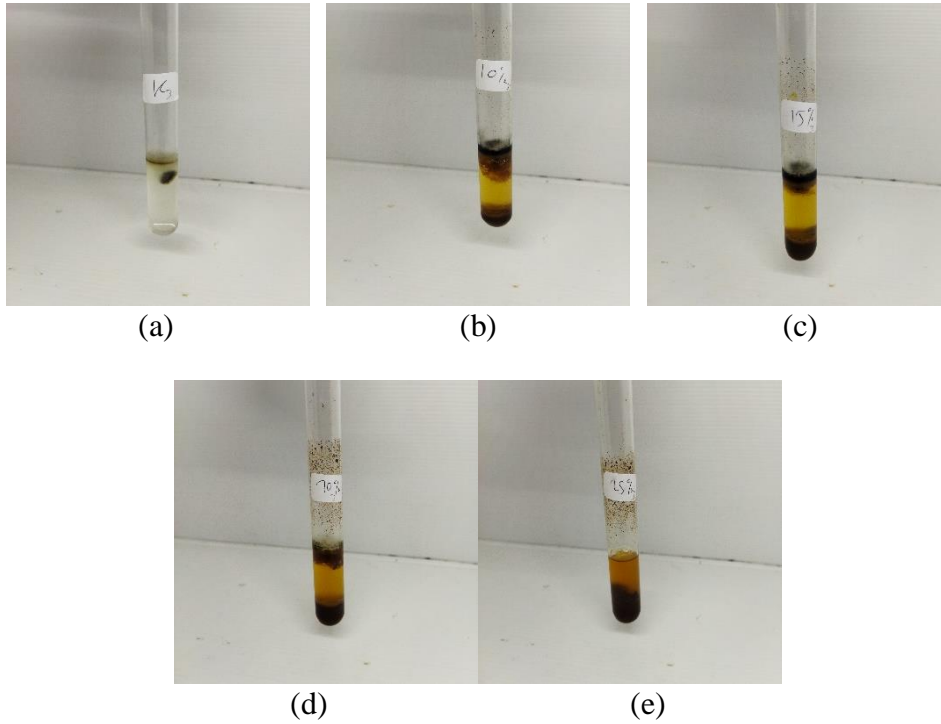
(c)



(d)

(e)

c) Ulangan III



Keterangan :

- (c) = Perlakuan Kontrol (Media PDB Murni)
- (d) = Perlakuan ekstrak kulit kakao 10%
- (e) = Perlakuan ekstrak kulit kakao 15%
- (f) = Perlakuan ekstrak kulit kakao 20%
- (g) = Perlakuan ekstrak kulit kakao 25%

## Lampiran 4. Ekstraksi Kulit Kakao

### Dokumentasi Pembuatan Ekstrak Kulit Buah Kakao



(a)



(b)



(c)



(d)



(e)



(f)



(g)



(h)



(i)



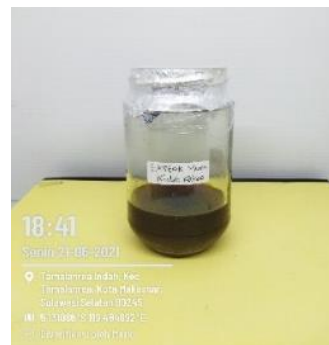
(j)



(k)



(l)



(m)

Keterangan :

- (a) = Pengeringan kulit kakao
- (b) = Penghalusan kulit kakao
- (c) = Penyaringan serbuk kulit buah kakao
- (d) = Penimbangan serbuk kulit kakao
- (e) = Perendaman serbuk kulit kakao menggunakan methanol
- (f) = Penyaringan filtrat kulit buah kakao
- (g) = Filtrat 1
- (h) = Filtrat 2
- (i) = Filtrat 3
- (j) = Proses evaporasi filtrat menggunakan *rotavapor*
- (k) = Proses evaporasi filtrat menggunakan *waterbath*
- (l) dan (m) = Ekstrak kulit buah kakao



**Lampiran 5. Analisis Data Penelitian**

**A. Data Mentah Pada Pengujian di Media PDA**

1) Data Diameter *B.theobromae* 1 HSI (Hari Setelah Inokulasi)

Konsentrasi	Panjang diameter (cm)			Rata-Rata
	I	II	III	
Kontrol (Methanol)	3,1	3,2	3,3	3,2
10%	2,7	2,6	2,6	2,63333
15%	2,4	2,4	2,4	2,4
20%	2,3	2,3	2,3	2,3
25%	2,2	2,2	2,2	2,2

2) Data *B.theobromae* 2 HSI (Hari Setelah Inokulasi)

Konsentrasi	Panjang diameter (cm)			Rata-Rata
	I	II	III	
Kontrol (Methanol)	8,3	8,4	8,2	8,3
10%	7,8	6,8	8	7,53333
15%	6,4	6,3	6,4	6,36667
20%	5,9	5,8	5,9	5,86667
25%	5,7	5,6	5,5	5,6

3) Data *B.theobromae* 3 HSI (Hari Setelah Inokulasi)

Konsentrasi	Panjang diameter (cm)			Rata-Rata
	I	II	III	
Kontrol (Methanol)	9	9	9	9
10%	8,8	8,5	9	8,76667
15%	8	7,8	7,8	7,86667
20%	7,7	7,6	7,6	7,63333
25%	7,5	7,5	7,2	7,4

4) Data Persentase Daya Hambat Pertumbuhan *B.theobromae* 1 HSI

Konsentrasi	Daya Hambat (%)
Kontrol (Methanol)	0
10%	0,177083333
15%	0,25
20%	0,28125
25%	0,3125

5) Data Persentase Daya Hambat Pertumbuhan *B.theobromae* 2 HSI

<b>Konsentrasi</b>	<b>Daya Hambat (%)</b>
Kontrol (Methanol)	0
10%	0,092369478
15%	0,232931727
20%	0,293172691
25%	0,325301205

6) Data Persentase Daya Hambat Pertumbuhan *B.theobromae* 3 HSI

<b>Konsentrasi</b>	<b>Daya Hambat (%)</b>
Kontrol (Methanol)	0
10%	0,025925926
15%	0,125925926
20%	0,151851852
25%	0,177777778

**B. Data Mentah Pada Pengujian di Media PDB**

1) Data Bobot Basah Ulangan I

<b>Konsentrasi</b>	<b>Berat Basah (gr)</b>
Kontrol	0,80
10%	0,74
15%	0,68
20%	0,58
25%	0,32

2) Data Bobot Basah Ulangan II

<b>Konsentrasi</b>	<b>Berat Basah (gr)</b>
Kontrol	0,74
10%	0,69
15%	0,77
20%	0,59
25%	0,59

3) Data Bobot Basah Ulangan III

---

<b>Konsentrasi</b>	<b>Berat Basah (gr)</b>
Kontrol	0,73
10%	0,70
15%	0,66
20%	0,67
25%	0,35

---

4) Data Bobot Kering Ulangan I

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<b>Konsentrasi</b>	<b>Berat Kering (gr)</b>
Kontrol	0,05
10%	0,06
15%	0,02
20%	0,03
25%	0,03

---

5) Data Bobot Kering Ulangan II

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<b>Konsentrasi</b>	<b>Berat Kering (gr)</b>
Kontrol	0,02
10%	0,06
15%	0,07
20%	0,05
25%	0,05

---

6) Data Bobot Kering Ulangan III

---

<b>Konsentrasi</b>	<b>Berat Kering (gr)</b>
Kontrol	0,10
10%	0,02
15%	0,04
20%	0,05
25%	0,01

---

### C. Analisis Data Menggunakan Software SPSS

#### 1) Data Pengujian Pada Media PDA 1 HSI

##### Uji Normalitas

##### One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		15
Normal Parameters <sup>a,b</sup>	Mean	,0000000
	Std. Deviation	,14735768
	Most Extreme Differences	
	Absolute	,174
	Positive	,174
	Negative	-,126
Test Statistic		,174
Asymp. Sig. (2-tailed)		,200 <sup>c,d</sup>

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

##### Uji Homogenitas

##### Test of Homogeneity of Variances

##### Diameter

Levene Statistic	df1	df2	Sig.
,138	4	15	,966

##### Uji Anova

##### ANOVA

##### Diameter

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1,911	4	,478	179,125	,000
Within Groups	,027	10	,003		
Total	1,937	14			

Uji Duncan

Diameter

Duncan<sup>a</sup>

Perlakuan	N	Subset for alpha = 0.05				
		1	2	3	4	5
25%	3	2,200				
20%	3		2,300			
15%	3			2,400		
10%	3				2,633	
Kontrol	3					3,200
Sig.		1,000	1,000	1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

2) Data Pengujian Pada Media PDA 2 HSI

Uji Normalitas

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		15
Normal Parameters <sup>a,b</sup>	Mean	,0000000
	Std. Deviation	,34764514
	Most Extreme Differences	
	Absolute	,137
	Positive	,109
	Negative	-,137
Test Statistic		,137
Asymp. Sig. (2-tailed)		,200 <sup>c,d</sup>

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Uji Homogenitas

Test of Homogeneity of Variances

Diameter

Levene Statistic	df1	df2	Sig.
1,304	4	15	,313

Uji Anova

ANOVA

Diameter

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15,793	4	3,948	44,867	,000
Within Groups	,880	10	,088		
Total	16,673	14			

Uji Duncan

Diameter

Duncan<sup>a</sup>

Perlakuan	N	Subset for alpha = 0.05			
		1	2	3	4
25%	3	5,600			
20%	3	5,867	5,867		
15%	3		6,367		
10%	3			7,533	
Kontrol	3				8,300
Sig.		,297	,066	1,000	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

3) Data Pengujian Pada Media PDA 3 HSI

Uji Normalitas

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		20
Normal Parameters <sup>a,b</sup>	Mean	,0000000
	Std. Deviation	,32295918
	Most Extreme Differences	
	Absolute	,181
	Positive	,181
	Negative	-,089
Test Statistic		,181
Asymp. Sig. (2-tailed)		,083 <sup>c</sup>

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Uji Homogenitas

Test of Homogeneity of Variances

Diameter

Levene Statistic	df1	df2	Sig.
2,583	4	15	,080

Uji Anova

ANOVA

Diameter

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6,033	4	1,508	68,561	,000
Within Groups	,220	10	,022		
Total	6,253	14			

Uji Duncan

Diameter

Duncan<sup>a</sup>

Perlakuan	N	Subset for alpha = 0.05		
		1	2	3
25%	3	7,400		
20%	3	7,633	7,633	
15%	3		7,867	
10%	3			8,767
Kontrol	3			9,000
Sig.		,083	,083	,083

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

4) Data Pengujian Pada Media PDB

Uji Normalitas

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		15
Normal Parameters <sup>a,b</sup>	Mean	,0000000
	Std. Deviation	,08316221
	Most Extreme Differences	
	Absolute	,126
	Positive	,118
	Negative	-,126
Test Statistic		,126
Asymp. Sig. (2-tailed)		,200 <sup>c,d</sup>

- a. Test distribution is Normal.
- b. Calculated from data.
- c. Lilliefors Significance Correction.
- d. This is a lower bound of the true significance.

Uji Homogenitas

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2,244	4	15	,113

Uji Anova

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,215	4	,054	8,984	,002
Within Groups	,060	10	,006		
Total	,275	14			

Uji Duncan

Duncan

Duncan<sup>a</sup>

Perlakuan	N	Subset for alpha = 0.05	
		1	2
P4	3	,4200	
P3	3		,6133
P2	3		,7033
P1	3		,7100
P0	3		,7567
Sig.		1,000	,060



5) Data Persentase Daya Hambat

Uji Normalitas

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		15
Normal Parameters <sup>a,b</sup>	Mean	,0000000
	Std. Deviation	6,31009558
	Most Extreme Differences	
	Absolute	,124
	Positive	,124
	Negative	-,117
Test Statistic		,124
Asymp. Sig. (2-tailed)		,200 <sup>c,d</sup>

- a. Test distribution is Normal.
- b. Calculated from data.
- c. Lilliefors Significance Correction.
- d. This is a lower bound of the true significance.

Uji Homogenitas

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2,715	4	10	,091

Uji Anova

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1513,096	4	378,274	8,193	,003
Within Groups	461,701	10	46,170		
Total	1974,798	14			

Uji Duncan

dayahambat

Duncan<sup>a</sup>

perlakuan	N	Subset for alpha = 0.05		
		1 (a)	2 (b)	3 (c)
Kontrol	3	,0000		
10%	3	9,8460	9,8460	
15%	3		20,2953	20,2953
20%	3			24,2092
25%	3			27,1860
Sig.		,106	,089	,263