

BAB 7

KESIMPULAN DAN SARAN

7.1 Kesimpulan

Berdasarkan hasil penelitian yang telah dilakukan, dapat disimpulkan bahwa :

1. Ekstrak metanol batang tanaman zaitun pada konsentrasi 200 – 51.200 $\mu\text{g/mL}$ terbukti tidak mempunyai Konsentrasi Bunuh Minimal (KBM) terhadap bakteri *Staphylococcus aureus*, namun jika konsentrasi ditingkatkan melebihi 51.200 $\mu\text{g/mL}$ kemungkinan nilai KBM dapat ditemukan.
2. Ekstrak metanol batang zaitun sebagai terapi antibiotik terhadap infeksi bakteri *Staphylococcus aureus* belum dapat digunakan karena pada kurva perhitungan nilai Konsentrasi Hambat Minimal (KHM) membentuk garis tidak linear.

7.2 Saran

Berdasarkan hasil penelitian yang telah dilakukan dapat disarankan bahwa :

1. Menggunakan pengencer yang memiliki tingkat kelarutan tinggi contohnya seperti Tween 20 (*Polysorbate 20*).
2. Membandingkan komponen tanaman zaitun yang lain karena pada ekstrak batang zaitun di konsentrasi 200 – 51.200 $\mu\text{g/mL}$ KHM tidak dapat ditentukan dan KBM tidak ditemukan
3. Melanjutkan penelitian dengan memperbesar konsentrasi ekstrak diatas 51.200 $\mu\text{g/mL}$.
4. Melakukan penelitian menggunakan jenis bakteri Gram negatif.

5. Menggunakan metode ekstraksi yang berbeda.
6. Memperhatikan ketersediaan simplisia tanaman yang digunakan di daerah penelitian.
7. Melakukan penelitian untuk mencari efek lain dari batang tanaman zaitun sebagai alternatif untuk mengobati penyakit kolestrol, hipertensi dan kanker.

DAFTAR PUSTAKA

1. Departemen Kesehatan Republik Indonesia. Kebijakan Obat Tradisional Nasional. Departemen Kesehatan Republik Indonesia. 2007.
2. Bubonja-Sonje M, Giacometti J, Abram M. Antioxidant and antilisterial activity of olive oil, cocoa and rosemary extract polyphenols. *Food Chemistry*. 2011;127(4):1821-1827.
3. Kementerian Kesehatan RI. Pedoman penggunaan antibiotik. Jakarta: Departemen Kesehatan RI; 2011.
4. Mardiasuti HW. Emerging resistance pathogen: situasi terkini di Asia, Eropa, Amerika Serikat, Timur Tengah dan Indonesia. 2007;5:76
5. World Health Organization .What is antimicrobial resistance? [Internet].. 2019 [diakses pada tanggal 24 January 2019]. Diakses dari: <https://www.who.int/features/qa/75/en/>
6. Laxminarayan R e. Antibiotic resistance-the need for global solutions. - PubMed - NCBI [Internet]. Ncbi.nlm.nih.gov. 2019 [diakses pada tanggal 26 February 2019]. Diakses dari: <https://www.ncbi.nlm.nih.gov/pubmed/24252483>
7. Antibiotic-Resistant Bugs in the 21st Century — A Clinical Super-Challenge | NEJM [Internet]. New England Journal of Medicine. 2019 [diakses pada tanggal 26 February 2019]. Diakses dari: <https://www.nejm.org/doi/full/10.1056/NEJMp0804651>
8. Cooper M, Shlaes D, Mossialos E, Morel C, Mossialos E, Ishikawa M et al. Fix the antibiotics pipeline [Internet]. *Nature*. 2019 [diakses pada tanggal

- 26 February 2019]. Diakses dari:https://www.nature.com/articles/472032a?error=cookies_not_supported&code=69e286e9-23c3-4ff8-9142-0a79b14f3749
9. WHO. Worldwide Situation Analysis Response to Antimicrobial Resistance. USA: World Health Organization. 2011. Halaman 2, 20, 29.
 10. Carroll K, Hobden J, Miller S, Morse S, Mietzner T, Detrick B et al. Jawetz, Melnick & Adelberg's medical microbiology. New York: Mcgraw-Hill Education; 2016.
 11. Pantosti A e. Mechanisms of antibiotic resistance in *Staphylococcus aureus*. - PubMed - NCBI [Internet]. Ncbi.nlm.nih.gov. 2019 [diakses pada tanggal 26 February 2019]. Diakses dari: <https://www.ncbi.nlm.nih.gov/pubmed/17661706>
 12. Adriana Chiappetta, Innocenzo Muzzalupo. Botanical Description. INTECH Open Access Publisher; 2012.
 13. olive classification [Internet]. 1957 [cited 21 March 2019];. Available from: <http://oliveoilsource.com>
 14. Hashmi MA, Khan A, Hanif M, Farooq U, Perveen S. Traditional uses , phytochemistry, and pharmacology of *Olea europaea* (olive). Evidence-Based Complement Altern Med. 2015
 15. Barbaro B, Toietta G, Maggio R, Arciello M, Tarocchi M. Effects of the olive-derived polyphenol oleuropein on human health. Int J Mol Sci. 2014;15:18508-24
 16. Khan Y, Panchal S, Vyas N, Butani A, Kumar V. *Olea europaea* : a phytopharmacological review. Phcog Rev. 2007;1(1).

17. Wei J e. Antibacterial Activity of Hydroxytyrosol Acetate from Olive Leaves (*Olea Europaea* L.). - PubMed - NCBI [Internet].
Ncbi.nlm.nih.gov. 2019 [cited 21 March 2019]. Available from:
<https://www.ncbi.nlm.nih.gov/pubmed/28768425>
18. Qabaha K, AL-Rimawi F, Qasem A, Naser S. Oleuropein Is Responsible for the Major Anti-Inflammatory Effects of Olive Leaf Extract. *Journal of Medicinal Food*. 2018;21(3):2.
19. ITIS Standard Report Page: *Staphylococcus aureus anaerobius* [Internet].
Itis.gov. 2019 [cited 25 March 2019]. Available from:
https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=969621#null
20. Honeyman A, Friedman H, Bendinelli M. *Staphylococcus aureus* infection and disease. New York: Kluwer Academic; 2002.
21. Estridge B, Reynolds A. *Basic clinical laboratory techniques*. Clifton Park, NY: Delmar Cengage Learning; 2012.
22. Bailey W, Tille P. *Bailey & Scott's diagnostic microbiology*. St. Louis: Elsevier; 2017.
23. Talaro K, Chess B. *Foundations in Microbiology*. NY: McGraw-Hill Higher Education; 2017.
24. TJ B. Use of the gram stain in microbiology. - PubMed - NCBI [Internet].
Ncbi.nlm.nih.gov. 2019 [cited 25 March 2019]. Available from:
<https://www.ncbi.nlm.nih.gov/pubmed/11475313>

25. Taylor T, Unakal C. Staphylococcus Aureus [Internet]. Ncbi.nlm.nih.gov. 2019 [cited 25 March 2019]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK441868/>
26. Karygianni L, Cecere M, Argyropoulou A, Hellwig E, Skaltsounis A, Wittmer A et al. Compounds from *Olea europaea* and *Pistacia lentiscus* inhibit oral microbial growth. BMC Complementary and Alternative Medicine. 2019;19(1).
27. Staphylococcus aureus [Internet]. Textbookofbacteriology.net. 2019 [cited 27 March 2019]. Available from: <http://textbookofbacteriology.net/staph.html>
28. Li X, Liu Y, Jia Q, LaMacchia V, O'Donoghue K, Huang Z. A systems biology approach to investigate the antimicrobial activity of oleuropein. Journal of Industrial Microbiology & Biotechnology. 2016;43(12):1705-1717.
29. Catalase test : a test to differentiate Staphylococcus and Streptococcus [Internet]. Microbiology and Infectious Diseases. 2019 [cited 27 March 2019]. Available from: <http://microbesinfo.com/2013/05/catalase-test-a-test-to-differentiate-staphylococcus-and-streptococcus/>
30. Coagulase Test: Principle, procedure and interpretation - [Internet]. Microbeonline.com. 2019 [cited 27 March 2019]. Available from: <https://microbeonline.com/diagnostic-tests-biochemical-tests-coagulase-test/>
31. Liu G. Molecular Pathogenesis of Staphylococcus aureus Infection. Pediatric Research. 2009;65(5 Part 2):71R-77R.

32. Aneja K. Experiments in microbiology plant pathology and biotechnology.
New Delhi: New age International (p) Ltd. Publishers; 2010.
33. Shields P, Tsang AY. Mannitol Salt Agar Plates Protocols. ASM Microbe
Libr. 2006
34. Kateete D, Kimani C, Katabazi F, Okeng A, Okee M, Nanteza A et al.
Identification of *Staphylococcus aureus*: DNase and Mannitol salt agar
improve the efficiency of the tube coagulase test. *Annals of Clinical
Microbiology and Antimicrobials*. 2010;9(1):23.
35. Aryal S, Panja S, Subedi N. Mannitol Salt Agar for the isolation of
Staphylococcus aureus [Internet]. Microbiology Info.com. 2019 [cited 28
March 2019]. Available from: [https://microbiologyinfo.com/mannitol-salt-
agar-for-the-isolation-of-staphylococcus-aureus/](https://microbiologyinfo.com/mannitol-salt-agar-for-the-isolation-of-staphylococcus-aureus/)
36. Impetigo: Practice Essentials, Background, Pathophysiology [Internet].
Emedicine.medscape.com. 2019 [cited 28 March 2019]. Available from:
<https://emedicine.medscape.com/article/965254-overview>
37. Mah T, O'Toole G. Mechanisms of biofilm resistance to antimicrobial
agents. *Trends in Microbiology*. 2001;9(1):34-39.
38. Rice L. Mechanisms of Resistance and Clinical Relevance of Resistance to
 β -Lactams, Glycopeptides, and Fluoroquinolones. *Mayo Clinic
Proceedings*. 2012;87(2):198-208.
39. de Lencastre H, Oliveira D, Tomasz A. Antibiotic resistant
Staphylococcus aureus: a paradigm of adaptive power. *Current Opinion in
Microbiology*. 2007;10(5):428-435.

40. Katzung B. Basic and clinical pharmacology. New York [etc.]: Mcgraw Hill Education; 2018.
41. Zeng X, Lin J. Beta-lactamase induction and cell wall metabolism in Gram-negative bacteria. *Frontiers in Microbiology*. 2013;4.
42. Black JG, Black LJ. Microbiology: Principles and Explorations. Libr Congr. 2013.
43. Agoes G. Teknologi Bahan Alam. Bandung: Penerbit Insitut Teknologi Bandung; 2007.
44. Mukhriani. Ekstraksi, pemisahan senyawa, dan identifikasi senyawa aktif. *J Kesehat*. 2014;VII(2):361-7
45. Kostova I, Ojala T, Lacy A, O’Kennedy R, Widelski J, Melliou E, et al. Natural Product Chemistry For Drug Discovery. Vol. 5, *Journal of natural products*. 2010. 440p
46. Azwanida. Medicinal & Aromatic Plants A Review on the Extraction Methods Use in Medicinal Plants , Principle , Strength and Limitation. 2015;4(3):3–8.
47. Kishikawa A, Ashour A, Zhu Q, Yasuda M, Ishikawa H, Shimizu K. Multiple Biological Effects of Olive Oil By-products such as Leaves, Stems, Flowers, Olive Milled Waste, Fruit Pulp, and Seeds of the Olive Plant on Skin. *Phytotherapy Research*. 2015;29(6):877-886.
48. Kurniasari E. Metode Maserasi [Internet]. academia.edu. [cited 21 April 2019]. Available from:
https://www.academia.edu/24271970/Metode_Ekstraksi

49. Leksono W, Pramesti R, Santosa G, Setyati W. Jenis Pelarut Metanol Dan N-Heksana Terhadap Aktivitas Antioksidan Ekstrak Rumput Laut *Gelidium* sp. Dari Pantai Drini Gunungkidul – Yogyakarta. *Jurnal Kelautan Tropis*. 2018;21(1):9.
50. Reger D, Goode S, Ball D. *Chemistry: principles and practice*. Belmont, CA: Brooks/Cole, Cengage Learning; 2009. p475-476
51. Kesalahan Spektrofotometri [Internet]. ACADEMIA. 2019 [cited 28 September 2019]. Available from:
https://www.academia.edu/6736800/KESALAHAN_SPEKTROFOTOMETRI
52. Haris Omar S. Oleuropein in Olive and its Pharmacological Effects. *Scientia Pharmaceutica*. 2010;78(2):133-154.
53. Pavel I, Danciu C, Oprean C, Dehelean C, Muntean D, Csuk R et al. In Vitro Evaluation of the Antimicrobial Ability and Cytotoxicity on Two Melanoma Cell Lines of a Benzylamide Derivative of Maslinic Acid. *Analytical Cellular Pathology*. 2016;2016:1-6.
54. Chouhan S, Sharma K, Guleria S. Antimicrobial Activity of Some Essential Oils- Present Status and Future Perspectives. *MDPI*. 2017;12-1.
55. Korukluoglu M, Sahan Y, Yigit A, Ozer E, Gücer S. ANTIBACTERIAL ACTIVITY AND CHEMICAL CONSTITUTIONS OF *OLEA EUROPAEA* L. LEAF EXTRACTS. *Journal of Food Processing and Preservation*. 2010;34(3):383-396.
56. Leekha S, Terrell C, Edson R. General Principles of Antimicrobial Therapy. *Mayo Clinic Proceedings*. 2011;86(2):156-167.