BAB 5
KESIMPULAN DAN SARAN

5.1 Kesimpulan

a. Berdasarkan hasil penelitian, campuran 1:1 ekstrak etanol 96% biji kopi robusta dan ekstrak etil asetat daun mint memiliki aktivitas antifungi terhadap *Penicillium* sp. yang diisolasi dari kaki pada konsentrasi 40% dan konsentrasi 60%, sedangkan konsentrasi 20% tidak menunjukkan aktivitas antifungi terhadap *Penicillium* sp.

b. Golongan senyawa yang terkandung dalam ekstrak etanol 96% biji kopi robusta yaitu alkaloid, flavonoid, kuinon, tanin, triterpenoid dan minyak atsiri sedangkan pada ekstrak etil asetat daun mint terdapat golongan senyawa alkaloid, flavonoid, tanin, steroid, triterpenoid, dan minyak atsiri.

5.2 Saran

a. Perlu dilakukan penelitian lebih lanjut untuk uji aktivitas antifungi campuran ekstrak etanol 96% biji kopi robusta (*Coffea canephora*) dan ekstrak etil asetat daun mint (*Mentha piperita*) terhadap *Penicillium* sp dengan menggunakan konsentrasi yang beragam sehingga dapat diketahui konsentrasi yang optimal.

b. Perlu dilakukan penelitian lebih lanjut mengenai aktivitas antifungi campuran ekstrak etanol 96% biji kopi robusta (*Coffea canephora*) dan ekstrak etil asetat daun mint (*Mentha piperita*) menggunakan senyawa dari golongan senyawa lebih efektif sebagai antifungi dari kedua tanaman sehingga dapat dikembangkan menjadi bahan baku obat antifungi khususnya terhadap *Penicillium* sp.

DAFTAR PUSTAKA

Abubakar, A.R. and Haque, M. 2020, Preparation of Medicinal Plants: Basic Extraction and Fractionation Procedures for Experimental Purposes, *Journal of Pharmacy and Bioallied Sciences*, **12(1):** 1-10.

Adamczyk, K., Garncarczyk, A., Antończak, P., and Wcisło-Dziadecka, D. 2020, The Foot Microbiome, *Journal of Cosmetic Dermatology*, **19(5):** 1039-1043.

Alabri, T. H. A., Al Musalami, A. H. S., Hossain, M. A., Weli, A. M. and Al-Riyami, Q. 2014, Comparative Study of Phytochemical Screening, Antioxidant and Antimicrobial Capacities of Fresh and Dry Leaves Crude Plant Extracts of *Datura metel* L, *Journal of King Saud University-Science*, **26(3)**: 237-243.

Al-Rejaboo, M. A., and Jalaluldeen, A. M. 2019, Studying The Airborne Fungi of Some Rooms in The Internal Sections of Mosul University Campus and The Possibility of Using Sage Plants to Control It, *Journal of Advanced Pharmacy Education & Research*, **9(3):** 17-22.

Alsohaili, S. A. and Bani-Hasan, B. M. 2018, Morphological and Molecular Identification of Fungi Isolated from Different Environmental Sources in the Northern Eastern Desert of Jordan, *Jordan Journal of Biological Sciences*, **11(3):** 329-337.

Andersen, B., Smedsgaard, J., and Frisvad, J. C. 2004, *Penicillium expansum*: Consistent Production of Patulin, Chaetoglobosins, and Other Secondary Metabolites in Culture and Their Natural Occurrence in Fruit Products, *Journal of Agricultural and Food Chemistry*, **52(8):** 2421-2428.

Ardyanti, N. K. N. T., Suhendra, L., dan Puta, G. G. 2020, Pengaruh Ukuran Partikel dan Lama Maserasi terhadap Karakteristik Ekstrak Virgin Coconut Oil Wortel (*Daucus carota* L.) sebagai Pewarna Alami, *Jurnal Rekayasa dan Manajemen Agroindustri*, **8(3):** 423-434.

Ashfia, F., Adriane, F. Y., Sari, D. P. dan Rusmini, R. 2019, Formulasi dan Uji Aktivitas Antibakteri Sediaan Footspray Anti Bau Kaki yang Mengandung Ekstrak Kulit Jeruk Nipis dan Ampas Kopi, *Indonesian Chemistry and Application Journal*, **3(1):** 28-33.

Asmah, N., Suniarti, D.F., Margono, A., Mas'ud, Z.A. and Bachtiar, E.W. 2020, Identification of Active Compounds in Ethyl Acetate, Chloroform, and N-Hexane Extracts from Peels of *Citrus aurantifolia* from Maribaya, West Java, Indonesia, *Journal of Advanced Pharmaceutical Technology & Research*, **11(3):** 107-112.

Awouafack, M. D., Tane, P. and Morita, H. 2017, 'Isolation and Structure Characterization of Flavonoids', in Justino, G., *Flavonoid: From Biosynthesis to Human Health*, IntechOpen, pp 45-59.

Balakrishnan, A. 2015, Therapeutic Uses of Peppermint-A Review, *Journal of pharmaceutical sciences and research*, **7(7):** 474-476.

Balamurugan, S. 2014, In Vitro Antifungal Activity of *Citrus aurantifolia* Linn Plant Extracts Against Phytopathogenic Fungi *Macrophomina phaseolina*, *International Letters of Natural Sciences*, **13:** 70-74.

Balouiri, M., Sadiki, M. and Ibnsouda, S. K. 2016, Methods for In Vitro Evaluating Antimicrobial Activity: A Review. *Journal of pharmaceutical analysis*, **6(2):** 71-79.

Bandh, S. A., Kamili, A. N. and Ganai, B. A. 2011, Identification of Some *Penicillium* Species by Traditional Approach of Morphological Observation and Culture, *African Journal of Microbiology Research*, **5(21):** 3493-3496.

Beena, H., Gupta, M., and Kindo, A. J. 2021, Pulmonary Infection with *Penicillium citrinum* in a Patient with Multiple Myeloma, *Indian Journal of Medical Microbiology*, **39(2):** 259-261.

Behera, S., Ghanty, S., Ahmad, F., Santra, S., and Banerjee, S. 2012, UV-Visible Spectrophotometric Method Development and Validation of Assay of Paracetamol Tablet Formulation, *J Anal Bioanal Techniques*, **3(6):** 151-7.

Benzidia, B., Barbouchi, M., Hammouch, H., Belahbib, N., Zouarhi, M., Erramli, H., Daoud, N.A., Badrane, N. and Hajjaji, N. 2019, Chemical Composition and Antioxidant Activity of Tannins Extract from Green Rind of *Aloe vera* (L.) Burm. F., *Journal of King Saud University-Science*, **31(4):**1175-1181.

Bernhard, M.K., Krause, M. and Syrbe, S., 2018, Sweaty Feet in Adolescents—Early Use of Botulinum Type A Toxin in Juvenile Plantar Hyperhidrosis, *Pediatric dermatology*, **35(6):** 784-786.

Bodalska, A., Kowalczyk, A., Włodarczyk, M. and Fecka, I. 2020, Analysis of Polyphenolic Composition of a Herbal Medicinal Product—Peppermint Tincture, *Molecules*, **25(1):** 1-19.

Bribi, N. 2018, Pharmacological Activity of Alkaloids: A Review, *Asian Journal of Botany*, **1:** 1- 6.

Campoy, S., and Adrio, J. L. 2017, Antifungals, *Biochemical Pharmacology*, **133:** 86-96.

Chairunnisa, S., Wartini, N. M. dan Suhendra, L. 2019, Pengaruh Suhu dan Waktu Maserasi terhadap Karakteristik Ekstrak Daun Bidara (*Ziziphus mauritiana* L.) sebagai Sumber Saponin, *Jurnal Rekayasa dan Manajemen Agroindustri*, **7(4):** 551-560.

De Kochko, A., Akaffou, S., Andrade, A. C., Campa, C., Crouzillat, D., Guyot, R., Ming, R., Mueller, A. A. L., Poncer, V., and Hamon, S. 2010, Advances in Coffea Genomics, *Advances in Botanical Research*, **53:** 23-63.

Departemen Kesehatan RI, 1985, *Cara Pembuatan Simplisia*, Jakarta: Departemen Kesehatan Republik Indonesia.

Departemen Kesehatan RI, 1989, *Materia Medika Indonesia* Jilid V, Jakarta: Departemen Kesehatan Republik Indonesia.

Dhifi, W., Bellili, S., Jazi, S., Bahloul, N. and Mnif, W. 2016, Essential Oils' Chemical Characterization and Investigation of Some Biological Activities: A Critical Review, *Medicines*, ***3*(4):** 2-16.

Diniarti, I. dan Iljanto, S. 2017, Strategi Peningkatan Daya Saing Industri Obat Tradisional (IOT) di Jawa Tengah Tahun 2017, *Jurnal Kebijakan Kesehatan Indonesia: JKKI*, **6(4):** 184-192.

Ditjen POM. 2000, *Parameter Standar Umum Ekstrak Tumbuhan Obat*, Jakarta: Departemen Kesehatan Republik Indonesia.

Dulger, B. 2009, Antifungal Activity of *Lamium tenuiflorum* Against Some Medical Yeast *Candida* and *Cryptococcus* Species, *Pharmaceutical Biology*, **47(5):** 467-470.

Duniya, S. V., Ojonugwa, M. C., Akogwu, O. A., and John, O. 2018, Phytochemical Constituents, Percentage Yield and Phenolic

Content Estimation of Different Solvent System of *Carica papaya* Leaves, *International Journal of Chemical and Pharmaceutical Sciences*, **6(7):** 201-205.

Egbuta, M. A., Mwanza, M. and Babalola, O. O. 2017, Health Risks Associated with Exposure to Filamentous Fungi, *International journal of environmental research and public health*, **14(7):** 719.

Ellis, D. H., Davis, S., Alexiou, H., Handke, R. and Bartley, R. 2007, *Descriptions of Medical Fungi 2nd Edition*, Adelaide: University of Adelaide.

Ergina, E., Nuryanti, S., dan Pursitasari, I. D. 2014, Uji Kualitatif Senyawa Metabolit Sekunder pada Daun Palado (*Agave angustifolia*) yang Diekstraksi dengan Pelarut Air dan Etanol, *Jurnal Akademika Kimia*, **3(3):** 165-172.

Fransworth, N. R. 1966, Biological and Phytochemical Screening of Plants, *Journal of pharmaceutical sciences*, **55(3):** 225-276.

Fatimatuzzahro, N. dan Prasetya, R. C. 2018, Efek Seduhan Kopi Robusta terhadap Profil Lipid Darah dan Berat Badan Tikus yang Diinduksi Diet Tinggi Lemak, *Jurnal Kedokteran Brawijaya*, **30(1):** 7-11.

Felsociova, S., Kacaniova, M., Horská, E., Vukovic, N., Hleba, L., Petrová, J., and Hajduová, Z. 2015, Antifungal Activity of Essential Oils Against Selected Terverticillate Penicillia, *Annals of agricultural and Environmental Medicine*, **22(1):** 38-42.

Felšöciová, S., Vukovic, N., Jeżowski, P., & Kačániová, M. 2020, Antifungal Activity of Selected Volatile Essential Oils Against *Penicillium* sp, *Open Life Sciences*, **15(1):** 511-521.

Fitriani, A., Hamdiyati, Y., dan Engriyani, R. E. R. 2012, Aktivitas Antifungi Ekstrak Etanol Daun Salam (*Syzygium polyanthum* (Wight) Walp.) terhadap Pertumbuhan Jamur *Candida albicans* secara In Vitro, *Biosfera*, **29(2):** 71-79.

Gakuubi, M. M., Maina, A. W. and Wagacha, J. M. 2017, Antifungal Activity of Essential Oil of *Eucalyptus camaldulensis* Dehnh. Against Selected *Fusarium* spp, *International journal of microbiology*, **2017:** 1-7.

Girsang, L. C., Fachrial, E., and Lister, I. N. E. 2020, Effectiveness Test of Robusta Coffee (*Coffea cenephora*) Extract from North Sumatra in Collagen and Hydration Skin Level of Female Wistar *Rattus*

norvegicus, *American Academic Scientific Research Journal for Engineering, Technology, and Sciences*, **65(1):** 108-115.

Gonelimali, F. D., Lin, J., Miao, W., Xuan, J., Charles, F., Chen, M. and Hatab, S. R. 2018, Antimicrobial Properties and Mechanism of Action of Some Plant Extracts Against Food Pathogens and Spoilage Microorganisms, *Frontiers in microbiology*, **9:** 1-9.

Gupta, P., Khare, V., Kumar, D., Ahmad, A., Banerjee, G., and Singh, M. 2015, Comparative Evaluation of Disc Diffusion and E-Test with Broth Micro-Dilution in Susceptibility Testing of Amphotericin B, Voriconazole and Caspofungin Against Clinical *Aspergillus* Isolates, *Journal of clinical and diagnostic research: JCDR*, **9(1):** DC04- DC07.

Handa, S. S., Khanuja, S. P. S., Longo, G. and Rakesh, D. D. 2008, *Extraction Technologies for Medicinal and Aromatic Plants*, United Nations Industrial Development and the International Center for Science and High Technology, Italy.

Hartini, H. 2017, Uji Aktivitas Antifungi Ekstrak Sarang Lebah dari Luwu Utara terhadap *Candida albicans*, *Bioedukasi: Jurnal Pendidikan Biologi*, **10(2):** 44-46.

Hasnaeni, H., Wisdawati, W., dan Usman, S. 2019, Pengaruh Metode Ekstraksi terhadap Rendemen dan Kadar Fenolik Ekstrak Tanaman Kayu Beta-Beta (*Lunasia amara* Blanco), *Jurnal Farmasi Galenika*, **5(2):** 175-182.

Ilyas, M., Kanti, A., Jamal, Y., Hertina, H. and Agusta, A. 2009, Biodiversity of Endophytic Fungi Associated with *Uncaria gambier* Roxb. (Rubiaceae) from West Sumatra, *Biodiversitas Journal of Biological Diversity*, **10(1):** 23-28.

Indriati, A., Hidayat, D. D., Andriansyah, C. E., Rahayuningtyas, A., dan Sudaryanto, A. 2020, Changes of Some Engineering Properties of Coffee Beans Due to Roasting Process, *Asian Journal of Applied Sciences*, **8(1):** 12-21.

Isnaini, Biworo, A., Khatimah, H., Gufron, K. M., Puteri, S. R. 2021, Aktivitas Antibakteri dan Antijamur Ekstrak Galam (*Melaleuca cajuputi* subsp. *Cumingiana* (Turcz.) *Barlow*) terhadap Bakteri *E. coli* dan Jamur *C. albicans*, **7(2):** 79-83.

Istianto, M., dan Eliza. 2009, Aktivitas Antijamur Minyak Atsiri terhadap Penyakit Antraknos Buah Pisang di Penyimpanan pada Kondisi Laboratorium, *Jurnal Hortikultura*, **19(2):** 192-198.

Katrin, D., Idiawati, N., dan Sitorus, B. 2015, Uji aktivitas antibakteri dari ekstrak daun malek (*Litsea graciae Vidal*) terhadap Bakteri *Stapylococcus aureus* dan *Escherichia coli*, *Jurnal Kimia Khatulistiwa*, **4(1):** 7-12.

Kementerian Kesehatan RI, 2017, Farmakope Herbal Indonesia, Jakarta: Kementerian Kesehatan Republik Indonesia.

Kenisa, Y. P., Istiati, I. and Setyari, W. 2012, Effect of Robusta Coffee Beans Ointment on Full Thickness Wound Healing, *Dental Journal (Majalah Kedokteran Gigi)*, **45(1):** 52-57.

Kidd, S., Halliday, C. L., Alexiou, H., and Ellis, D. 2016, *Descriptions of Medical Fungi* Vol. 3, The Authors, Adelaide, Australia.

Komala, O., Yulianita, dan Siwi, F. R. (2020). Aktivitas Antijamur Ekstrak Etanol 50% dan Etanol 96% Daun Pacar Kuku *Lawsonia inermis* L terhadap *Trichophyton mentagrophytes*, *Ekologia*, **19(1):** 12-19.

Kregiel, D., Berlowska, J., Witonska, I., Antolak, H., Proestos, C., Babic, M., Babic, L. and Zhang, B. 2017, 'Saponin-Based, Biological-Active Surfactants from Plants', in Najjar, R., *Application and Characterization of Surfactants*, IntechOpen, pp 183-205.

Kumaradewi, D. A. P., Subaidah, W. A., Andayani, Y., and Al-Mokaram, A. 2021, Phytochemical Screening and Activity Test of Antioxidant Ethanol Extract of Buni Leaves (*Antidesma bunius* L. Spreng) Using DPPH Method, *Jurnal Penelitian Pendidikan IPA*, **7(2):** 275-280.

Lestari, A. D., Elfrida, dan Indriyati. 2019, Identifikasi Jamur pada Roti yang Dijual di Kota Langsa Berdasarkan Lama Penyimpanan, *Jurnal Jeumpa*, ***6*(2):** 245-256.

Lestyaningrum, E.N., Rukmi, I. and Pujiyanto, S., 2019, In Vitro Antifungal Activity of Ethanolic and Ethyl Acetate Extract of Mint Leaves (*Mentha piperita* L.) Against *Candida albicans*, *Journal of Physics: Conference Series*, **1217(1):** 1-6.

Loolaie, M., Moasefi, N., Rasouli, H. and Adibi, H. 2017, Peppermint and Its Functionality: A Review, *Archives of Clinical Microbiology*, **8(4):** 1-16.

Lutfiyanti, R., Ma'ruf, W. F., dan Dewi, E. N. 2012, Aktivitas Antijamur Senyawa Bioaktif Ekstrak *Gelidium latifolium* terhadap *Candida albicans*, *Jurnal Pengolahan dan Bioteknologi Hasil Perikanan*, **1(1):** 26-33.

Mahlo, S. M., Chauke, H. R., McGaw, L., ang Eloff, J. 2016, Antioxidant and Antifungal Activity of Selected Medicinal Plant Extracts Against Phytopathogenic Fungi, *African Journal of Traditional, Complementary and Alternative Medicines*, **13(4):** 216-222.

Mamede, M.E. and Pastore, G.M. 2006, Study of Methods for The Extraction of Volatile Compounds from Fermented Grape Must, *Food Chemistry*, **96(4):** 586-590.

Manurung, H., Aryani, R., Nugroho, R. A., Sari, Y. P., Chemovita, R. and Auliana. 2019, Phytochemical Analysis and Antioxidant Activity of Leaves Extracts of Endemic Plant Jahe Balikpapan (Etlingera Balikpapanensis A. D. Poulsen), *International Journal of Scientific and Technology Research*, **8(9):** 308- 313.

Margaretta, S., Handayani, S. D., Indraswati, N. dan Hindarso, H. 2011, Ekstraksi Senyawa Phenolic *Pandanus amaryllifolius Roxb*. sebagai Antioksidan Alami, *Widya Teknik*, **10(1):** 21-30.

Marliana, S. D., Suryanti, V. dan Suyono, S. 2005, Skrining Fitokimia dan Analisis Kromatografi Lapis Tipis Komponen Kimia Buah Labu Siam (*Sechium edule* Jacq. Swartz.) dalam Ekstrak Etanol, *Asian Journal of Natural Product Biochemistry*, **3(1):** 26-31.

Martínez, G., Regente, M., Jacobi, S., Del Rio, M., Pinedo, M., and de la Canal, L. 2017, Chlorogenic Acid is A Fungicide Active Against Phytopathogenic Fungi, *Pesticide Biochemistry and Physiology*, **140:** 30-35.

Maslahat, M., Syawaalz, A. dan Restianingsih, R. 2013, Identifikasi Senyawa Kimia pada Simplisia Daun Sirsak (*Annona muricata Linn*.), *Jurnal Sains Natural*, **3(1):** 63-73.

McGinnis, M. R., and Tyring, S. K. 1996, *Introduction to Mycology-Medical Microbiology 4th Edition*, University of Texas Medical Branch, Galveston, diakses pada tanggal 9 November 2021, https://www.ncbi.nlm.nih.gov/books/NBK8125/

Mehta, V. V., Rajesh, G., Rao, A., Shenoy, R. and BH, M. P. 2014, Antimicrobial Efficacy of *Punica granatum* Mesocarp, *Nelumbo nucifera* Leaf, *Psidium guajava* Leaf and *Coffea canephora*

Extract on Common Oral Pathogens: An In-Vitro Study, *Journal of clinical and diagnostic research: JCDR*, **8(7):** ZC65- ZC68.

Moghaddam, M., Pourbaige, M., Tabar, H. K., Farhadi, N. and Hosseini, S. M. A. 2013, Composition and Antifungal Activity of Peppermint (*Mentha Piperita*) Essential Oil from Iran, *Journal of Essential Oil Bearing Plants*, **16(4):** 506-512.

Monisa, F. S., Bintang, M., Safithri, M., dan Falah, S. 2016, Potensi Ekstrak Tanin Daun dan Kulit Batang Surian sebagai Penghambat α-Glukosidase, *Jurnal Ilmu dan Teknologi Kayu Tropis*, **14(2):** 156-164.

Morsy, N. F. S. 2017, 'Chemical Structure, Quality Indices and Bioactivity of Essential Oil Constituents', in El-Shemy, H., *Active Ingredients from Aromatic Medicinal Plants*, IntechOpen, pp 175-206.

Mustakim, M. N., & Sari, M. (2019). Pemanfaatan Minyak Biji Kopi (Fine Robusta Toyomerto) sebagai Bahan Baku Pembuatan Parfum Eau De Toilette. *Agroindustrial Technology Journal*, **3(1):** 20-28.

Mutrikah, M., Santoso, H., dan Syauqi, A. 2018, Profil Bioaktif pada Tanaman Temulawak (*Curcuma xanthorriza* Roxb) dan Beluntas (*Pluchea indica* Less), *Biosaintropis* **4(1):** 15-21.

Nada, F. A. Q., Rahayu, T., dan Hayati, A. 2021, Analisis Skrining Fitokimia dan Aktivitas Antioksidan Ekstrak Biji Sangrai Kopi Robusta (*Coffea canephora*) dari Tanaman Hasil Pemupukan Organik dan Anorganik, *Jurnal Sains Alami (Known Nature)*, **3(2):** 31-39.

Najib, A., Malik, A., Ahmad, A. R., Handayani, V., Syarif, R. A., dan Waris, R. 2017, Standarisasi Ekstrak Air Daun Jati Belanda dan Teh Hijau, *Jurnal Fitofarmaka Indonesia*, **4(2):** 241-245.

Noman, E. A., Al-Gheethi, A.A., Rahman N. N. A., Hideyuki N., Talip B. B. H. A., Mohamed, R. M. S. R. and Kadir, M. O. A. 2018, Phenotypic Identification of *Penicillium* spp. Isolated from Clinical Wastes Based on Microstructure Characteristics, *Malaysian Journal of Microbiology*, **14(2):** 88-95.

Oshikata, C., Tsurikisawa, N., Saito, A., Watanabe, M., Kamata, Y., Tanaka, M., Tsuburai, T., Mitomi, H., Takatori, K., Yasueda, H. and Akiyama, K. 2013, Fatal Pneumonia Caused by *Penicillium digitatum*: a Case Report, *BMC Pulmonary Medicine*, **13(1):** 1-4.

Parbuntari, H., Prestica, Y., Gunawan, R., Nurman, M. N., and Adella, F. 2018, Preliminary Phytochemical Screening (Qualitative Analysis) of Cacao Leaves (*Theobroma cacao* L.), *Eksakta: Berkala Ilmiah Bidang MIPA*, **19(2):** 40-45.

Piotrowski, W. and Kubica, R. 2021, Integration of the Process for Production of Ethyl Acetate by an Enhanced Extraction Process. *Processes*, **9(8):** 1-16.

Prabowo, H., Cahya, I. A. P. D., Arisanti, C. I. S., dan Samirana, P. O. 2019, Standardisasi Spesifik dan Non-Spesifik Simplisia dan Ekstrak Etanol 96% Rimpang Kunyit (*Curcuma domestica* Val.), *Jurnal Farmasi Udayana*, **8(1):** 29-35.

Pratita, A. T. K. 2017, Skrining Fitokimia dan Analisis Kromatografi Lapis Tipis Senyawa Alkaloid dari Berbagai Ekstrak Kopi Robusta (*Coffea canephora*), *Jurnal Kesehatan Bakti Tunas Husada: Jurnal Ilmu-ilmu Keperawatan, Analis Kesehatan dan Farmasi*, **17(2):** 198-201.

Prayoga, D. G. E., Nocianitri, K. A. dan Puspawati, N. N. 2019, Identifikasi Senyawa Fitokimia dan Aktivitas Antioksidan Ekstrak Kasar Daun Pepe (*Gymnema reticulatum* Br.) Pada Berbagai Jenis Pelarut, *Jurnal Ilmu dan Teknologi Pangan*, **8(2):** 111-121.

Purwanto, P., Sagita, Y. A., Lestari, P. E., Praharani, D., Jani, Y. and Yaro, A. 2020, Inhibition of *Candida albicans* Growth by Steeping Freeze-Dried Robusta Ground Coffee, *Coffee Science*, **15:** e151638.

Puspitasari, L., Mareta, S., dan Thalib, A. 2021, Karakterisasi Senyawa Kimia Daun Mint (*Mentha* sp.) dengan Metode FTIR dan Kemometrik, *Sainstech Farma*, **14(1):** 5-11.

Putri, W.S., Warditiani, N.K. and Larasanty, L.P.F. 2013, Skrining Fitokimia Ekstrak Etil Asetat Kulit Buah Manggis (*Garcinia mangostana* L.). *Jurnal Farmasi Udayana*, **2(4):** 56-60.

Qin, Y., Huang, X., Chen, H., Liu, X., Li, Y., Hou, J., Li, A., Yan, X., and Chen, Y. 2020, Burden of *talaromyces marneffei* Infection in People Living with HIV/AIDS in Asia During ART Era: a Systematic Review and Meta-Analysis, *BMC Infectious Diseases*, **20(1):** 1-14.

Rafiq, S., Yasmin, M. R. S., Raja, F. and Shahina, S. J. 2020, Microbiological Analysis of Bacteria and Fungi from Socks of

School Children and Antibacterial Activity of Herbal Foot Disinfectant Spray, *International Journal of Scientific and Technology Research*, **9(1):** 4028-4031.

Rasul, M.G. 2018, Conventional Extraction Methods Use in Medicinal Plants, Their Advantages and Disadvantages, *International Journal of Basic Sciences Applied Computing*, **2(6):** 10-14.

Revathi, P., Prabhu, N., Jayaseelan, T. S., Lakshika, S., Manickavasagam, S., and Uma, A. 2015, Interaction of Silver Nitrate with Commercially Available Cotton Socks; Relationship to The Antibacterial Action of Silver Ions, *International Journal of Innovation Sciences and Research*, **4(3):** 120-123.

Rita, P. and Animesh, D. K. 2011, An Updated Overview on Peppermint (*Mentha piperita* L.), *International Research Journal of Pharmacy*, **2(8):** 1-10.

Rosmania, R. dan Yanti, F. 2020, Perhitungan Jumlah Bakteri di Laboratorium Mikrobiologi Menggunakan Pengembangan Metode Spektrofotometri, *Jurnal Penelitian Sains*, **22(2):** 76-86.

Sada, J. T. dan Tanjung, R. H. 2010, Keragaman Tumbuhan Obat Tradisional di Kampung Nansfori Distrik Supiori Utara, kabupaten Supiori–Papua, *Jurnal Biologi Papua*, **2(2):** 39-46.

Sader, H. S. and Pignatari, A. C. C. 1994, E Test: A Novel Technique for Antimicrobial Susceptibility Testing, *Sao Paulo Medical Journal*, **112(4):** 635-638.

Saharkhiz, M. J., Motamedi, M., Zomorodian, K., Pakshir, K., Miri, R., and Hemyari, K. 2012, Chemical Composition, Antifungal and Antibiofilm Activities of The Essential Oil of *Mentha piperita* L, *International Scholarly Research Notices*, **2012.**

Saif, F. A., Yaseen, S. A., Alameen, A. S., Mane, S. B., & Undre, P. B. 2020. Identification of *Penicillium* Species of Fruits Using Morphology and Spectroscopic Methods, *Journal of Physics: Conference Series*, **1644 (1):** 012019.

Salni, S., Aminasih, N. dan Srivonia, R. 2013, Isolasi Senyawa Antijamur dari Rimpang Lengkuas Putih (*Alpinia galanga* (L.) Willd) dan Penentuan Konsentrasi Hambat Minimum terhadap *Candida albicans*, *Prosiding Semirata FMIPA Universitas Lampung*, **1(1):** 301-307.

Sang, H. K., Choi, Y. P. and Yu, S. H. 2010, Phylogenetic Analysis, Morphology and Pathogenicity of *Penicillium* spp. Associated with Blue Mold of Apple in Korea, *Korean Journal of Agricultural Science*, **37(3):** 341-350.

Santosa, H., Sari, W. and Handayani, N. A. 2018, Ekstraksi Saponin Dari Daun Waru Berbantu Ultrasonik Suatu Usaha Untuk Mendapatkan Senyawa Penghambat Berkembangnya Sel Kanker, *Jurnal Inovasi Teknik Kimia*, **3(2):** 12-16.

Sari, E. R., dan Nugraheni, E. R. 2013, Uji Aktivitas Antifungi Ekstrak Etanol Daun Cabai Jawa (*Piper retrofractum*) terhadap Pertumbuhan *Candida albicans*, *Biofarmasi*, **11(2):** 36-42.

Scorzoni, L., Benaducci, T., Almeida, A. M. F., Silva, D. H. S., Bolzani, V. D. S. and Gianinni, M. J. S. M. 2007, The Use of Standard Methodology for Determination of Antifungal Activity of Natural Products Against Medical Yeasts *Candida* sp and *Cryptococcus* sp., *Brazilian Journal of Microbiology*, **38:** 391-397.

Setyawaty, R. 2020, Preliminary Studies on The Content of Phytochemical Compounds on Skin of Salak Fruit (*Salacca zalacca*), *Pharmaceutical Journal of Indonesia*, **6(1):** 1-6.

Shalayel, M.H.F., Asaad, A.M., Qureshi, M.A. and Elhussein, A.B. 2017, Anti-Bacterial Activity of Peppermint (*Mentha piperita*) Extracts Against Some Emerging Multi-Drug Resistant Human Bacterial Pathogens, *Journal of Herbal Medicine*, **7:** 27-30.

Silambarasan, S., Kumar, E. P., Murugan, T., Saravanan, D. and Balagurunathan, R. 2012, Antibacterial and Antifungal Activities of Actinobacteria Isolated from Rathnagiri Hills, *Journal of Applied Pharmaceutical Science*, **2(10):** 99 – 103.

Singh, A. P. and Kumar, S. 2019, 'Applications of tannins in industry', in Aires, A., *Tannins-Structural Properties, Biological Properties and Current Knowledge*, IntechOpen, pp 1-19.

Siswandono dan Soekardjo, H.B. 2000, Kimia Medisinal II, Universitas Airlangga Press, Surabaya.

Smeriglio, A., Barreca, D., Bellocco, E. and Trombetta, D. 2017, Proanthocyanidins and Hydrolysable Tannins: Occurrence, Dietary Intake and Pharmacological Effects, *British journal of pharmacology*, **174:** 1244-1262.

Steglińska, A., Jachowicz, A., Szulc, J., Adamiak, J., Otlewska, A., Pielech-Przybylska, K. and Gutarowska, B. 2019, Factors Influencing Microbiological Biodiversity of Human Foot Skin, *International journal of environmental research and public health*, **16(18):** 3503.

Subaryanti, S., Melasari, F., dan Zainuddin, R. 2022, Potensi Antifungi Ekstrak Etanol Kulit Buah Pisang Batu (*Musa balbisiana* Colla) terhadap Pertumbuhan *Candida albicans* dan *Candida tropicalis*., *Sainstech Farma*, **15(1):** 23-30.

Sujana, P., Sridhar, T. M., Josthna, P., and Naidu, C. V. 2013, Antibacterial Activity and Phytochemical Analysis of *Mentha piperita* L. (Peppermint)—An Important Multipurpose Medicinal Plant, *American Journal of Plan Sciences*, **4:** 77-83.

Sulasiyah, S., Sarjono, P. R. dan Aminin, A. L. 2018, Antioxidant from Turmeric Fermentation Products (*Curcuma longa*) by *Aspergillus oryzae. Jurnal Kimia Sains dan Aplikasi*, **21(1):** 13-18.

Sung, W. S., and Lee, D. G. 2010, Antifungal Action of Chlorogenic Acid Against Pathogenic Fungi, Mediated by Membrane Disruption, *Pure and Applied Chemistry*, **82(1):** 219-226.

Surahmaida, S., dan Umarudin, U. 2019, Studi Fitokimia Ekstrak Daun Kemangi dan Daun Kumis Kucing Menggunakan Pelarut Metanol, *Indonesian Chemistry and Application Journal*, **3(1):** 1-6.

Sweetman, C. S. 2009, Martindale: The Complete Drug Reference 36th edition, Pharmaceutical Press, London.

Tanauma, H. A. 2016, Aktivitas Antibakteri Ekstrak Biji Kopi Robusta (*Coffea canephora*) Terhadap Bakteri *Escherichia coli*, *Pharmacon*, ***5*(4):** 243-251.

Taurina, W., Sari, R., Hafinur, U. C., Wahdaningsih, S., dan Isnindar. 2017, Optimasi dan Lama Pengadukan terhadap Ukuran Nanopartikel Kitosan-Ekstrak Etanol 70% Kulit Jeruk Siam (*Citrus nobilis* L.var Microcarpa), *Traditional Medicine Journal*, **22(1):** 16-20.

Tetti, M. 2014, Ekstraksi, Pemisahan Senyawa, dan Identifikasi Senyawa Aktif, *Jurnal Kesehatan*, **7(2)**.

Tiran, F. A. dan Nastiti, C. M. 2014, Aktivitas Antibakteri Lotion Minyak Kayu Manis terhadap *Staphylococcus epidermidis* Penyebab Bau Kaki, *Jurnal Farmasi Sains dan Komunitas (Journal of Pharmaceutical Sciences and Community),* **11(2):** 72-80.

Tiwari, R., Singh, S.K., Choudhury, S. and Garg, S.K. 2017, Antifungal Activity of Methanolic Extracts of Leaves of *Eucalyptus citriodora* and *Saraca indica* Against Fungal Isolates from Dermatological Disorders in Canines, *International Journal of Pharmacology*, **13(6):** 643-648.

Tok, T. T. and Gowder, S. J. 2019, Structural and Pharmacological Properties of Alkaloids with Special Reference to Thebaine Type Alkaloids, *Biomedical Journal of Scientific and Technical Research*, **17(3):** 12767-12780.

Trisnawaty, K., Rauna, A. E., Dewi, S. R. P., dan Handayani, P. 2020, In Vitro Study of Antifungal Effect of *Carica papaya* Peel Var. California Extract Against *Candida albicans*, *Jurnal Kedokteran dan Kesehatan: Publikasi Ilmiah Fakultas Kedokteran Universitas Sriwijaya*, **8(1):** 61-68.

Tullio, V., Roana, J., Scalas, D. and Mandras, N. 2019, Evaluation of The Antifungal Activity of *Mentha x Piperita* (*Lamiaceae*) of Pancalieri (Turin, Italy) Essential Oil and Its Synergistic Interaction with Azoles, *Molecules*, **24(17):** 3148.

UC, R. and Nair, V. M. G. 2013, Phytochemical Analysis of Successive Reextracts of The Leaves of *Moringa oleifera Lam*., *International Journal of Pharmacy and Pharmaceutical Sciences*, **5:** 629-634.

United States Departement of Agriculture. 2015. Plants Profile for *Mentha piperita* (Pappermint). Diakses pada 2 Mei 2021, https://plants.usda.gov/home/plantProfile?symbol=MEPI

United States Departement of Agriculture. 2015, 'Plants Profile for *Coffea canephora* (Robusta coffee), diakses pada 2 Mei 2021, https://plants.usda.gov/home/plantProfile?symbol=MEPI

Utami, N. F., and Nhestricia, N. 2019, The Test of Antioxidant Activities with Comparison of Extraction Methods from Robusta Coffee Seeds (*Coffea canephora*), *Journal of Science Innovare*, **1(02):** 60-63.

Utami, Y. P., Umar, A. H., Syahruni, R., dan Kadullah, I. 2017, Standardisasi Simplisia dan Ekstrak Etanol Daun Leilem (*Clerodendrum minahassae* Teisjm. & Binn.), *Journal of Pharmaceutical and Medicinal Sciences*, **2(1):** 32-39.

Valgas, C., Souza, S. M. D., Smânia, E. F. and Smânia Jr, A. 2007, Screening Methods to Determine Antibacterial Activity of Natural Products. *Brazilian journal of microbiology*, **38:** 369-380.

Van Der Vossen, H. A. M. and Wessel, M. (eds). 2000, *Plant Resource of South-East Asia*, Backhuys Publishers, The Netherlands.

Velho-Pereira, S. and Kamat, N. M. 2011, Antimicrobial Screening of Actinobacteria Using a Modified Cross-Streak Method, *Indian journal of pharmaceutical sciences*, **73(2):** 223.

Vernanda, R. Y., Puspitasari, M. R., dan Satya, H. N. 2019, Standarisasi Spesifik dan Non Spesifik Simplisia dan Ekstrak Etanol Bawang Putih Tunggal Terfermentasi (*Allium sativum* Linn.), *Jurnal Farmasi Sains dan Terapan*, **6(2):** 74-83.

Vifta, R. L. dan Advistasari, Y. D. 2018, Skrining Fitokimia, Karakterisasi, dan Penentuan Kadar Flavonoid Total Ekstrak dan Fraksi-Fraksi Buah Parijoto (*Medinilla speciosa* B.), *Prosiding Seminar Nasional Unimus*, **1:** 8-14.

Visagie, C. M., Houbraken, J., Frisvad, J. C., Hong, S. B., Klaassen, C. H. W., Perrone, G., Seifert, K.A., Varga, J., Yaguchi, T., and Samson, R. A. 2014, Identification and Nomenclature of The Genus *Penicillium*, *Studies in Mycology*, **78:** 343-371.

Wahyuni, D. T., dan Widjanarko, S. B. 2015, Pengaruh Jenis Pelarut dan Lama Ekstraksi terhadap Ekstrak Karotenoid Labu Kuning dengan Metode Gelombang Ultrasonik, *Jurnal Pangan dan Agroindustri*, **3(2):** 390-401.

Wahyuni, R., Guswandi, G., dan Rivai, H. 2017, Pengaruh Cara Pengeringan Dengan Oven, Kering Angin dan Cahaya Matahari Langsung terhadap Mutu Simplisia Herba Sambiloto, *Jurnal Farmasi Higea*, **6(2):** 126-132.

Wiegand, I., Hilpert, K. and Hancock, R. E. 2008, Agar and Broth Dilution Methods to Determine the Minimal Inhibitory Concentration (MIC) of Antimicrobial Substances, *Nature protocols*, **3(2):** 163-175.

Wigati, E. I., Pratiwi, E., Nissa, T. F., dan Utami, N. F. 2018, Uji Karakteristik Fitokimia dan Aktivitas Antioksidan Biji Kopi Robusta (*Coffea canephora* Pierre) dari Bogor, Bandung dan Garut dengan metode DPPH (1,1-diphenyl-2-picrylhydrazyl), *Fitofarmaka: Jurnal Ilmiah Farmasi*, **8(1):** 59-66.

Wijaya, S., Setiawan, H. K., dan Purnama, V. B. 2019, Standarisasi Spesifik dan Non Spesifik dari Ekstrak Etanol Daun andang Gendis (*Clinacanthus nutans*), *Jurnal Farmasi Sains dan Terapan*, **6(2):** 56-65.

Wijaya, W., Ridwan, R.D., and Budi, H.S. 2016, Antibacterial Ability of Arabica (*Coffea Arabica*) and Robusta (*Coffea Canephora*) Coffee Extract on Lactobacillus Acidophilus, *Majalah Kedokteran Gigi*, **49 (2):** 99-103.

World Health Organization. 2002. WHO Monograph on Selected Medicinal Plants Volume 2. Diakses pada 4 Mei 2021, http://apps.who.int/iris/bitstream/handle/10665/42052/9241545372.pdf?sequence=2

Wullur, A. C., Schaduw, J., dan Wardhani, A. N. 2012, Identifikasi Alkaloid pada Daun Sirsak (*Annona muricata* L.), *Jurnal Ilmiah Farmasi*, **3(2):** 54-56.

Yadav, A. N., Verma, P., Kumar, V., Sangwan, P., Mishra, S., Panjiar, N., Gupta V. K., and Saxena, A. K. 2018, 'Biodiversity of The Genus *Penicillium* in Different Habitats', in Gupta V. K., *New and future developments in microbial biotechnology and bioengineering, Penicillium System Properties and Applications*, 1st ed., Elsevier, pp 3-18.

Yanti, R., Nurdiawati, H., Cahyanto, M. N., dan Pranoto, Y. 2020, Identifikasi Komponen dan Uji Potensi Anti Jamur Minyak Atsiri Serai Dapur (*Cympobogon citratus*) terhadap Jamur Penghasil Aflatoksin, *Agritekno: Jurnal Teknologi Pertanian*, **9(2):** 72-80.

Yasir, A. S., Suryaneta, A. G. F., Saputra, I. S., Hermawan, D., dan Berliyanti, R. T. 2022, Formulasi Masker Gel Peel-Off Ekstrak Biji Kopi Robusta (*Coffea canephora*) Khas Lampung, *Majalah Farmasetika*, **7(2):** 153-164.

Yuwanti, S., Yusianto, dan Nugraha, T.C. 2016, 'Karakteristik Minyak Kopi yang Dihasilkan dari Berbagai Suhu Penyangraian', Universitas Negeri Jember, Prosiding Seminar Nasional APTA, Jember, Indonesia, pp. 157-160.

Zhang, Q. W., Lin, L. G. and Ye, W. C. 2018, Techniques for Extraction and Isolation of Natural Products: A Comprehensive Review, *Chinese medicine*, **13(1):** 1-26.

Zhou, X., Seto, S.W., Chang, D., Kiat, H., Razmovski-Naumovski, V., Chan, K. and Bensoussan, A., 2016, Synergistic Effects of Chinese Herbal Medicine: A Comprehensive Review of Methodology and Current Research, *Frontiers in Pharmacology*, **7:** 1-16.

Zhu, C., Lei, M., Andargie, M., Zeng, J., dan Li, J. 2019, Antifungal Activity and Mechanism of Action of Tannic Acid Against *Penicillium digitatum*, *Physiological & Molecular Plant Pathology, Elsevier*, **107(7):** 46-5