

BAB 5

KESIMPULAN DAN SARAN

5.1 Kesimpulan

1. Ekstrak etanol mahkota buah nanas (*Ananas comosus*) dengan konsentrasi 20%, 30%, 40% dan 50% memiliki aktivitas antibakteri terhadap *Cutibacterium acnes* dengan rata-rata diameter hambat pertumbuhan (DHP) berturut-turut $6,63 \pm 0,08$ mm, $6,61 \pm 0,12$ mm, $7,12 \pm 0,33$ dan $7,74 \pm 0,45$ mm.
2. Golongan senyawa yang terdapat pada ekstrak etanol mahkota buah nanas (*Ananas comosus*) adalah flavonoid, saponin, triterpenoid/steroid serta golongan senyawa yang memberikan aktivitas antibakteri terhadap bakteri *Cutibacterium acnes* adalah klorofil.

5.2 Saran

Dapat dilakukan penelitian uji aktivitas antibakteri ekstrak etanol mahkota buah nanas dengan menggunakan pelarut yang sesuai dengan polaritas senyawa yang punya aktivitas antibakteri.

DAFTAR PUSTAKA

- Afriyanti, R.N., 2015, Akne Vulgaris Pada Remaja, *Medical Faculty of Lampung University*, **4(6)**:102–109.
- Anuzar, C.H., Hazar, S. and Suwendar., 2017, Uji Aktivitas Antibakteri Ekstrak Etanol Daun Cabe Rawit (*Capsicum frutescens* L.) terhadap Pertumbuhan Bakteri Penyebab Jerawat *Propionibacterium acnes* secara Invitro, *Jurnal Farmasi*, **3(2)**: 457–464.
- Balouiri, M., Sadiki, M. and Ibsouda, S.K., 2016, Methods for in vitro evaluating antimicrobial activity, *Journal of Pharmaceutical Analysis*, **6(2)**: 71–79.
- Bojar, R.A. and Holland, K.T., 2004, Acne and propionibacterium acnes, *Clinics in Dermatology*, **22(5)**: 375–379.
- Brunton, L. and Knollmann, B., 2022., *Goodman and Gilman's the Pharmacological Basis of Therapeutics, 14th Edition*. McGraw-Hill Education.
- Chua, L.S., Latiff, N.A. and Mohamad, M., 2016., Reflux extraction and cleanup process by column chromatography for high yield of andrographolide enriched extract, *Journal of Applied Research on Medicinal and Aromatic Plants*, **3(2)**: 64–70.
- Dabbaghi, Kabiri.A., Ramazani.K., Zohuriaan-Mehr.A., Jahandideh. M., Arash. (2019), Synthesis of bio-based internal and external cross-linkers based on tannic acid for preparation of antibacterial superabsorbents, *Polymers for Advanced Technologies*, **30(11)**: 2894–2905.
- Das, K., Tiwari, R.K.S. and Shrivastava, D.K., 2010, Techniques for evaluation of medicinal plant products as antimicrobial agent: Current methods and future trends, *Journal of Medicinal Plants Research*, **4(2)**: 104–111.
- Davis, W.W. and Stout, T.R., 1971, Disc plate method of microbiological antibiotic assay. I. Factors influencing variability and error,

Applied microbiology, **22(4)**: 659–665.

- Depkes RI., 2000, Parameter Standar Umum Ekstrak Tumbuhan Obat, Departemen Kesehatan RI, Jakarta
- Shixia,D., Xiushi, Y., Lei. Z., Fengxiang. Z., Zhaohua. H., Peng.X., 2020, Antibacterial activity and mechanism of action saponins from *Chenopodium quinoa* Willd. husks against foodborne pathogenic bacteria, *Industrial Crops and Products*, **149(3)**: 112- 350.
- Dutta, S. and Bhattacharyya, D., 2013, Enzymatic, antimicrobial and toxicity studies of the aqueous extract of *Ananas comosus* (pineapple) crown leaf, *Journal of Ethnopharmacology*, **150(2)**: 451–457.
- Fitriyanti, F., Hendrawan, M.N.R. and Astuti, K.I., 2019, Antibacterial Activity Test of Ethanol Extract Pineapple (*Ananas comosus* (L.) Merr.) Peel against Growth of *Propionibacterium acnes*, *Borneo Journal of Pharmacy*, **2(2)**: 108–113.
- Lizelle. F., Candice. C., Marique. A., Jeanetta. D., Minja. G., 2016, Treatment modalities for acne, *Molecules*, **21(8)**: 1–20.
- Furuya, T., 1988, ‘Saponins (*Ginseng Saponins*) *Phytochemicals*’, in Plant Cell Cultures. ACADEMIC PRESS, INC, pp 213-234
- Genebriera, J. and Davis, M., 2009, ‘ACNE’, in Elsevier, *Pharmacology and Therapeutics.*, pp. 973–981.
- Gollnick, H., 2003, Current concepts of the pathogenesis of acne: Implications for drug treatment, *Drugs*, **63(15)**: 1579–1596.
- Hassan, A., Othman, Z. and Siriphanich, J. 2011, ‘Pineapple (*Ananas comosus* L. Merr.)’, in *Postharvest Biology and Technology of Tropical and Subtropical Fruit*, pp 194-218
- Wafaa M.H., Abeer A. M., Hussein A. H. S.A., Amra. B., Kirill G. T., Miroslava. K., Ronald. M.R., 2021, Pineapple (*Ananas comosus* L. Merr.), Waste Streams, Characterisation and Valorisation, *Open Journal of Ecology*, **11(09)**: 610–634.
- Hossain, M.F., 2016, World pineapple production, *African Journal of Food, Agriculture, Nutrition and Development*, **16(4)**: 11443–11456.
- Jasmine Praveena, R. and Estherlydia, D., 2014, Comparative study of phytochemical screening and antioxidant capacities of vinegar

- made from peel and fruit of pineapple (*Ananas comosus* L.), *International Journal of Pharma and Bio Sciences*, **5(4)**: B394–B403.
- Kacar, A., Avunduk, S., Omuzbuken, B., Aykin. E., 2018, Biocidal Activities of a Triterpenoid Saponin and Flavonoid Extracts From the *Erica Manipuliflora* Salisb . Against Microfouling Bacteria, *Int J Agric For Life Sci*, **2(2)**: 40–46.
- Kaczmarek, B., 2020, Tannic acid with antiviral and antibacterial activity as a promising component of biomaterials, *Materials*, 13(14)
- Kemenkes RI (2017) *Farmakope Herbal Indonesia Edisi II*. II. Jakarta. Available at: <https://doi.org/10.1201/b12934-13>.
- Kementrian Kesehatan RI., 2020, *Farmakope Indonesia Edisi VI*, Kementrian Kesehatan RI.
- Larrauri, J.A., Rupérez, P. and Saura Calixto, F., 1997, Pineapple Shell as a Source of Dietary Fiber with Associated Polyphenols, *Journal of Agricultural and Food Chemistry*, **45(10)**: 4028–4031.
- Loo, M., 2009, 'Acne', in Elsevier, *Integrative Medicine for Children* r, pp. 141–146.
- Loon, Y.K., Satari, M.H. and Dewi, W., 2018, Antibacterial effect of pineapple (*Ananas comosus*) extract towards *Staphylococcus aureus*, *Padjadjaran Journal of Dentistry*, **30(1)**: 1.
- Mahmoud, R.-K. and Rafieian-Kopaei, M., 2012, Rafieian-Kopaei M. Medicinal plants and the human needs, *Journal of HerbMed Pharmacology Journal*, **1(1)**: 1–2.
- Andrew. M., Alexandra L.P., Peter A.L., Sheila. P., 2008, A dep phylogenetic group of *Propionibacterium acnes*, *Journal of Medical Microbiology*, **57(2)**: 218–224.
- Mcfarland, J., 1907, An Instrument for Estimating the Number of Bacteria in Suspensions Used for Calculating the Opsonic Index and for, *Journal of the American Medical Association*, **49(15)**: 1176–1178.
- Maimunah. M.A., Norhashila. H., Samsuzana. A.A., Ola. L., 2020, Pineapple (*Ananas comosus*): A comprehensive review of nutritional values, volatile compounds, health benefits, and

- potential food products, *Food Research International*, 137(9): 109-675.
- Maimunah. M.,Norhashila. H.,Samsuzana. A.,Ola. L., 2020, An overview of non-destructive approaches for quality determination in pineapples, *Journal of Agricultural and Food Engineering*, **1(1)**: 1–7.
- Mohamad. N.,Raghida. D., Othmane. M., Akram. H., 2020, Potency of Combining Eucalyptus camaldulensis, *Medicines*, **7(40)**: 1–19.
- Institute of Medicine., 2004, *The Infectious Etiology of Chronic Diseases: Defining the Relationship, Enhancing the Research, and Mitigating the Effects: Workshop Summary*. The National Academies, Washington, DC: Press.
- Oxley, K. S.; Jackson, J. B.; Cerutis, D. R. (2015). Acne (Vulgaris and Rosacea). In Michael Caplan (Ed), Reference Module in Biomedical Sciences (1-5). Elsevier.
- Pandey, A. and Negi, P.S., 2018, Phytochemical composition, in vitro antioxidant activity and antibacterial mechanisms of Neolamareckia cadamba fruits extracts, *Natural Product Research*, **32(10)**: 1189–1192.
- Abubakar. A.R., Haque.M., 2017, Methodology Used in the Study, *Asian Journal of Pharmaceutical and Clinical Research*, **7(10)**: 1–5.
- Prakoso, Y.A., Setiyo Rini, C. and Wirjaatmadja, R., 2018, Efficacy of Aloe vera, Ananas comosus, and Sansevieria masoniana Cream on the Skin Wound Infected with MRSA, *Advances in Pharmacological Sciences* 2018
- Ramadani, A.H., Karima, R. and Ningrum, R.S., 2022, Indonesian Journal of Chemical Research Antibacterial Activity of Pineapple Peel (Ananas comosus) Eco-enzyme Against Acne Bacteria (Staphylococcus aureus and Prapionibacterium acnes), *J. Chem. Res*, **9(3)**: 201–207.
- Reich, E. and Blatter, A., 2005, ‘Thin-Layer Chromatography Overview’, in Worsfold.P., Townshend.A., Poole.C., *Textbook of Encyclopedia of Analytical Science*, 2nd ed., Elsevier, Switzerland, pp. 57–66.
- Richardson, P.M. and Harborne, J.B., 1985, *Phytochemical Methods*. Second edition, Chapman and Hall, London and New york.

- Stone, B.C., 1969, Flora of Java (Spermatophytes Only). Volume I: Gymnospermae, Families 1-7; Angiospermae, Families 8-110. C. A. Backer, R. C. Bakhuizen van den Brink, Jr. Flora of Java (Spermatophytes Only). Volume II: Angiospermae, Families 8-110. C. A. Backer, R. C. Bakhuizen van den Brink, Jr. Flora of Java (Spermatophytes Only). Volume III: Angiospermae, Families 191-238; Addenda et Corrigenda; General Index. C. A. Backer, R. C. Bakhuizen van den Brink, Jr. Available at: .
- Wali, N., 2018, *Pineapple (Ananas comosus), Nonvitamin and Nonmineral Nutritional Supplements*. Elsevier Inc.
- White, G.M., 1998, Recent findings in the epidemiologic evidence, classification, and subtypes of acne vulgaris, *Journal of the American Academy of Dermatology*, **39(2)**: 34–37.
- Yixi. X., Weijie. Y., Fen. T., Xiaoqing. C., Licheng. R., 2014, Antibacterial Activities of Flavonoids: Structure-Activity Relationship and Mechanism, *Current Medicinal Chemistry*, **22(1)**: 132–149.
- Peng. X., Xiushi. Y., Lei. Z., Zhaohua. H., Ruoyu. Z., Fengxiang. Z., 2020, Relationship between antimicrobial activity and amphipathic structure of ginsenosides, *Industrial Crops and Products*, 143(November 2019), p. 111929.
- Yuan. Z., Wei E.Z., Jia Q.Y., Min. L., Yu. Z., Xin. S., Ying L.M., Xue S.F., Jun.Y., Guo H.L., 2018, A review of the extraction and determination methods of thirteen essential vitamins to the human body: An update from 2010, *Molecules*, **23(6)**: 1–25.