

DAFTAR PUSTAKA

- Andayani, D.G.S., Sukandar, U., Sukandar, E.Y., Adnyana, I.K., 2015. Antibacterial, Antifungal and Anticancer Activity of Five Strains of Soil Microorganisms Isolated From Tangkuban Perahu Mountain by Fermentation. *HAYATI J. Biosci.* 22, 186–190.
- Balouiri, M., Sadiki, M., Ibensouda, S.K., 2016. Methods for In Vitro Evaluating Antimicrobial Activity: A Review. *J. Pharm. Anal.* 6, 71–79.
- Baskaran, R., Vijayakumar, R., Mohan, P.M., 2011. Enrichment method for the isolation of bioactive actinomycetes from mangrove sediments of Andaman Islands, India. *Malays. J. Microbiol.* 7, 26–32.
- Chavan, D. V, 2013. A Review on Actinomycetes and Their Biotechnological Application. *Int. J. Pharm. Sci. Res.* 4, 1730–1742.
- Cloekaert, A., Zygmunt, M.S., Doublet, B., 2017. Editorial : Genetics of Acquired Antimicrobial Resistance in Animal and Zoonotic Pathogens 8, 8–10.
- Cover, T.M., Gacs, P., Gray, R.M., 1989. Kolmogorov's Contributions to Information Theory and Algorithmic Complexity. *Ann. Probab.* 17, 840–865.
- Cox, G., Wright, G.D., 2013. Intrinsic Antibiotic Resistance: Mechanisms, Origins, Challenges and Solutions. *Int. J. Med. Microbiol.*
- Davis, W.W., Stout, T.R., 1971. Disc Plate Method of Microbiological Antibiotic Assay. I. Factors Influencing Variability and Error. *Appl. Microbiol.* 22, 659–665.
- Dewi, A., 2013. Isolasi, identifikasi dan uji sensitivitas *Staphylococcus aureus* terhadap Amoxicillin dari Sampel Susu Kambing Peranakan Ettawa (PE) Penderita Mastitis di Wilayah Girimulyo, Kulonprogo, Yogyakarta. *J. Sain Vet.* 31, 138–150.
- Eccleston, G.P., 2008. The Occurrence of Bioactive Micromonosporae in Aquatic Habitats of the Sunshine Coast in Australia. *Mar. Drugs* 6, 243–261.
- El Karkouri, A., Assou, S.A., El Hassouni, M., 2019. Isolation and Screening of Actinomycetes Producing Antimicrobial Substances from an Extreme Moroccan Biotope. *Pan Afr. Med. J.* 33, 1–9.
- Elfidasari, D., 2011. Perbandingan Kualitas Es di Lingkungan Universitas Al Azhar Indonesia dengan Restoran Fast Food di Daerah Senayan dengan Indikator Jumlah *Escherichia coli* Terlarut. *J. Al-AZHAR Indones. SERI SAINS DAN Teknol.* 1, 18.
- Garcia, L.C., Martinez-Molina, E., Trujillo, M.E., 2010. *Micromonospora pisi* sp. nov., Isolated From Root Nodules of *pisum sativum*. *Int. J. Syst. Evol. Microbiol.* 60, 331–337.
- Hudzicki, J., 2016. Kirby-Bauer Disk Diffusion Susceptibility. *Am. Soc. Microbiol.* 3, 6–13.
- Islam, M.S., Aryasomayajula, A., Selvaganapathy, P.R., 2017. A review on Macroscale and Microscale Cell Lysis Methods. *Micromachines* 8.

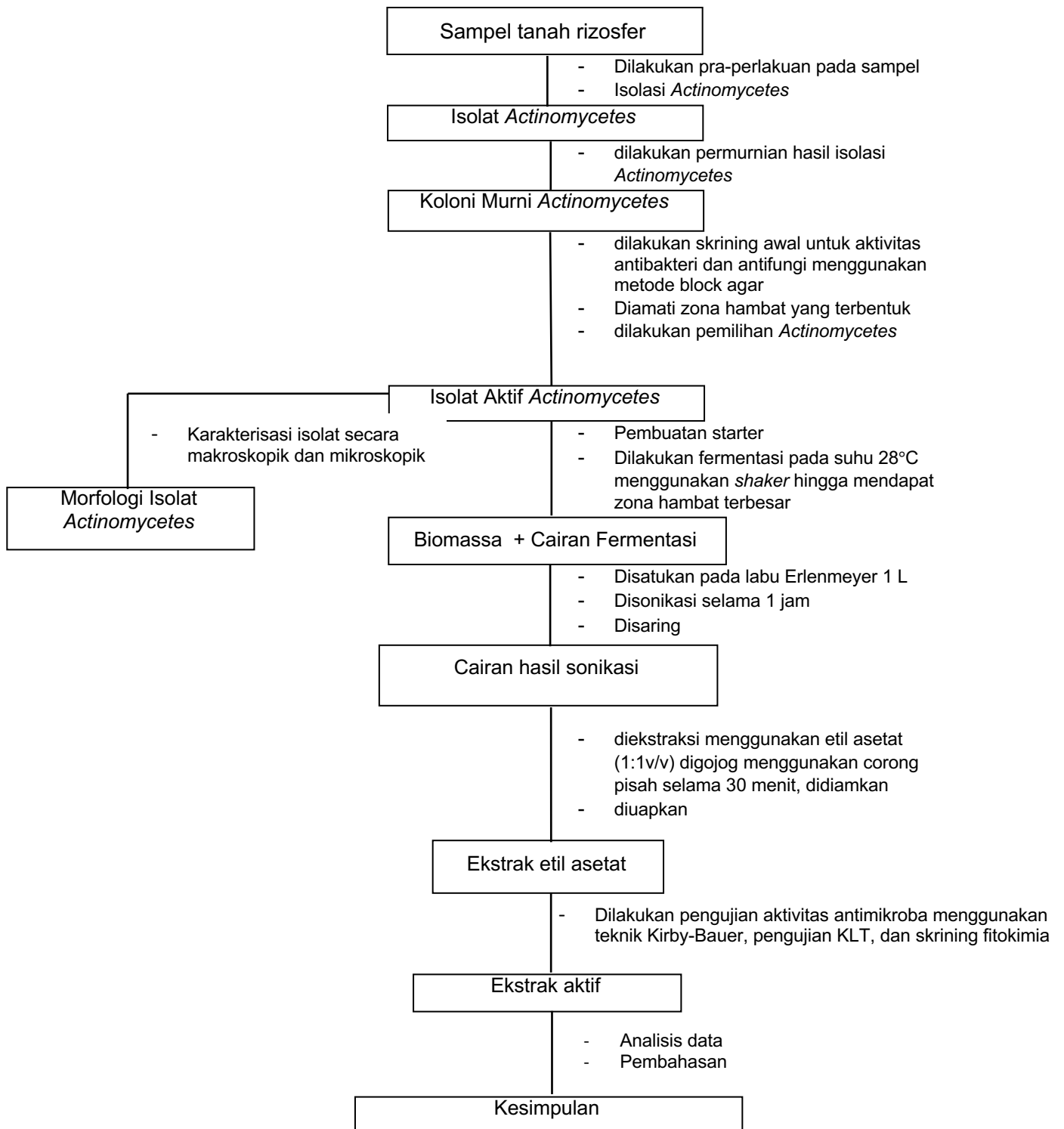
- Islamiah, D.N., Linda, R., Rahmawati, 2017. Jenis-jenis Bakteri Rizosfer Kawasan Tanah Mangrove *Avicennia* di Kelurahan Terusan , Kecamatan Mempawah hilir, Kalimantan Barat. *J. Protobiont* 6, 165–172.
- Jiang, Y., Li, Q., Chen, X., Jiang, C., 2016. Isolation and Cultivation Methods of Actinobacteria. *Actinobacteria - Basics Biotechnol. Appl.*
- Katili, A.S., Retnowati, Y., 2017. Isolation of Actinomycetes from mangrove ecosystem in Torosiaje, Gorontalo, Indonesia. *Biodiversitas* 18, 826–833.
- Krismawati, H., Sembiring, L., Wahyuono, S., 2015. Streptomycetes Penghasil Antibiotik yang Berasosiasi dengan Rhizosfer Beberapa Spesies Mangrove. *J. Plasma* 1, 59–70.
- Kumar, R.R., Jadeja, V.J., 2016. Isolation of Actinomycetes: A Complete Approach. *Int. J. Curr. Microbiol. Appl. Sci.* 5, 606–618.
- Lee, L.H., Zainal, N., Azman, A.S., Eng, S.K., Goh, B.H., Yin, W.F., Ab Mutalib, N.S., Chan, K.G., 2014. Diversity and antimicrobial activities of actinobacteria isolated from tropical mangrove sediments in Malaysia. *Sci. World J.* 2014.
- Malek, N.A., Zainuddin, Z., Chowdhury, A.J.K., Abidin, Z.A.Z., 2015. Diversity and Antimicrobial Activity of Mangrove Soil Actinomycetes Isolated from Tanjung Lumpur, Kuantan. *J. Teknol.* 77, 37–43.
- Mizuhara, N., Kuroda, M., Ogita, A., Tanaka, T., Usuki, Y., Fujita, K.I., 2011. Antifungal Thiopeptide Cyclothiazomycin B1 Exhibits Growth Inhibition Accompanying Morphological Changes Via Binding to Fungal Cell Wall Chitin. *Bioorganic Med. Chem.* 19, 5300–5310.
- Neu, H.C. and Gootz, T.D. 2001. Antimicrobial Chemotherapy. In: Baron, S. (eds)., "Medical Microbiology". 5th Ed. Galvestone: The University of Texas Medical Branch.
- NKT, M., 2013. Keanekaragaman Mangrove di Wilayah Tapak, Tugurejo, Semarang 36, 123–130.
- Nurkanto, A., Agusta, A., 2015. Identifikasi Molekular dan Karakterisasi Morfo-Fisiologi Actinomycetes Penghasil Senyawa Antimikroba (Molecular Identification and Morpho-Physiological Characterization of Actinomycetes with Antimicrobial Properties). *J. Biol. Indones.* 11, 195–203.
- Paul, R.K., Dutta, D., Chakraborty, D., Nayak, A., Dutta, P.K., Nag, M., 2019. Antimicrobial Agents from Natural Sources: An Overview. *Adv. Pharm. J.* 4, 41–51.
- Pimentel-Elardo, S.M., Tiro, L.P., Grozdanov, L., Hentschel, U., 2008. *Saccharopolyspora cebuensis* sp. nov., a Novel Actinomycete Isolated from a Philippine Sponge (Porifera). *Int. J. Syst. Evol. Microbiol.* 58, 628–632.
- Prasetyo, H.D., Santoso, I., Maryanto, A.E., 2021. Production of Antimicrobial Compound from Two Potential Actinomycetes SRM 2 and SD 17 Using Soluble and Local Starch. *J. Phys. Conf. Ser.* 1725.
- Pratama, Y., Sarjono, P.R., Mulyani, N.S., 2015. Skrining Metabolit

- Sekunder Bakteri Endofit yang Berfungsi sebagai Antidiabetes dari Daun Mimba (*Azadirachta Indica*). *J. Kim. Sains dan Apl.* 18, 73–78.
- R, F., Citra, D., Nirwani, B., Nurmasitoh, T., Bowo, E., 2009. Manfaat Sirih Merah (*Piper Crocatum*) sebagai Agen Anti Bakterial Terhadap Bakteri Gram Positif Dan Bakteri Gram Negatif. *J. Kedokt. dan Kesehat. Indones.* 1, 12–20.
- Raihan, M., Taqwa, N., Hanifah, A.R., Lallo, S., Ismail, I., Amir, M.N., 2020. Skrining Fitokimia Ekstrak Kulit Buah Nangka (*Artocarpus heterophyllus*) dan Aktifitas Antioksidannya terhadap [2,2'-azinobis-(3-ethylbenzothiazoline-6-sulfonate)] (ABTS). *Maj. Farm. dan Farmakol.* 23, 101–105.
- Retnowati, Y., 2017. Isolasi dan Uji Aktivitas Antibakteri Actinomycetes dari Rhizosfer Bakau di Hutan Bakau Torosiaje Gorontalo. *Semin. Nas. Pendidik. Biol. dan Saintek II* 1–10.
- Rosmine, E., Varghese, S.A., 2016. Isolation of actinomycetes from mangrove and estuarine sediments of Cochin and screening for antimicrobial activity. *J. Coast. Life Med.* 4, 207–210.
- Ryandini, D., Radjasa, O.K., Oedjijono, 2018. Isolate Actinomycetes SA32 Origin of Segara Anakan Mangrove Rhizosphere and its Capability in Inhibiting Multi-Drugs Resistant Bacteria Growth. *J. Microb. Biochem. Technol.* 10, 1–7.
- Sabaratnam, V., Fiedler, H.-P., Ward, A., Goodfellow, M., 2004. Production and Chemical Characterization of Antifungal Metabolites From Micromonosporasp. M39 Isolated From Mangrove Rhizosphere Soil. *World J. Microbiol. Biotechnol.* 523–528.
- Saga, T., Yamaguchi, K., 2009. History of Antimicrobial Agents and Resistant Bacteria. *Japan Med. Assoc. J.* 52, 103–108.
- Sapkota, A., Thapa, A., Budhathoki, A., Sainju, M., Shrestha, P., Aryal, S., 2020. Isolation, Characterization, and Screening of Antimicrobial-Producing Actinomycetes from Soil Samples. *Int. J. Microbiol.* 2020.
- Sengupta, S., Pramanik, A., Ghosh, A., Bhattacharyya, M., 2015. Antimicrobial activities of actinomycetes isolated from unexplored regions of Sundarbans mangrove ecosystem. *BMC Microbiol.* 15, 1–16.
- Sharma, D., Kaur, T., Chadha, B.S., Manhas, R.K., 2011. Antimicrobial activity of actinomycetes against multidrug resistant staphylococcus aureus, E. coli and various other pathogens. *Trop. J. Pharm. Res.* 10, 801–808.
- Soares, G.M.S., Figueiredo, L.C., Faveri, M., Cortelli, S.C., Duarte, P.M., Feres, M., 2012. Mechanisms of Action of Systemic Antibiotics Used in Periodontal Treatment and Mechanisms of Bacterial Resistance to These Drugs. *J. Appl. Oral Sci.* 20, 295–305.
- Sofariyanti, A.E., Sasongkowati, R., Anggraini, A.D., 2019. Aktivitas Antibakteri Aktinomisetes Di Hutan Mangrove Wonorejo Surabaya yang Antagonis Terhadap Bakteri Staphylococcus aureus 8, 738–748.
- Solecka, J., Zajko, J., Postek, M., Rajnisz, A., 2012. Biologically Active

- Secondary Metabolites from Actinomycetes. *Cent. Eur. J. Biol.* 7, 373–390.
- Song, Q., Huang, Y., Yang, H., 2012. Optimization of Fermentation Conditions for Antibiotic Production by Actinomycetes YJ1 Strain against *Sclerotinia sclerotiorum*. *J. Agric. Sci.* 4, 95–102.
- Valli, S., Sugasini, S.S., Aysha, O.S., Nirmala, P., Vinoth Kumar, P., Reena, A., 2012. Antimicrobial potential of actinomycetes species isolated from marine environment. *Asian Pac. J. Trop. Biomed.* 2, 469–473.
- Wang, X., Huang, L., Kang, Z., Buchenauer, H., Gao, X., 2010. Optimization of the Fermentation Process of Actinomycete strain Hhs.015(T). *J. Biomed. Biotechnol.* 2010.
- Xiao, J., Wang, Y., Luo, Y., Xie, S.J., Ruan, J.S., Xu, J., 2009. *Streptomyces avicenniae* sp. nov., a Novel Actinomycete Isolated from the Rhizosphere of the Mangrove Plant *Avicennia mariana*. *Int. J. Syst. Evol. Microbiol.* 59, 2624–2628.

LAMPIRAN

Lampiran 1. Skema kerja penelitian



Lampiran 2. Komposisi Media**Tabel 4. Komposisi Media NA**

Nama Bahan	Jumlah
<i>Beef extract</i>	0,3 g
Pepton	0,5 g
Agar	1,5 g
Aquadest	ad 100 mL

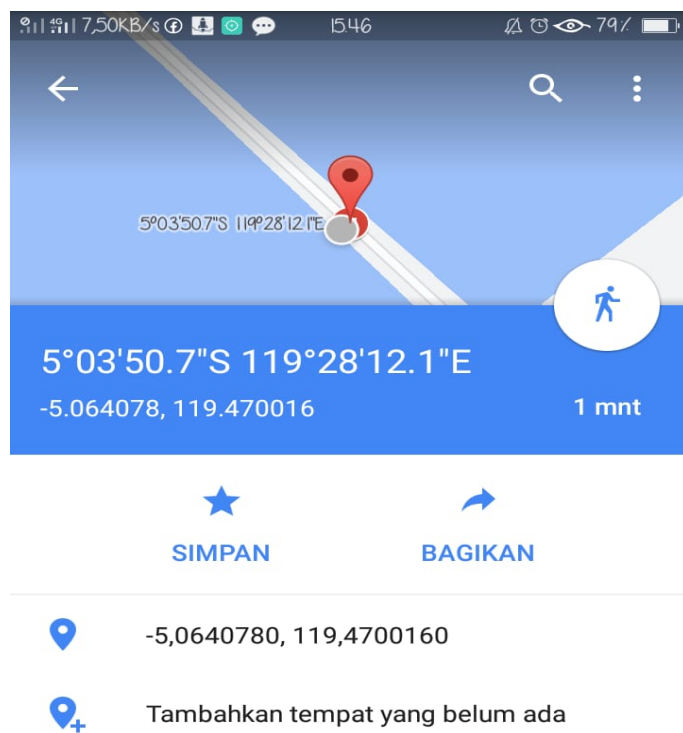
Tabel 5. Komposisi Media PDA

Nama Bahan	Jumlah
Pati kentang	0,4 g
Dekstrosa	2 g
Agar	1,5 g
Aquadest	ad 100 mL

Tabel 6. Komposisi Media MHA

Nama Bahan	Jumlah
<i>Beef extract</i>	0,2 g
<i>Casein hydrolysate</i>	1,75 g
<i>Starch</i>	0,15 g
<i>Agar</i>	1,7 g
Aquadest	ad 100 mL

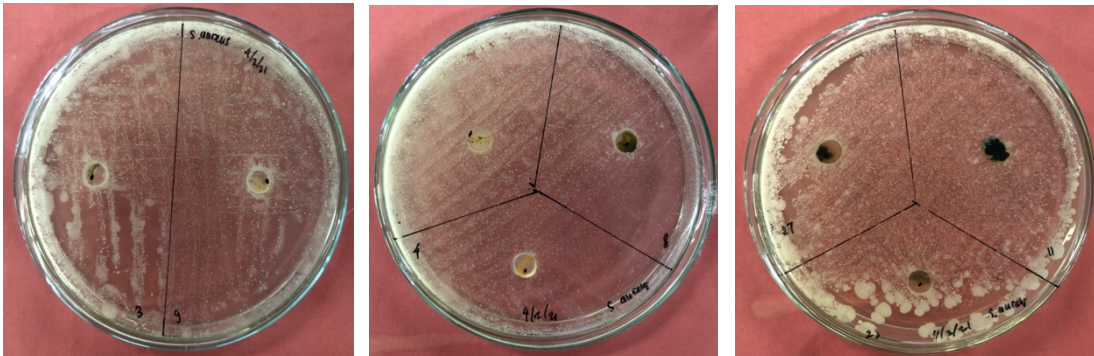
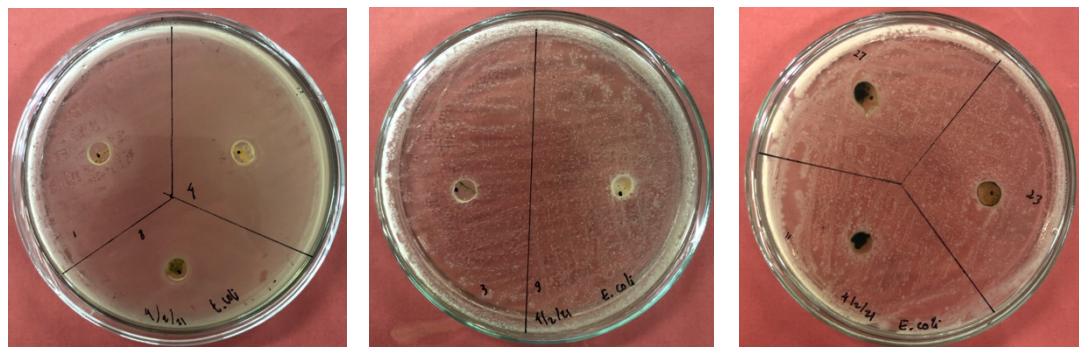
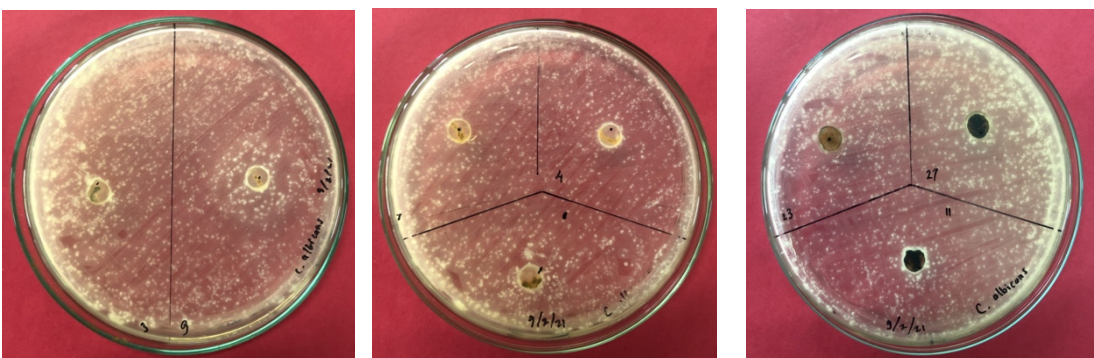
Lampiran 3. Lokasi Pengambilan Sampel



Gambar 9. Peta lokasi pengambilan sampel



Gambar 10. Tempat Pengambilan Sampel

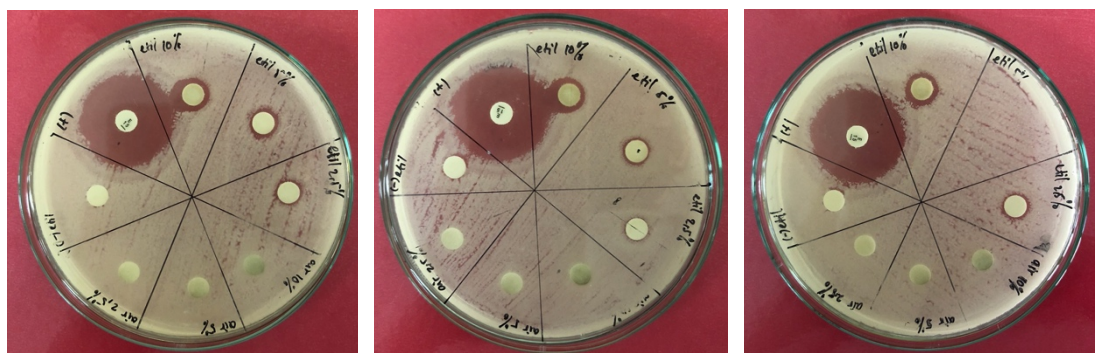
Lampiran 4. Gambar Hasil Penelitian**Gambar 11. Hasil uji antagonis isolat terhadap *S. aureus*****Gambar 12. Hasil uji antagonis isolat terhadap *E. coli*****Gambar 13. Hasil uji antagonis isolat terhadap *C. albicans***



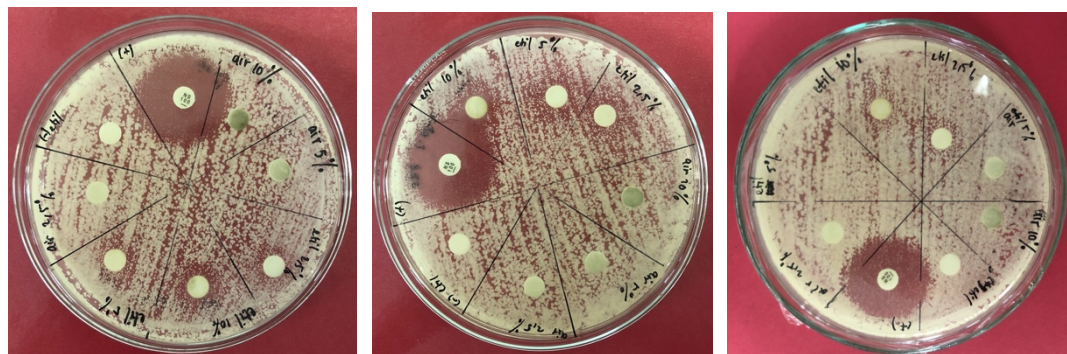
Gambar 14. Hasil fermentasi selama 12 hari



Gambar 15. Hasil uji aktivitas antimikroba terhadap *S. aureus*



Gambar 16. Hasil uji aktivitas antimikroba terhadap *E. coli*



Gambar 1. Hasil uji aktivitas antimikroba terhadap *C. albicans*