

## **BAB 5**

### **KESIMPULAN DAN SARAN**

#### **5.1 Kesimpulan**

Berdasarkan studi pustaka yang telah dilakukan terhadap 15 artikel ilmiah yang terkait dengan aktivitas antibakteri ekstrak etanol tanaman srikaya (*Annona squamosa* L.) dapat disimpulkan bahwa :

1. Bagian dari tanaman srikaya (*Annona squamosa* L.) yang mempunyai aktivitas antibakteri, yaitu daun dengan konsentrasi ekstrak antara 0,01% - 100% serta memiliki nilai KHM pada konsentrasi 125 µg/ml dan nilai KBM dengan konsentrasi 500 µg/ml. Bagian biji dengan konsentrasi ekstrak antara 0,1% - 100%. Daging buah dengan konsentrasi ekstrak 5% - 50% dan bagian kulit dengan konsentrasi ekstrak terkecil 25 µg/ml dan konsentrasi tertinggi 50%.
2. Metabolit sekunder alkaloid, flavonoid, terpenoid, saponin, glikosida, tanin dan senyawa fenolik yang terkandung dalam ekstrak etanol tanaman srikaya (*Annona squamosa* L.) menunjukkan aktivitas antibakteri terhadap bakteri Gram positif maupun Gram negatif.

#### **5.2 Saran**

Pada penelitian selanjutnya dapat dilakukan studi pustaka mengenai tanaman srikaya (*Annona squamosa* L.) yang menunjukkan aktivitas selain aktivitas antibakteri

## DAFTAR PUSTAKA

- Abdillah, M.F.R., Soesetijo, A. dan Kristiana, D., 2018, Efektivitas Ekstrak Biji Srikaya (*Annona squamosa* L.) sebagai Bahan Pembersih Gigi Tiruan terhadap Daya Hambat Pertumbuhan *Streptococcus mutans*, *e-Journal Pustaka Kesehatan*, **8(1)**: 48-53.
- Akiyama, H., Fujii, K., Yamasaki, O., Oono, T. and Iwatsuki, K., 2001, Antibacterial Action of Several Tannins against *Staphylococcus aureus*, *Journal of Antimicrobial Chemotherapy*, **48**: 487-491.
- Al-Deen, F.M.N., 2017, Evolution of Antibacterial Activity of Various Solvents Extracts of *Annona Squamosa* Fruit, *Iraqi Journal of Science*, **58 (4C)**: 2301-2308.
- Al-Nemari, R., Al-Senaidy, A., Semlali, A., Ismael, M., Badjah-Hadj-Ahmed, A.Y. and Bacha, A.B., 2020, GC-MS Profiling and Assessment of Antioxidant, Antibacterial, and Anticancer Properties of Extracts of *Annona squamosa* L. Leaves, *BMC Complementary Medicine and Therapies*, **20**: 1-14.
- Altaee, M.F., Younis, R.W. and Kamona, Z.K., 2020, Activity of *Annona squamosa* Peels Extracts against Two Pathogenic Bacteria and Two Blood Cancer Cell Lines, *Iraqi Journal of Agricultural Sciences*, **51(6)**: 1496-1503.
- Alvionita, M., Oktavia, I., Subandi and Muntholib, 2019, Bioactivity of Flavonoid in Ethanol Extract of *Annona squamosa* L. Fruit as Xanthine Oxidase Inhibitor, *Materials Science and Engineering*, **546**: 1-10.
- Amudha, P. and Varadharaj, V., 2017, Phytochemical and Pharmacological Potential of *Annona* Species : A Review, *Asian Journal of Pharmaceutical and Clinical Research*, **10**: 68-75.
- Andrade, J.N., Costa, N.E.M. and Brandao, H., 2015, Using Ichthyotoxic Plants as Bioinsecticide: A literature review, *Rev. Bras. Pl. Med., Campinas*, **17(4)**: 649-656.
- Asif, M., 2017, Antimicrobial Agents, *Journal of Analytical & Pharmaceutical Research*, **4**: 1-6.
- Awanchiri, S.S., Dufat, H.T.V., Shirri, J.C., Dongfack, M.D.J., Nguenang, G.M., Boutefnouchet, S., Fomum, Z.T., Seguin, E., Verite, P.,

- Tillequin, F. and Wandji, J., 2009, Triterpenoids with Antimicrobial Activity from *Drypetes inaequalis*, *Phytochemistry*, **70**: 419-423.
- Banso, A. and Adeyemo, S.O., 2007, Evaluation of Antibacterial Properties of Tannins Isolated from *Dichrostachys cinerea*, *African Journal of Biotechnology*, **6(15)**: 1785-1787.
- Bhardwaj, R., Pareek, S., Sagar, N. A., and Vyas, N., 2019, Bioactive Compounds of *Annona*, *Bioactive Compounds in Underutilized Fruits and Nuts*, pp. 1-26.
- Bobbarala, V., 2012. Antibacterial Activity of Naturally Occurring Compounds from Selected Plants. In: *Antimicrobial Agent*. Croatia: InTech, pp. 1-24.
- Chandrashekar, C. and Kulkarni, V.R., 2011, Isolation Characterization and Antimicrobial Activity of *Annona squamosa* Leaf, *Journal of Pharmacy Research*, **4(6)**: 1831-1832.
- Dewangga, V.S., dan Nirwana, A.P., 2019, Uji Daya Hambat Ekstrak Etanol Daun Srikaya (*Annona squamosa* L.) terhadap Pertumbuhan *Staphylococcus aureus* secara In Vitro, *Jurnal Kesehatan Kusuma Husada*, pp. 50-56.
- Dong, S., Yang, X., Zhao, L., Zhang, F., Hou, Z. and Xue, P., 2020, Antibacterial Activity and Mechanism of Action Saponins from *Chenopodium quinoa* Wild. Husks against Foodborne Pathogenic Bacteria, *Industrial Crops and Products*, **149**: 1-14.
- Dholvitayakhun, A. and Trachoo, N., 2012, Antibacterial Activity of Ethanol Extract from Some Thai Medicinal Plants against *Campylobacter jejuni*, *International Journal of Pharmacological and Pharmaceutical Sciences*, **6(5)**: 113-116.
- Dholvitayakhun, A., Trachoo, N., Sakee, U. and Cushnie, T.P.T., 2013, Potential Application for *Annona squamosa* Leaf Extract in the Treatment and Prevention of Foodborne Bacterial Disease, *Natural Product Communications*, **8(3)**: 385-388.
- El-Chaghaby, G.A., Ahmad, A.F. and Ramis, E.S., 2014, Evaluation of The Antioxidant and Antibacterial Properties of Various Solvents Extracts of *Annona squamosa* L. Leaves, *Arabian Journal of Chemistry*, **7**: 227-233.
- Guimaraes, A.C., Meireles, L.M., Lemos, M.F., Guimaraes, M.C.C., Endrigger, D.C., Fronza, M. and Scherer, R., 2019, Antibacterial

- Activity of Terpenes and Terpenoids Present in Essential Oils, *Molecules*, **24**: 1-12.
- Hagr, T.E., Adam, I.A., Almain, A.A. and Mohammed, M.M., 2019, Phytochemical Screening, GC-MS Analysis, Antibacterial and Antioxidant Activity of Seeds Oil of *Annona squamosa* L. Sudanese Medicinal Plant, *Journal of Pharmacy and Pharmacology*, **7(1)**: 1-6.
- Hussein, R.A. and El-Anssary, A.A., 2018, The Key Drivers of the Pharmacological Actions of Medicinal Plants, In: *Plants Secondary Metabolites*, Philip F. Builders, pp. 11-30.
- Isramilda, Sahreni, S. dan Saputra, A.I., 2020, Uji Konsentrasi Daya Hambat Rebusan Daun Srikaya (*Annona squamosa* L.) Terhadap Pertumbuhan *Staphylococcus aureus*, *BEST JOURNAL : Biology Education, Science and Technology*, **3(1)**: 01-08.
- Izah, S.C., 2018, Some Determinant Factors of Antimicrobial Susceptibility Pattern of Plant Extracts, *Res Rev Insights*, **2(3)**: 1-4.
- Jada, M.S., Usman, W.A. and Adamu, Y., 2014, In Vitro Antimicrobial Effect of Crude Tannins Isolated from the Leaf of *Annona senegalensis*, *International Journal of Biochemistry Research and Review*, **4(6)**: 615-623.
- Jada, M.S, Usman, W.A and Olabisi, A.O, 2015, Crude Flavonoids Isolated from the Stem Bark of *Annona senegalensis* have Antimicrobial Activity, *Journal of Advances in Biology and Biotechnology*, **2(1)**: 24 - 29.
- Jangnga, I.D., Kambaya, P.P. dan Kosala, K., 2018, Uji Aktivitas Antibakteri dan Analisis Bioautografi Kromatografi Lapis Tipis Ekstrak Etanol Daun Srikaya (*Annona squamosa* L.) terhadap *Enterococcus faecalis* secara In Vitro, *ODONTO Dental Journal*, **5(2)**: 102-109.
- Kaladhar, Duddukuri, G.R. and Yarla, N.S., 2014, Phytochemical Analysis, Antioxidant and Antimicrobial Activities from Raw Fruits Peel Crude Extracts of *Annona Squamosa* Linn, *World Journal of Pharmacy and Pharmaceutical Sciences*, **4**: 1-8.
- Karunia, S.D., Supartono dan Sumarni, W., 2017, Analisis Sifat Antibakteri Ekstrak Biji Srikaya (*Annona squamosa* L.) dengan Pelarut Organik, *Indonesian Journal of Chemical Science*, **6(1)**: 56-60.

- Kew, R., 2020, Diakses pada 8 Oktober 2020, <http://www.plantsoftheworldonline.org/taxon/urn:lsid:ipni.org:names:72319-1>
- Khan, H., Khan, M.A. and Abdullah, 2012, Antibacterial, Antioxidant and Cytotoxic Studies of Total Saponin, Alkaloid and Sterols Contents of Decoction of Joshanda: Identification of Components Through Thin Layer Chromatography, *Toxicology and Industrial Health*, **31(3)**: 1-7.
- Kulkarni, C.P., 2017, Antibacterial and Insecticidal Activity of Crude Seed Extracts of *Annona squamosa* L., *International Journal of Pharmaceutical Science Invention*, **6**: 25-29.
- Kusbiantoro, D., Purwaningrum, Y., 2018, Pemanfaatan Kandungan Metabolit Sekunder pada Tanaman Kunyit Dalam Mendukung Peningkatan Pendapatan Masyarakat, *Jurnal Kultivasi*, **17(1)**: 544-549.
- Lall, N., Kishore, N., Bodiba, D., More, G., Tshikalange, Kikuchi, H. and Oshima, Y., 2016, Alkaloids from Aerial Parts of *Annona senegalensis* against *Streptococcus mutans*, *Natural Product Research*, **31**: 1-5.
- Ma, C., Chen, Y., Chen, J., Li, X. and Chen, Y., 2017, A Review on *Annona squamosa* L.: Phytochemicals and Biological Activities, *The American Journal of Chinese Medicine*, **45(5)**: 1-32.
- Majdanik, M.M., Kepa, M., Wojtyczka, R.D., Idzik, D. and Wasik, T.J., 2018, Phenolic Compounds Diminish Antibiotic Resistance of *Staphylococcus aureus* Clinical Strains, *International Journal of Environmental Research and Public Health*, **15**: 1-18.
- Muharni, Fitriya dan Farida, S., 2017, Uji Aktivitas Antibakteri Ekstrak Etanol Tanaman Obat Suku Musi di Kabupaten Musi Banyuasin, Sumatera Selatan, *Jurnal Kefarmasian Indonesia*, **7(2)**: 127-135.
- Nag, M., Mukherjee, P.K., Biswas, R., Chanda, J. and Kar, A., 2016, Evaluation of Antimicrobial Potential of Some Indian Ayurvedic Medicinal Plants, *Pharmacognosy Journal*, **8**: 525-533.
- Pandey, N. and Barve, D., 2011, Phytochemical and Pharmacological Review on *Annona squamosa* Linn, *International Journal of Research in Pharmaceutical and Biomedical Sciences*, **2(4)**: 1404-1412.

- Patil, C.D., Pawar, N. and Bhandare, P.S., 2019, A Comparative in Vitro Antimicrobial Activity of *Annona squamosa* on Gram Positive & Gram Negative Microorganism, *International Journal of Trend in Scientific Research and Development*, **3**: 2492-2496.
- Paul, R.K., Dutta, D., Chakraborty, D., Nayak, A. Dutta, P.K. and Nag, M., 2019, Antimicrobial Agents from Natural Sources: An overview, *Advance Pharmaceutical Journal*, **4(2)**: 41-51.
- Prasad, C., Kumar, A., Singh, S.K. and Singh S.K., 2017, Antibacterial Properties of Unripened Fruits of *Trapa natans*, *Annona squamosa*, *Ficus carica* and *Anthocephalus cadamba* against Pathogenic Gram Positive and Negative Bacteria, *International Journal of Engineering Research and Application*, **7**: 33-37.
- Rahayu, M., Sunarti, S., Sulistiarini, D. dan Prawiroatmodjo, S., 2006, Pemanfaatan Tumbuhan Obat secara Tradisional oleh Masyarakat Lokal di Pulau Wawonii, Sulawesi Tenggara, *Biodiversitas*, **7(3)**: 245-250.
- Rianto, L., Handayani, I.A. dan Septiyani, A., 2015, Uji Aktivitas Ekstrak Etanol 96% Biji Srikaya (*Annona squamosa* L.) sebagai Antidiare yang Disebabkan oleh Bakteri *Shigella dysenteriae* Dengan Metode Difusi Cakram, *Jurnal Ilmiah Manuntung*, **1(2)**: 181-186.
- Saha, R., 2011, Pharmacognosy and pharmacology of *Annona squamosa*: A Review, *International Journal of Pharmacy and Life Sciences*, **2**: 1183-1189.
- Sakr, F.R., Dabbous, M.K., Malaeb, D.N. and Rahal, M.K., 2014, Novel Antimicrobial Agents: A Review, *International Journal Of Pharmacy & Technology*, **5**: 2824-2838.
- Saleem, T.S.M., Basnett, H., Ravi, V., Shrestha, B., Verma, N.K., Patel, S.S., Kumar, S.V. and Gauthaman K., 2009, Phyto-pharmacological review of *Annona squamosa* Linn., *Natural Products An Indian Journal*, **5**: 85-88.
- Saxena, M., Saxena, J., Nema, R., Singh, D. and Gupta, A., 2013, Phytochemistry of Medicinal Plants, *Journal of Pharmacognosy and Phytochemistry*, **1(6)**: 168-182.
- Simon, N., Santhoskumar, R. and Kumar, S.N., 2016, Phytochemical Analysis and Antimicrobial Activities of *Annona squamosa* L. Leaf Extracts, *Journal of Pharmacognosy and Phytochemistry*, **5(4)**: 128-131.

- Supriyadi, 2016, Community of Practitioners : Solusi Alternatif Berbagai Pengetahuan Antar Pustakawan, *Lentera Pustaka*, **2(2)**: 83-93.
- Scalbert, A., 1991, Antimicrobial Properties of Tannins, *Phytochemistry*, **30(12)**: 3875-3883.
- Tansil, A.Y.M., Nangoy, E., Posangi, J. dan Bara, R.A., 2016, Uji Daya Hambat Ekstrak Etanol Daun Srikaya (*Annona squamosa*) terhadap Pertumbuhan Bakteri *Escherichia coli* dan *Staphylococcus aureus*, *Jurnal e-Biomedik (eBm)*, **4(2)**.
- Tagousop., C.N., Tamokou, J.D., Ekom, S.E., Ngnokam, D. and Nazabadioko, L.V., 2018, Antimicrobial Activities of Flavonoid Glycosides from *Graptophyllum grandulosum* and Their Mechanism of Antibacterial Action, *BMC Complementary and Alternative Medicine*, **18**: 1-10.
- Thawabteh, A., Juma, S., Bader, M., Karaman, D., Scrano, L., Bufo, S.A. and Karaman, R., 2019, The Biological Activity of Natural Alkaloids against Herbivores, Cancerous Cells and Pathogens, *Toxins*, **11**: 1-28.
- Umadevi, K.J., Vanitha, V. and Vijayalakshmi, K., 2011, Antimicrobial Activity of Three Indian Medicinal Plants - An In Vitro Study, *International Quarterly Journal of Life Sciences*, **6(1)**: 25-28.
- Vijayalakshmi, R. and Nithiya, T., 2015, Antimicrobial Activity of Fruit Extract of *Annona squamosa* L., *World Journal of Pharmacy and Pharmaceutical Science*, **4**: 1257-1267.
- Vyas, K., Manda, H., Sharma, R.K and Singhal, G., 2012, An Update Review On *Annona Squamosa*, *International Journal of Pharmacy & Therapeutics*, **3(2)**: 107-118.
- Western, U., 2021, Diakses pada 7 Januari 2021, <https://www.lib.uwo.ca/tutorials/typesofliteraturereviews/index.html>
- Xie, Y., Yang, W., Tang, F., Chen, X. and Ren, L., 2015, Antibacterial Activities of Flavonoids: Structure-Activity Relationship and Mechanism, *Current Medicinal Chemistry*, **22(1)**: 132-149.
- Yadav, J., Pawar, R., Mandloi, M., Panchal, A. and Soni, S., 2020, Evaluation of Antibacterial Activity of *Annona squamosa* Leaves Extract, *Pramana Research Journal*, **10**: 45-48.

Zahid, M., Mujahid, M., Singh, P.K., Farooqui, S., Singh, K., Parveen, S. and Arif, M., 2018, *Annona squamosa* Linn. (Custard Apple): An Aromatic Medicinal Plant Fruit with Immense Nutraceutical and Therapeutic Potentials, *International Journal of Pharmaceutical Sciences and Research*, **9(5)**: 1745-1759.