DAFTAR PUSTAKA

Achmad, S., 1985. Kimia Organik Bahan Alam. Jakarta. Universitas Terbuka

Agusta, A., 2009. *Biologi dan kimia jamur endofit.* Bandung: Penerbit ITB. Hal: 110.

Almirante, B., Rodriguez, D., Park, B.J., Cuenca-Estrella, M., Planes, A.M., Almela, M., Mensa, J., Sanchez, F., Ayats, J., Gimenez, M., Saballs, P., Fridkin, S.K., Morgan, J., Rodriguez-Tudela, J.L., Warnock, D.W., Pahissa, A., the Barcelona Candidemia Project Study Group, 2005. Epidemiology and Predictors of Mortality in Cases of Candida Bloodstream Infection: Results from Population-Based Surveillance, Barcelona, Spain, from 2002 to 2003. *Journal of Clinical Microbiology*, Vol. 43, No. 4, Hal: 1829–1835.

Anonim, 2008. *Kumpulan Kuliah Farmakologi, 2nd ed.* Jakarta: EGC Kedokteran.

Aref, H.L., Salah, K.B., Chaumont, J.P., Fekih, A., Aouni, M., Said, K., 2010. In vitro antimicrobial activity of four *Ficus carica* latex fractions against resistant human pathogens (antimicrobial activity of *Ficus carica* latex). *Pak J Pharm Sci* Vol. 23, No. 1, Hal: 53–58.

Bouyahya, A., Bensaid, M., Bakri, Y., Dakka, N., 2016. Phytochemistry and Ethnopharmacology of *Ficus carica*. *International Journal of Biochemistry Research & Review*. Vol. 14, No. 1, Hal: 1–12.

Burkill, I.H., 1935. A *Dictionary of the Economic Products of MalayPeninsular,* Malaysia: Ministry of Agriculture of Malaysia,

Castillo, U.F., Strobel, G.A., Ford, E.J., Hess, W.M., Porter, H., Jensen, J.B., Albert, H., Robison, R., Condron, M.A.M., Teplow, D.B., Stevens, D., Yaver, D., 2002. Munumbicins, wide-spectrum antibiotics produced by *Streptomyces* NRRL 30562, endophytic on *Kennedia nigriscans*. *Microbiology*. Vol. 148, Hal: 2675-2685

Chawla, A., Kaur, R., Sharma, A.K., 2012. *Ficus carica* Linn.: A Review on its Pharmacognostic, Phytochemical, and Pharmalogical Aspects. *International Journal of Pharmaceutical and Phytopharmacological* Research. Vol. 1, No. 4, Hal: 215–232.

Colombo, A.L., Nucci, M., Park, B.J., Nouer, S.A., Arthington-Skaggs, B., da Matta, D.A., Warnock, D., Morgan, J., for the Brazilian Network Candidemia Study, 2006. Epidemiology of Candidemia in Brazil: a Nationwide Sentinel Surveillance of Candidemia in Eleven Medical Centers. *Journal of Clinical Microbiology*, Vol. 44, No. 8, Hal: 2816–2823.

da Silva, M.A., Oliveira, A.P.S., Sannomiya, M., Sano, P.T., Varanda, E.A., Vilegas, W., 2007. Flavonoids and a naphthopyranone from *Eriocaulon ligulatum* and their mutagenic activity. *Chemical and Pharmaceutical Bulletin*. Vol. 55, No. 11. Hal: 1635–1639.

Daecon, J.W., 2006. *Fungal Biology*. Blackwell publishing, Cornwall. Vol. 4, Hal: 371.

Daisy, P., Hendaryanto, S., Wijayani, A., 1994. *Teknik Kultur Jaringan, Pengenalan dan Petunjuk Perbanyakan Tanaman Secara Vegetatif-Modern*. Yogyakarta: Kanisius.

Daley, D.K., Brown, K.J., Badal, S., 2017. *Fungal Metabolites Chapter 20*. Jamaica: Elsevier Inc.

Damiana, S.C., 2014. Kajian Molekuler Resistensi *Candida Albicans* Terhadap Antifungi. *Jurnal Farmasi Sains Dan Komunitas,* Vol. 11, No. 1, Hal: 43–47.

Dijksterhuis, J., Samson, R.A., 2007. Food mycology a multifaceted approach to fungi and food. *Taylor and Francis Group, LCC*. Vol. 14. Hal: 412.

Duke, J.A., Bugenschutz-godwin, M.J., Du collier, J., and Duke, P.K., 2002. *Hand Book of Medicinal Herbs, 2nd edition.* USA: CRCPress.

Fitria, L., Wulandari, R.A., Hermawati, E., Susanna, D., 2008. Kualitas Udara dalam Ruang Perpustakaan Universitas X Ditinjau dari Kualitas Biologi, Fisik, dan Kimiawi. *Makara Seri Kesehatan*, Vol. 12, No. 2, Hal: 76-82.

Fried, G.H., Hademenos, G.J., 2009. Biologi. Jakarta: Erlangga.

Fried, B., Sherma, J., 1994. Thin-Layer Chromatography: Techniques and Applications. New York: M. Dekker.

Gandjar, I.G., Rohman, A., 2007. *Kimia Farmasi Analisis*.Yogyakarta: Pustaka Pelajar.

Gilani, A., 2008. Ethnopharmacological studies on antispasmodic and antiplatelet activities of *Ficus carica*. *Journal of Ethnopharmacology*, No. 119, Hal: 1–5.

Guo, L., Wu, J., Han, T., Cao, T., Rahman, K., Qin, L., 2008. Chemical Composition, Antifungal and Antitumor Properties of Ether Extracts of *Scapania verrucosa* Heeg. and its Endophytic Fungus *Chaetomium fusiforme*. *Molecules.* Vol. 13, Hal: 2114–2125.

Hardjono., 1983. *Kromatografi*. Laboratorium Analisa Kimia Fisika Pusat, UGM. Yogyakarta. Hal 32-34.

Helander, M., Faeth, S.H., Saikkonen, K., Wa, P., 2004. Evolution of endophyte – plant symbioses. *Trends Plant Science.* Vol. 9, Hal: 275–280.

Ikegbunam, M.N., Metuh, R.C., Anagu, L.O., and Awah, N.S., 2013. Antimicrobial Activity Of Some Cleaning Products Against Selected Bacteria. *International Research Journal of Pharmaceutical and Applied Science.* Vol. 3, No. 4, Hal: 133–135.

Jawetz, E., Melnick., Adelberg., 1995. *Medical Microbiology, Twenty-sixth. ed.* a English: Mc Graw Hill Education.

Jia, M., Chen, L., Xin, H.-L., Zheng, C.-J., Rahman, K., Han, T., Qin, L.-P., 2016. A Friendly Relationship between Endophytic Fungi and Medicinal Plants: A Systematic Review. Front. *Microbiol.* Vol. 7, Hal: 906.

Joseph, B., Priya, R.M., 2011. Bioactive compounds from endophytes and their potential in pharmaceutical effect. *American Journal of Biochemistry and Molecular Biology*, Vol. 1, No. 3, Hal: 291–309.

Joseph, B., Raj, S.J., 2011. Pharmacognostic and phytochemical properties of *Ficus carica* Linn – An overview. *International Journal of PharmTech Research*. Vol. 3, No. 1, Hal: 8–12.

Kalista, K.F., Chen, L.K., Wahyuningsih, R., Rumende, C.M., 2017. Karakteristik Klinis dan Prevalensi Pasien Kandidiasis Invasif di Rumah Sakit Cipto Mangunkusumo. *Jurnal Penyakit Dalam Indonesia*. Vol. 4. No. 2. Hal: 56-61.

Kasotia, A., Choudhary, D.K., 2014. *Role of Endophytic Microbes in Mitigation of Abiotic Stress in Plants Chapter 4, Second ed*, Amsterdam: Elsevier Inc.

Kumala, S., 2015. *Mikroba Endofit: Pemanfaatan Mikroba Endofit dalam Bidang Farmasi.* Jakarta: Penerbit Isti.

Kumalasari, E., Sulistyani, N., 2011. Aktivitas Antifungi Ekstrak Etanol Batang Binahong (*Anredera cordifolia* (Tenore) Steen.) Terhadap *Candida albicans* serta Skrining Fitokimia. *Jurnal Ilmiah Kefarmasian*. Vol. 1, No. 2. Hal: 51-62.

Kusumaningtyas, E., 2014. Mekanisme Infeksi *Candida albicans* pada permukaan sel. *Lokakarya Nasional Penyakit Zoonosis.* Hal: 304-313.

Lambert, J.P., Kolstad, R., 1986. Effect of a benzoic acid-detergent germicide on denture-borne *Candida albicans. The Journal of Prosthetic Dentistry.* Vol. 55, No. 6, Hal: 699–700.

Leba, M.A.U., 2017. *Buku Ajar: Ekstraksi dan Real Kromatografi*. Yogyakarta: Deepublish.

Liang, X.A., Ma, Y.M., Zhang, H.C., Liu, R., 2016. A new helvolic acid derivative from an endophytic *Fusarium* sp. of *Ficus carica*. *Natural Product Research*. Vol. 30, Hal: 2407-2412

Liu, F., Yang, Z., Zheng, X., Luo, S., Zhang, K., Li, G., 2011. Nematicidal coumarin from *Ficus carica* L. *Journal of Asia-Pasific Entomology*. No. 14, Hal: 79–81.

Lutfiyanti, R., Ma'ruf, W.F., Dewi, E.N., 2012. Aktivitas antijamur senyawa bioaktif ekstrak *Gelidium latifolium* terhadap *Candida albicans*. *Jurnal Pengolahan dan Bioteknologi Hasil Perikanan*. Vol. 1, No. 1. Hal: 1-8.

Margiono, S., 2008. Produksi metabolit sekunder (antibiotik) oleh isolat jamur endofit Indonesia. *Majalah Farmasi Indonesia*. Vol. 19, No. 2. Hal: 86-94

Mawa, S., Husain, K., Jantan, I., 2013. *Ficus carica* L. (*Moraceae*): Phytochemistry, Traditional Uses and Biological Activities. *Evidence - Based Complementary and Alternative Medicine.* Vol. 2013. Hal: 1–8.

Mears, A.L., Stocks, S.M., Krist, V., 2017. A review of control strategies for manipulating the feed rate in fed-batch fermentation processes. *Journal of Biotechnology*. Vol. 245, Hal: 34–46.

Meizarini, A., Munadziroh, E., Rachmadi, P., 2005. Sitotoksisitas bahan restorasi cyanoacrylate dengan variasi perbandingan powder dan liquid menggunakan MTT assay. *Jurnal Penelitian Medika Eksakta*. Vol. 6, No. 1, Hal:16–25.

Mohammed, M.S., Osman, W.J.A., Garelnabi, E.A.E., Osman, Z., Oesman, B., Khalid, H.S., Mohamed, M.A., 2014. Secondary metabolites as anti-inflammatory agents. *The Journal of Phytopharmacology.* Vol. 3, No. 4, Hal: 275–285.

Morrell, M., Fraser, V.J., Kollef, M.H., 2005. Delaying the Empiric Treatment of Candida Bloodstream Infection until Positive Blood Culture Results Are

Obtained: a Potential Risk Factor for Hospital Mortality. *Antimicrobial Agents and Chemotherapy*. Vol. 49, No. 9, Hal: 3640–3645.

Noverita, Fitria, D., Sinaga, E., 2009. Isolasi dan uji aktivitas antibakteri jamur endofit dari daun dan rimpang *Zingiber ottensii* Val. *Jurnal Farmasi Indonesia*. Vol. 4, No. 4. Hal: 171–176.

Patil, V.V., Patil, V.R., 2011. Evaluation of anti-inflammatory activity of *Ficus carica* Linn. leaves. *Indian Journal of Natural Products and Resources*. Vol. 2, No. 2. Hal: 151-155.

Pelczar, M.J., dan Chan, E.C.S., 1986. *Dasar-dasar Mikrobiologi 1*. Jakarta: Universitas Indonesia.

Penelope, O., 1997. *Great Natural Remedies*. USA: Kyle Cathic Limited.

Peter A., 1994. *Farmakologi*. Jakarta: EGC Kedokteran.

Polii, S.V.G., Pandaleke, H.E., Kapantow, M.G., 2016. Profil kandidosis intertriginosa di Poliklinik Kulit dan Kelamin RSUP Prof. Dr. RD Kandou Manado periode Januari-Desember 2013. *Jurnal e-Clinic (eCl)*. Vol. 4. No. 1. Hal: 446-451.

Prabavathy, D., Nachiyar, C.V., 2011. Screening and characterisation of antimicrobial compound from endophytic Aspergillus sp. isolated from *Ficus carica. Journal of Pharmacy Research.* Vol. 4, No. 6, Hal: 1935–1936.

Pratiwi, S.T., 2008. *Mikrobiologi Farmasi*. Jakarta: Penerbit Erlangga.

Putri, W.S., Warditiani, N.K., Larasanty, L.P.F., 2013. Skrining Fitokimia Ekstrak Etil Asetat Kulit Buah Manggis (*Garcinia mangostana* L.). *Jurnal Farmasi Udayana*. Vol. 2, No. 4, Hal: 56-60

Rimbawan, F., 2018. "Isolasi dan Seleksi Kapang Endofit Tanaman Tin (*Ficus carica* L.) yang Berpotensi sebagai Antibakteri Terhadap Bakteri *Staphylococcus aureus* ATCC 25923". Fakultas Matematika dan Ilmu Pengetahuan Alam. Univeristas Islam Indonesia. Yogyakarta.

Roosheroe, I. G., Sjamsuridzal, W., Oetari, A., 2006. *Mikologi Dasar dan Terapan, Revisi ed.* Yogyakarta: Yayasan Obor Indonesia.

Ross, J.A., Kasum, C.M., 2002. Dietary Flavonoids : Bioavailability, Metabolic Effects, and Safety. *The Annual Review of Nutrition*. Vol. 22, Hal: 19–34.

Rowe, R. C., P. J. Shekey, M. E. Quinn, 2009. *Handbook of Pharmaceutical Excipients Sixth Edition*. USA: Pharmaceutical Press and American Pharmacist Association.

Saifudin, A., 2014. *Senyawa Alam Metabolit Sekunder Teori, Konsep, dan Teknik Pemurnian, 1st ed.* Yogyakarta: Deepublish.

Schulz, B., Boyle, C., Draeger, S., Rommert, A.K., Krohn, K., 2002. Endophytic fungi : a source of novel biologically active secondary metabolites. *Mycological Research*. Vol. 106, No. 9, Hal: 996–1004.

Shepherd, R.W., Turmelle, Y., Nadler, M., Lowell, J.A., Narkewicz, M.R., McDiarmid, S.V., Anand, R., Song, C., the SPLIT Research Group, 2008. Risk Factors for Rejection and Infection in Pediatric Liver Transplantation. *Am J Transplant*. Vol. 8, No. 2, Hal: 396–403.

Siregar, R.S., 2005. *Mikosis intermediet: Kandidiasis. In: Penyakit Jamur Kulit 2nd edition*. Hal 44-60

Smid, E.J., Lacroix, C., 2013. Microbe – microbe interactions in mixed culture food fermentations. *Elsevier: Current Opinion in Biotechnology*. Vol. 24, Hal: 148–154.

Soni, N., Mehta, S., Satpathy, G., Gupta, R.K., 2014. Estimation of nutritional , phytochemical , antioxidant and antibacterial activity of dried fig (*Ficus carica*). *Journal of Pharmacognosy and Phytochemistry*. Vol. 3, No. 2, Hal: 158–165.

Stahl., 1985. *Drugs Analysis by Chromatography and Microscopy*. diterjemahkan oleh Kosasih Padmawinata. Bandung: Institut Teknologi Bandung.

Stockert, J.C., Blázquez-Castro, A., Cañete, M., Horobin, R.W., Villanueva, Á., 2012. MTT *assay* for cell viability: Intracellular localization of the formazan product is in lipid droplets. *Acta Histochemica.* Vol. 114, Hal: 785–796.

Strobel, G., Long, D., 1998. Endophytes microbes embody pharmaceutical potential. *Asni News*. Vol. 63, No. 5, Hal: 263.

Strobel, G.A., 2003. Endophytes as sources of bioactive products. *Microbes and Infection*. Vol. 5, Hal: 535–544.

Strobel, G., Daisy, B., Castillo, U., Harper, J., 2004. Natural products from endophytic microorganisms. *Journal of Natural Product*. Vol. 67, Hal: 257-268.

Tamamoto, M., Hamada, T., Miyake, Y., Suginaka, H., 1985. Ability of enzymes to remove Candida. *The Journal of Prosthetic Dentistry*. Vol. 53, Hal: 214–216.

Tiwari, K., 2015. The future product: endophytic fungal metabolites. *Journal of Biodiverisity, Bioprospecting and Development*. Vol. 2, No. 1, Hal: 1-7

Tscherter, H., Dreyfuss., 1992. New Metabolites, Processes for Their Production and Uses. International Application Published Under The Patent Cooperation Treaty (PCT). *International Publication.* No. 38, Hal: 28-45.

USP Convention. 2007. United States of Pharmacopeia National Formulary, USP 30/NF 25. Twinbrook Parkway: United States Pharmacopeial Convention

Vallejo, F., Marín, J.G., Tomás-barberán, F.A., 2012. Phenolic compound content of fresh and dried figs (*Ficus carica* L.). *Food Chemistry.* Vol. 130, Hal: 485–492.

Vaya, J., and Mahmood, S., 2006. Flavonoid content in leaf extracts of the fig (*Ficus carica* L.), carob (*Ceratonia siliqua* L.) and pistachio (*Pistacia lentiscus* L.). *Biofactor*. Vol. 28, Hal: 169–175.

Verma, V.C., Gond, S.K., Kumar, A., Kharwar, R.N., Boulanger, L., and Strobel, G.A., 2011. Endophytic fungal flora from roots and fruits of an Indian neem plant *Azadirachta indica* A. Juss., and impact of culture on their isolation. *Indian Journal of Microbiology*. Vol. 51, Hal: 469-476.

Vinson, J.A., 1999. The Functional Food Properties of Fig. *American Association of Cereal Chemists.* Vol. 44, No. 2, Hal: 82-87.

Voşgan, Z., Jelea, M., Dumuța, A., Pop, F., 2015. Fungal diversity in goat milk obtained by manual milking. *Journal of Agroalimentary Processes and Technology.* Vol. 21, No. 3, Hal: 2–6.

Wahyuningtyas, E., 2008. Pengaruh Ekstrak *Graptophyllum pictum* Terhadap Pertumbuhan *Candida albicans* pada Plat Gigi Tiruan Resin Akrilik. *Indonesian Journal of Dentistry*. Vol. 15, No. 3, Hal: 187-191.

Wang, H., Cheng, H., Wang, F., Wei, D., Wang, X., 2010. An improved 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) reduction assay for evaluating the viability of Escherichia coli cells. *Journal of Microbiological Methods.* Vol. 82, No. 3, Hal: 330–333.

Wani, K., Saboo, S., Solanke, P., Tidke, P., 2016. Production of novel secondary metabolites secondary from endophytic fungi by using fermentation process. *Indo American Journal of Pharmaceutical Research*. Vol. 6, No. 3, Hal: 4957–4961.

Waqasv, M., Khan, A.L., Kamran, M., Hamayun, M., Kang, S.M., Kim, Y.H., Lee, I.J., 2012. Endophytic fungi produce gibberellins and indoleacetic acid and promotes host-plant growth during stress. *Molecules.* Vol. 17, Hal: 10754-10773.

Watson, D., 2005. *Analisis Farmasi, Edisi Kedua*. Jakarta: Penerbit Buku Kedokteran EGC.

Wisplinghoff, H., Bischoff, T., Tallent, S.M., Seifert, H., Wenzel, R.P., Edmond, M.B., 2004. Nosocomial bloodstream infections in US hospitals: analysis of 24,179 cases from a prospective nationwide surveillance study. *Clinical Infectious Diseases.* Vol. 39, 309–317.

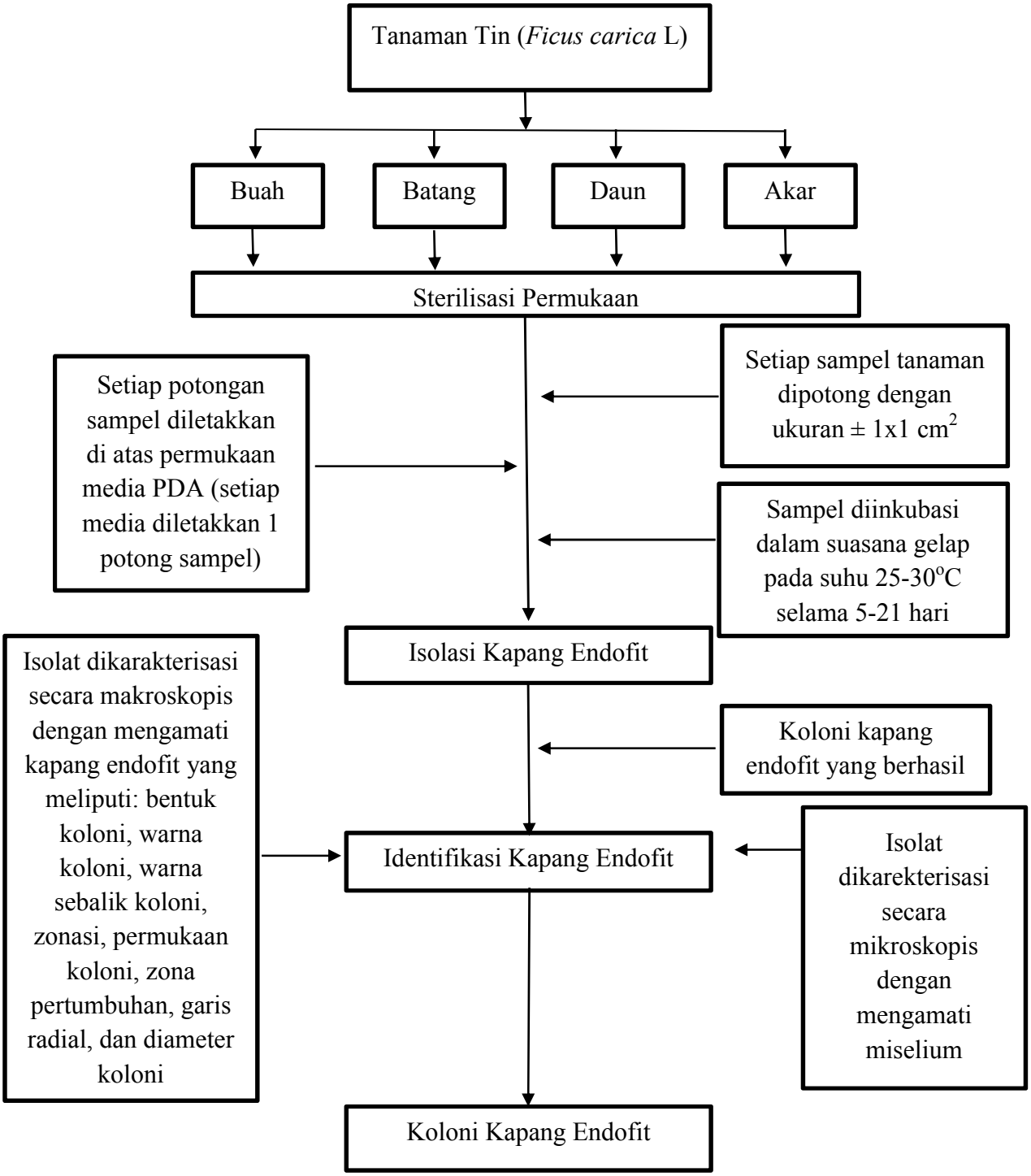
Werbach, M., 1993. *Healing with Food*. USA: HarperCollins.

Zhang, H.W., Song, Y.C., Tan, R.X., 2006. Biology and chemistry of endophytes. *The Royal Society of Chemistry*. Vol. 23, 753–771.

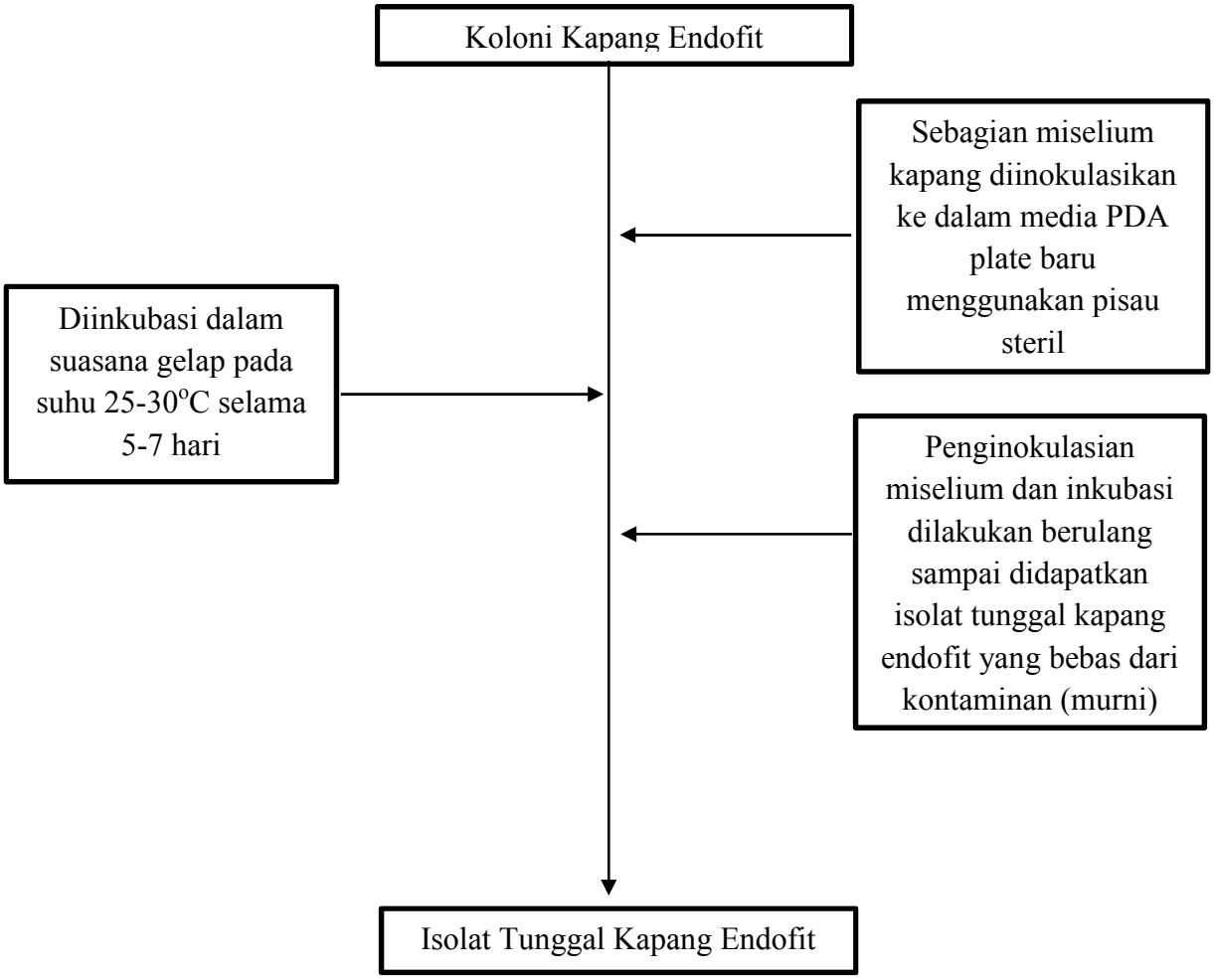
Zhao, J., Xu, L., J. Wang, P. Li, T. Shan and X. Li. 2010. Beauvericin from Endophytic Fungus, Fusarium redolens, Isolated from Dioscorea zingiberensis and Its Antibacterial Activity. *Natural Product Community.* Vol. 5, No. 5, Hal: 811-814.

LAMPIRAN

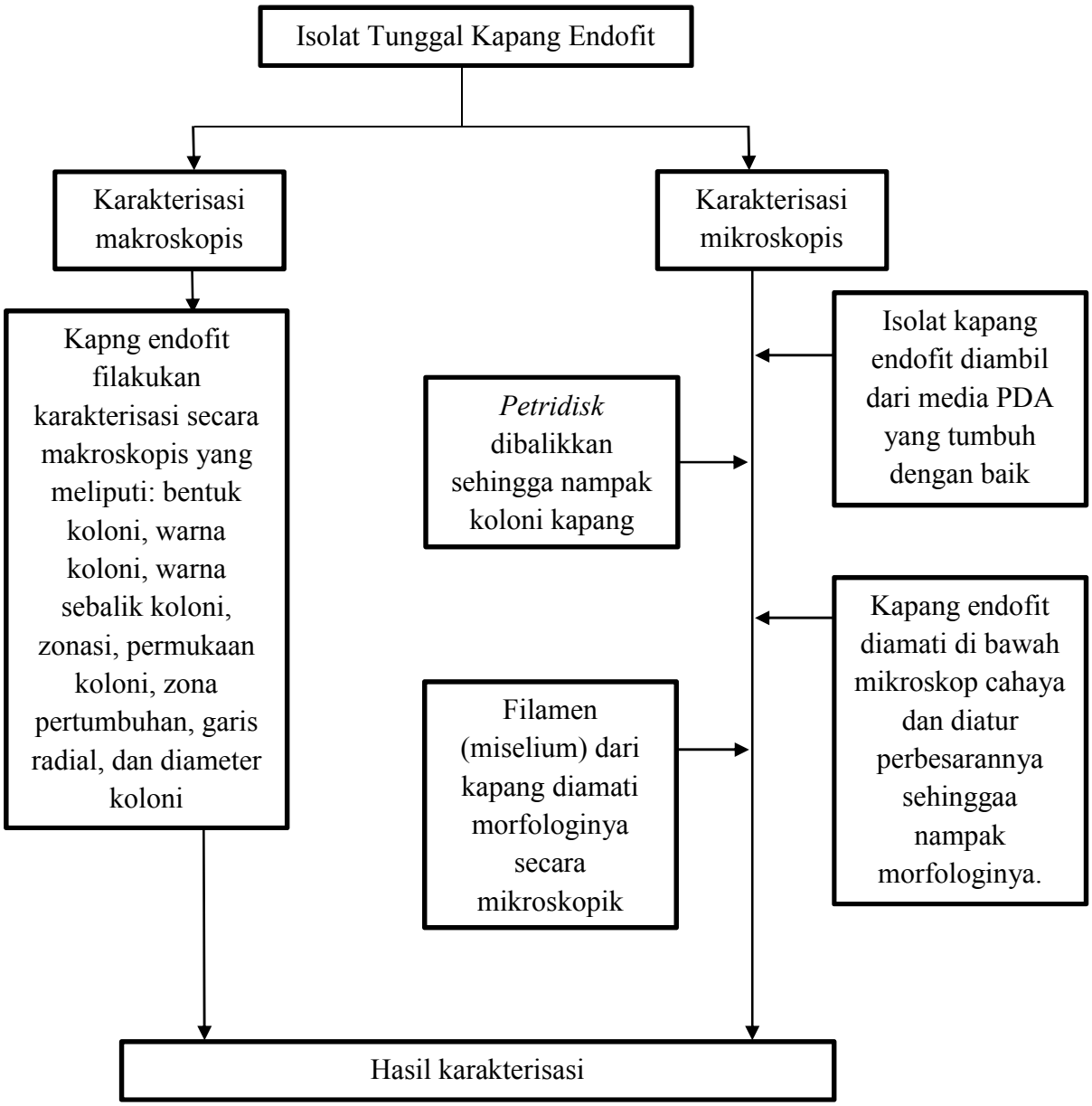
Lampiran 1. Skema Kerja Isolasi dan Identifikasi Kapang Endofit (Rimbawan, 2018)



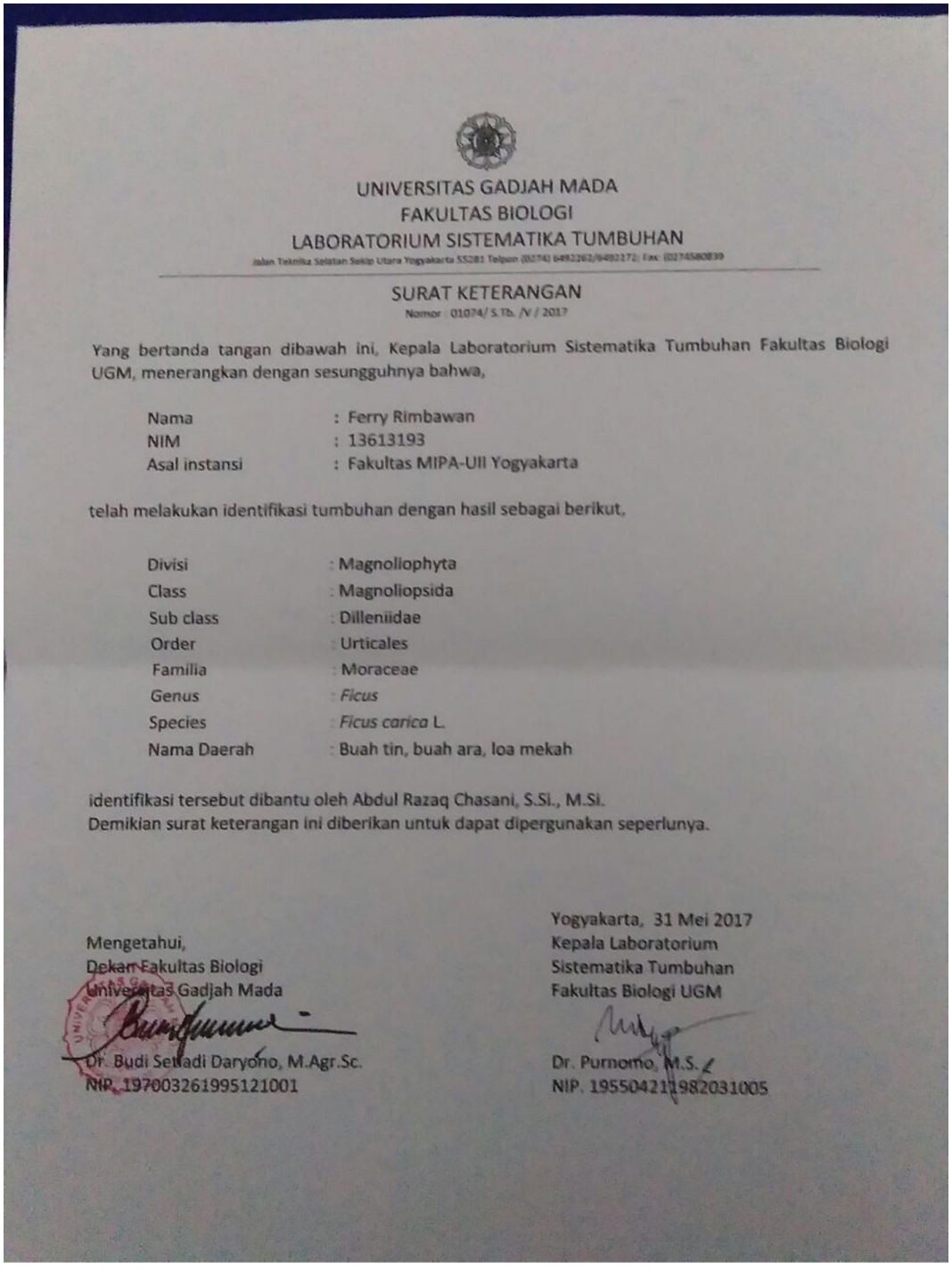
Lampiran 2. Skema Kerja Pemurnian Kapang Endofit (Rimbawan, 2018)



Lampiran 3. Skema Kerja Karakterisasi makroskopis dan mikroskopis isolat tunggal kapang endofit (Rimbawan, 2018)



Lampiran 4. Hasil Determinasi Tanaman Tin **(**Rimbawan, 2018)



UNIVERSITAS GADJAH MADA
FAKULTAS BIOLOGI
LABORATORIUM SISTEMATIKA TUMBUHAN
Jalan Teknika Selatan Sekip Utara Yogyakarta 55281 Telpon (0274) 6492262/6492172; Fax. (0274580839

SURAT KETERANGAN
Nomor : 01074/ S.Tb. /V / 2017

Yang bertanda tangan dibawah ini, Kepala Laboratorium Sistematika Tumbuhan Fakultas Biologi UGM, menerangkan dengan sesungguhnya bahwa,

Nama : Ferry Rimbawan
NIM : 13613193
Asal instansi : Fakultas MIPA-UII Yogyakarta

telah melakukan identifikasi tumbuhan dengan hasil sebagai berikut,

Divisi : Magnoliophyta
Class : Magnoliopsida
Sub class : Dilleniidae
Order : Urticales
Familia : Moraceae
Genus : *Ficus*
Species : *Ficus carica* L.
Nama Daerah : Buah tin, buah ara, loa mekah

identifikasi tersebut dibantu oleh Abdul Razaq Chasani, S.Si., M.Si.
Demikian surat keterangan ini diberikan untuk dapat dipergunakan seperlunya.

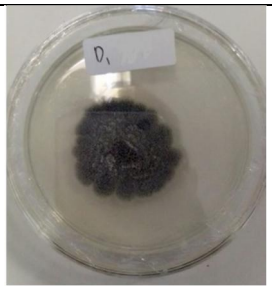
Yogyakarta, 31 Mei 2017
Kepala Laboratorium
Sistematika Tumbuhan
Fakultas Biologi UGM

Dr. Purnomo, M.S.
NIP. 195504211982031005

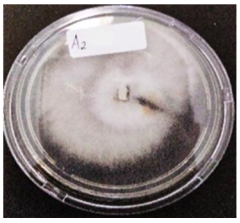
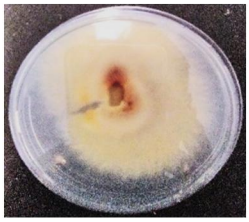
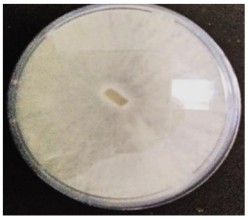
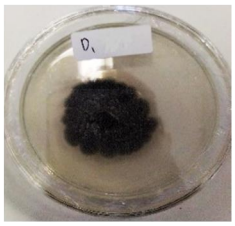
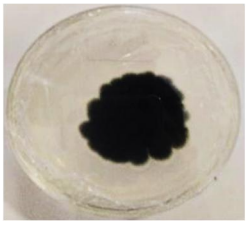
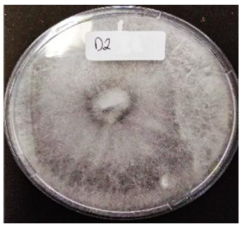
Mengetahui,
Dekan Fakultas Biologi
Universitas Gadjah Mada

Dr. Budi Setiadi Daryono, M.Agr.Sc.
NIP. 197003261995121001

Lampiran 5. Hasil Isolasi Kapang Endofit Tanaman Tin (Rimbawan, 2018)

Kapang Endofit	Gambar
A_2	
Ba_2	
Bu_2	
D_1	
D_2	

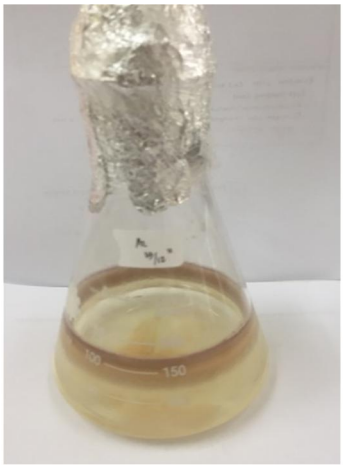
Lampiran 6. Hasil Pemurnian Isolat Kapang Endofit (Rimbawan, 2018)

Isolat	Penampakan Isolat Tunggal Kapang Endofit	
	Sisi Atas	Sisi Bawah
A_2 (Akar)		
Ba_2 (Batang)		
Bu_2 (Buah)		
D_1 (Daun)		
D_2 (Daun)		

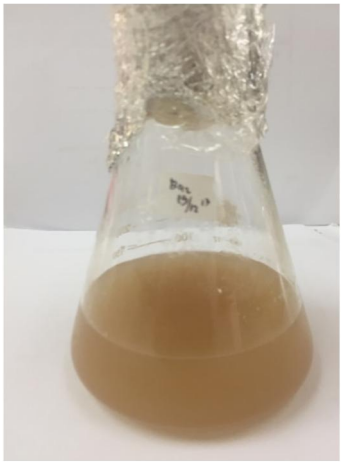
Lampiran 7. Hasil karakterisasi makroskopis isolat kapang endofit (Rimbawan, 2018)

Pengamatan Makroskopis	Isolat				
	A2	Ba2	Bu2	D1	D2
Warna Permukaan Koloni	Putih	Putih	Putih	Hijau tua kehitaman	Putih
Warna Sebalik Koloni	Kuning kecoklatan pada bagian tengah	Putih	Putih	Hijau tua kehitaman	Putih
Zonasi	-	-	-	Ada	-
Permukaan Koloni	Halus	Halus	Halus	Kasar dan bergranul	Halus
Zona Pertumbuhan	-	-	-	Ada	-
Garis Radial	-	-	-	-	-
Diameter Koloni	7,5cm	8cm	8cm	5,5cm	9cm

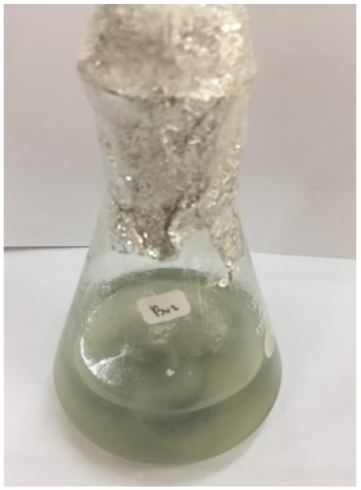
Lampiran 8. Gambar Kultur Cair



A2 (Akar)



Ba2 (Batang)

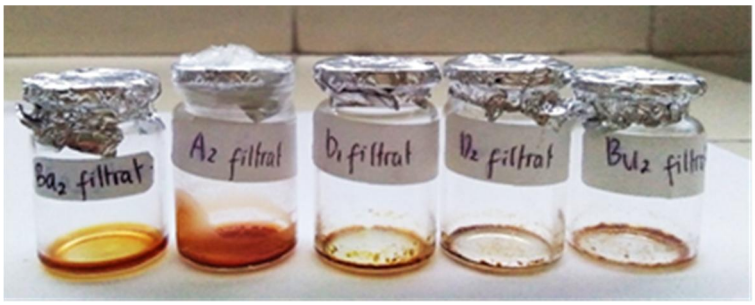


Bu2 (Buah)

D1 (Daun)

D2 (Daun)

Lampiran 9. Hasil ekstraksi isolat kapang endofit



Lampiran 10. Hasil Optimasi Fase Gerak

Fase Gerak		Perbandingan
Pelarut 1	Pelarut 2	
N – heksan	Metanol	2 : 3
N – heksan	Metanol	1 : 4
N – heksan	Metanol	1 : 9
Kloroform	Metanol	9 : 1
Etil asetat	Kloroform	5 : 3
Etil asetat	Kloroform	5 : 5
Etil asetat	Kloroform	3 : 2
Etil asetat	Kloroform	2 : 3

Lampiran 11. Perhitungan Pembuatan Sampel Ekstrak

11.1 Sampel ekstrak filtrat kapang endofit

11.1.1 Sampel A_2

Total ekstrak yang diperoleh 155,18 mg

Pembuatan larutan stok dengan 10 mg ekstrak dan 100 µl DMSO

Konsentrasi ekstrak dalam stok:

$\frac{10\ mg}{100\ \mu l}$ = 10.000 µg/100µl = 100.000 ppm

11.1.2 Sampel Ba_2

Total ekstrak yang diperoleh 184,32 mg

Pembuatan larutan stok dengan 10 mg ekstrak dan 100 µl DMSO

Konsentrasi ekstrak dalam stok:

$\frac{10\ mg}{100\ \mu l}$ = 10.000 µg/100µl = 100.000 ppm

11.1.3 Sampel Bu_2

Total ekstrak yang diperoleh 206,48 mg

Pembuatan larutan stok dengan 10 mg ekstrak dan 100 µl DMSO

Konsentrasi ekstrak dalam stok:

$\frac{10\ mg}{100\ \mu l}$ = 10.000 µg/100µl = 100.000 ppm

11.1.4 Sampel D_1

Total ekstrak yang diperoleh 110,71 mg

Pembuatan larutan stok dengan 10 mg ekstrak dan 100 µl DMSO

Konsentrasi ekstrak dalam stok:

$\frac{10\ mg}{100\ \mu l}$ = 10.000 µg/100µl = 100.000 ppm

11.1.5 Sampel D_2

Total ekstrak yang diperoleh 107,47 mg

Pembuatan larutan stok dengan 10 mg ekstrak dan 100 µl DMSO

Konsentrasi ekstrak dalam stok:

$\frac{10\ mg}{100\ \mu l}$ = 10.000 µg/100µl = 100.000 ppm

11.2 Pengenceran sampel ekstrak filtrat kapang endofit dalam *96-well microplate*

11.2.1 Sampel A_2

- *well* ke – 1 (disesuaikan dengan muatan maksimal *well* yaitu 200 µl)

  $M_1 \times V_1 = M_2 \times V_2$

  100.000 ppm × 0,004 ml = M_2 × 0,2 ml

  M_2 = 2000 µl/ml

- *well* ke – 2

  $M_1 \times V_1 = M_2 \times V_2$

  2000µl/ml × 0,1 ml = M_2 × 0,2 ml

  M_2 = 1000 µl/ml

- *well* ke – 3

  $M_1 \times V_1 = M_2 \times V_2$

  1000 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 500 µl/ml

- *well* ke – 4

  $M_1 \times V_1 = M_2 \times V_2$

  500 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 250 µl/ml

- *well* ke – 5

  $M_1 \times V_1 = M_2 \times V_2$

  250 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 125 µl/ml

- *well* ke – 6

  $M_1 \times V_1 = M_2 \times V_2$

  125 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 62,5 µl/ml

- *well* ke – 7

  $M_1 \times V_1 = M_2 \times V_2$

  62,5 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 31,25 µl/ml

- *well* ke – 8

$M_1 \times V_1 = M_2 \times V_2$

31,25 µl/ml × 0,1ml = M_2 × 0,2 ml

M_2 = 15,625µl/ml

- *well* ke – 9

$M_1 \times V_1 = M_2 \times V_2$

15,625 µl/ml × 0,1ml = M_2 × 0,2 ml

M_2 = 7,8125 µl/ml

11.2.2 Sampel Ba_2

- *well* ke – 1 (disesuaikan dengan muatan maksimal *well* yaitu 200 µl)

$M_1 \times V_1 = M_2 \times V_2$

100.000 ppm × 0,004 ml = M_2 × 0,2 ml

M_2 = 2000 µl/ml

- *well* ke – 2

$M_1 \times V_1 = M_2 \times V_2$

2000µl/ml × 0,1 ml = M_2 × 0,2 ml

M_2 = 1000 µl/ml

- *well* ke – 3

$M_1 \times V_1 = M_2 \times V_2$

1000 µl/ml × 0,1ml = M_2 × 0,2 ml

M_2 = 500 µl/ml

- *well* ke – 4

$M_1 \times V_1 = M_2 \times V_2$

500 µl/ml × 0,1ml = M_2 × 0,2 ml

M_2 = 250 µl/ml

- *well* ke – 5

$M_1 \times V_1 = M_2 \times V_2$

250 µl/ml × 0,1ml = M_2 × 0,2 ml

M_2 = 125 µl/ml

- *well* ke – 6

$M_1 \times V_1 = M_2 \times V_2$

125 µl/ml × 0,1ml = M_2 × 0,2 ml

$M_2 = 62,5$ µl/ml

- *well* ke – 7

  $M_1 \times V_1 = M_2 \times V_2$

  62,5 µl/ml × 0,1ml = M_2 × 0,2 ml

  $M_2 = 31,25$ µl/ml

- *well* ke – 8

  $M_1 \times V_1 = M_2 \times V_2$

  31,25 µl/ml × 0,1ml = M_2 × 0,2 ml

  $M_2 = 15,625$µl/ml

- *well* ke – 9

  $M_1 \times V_1 = M_2 \times V_2$

  15,625 µl/ml × 0,1ml = M_2 × 0,2 ml

  $M_2 = 7,8125$ µl/ml

11.2.3 Sampel Bu_2

- *well* ke – 1 (disesuaikan dengan muatan maksimal *well* yaitu 200 µl)

  $M_1 \times V_1 = M_2 \times V_2$

  100.000 ppm × 0,004 ml = M_2 × 0,2 ml

  $M_2 = 2000$ µl/ml

- *well* ke – 2

  $M_1 \times V_1 = M_2 \times V_2$

  2000µl/ml × 0,1 ml = M_2 × 0,2 ml

  $M_2 = 1000$ µl/ml

- *well* ke – 3

  $M_1 \times V_1 = M_2 \times V_2$

  1000 µl/ml × 0,1ml = M_2 × 0,2 ml

  $M_2 = 500$ µl/ml

- *well* ke – 4

  $M_1 \times V_1 = M_2 \times V_2$

  500 µl/ml × 0,1ml = M_2 × 0,2 ml

  $M_2 = 250$ µl/ml

- *well* ke – 5

$M_1 \times V_1 = M_2 \times V_2$

250 µl/ml × 0,1ml = M_2 × 0,2 ml

M_2 = 125 µl/ml

- *well* ke – 6

  $M_1 \times V_1 = M_2 \times V_2$

  125 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 62,5 µl/ml

- *well* ke – 7

  $M_1 \times V_1 = M_2 \times V_2$

  62,5 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 31,25 µl/ml

- *well* ke – 8

  $M_1 \times V_1 = M_2 \times V_2$

  31,25 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 15,625µl/ml

- *well* ke – 9

  $M_1 \times V_1 = M_2 \times V_2$

  15,625 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 7,8125 µl/ml

11.2.4 Sampel D_1

- *well* ke – 1 (disesuaikan dengan muatan maksimal *well* yaitu 200 µl)

  $M_1 \times V_1 = M_2 \times V_2$

  100.000 ppm × 0,004 ml = M_2 × 0,2 ml

  M_2 = 2000 µl/ml

- *well* ke – 2

  $M_1 \times V_1 = M_2 \times V_2$

  2000µl/ml × 0,1 ml = M_2 × 0,2 ml

  M_2 = 1000 µl/ml

- *well* ke – 3

  $M_1 \times V_1 = M_2 \times V_2$

  1000 µl/ml × 0,1ml = M_2 × 0,2 ml

M_2 = 500 µl/ml

- *well* ke – 4

  $M_1 \times V_1 = M_2 \times V_2$

  500 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 250 µl/ml

- *well* ke – 5

  $M_1 \times V_1 = M_2 \times V_2$

  250 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 125 µl/ml

- *well* ke – 6

  $M_1 \times V_1 = M_2 \times V_2$

  125 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 62,5 µl/ml

- *well* ke – 7

  $M_1 \times V_1 = M_2 \times V_2$

  62,5 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 31,25 µl/ml

- *well* ke – 8

  $M_1 \times V_1 = M_2 \times V_2$

  31,25 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 15,625µl/ml

- *well* ke – 9

  $M_1 \times V_1 = M_2 \times V_2$

  15,625 µl/ml × 0,1ml = M_2 × 0,2 ml

  M_2 = 7,8125 µl/ml

11.2.5 Sampel D_2

- *well* ke – 1 (disesuaikan dengan muatan maksimal *well* yaitu 200 µl)

  $M_1 \times V_1 = M_2 \times V_2$

  100.000 ppm × 0,004 ml = M_2 × 0,2 ml

  M_2 = 2000 µl/ml

- *well* ke – 2

$M_1 \times V_1 = M_2 \times V_2$

$2000\mu l/ml \times 0{,}1\ ml = M_2 \times 0{,}2\ ml$

$M_2 = 1000\ \mu l/ml$

- *well* ke – 3

  $M_1 \times V_1 = M_2 \times V_2$

  $1000\ \mu l/ml \times 0{,}1ml = M_2 \times 0{,}2\ ml$

  $M_2 = 500\ \mu l/ml$

- *well* ke – 4

  $M_1 \times V_1 = M_2 \times V_2$

  $500\ \mu l/ml \times 0{,}1ml = M_2 \times 0{,}2\ ml$

  $M_2 = 250\ \mu l/ml$

- *well* ke – 5

  $M_1 \times V_1 = M_2 \times V_2$

  $250\ \mu l/ml \times 0{,}1ml = M_2 \times 0{,}2\ ml$

  $M_2 = 125\ \mu l/ml$

- *well* ke – 6

  $M_1 \times V_1 = M_2 \times V_2$

  $125\ \mu l/ml \times 0{,}1ml = M_2 \times 0{,}2\ ml$

  $M_2 = 62{,}5\ \mu l/ml$

- *well* ke – 7

  $M_1 \times V_1 = M_2 \times V_2$

  $62{,}5\ \mu l/ml \times 0{,}1ml = M_2 \times 0{,}2\ ml$

  $M_2 = 31{,}25\ \mu l/ml$

- *well* ke – 8

  $M_1 \times V_1 = M_2 \times V_2$

  $31{,}25\ \mu l/ml \times 0{,}1ml = M_2 \times 0{,}2\ ml$

  $M_2 = 15{,}625\mu l/ml$

- *well* ke – 9

  $M_1 \times V_1 = M_2 \times V_2$

  $15{,}625\ \mu l/ml \times 0{,}1ml = M_2 \times 0{,}2\ ml$

  $M_2 = 7{,}8125\ \mu l/ml$

Lampiran 12. Hasil Uji Penentuan Persen (%) Kematian Sel Jamur

a. Hasil A_2 (Akar)

Nama Jamur	konsentrasi	% kematian
A_2	2000 ppm	±85,0066667
	1000 ppm	±57,2
	500 ppm	±41,6133333
	250 ppm	±18,0187991
	125 ppm	±16,7633333
	62,5 ppm	±16,3566667
	31,25 ppm	±18,4819192
	15, 625 ppm	±20,0833333
	7,8125 ppm	±17,326601

b. Hasil Bu_2 (Buah)

Nama Jamur	konsentrasi	% kematian
Bu_2	2000 ppm	±76,178609
	1000 ppm	±74,00085
	500 ppm	±52,823841
	250 ppm	±18,25684
	125 ppm	±29,424787
	62,5 ppm	±6,9807588
	31,25 ppm	±27,023333
	15, 625 ppm	±41,954886
	7,8125 ppm	±47,283562

c. Hasil D_1 (Daun)

Nama Jamur	konsentrasi	% kematian
D_1	2000 ppm	±79,85666667
	1000 ppm	±75,72024608
	500 ppm	±72,54962934
	250 ppm	±38,27879187
	125 ppm	±10,95677253
	62,5 ppm	±44,80746263
	31,25 ppm	±37,56701927
	15, 625 ppm	±37,16822966
	7,8125 ppm	±38,07068663

d. Hasil D_2 (Daun)

Nama Jamur	konsentrasi	% kematian
D_2	2000 ppm	±72,920408
	1000 ppm	±54,5387961
	500 ppm	±39,909114
	250 ppm	±37,2739022
	125 ppm	±33,5225919
	62,5 ppm	±46,9817032
	31,25 ppm	±37,8860083
	15, 625 ppm	±48,6820373
	7,8125 ppm	±36,0866443

Lampiran 13. Foto penelitian

Proses ekstraksi dengan corong pisah

Pemisahan miselia dan media kultur dengan bantuan *ultrasonicator*

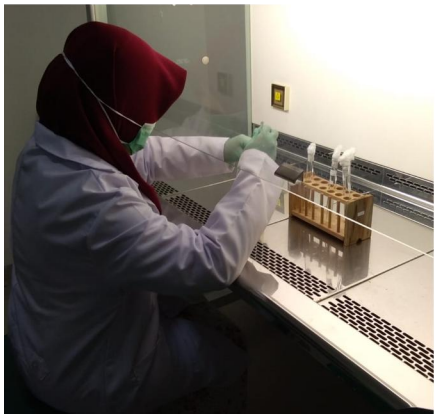
Proses pengentalan ekstrak dengan *rotary evaporator*

Proses sterilisasi menggunakan *autoclave*

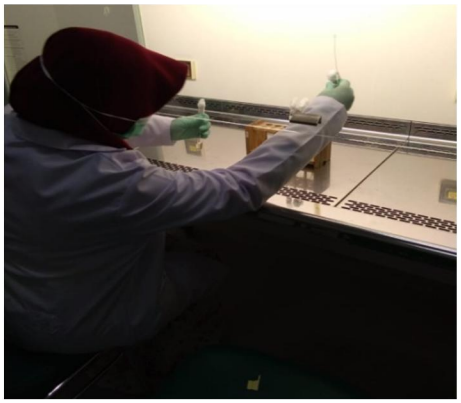
Proses pemanenan setelah dilakukan kultivasi cair dengan *shaker incubator*

Proses pembuatan media

Proses inkubasi bakteri



Proses pemindahan peremajaan mikroba uji



Proses pemindahan peremajaan mikroba uji

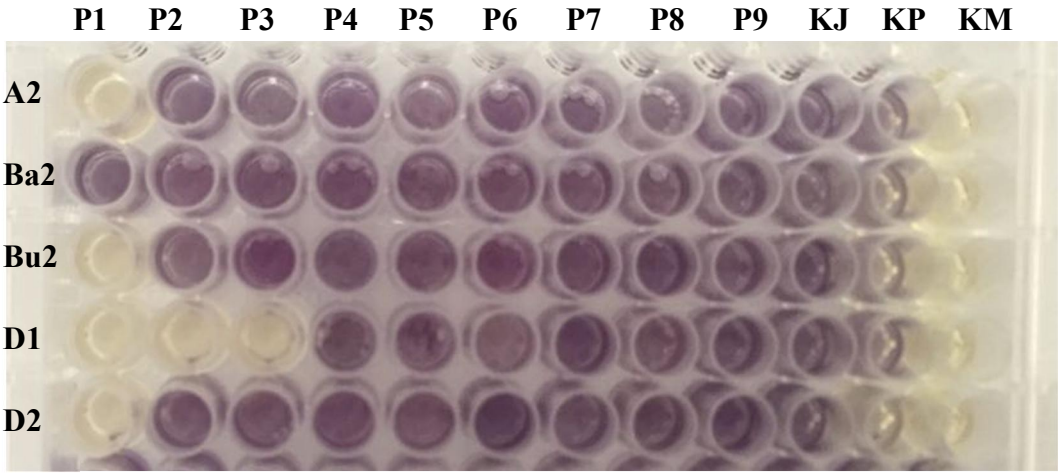
Sterilisasi sebelum melakukan kerja didalam LAF menggunakan alkohol 70%

Pembacaan hasil uji menggunakan *microplate reader*

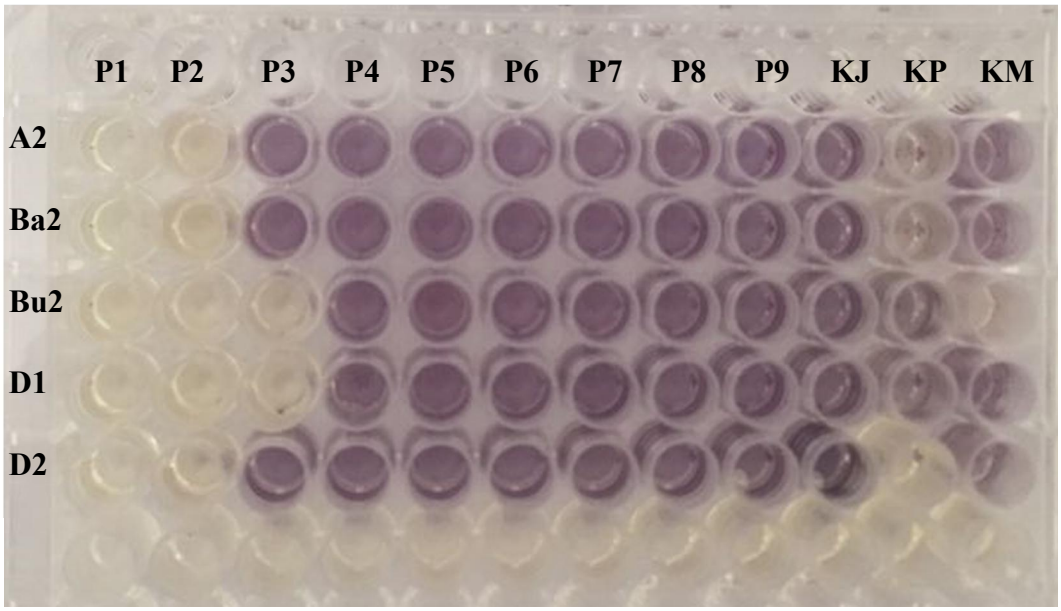
Kultivasi cair dalam *shaker incubator*

Lampiran 14. Hasil Pengujian MTT Assay

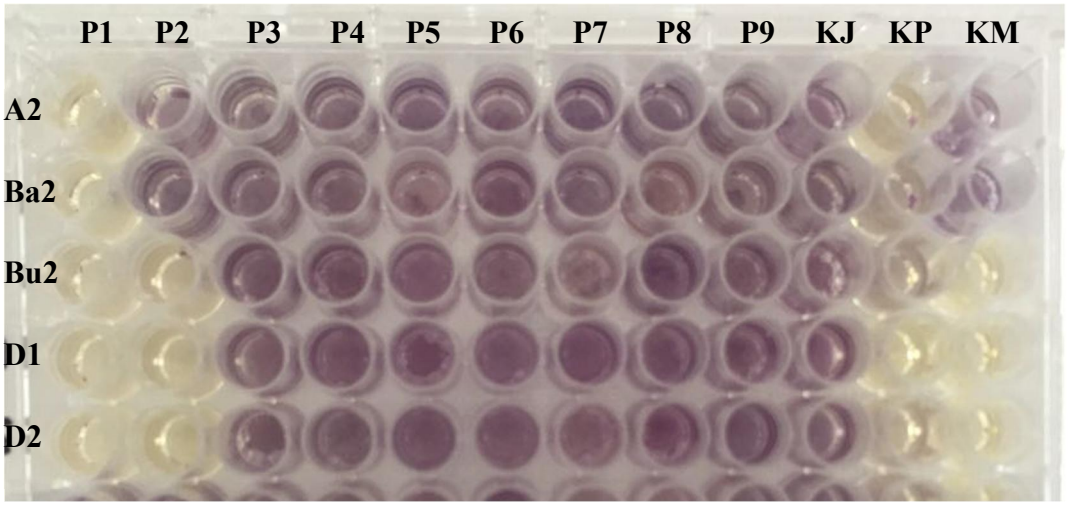
Replikasi 1



Replikasi 2



Replikasi 3



Replikasi 4