

DAFTAR PUSTAKA

- Abdelzaher, O. F., Abdoon, A. S. S., Rady, M. I., El-Sayed, M. M. A.-E., Mehany, A. B. M., & Mohammed, F. E. (2018). Hepatic and Renal Histopathological and Ultrastructural Alterations Following Exposure to Different Gold Nanoparticle Sizes in Female Pregnant Rats. *Al-Azhar Bulletin of Science*, 29(Issue 2-C), 25–38. <https://doi.org/10.21608/absb.2018.33816>
- Ademola, B., Atanda, A., Aji, S., & Abdu, A. (2020). Clinical, Morphologic and Histological Features of Chronic Pyelonephritis: An 8-year Review. *Nigerian Postgraduate Medical Journal*, 27(1), 37. https://doi.org/10.4103/npmj.npmj_109_19
- Agit, A., Aini, L. N., Ananda, F., Sriyanah, M., Situmorang, B., Zahra, S., Efendi, S., Amane, A. P. O., A, Y. P. E., Wardhana, A., Ahmadin, & Rokhmah, S. (2023). *Metodologi Penelitian Kuantitatif dan Kualitatif*. Media Sains Indonesia.
- Aisyah, S., Budiman, H., Florenstina Br. G. D., Aliza, D., Salim, M. N., Balqis, U., & Armansyah, T. (2015). Efek Pemberian Minyak Jelantah Terhadap Gambaran Histopatologis Hati Tikus Putih (*Rattus norvegicus*). *Jurnal Medika Veterinaria*, 9(1). <https://doi.org/10.21157/j.med.vet.v9i1.2989>
- Alisa, N., Aprilia, C. A., Pradana, D. L. C., & Harfiani, E. (2024). Uji Toksisitas Akut In Vitro Infusa Daun Suruhan (*Peperomia pellucida* L. Kunth) dengan Metode *Brine Shrimp Lethality Test* (BSLT). *Seminar Nasional Riset Kedokteran*.
- Aller, M.-A., Arias, J.-L., García-Domínguez, J., Arias, J.-I., Durán, M., & Arias, J. (2008). Experimental Obstructive Cholestasis: The Wound-Like Inflammatory Liver Response. *Fibrogenesis & Tissue Repair*, 1(1), 6. <https://doi.org/10.1186/1755-1536-1-6>
- Amelia, S., Lubis, N. D. A., Balatif, R., Rozi, M. F., & Sidhi, S. P. (2020). Antibacterial effect of Andaliman (*Zanthoxylum acanthopodium*) Against Contaminant In Raw Common Carp (*Cyprinus carpio Linnaeus*). *IOP Conference Series: Earth and Environmental Science*, 425, 012036. <https://doi.org/10.1088/1755-1315/425/1/012036>
- Aminah, A., Tomayahu, N., & Abidin, Z. (2017). Penetapan Kadar Flavonoid Total Ekstrak Etanol Kulit Buah Alpukat (*Persea americana* Mill.) Dengan Metode Spektrofotometri UV-Vis. *Jurnal Fitofarmaka Indonesia*, 4(2), 226–230. <https://doi.org/10.33096/jffi.v4i2.265>
- Apriandi, A., Tarman, K., & Sugita, P. (2016). Toxicity Sub chronic Water Extract *Meretrix meretrix* Linnaeus In Vivo on *Sprague Dawley* Rats. *Jurnal*

- Pengolahan Hasil Perikanan Indonesia*, 19(2), 177. <https://doi.org/10.17844/jphpi.v19i2.13464>
- Arini, W., Isdadiyanto, S., & Sitasiwi, A. J. (2020). Efek Pemberian Ekstrak Etanol Daun Mimba (*Azadirachta indica* A. Juss.) terhadap Struktur Ren Tikus Putih (*Rattus norvegicus* L.) yang Diberi Pakan Tinggi Lemak. *Buletin Anatomi dan Fisiologi*, 5(2), 157–165. <https://doi.org/10.14710/baf.5.2.2020.157-165>
- Armita, I. P., & Justitia, B. (2021). Gambaran Histopatologi Ginjal Pada Tikus Putih Jantan Galur *Wistar* Setelah Pemberian Madu Intraperitoneal Post Laparatomi. *JOMS*, 1(2), 69–75.
- Arsita, E. V., Saragih, D. E., & Aldrin, K. (2019). Anticancer Potential From Ethanol Extract of *Zanthoxylum acanthopodium* DC. Seed To Against MCF-7 Cell Line. *IOP Conference Series: Earth and Environmental Science*, 293(1), 012016. <https://doi.org/10.1088/1755-1315/293/1/012016>
- Arts, J. W. M., Kramer, K., Arndt, S. S., & Ohl, F. (2012). The Impact of Transportation on Physiological and Behavioral Parameters in *Wistar* Rats: Implications for Acclimatization Periods. *ILAR Journal*, 53(1), E82–E98. <https://doi.org/10.1093/ilar.53.1.82>
- Astitu, V. E. R., Muktamiroh, H., Harfiani, E., & Selvester, M. (2023). Gambaran Histopatologi Hepar Mencit yang Diinduksi Aloksan: Perubahan Setelah Pemberian Ekstrak Biji Hijau Kopi Aceh Gayo. *Seminar Nasional Riset Kedokteran (SENSORIK)*.
- Awlqadr, F. H., Majeed, K. R., Altemimi, A. B., Hassan, A. M., Qadir, S. A., Saeed, M. N., Faraj, A. M., Salih, T. H., Abd Al-Manhel, A. J., Najm, M. A. A., Tsakali, E., Van Impe, J. F. M., Abd El-Maksoud, A. A., & Abdelmaksoud, T. G. (2025). Nanotechnology-Based Herbal Medicine: Preparation, Synthesis, And Applications In Food And Medicine. *Journal of Agriculture and Food Research*, 19, 1–30. <https://doi.org/10.1016/j.jafr.2025.101661>
- Badan Pengawas Obat dan Makanan Republik Indonesia. (2022). *Pedoman Uji Toksisitas Praktikum Secara In Vivo*. Badan Pengawas Obat dan Makanan Republik Indonesia.
- Banso, A., & Adeyemo, S. (2010). Phytochemical Screening And Antimicrobial Assessment of *Abutilon mauritianum*, *Bacopa monnifera* and *Datura stramonium*. *Biokemistri*, 18(1). <https://doi.org/10.4314/biokem.v18i1.56390>
- Bayani, F. (2016). Analisis Fenol dan Uji Aktivitas Antioksidan dari Ekstrak Buah Sentul (*Sandoricum koetjape* Merr). *Hydrogen: Jurnal Kependidikan Kimia*, 4(1), 55. <https://doi.org/10.33394/hjkk.v4i1.47>
- Brandao-Costa, R., Batistaa, J., Nascimento, T., & Porto, A. (2019). Renal Function Effects of FDS, A Saponin Isolated From *Filicium decipiens* Seeds:

- Biochemical and Histopathological Studies. *Journal of Plant Science and Phytopathology*, 3(3), 007–010. <https://doi.org/10.29328/journal.jpssp.1001040>
- Budiastuti, D., & Bandur, A. (2018). *Validitas dan Reliabilitas Penelitian*. Penerbit Mitra Wacana Media.
- Capdevila, S., Giral, M., Ruiz De La Torre, J. L., Russell, R. J., & Kramer, K. (2007). Acclimatization of Rats After Ground Transportation to A New Animal Facility. *Laboratory Animals*, 41(2), 255–261. <https://doi.org/10.1258/002367707780378096>
- Chandra, M. A. (2023). Verifikasi Metode Analisis Larutan Quercetin Menggunakan Spektrofotometer UV-Vis (T60). *Borneo Journal of Pharmascientech*, 07(02), 59–64.
- Costa, R. D., Teixeira, C., Casazza, A., Costa, R., Silva Júnior, J. O., Converti, A., & Perego, P. (2024). Polyphenol Extraction Using Microwaves and Pressured Liquid Condition from Cupuaçu Seed By-Product: Optimization and Comparative Study. *Journal of the Brazilian Chemical Society*. <https://doi.org/10.21577/0103-5053.20240149>
- Dale, D., & Astrid, W. (2023). Acute Tubular Necrosis. *PathologyOutlines.Com Website*. <https://www.pathologyoutlines.com/topic/kidneyatn.html>.
- Danielsen, E. M., & Hansen, G. H. (2003). Lipid Rafts in Epithelial Brush Borders: Atypical Membrane Microdomains With Specialized Functions. *Biochimica et Biophysica Acta (BBA) - Biomembranes*, 1617(1–2), 1–9. <https://doi.org/10.1016/j.bbamem.2003.09.005>
- De Vries, B., Matthijsen, R. A., Van Bijnen, A. A. J. H. M., Wolfs, T. G. A. M., & Buurman, W. A. (2003). Lysophosphatidic Acid Prevents Renal Ischemia-Reperfusion Injury by Inhibition of Apoptosis and Complement Activation. *The American Journal of Pathology*, 163(1), 47–56. [https://doi.org/10.1016/S0002-9440\(10\)63629-2](https://doi.org/10.1016/S0002-9440(10)63629-2)
- Delaney, M. A., Kowalewska, J., & Treuting, P. M. (2018). Urinary System. In *Comparative Anatomy and Histology* (pp. 275–301). Elsevier. <https://doi.org/10.1016/B978-0-12-802900-8.00016-6>
- Dewana, A. A. W., Suyono, T., Chiuman, L., & Ginting, S. F. (2022). Testing Antioxidant And Antibacterial Activity Of Andaliman Fruit (*Zanthoxylum acanthopodium* DD.) Ethanol Extract With Abts Method (2,2'-Azino-Bis(3-Ethylbenz-Thiazoline-6-Sulfonic Acid) And Minimum Resistant Concentration. *International Journal of Health and Pharmaceutical (IJHP)*, 2(1), 188–196. <https://doi.org/10.51601/ijhp.v2i1.35>

- Dewi, S. R. (2018). Uji Efek Anti Inflamasi Rebusan Daun Jamblang (*Syzygium cumini*) Pada Mencit (*Mus musculus*). *Media Farmasi*, 14(1), 8. <https://doi.org/10.32382/mf.v14i1.78>
- Diep, T. T., Dung, L. V., Trung, P. V., Hoai, N. T., Thao, D. T., Uyen, N. T. T., Linh, T. T. H., Ha, T. H. N., & Truc, H. T. (2023). Chemical Composition, Antimicrobial, Nitric Oxide Inhibition and Cytotoxic Activity of Essential Oils from *Zanthoxylum acanthopodium* DC. Leaves and Stems from Vietnam. *Chemistry & Biodiversity*, 20(8), e202300649. <https://doi.org/10.1002/cbdv.202300649>
- Digambiro, R. A., & Parwanto, E. (2024). *Panduan Prosesing dan Pewarnaan Jaringan dalam Histopatologi*. Penerbit Lakeisha.
- Djudjaj, S., & Boor, P. (2019). Cellular And Molecular Mechanisms Of Kidney Fibrosis. *Molecular Aspects of Medicine*, 65, 16–36. <https://doi.org/10.1016/j.mam.2018.06.002>
- Dwitarani, N., Amin, R. R., Sofyah, T. M., Ramadhani, D. N., & Sutoyo, S. (2021). Sintesis dan Karakterisasi Nanoherbal Ekstrak Etanol Kayu Secang (*Caesalpinia sappan* L.). *Jurnal Kimia Riset*, 6(2), 102. <https://doi.org/10.20473/jkr.v6i2.30883>
- Evans, J. G., & Butler, W. H. (2007). Histopathology in Safety Evaluation. In D. Anderson & D. M. Conning (Eds.), *Experimental Toxicology* (2nd ed., pp. 119–129). Royal Society of Chemistry. <https://doi.org/10.1039/9781847550798-00119>
- Fajriyah, S. N., Lestari, Y. E., Suaka, N. I., & Darmawan, E. (2021). Narrative Review: Nano Kapsul Ekstrak Biji pepaya (*Carica papaya* L.) sebagai Antifertilitas. *Jurnal Surya Medika*, 6(2), 10–24. <https://doi.org/10.33084/jsm.v6i2.1688>
- Farida, Y., Azela, W., Lestar, M. E., & Pratami, D. K. (2021). The Quality Parameters, Total Flavonoids Determination and Antioxidant Activity Compound of Andaliman Fruit (*Zanthoxylum acanthopodium* DC.) Extract. *International Journal of Applied Pharmaceutics*, 34–40. <https://doi.org/10.22159/ijap.2021.v13s2.07>
- Fauziyah, R. N. (2019). *Sampling dan Besar Sampel Bidang Kesehatan Masyarakat dan Klinis*. Politeknik Kesehatan Kemenkes Bandung.
- Feng, A. Y. T., & Himsworth, C. G. (2014). The Secret Life of The City Rat: A Review of The Ecology of Urban Norway and Black Rats (*Rattus norvegicus* and *Rattus rattus*). *Urban Ecosystems*, 17(1), 149–162. <https://doi.org/10.1007/s11252-013-0305-4>

- Fogo, A. B., Lusco, M. A., Najafian, B., & Alpers, C. E. (2016). AJKD Atlas of Renal Pathology: Toxic Acute Tubular Injury. *American Journal of Kidney Diseases*, 67(6), 31–32. <https://doi.org/10.1053/j.ajkd.2016.04.003>
- Gartner, L. P., & Hiatt, J. L. (2007). *Color Textbook of Histology* (3th ed). Saunders, Elsevier.
- Global Biodiversity Information Facility Secretariat. (2023). *Zathoxylum acanthopodium* DC. [Checklist Dataset]. *GBIF Backbone Taxonomy*. <https://www.gbif.org/species/7269121>
- Greaves, P. (2012). *Histopathology of Preclinical Toxicity Studies: Interpretation and Relevance in Drug Safety Studies* (4th ed). Elsevier/AP.
- Gunasekaran, T., Haile, T., Nigussie, T., & Dhanaraju, M. D. (2014). Nanotechnology: An Effective Tool For Enhancing Bioavailability And Bioactivity Of Phytomedicine. *Asian Pacific Journal of Tropical Biomedicine*, 4, S1–S7. <https://doi.org/10.12980/APJTB.4.2014C980>
- Guyton, A. C., & Hall, J. E. (2011). *Textbook of Medical Physiology* (12. ed). Saunders, Elsevier.
- Hakim, A. R., & Saputri, R. (2020). Narrative Review: Optimasi Etanol Sebagai Pelarut Senyawa Flavonoid dan Fenolik. *Jurnal Surya Medika*, 6(1), 177–180.
- Hansen, J. T., & Weber, E. C. (2014). *Netter's Anatomy Flashcards*.
- Hegazy, A. A., Ahmed, M. M., Shehata, M. A., & Abdelfattah, M. M. (2018). Changes in Rats' Liver Structure Induced by Zinc Oxide Nanoparticles and the Possible Protective Role of Vitamin E. *International Journal of Human Anatomy*, 1(3), 1–16. <https://doi.org/10.14302/issn.2577-2279.ijha-18-2384>
- Hikmawanti, N. P. E., Fatmawati, S., & Asri, A. W. (2021). The Effect of Ethanol Concentrations as The Extraction Solvent on Antioxidant Activity of Katuk (*Sauropus androgynus* (L.) Merr.) Leaves Extracts. *IOP Conference Series: Earth and Environmental Science*, 755(1), 012060. <https://doi.org/10.1088/1755-1315/755/1/012060>
- Husin, A. P. (2018). *Uji Toksisitas Subkronik Ekstrak Jintan Hitam (Nigella sativa) terhadap Berat Badan dan Histologi Ginjal Tikus (Rattus norvegicus) Galur Sprague Dawley* [Universitas Pembangunan Nasional “Veteran” Jakarta]. <http://repository.upnvj.ac.id/id/eprint/2505>
- Husna, F., Suyatna, F. D., Arozal, W., & Purwaningsih, E. H. (2019). Model Hewan Coba pada Penelitian Diabetes. *Pharmaceutical Sciences and Research*, 6(3). <https://doi.org/10.7454/psr.v6i3.4531>
- Indrianingsih, A. W., Styaningrum, P., Suratno, Windarsih, A., Suryani, R., Noviana, E., & Itoh, K. (2024). The Effect of Extraction Method on Biological Activity

Zahidatur Rosyidah, 2025

PENGARUH PEMERIAN EKSTRAK ETANOL 70% BUAH ANDALIMAN (ZANTHOXYLUM ACANTHOPODIUM DC.) TERHADAP GAMBARAN HISTOPATOLOGI HEPAR DAN GINJAL TIKUS SPRAGUE DAWLEY

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- and Phytochemical Content of *Artocarpus heterophyllus* (Jackfruit) Leaves Extract Concurrent With Its Principal Component Analysis. *Process Biochemistry*, 143, 135–147. <https://doi.org/10.1016/j.procbio.2024.04.034>
- Iqbal, E., Salim, K. A., & Lim, L. B. L. (2015). Phytochemical Screening, Total Phenolics And Antioxidant Activities Of Bark And Leaf Extracts Of *Goniothalamus velutinus* (Airy Shaw) From Brunei Darussalam. *Journal of King Saud University - Science*, 27(3), 224–232. <https://doi.org/10.1016/j.jksus.2015.02.003>
- Isdadiyanto, S., & Tana, S. (2019). Struktur Histologi Hepar Tikus *Wistar* (*Rattus norvegicus*) Jantan Setelah Pemberian Teh Kombucha Konsentrasi 75% dengan Waktu Fermentasi yang Berbeda. *Bioma : Berkala Ilmiah Biologi*, 21(2), 165–172. <https://doi.org/10.14710/bioma.21.2.165-172>
- Istikhomah, L. (2016). Efek Hepatoprotektor Ekstrak Buah Pedada (*Sonneratia caseolaris*) Pada Tikus Putih (*Rattus norvegicus*). *Life Science*, 5(1), 52–58.
- Jannah, D. R., & Budijastuti, W. (2022). Gambaran Histopatologi Toksisitas Ginjal Tikus Jantan (*Rattus norvegicus*) yang diberi Sirup Umbi Yakon (*Smallanthus sonchifolius*). *LenteraBio : Berkala Ilmiah Biologi*, 11(2), 238–246. <https://doi.org/10.26740/lenterabio.v11n2.p238-246>
- Joung, J., Cho, J., Kim, Y., Choi, S., & Son, C. (2019). A Literature Review For The Mechanisms of Stress-Induced Liver Injury. *Brain and Behavior*, 9(3), e01235. <https://doi.org/10.1002/brb3.1235>
- Junairiah, J., Ni'matuzahroh, N., Zuraidassanaaz, N. I., & Sulistyorini, L. (2019). Isolation And Identification Of Secondary Metabolites Of Black Betel (*Piper betle* L. var *Nigra*). *Jurnal Kimia Riset*, 3(2), 131. <https://doi.org/10.20473/jkr.v3i2.12064>
- Kaplowitz, N. (2002). Biochemical and Cellular Mechanisms of Toxic Liver Injury. *Seminars in Liver Disease*, 22(02), 137–144. <https://doi.org/10.1055/s-2002-30100>
- Kaya, C., Karabulut, R., Turkeyilmaz, Z., Sonmez, K., Kulduk, G., Gülbahar, Ö., Köse, F., & Basaklar, A. C. (2015). Lycopene Has Reduced Renal Damage Histopathologically and Biochemically in Experimental Renal Ischemia-Reperfusion Injury. *Renal Failure*, 37(8), 1390–1395. <https://doi.org/10.3109/0886022X.2015.1064742>
- Kementerian Kesehatan Republik Indonesia. (2017). *Farmakope Herbal Indonesia* (2nd ed.). Kementerian Kesehatan RI.
- Klaassen, C. D. (2019). *Toxicology: The Basic Science of Poisons* (9th ed.). Mc Graw Hill Education.

- Kumar, A., Anu, Mohan, A., Sharma, N. R., & Rehman, H. (2017). Antibacterial, Antioxidant Analysis of Phytochemical Extracts Derived From Seeds of *Syzygium cumini* L. against Pathogenic Bacteria. *Research Journal of Pharmacy and Technology*, 10(8), 2707. <https://doi.org/10.5958/0974-360X.2017.00481.4>
- Leary, S., Pharmaceuticals, F., Underwood, W., Anthony, R., Cartner, S., Johnson, C. L., & Patterson-Kane, E. (2020). *AVMA Guidelines for the Euthanasia of Animals: 2020 Edition*.
- Manurung, M. S., Trianto, H. F., Ilmiawan, M. I., & Handini, M. (2017). *Pengaruh Pajanan Akut Formaldehid per Oral terhadap Gambaran Histologis Korteks Ginjal Tikus Putih Jantan Galur Wistar*. 3.
- Marliana, S. D., Suryanti, V., & Suyono, S. (2005). The Phytochemical Screenings And Thin Layer Chromatography Analysis Of Chemical Compounds In Ethanol Extract Of Labu Siam Fruit (*Sechium edule* Jacq. Swartz.). *Biofarmasi Journal of Natural Product Biochemistry*, 3(1), 26–31. <https://doi.org/10.13057/biofar/f030106>
- Maulidza, C. P., Halim, B., Chiuman, L., Nasution, A. R., & Theresia, Y. (2025). The Effect of Andaliman Fruit Extract (*Zanthoxylum acanthopodium* DC) on α -Synuclein Levels in Rotenon-Induced *Wistar* Rats. *Jurnal Penelitian Pendidikan IPA*, 11(2), 516–524. <https://doi.org/10.29303/jppipa.v11i2.10362>
- Maulina, M. (2018). *Zat-Zat yang Mempengaruhi Histopatologi Hepar*. Unimal Press.
- Megawati, E., Bangun, H., Putra, I., Rusda, M., Syahrizal, D., Jusuf, N., Eyanoer, P., Lubis, R., & Amin, M. (2023). Phytochemical Analysis by FTIR of *Zanthoxylum acanthopodium*, DC Fruit Ethanol Extract, N-hexan, Ethyl Acetate and Water Fraction. *Medical Archives*, 77(3), 183. <https://doi.org/10.5455/medarh.2023.77.183-188>
- Mennen, L. I., Walker, R., Bennetau-Pelissero, C., & Scalbert, A. (2005). Risks and safety of polyphenol consumption. *The American Journal of Clinical Nutrition*, 81(1), 326S-329S. <https://doi.org/10.1093/ajcn/81.1.326S>
- Mescher, A. L., & Junqueira, L. C. U. (2013). *Junqueira's basic histology: Text and atlas* (Thirteenth edition). McGraw-Hill Medical.
- Moore, K. L., & Dalley, A. F. (2013). *Anatomi Berorientasi Klinis Edisi V* (5th ed.). Erlangga Medical Series.
- Mulyono, A., Ristiyanto, & H, N. S. (2009). Karakteristik Histopatologi Hepar Tikus Got (*Rattus norvegicus*) Infektif *Leptospira* sp. *Jurnal Vektora*, 1(2), 84–92.
- Munira, Zakiah, N., Handayani, R., & Nasir, M. (2022). POTENSI ANTIMIKROBA EKSTRAK DAUN JAMBLANG (*Syzygium cumini* L.) DARI KAWASAN

- GEOHERMAL IE SEUM ACEH BESAR. *Jurnal Insan Farmasi Indonesia*, 5(1), 98–107. <https://doi.org/10.36387/jifi.v5i1.915>
- Muslim, A. S., & Wulan, A. J. (2024). Pengaruh Pemberian Ekstrak Biji Kopi Robusta (*Coffea canephora*) Lampung Terhadap Gambaran Histopatologi Tubulus Proksimal Ginjal Tikus Putih (*Rattus norvegicus*) Jantan Galur *Sprague-Dawley* yang Diinduksi Monosodium Glutamat. *Journal of Medula*, 14(7), 1384–1391.
- Natasutedja, A. O., Lumbantobing, E., Josephine, E., Carol, L., Junaedi, D. I., Normasiwi, S., & Putra, A. B. N. (2020). Botanical Aspects, Phytochemicals and Health Benefits of Andaliman (*Zanthoxylum acanthopodium*). *Indonesian Journal of Life Sciences | ISSN: 2656-0682 (Online)*, 2(1), 8–15. <https://doi.org/10.54250/ijls.v2i1.32>
- Nguyen, N. V. T., Duong, N. T., Nguyen, K. N. H., Bui, N. T., Pham, T. L. T., Le, P. H., & Kim, K. H. (2021). Effect of Extraction Solvent on Total Phenol, Flavonoid Content, and Antioxidant Activity of *Avicennia officinalis*. *Biointerface Research in Applied Chemistry*, 12(2), 2678–2690. <https://doi.org/10.33263/BRIAC122.26782690>
- Nurlaeni, Y., Junaedi, D. I., & Iskandar, J. (2024). Botany, Morphology, Ecology, Cultivation, Traditional Utilization And Conservation Of Andaliman (*Zanthoxylum acanthopodium*) in North Sumatra, Indonesia. *N U S A N T A R A B I O S C I E N C E*.
- Ogoke, O., Oluwole, J., & Parashurama, N. (2017). Bioengineering Considerations In Liver Regenerative Medicine. *Journal of Biological Engineering*, 11(1), 46. <https://doi.org/10.1186/s13036-017-0081-4>
- Oktaviyanti, N. D., Kartini, K., Hadiyat, M. A., Rachmawati, E., Wijaya, A. C., Hayun, H., & Mun'im, A. (2020). A Green Extraction Design for Enhancing Flavonoid Compounds From *Ixora javanica* Flowers Using a Deep Eutectic Solvent. *Royal Society Open Science*, 7(10), 201116. <https://doi.org/10.1098/rsos.201116>
- Oprescu, E.-E., Enascuta, C.-E., Radu, E., Ciltea-Udrescu, M., & Lavric, V. (2022). Does the Ultrasonic Field Improve the Extraction Productivity Compared to Classical Methods – Maceration and Reflux Distillation? *Chemical Engineering and Processing - Process Intensification*, 179, 109082. <https://doi.org/10.1016/j.cep.2022.109082>
- Pasaribu, R. S. (2024). *Aktivitas Antibakteri Ekstrak Etanol Buah Andaliman (Zanthoxylum acanthopodium DC.) Terhadap Propionibacterium acnes* [Universitas Pembangunan Nasional “Veteran” Jakarta]. <http://repository.upnvj.ac.id/id/eprint/31710>
- Pérez-Correa, J. R., Mateos, R., & Domínguez, H. (Eds.). (2023). *Marine phenolic compounds: Science and engineering*. Elsevier.

- Permanasari, E. D., Amalia, M. P. R., Susilo, S., & Prastiwi, R. (2024). Total Flavonoid Content and Antioxidant Properties of Different Extraction Methods of Red Spinach Leaf (*Amaranthus tricolor* L.). *Jurnal Sains Farmasi & Klinis*, 11(1), 17–24. <https://doi.org/10.25077/jsfk.11.1.17-24.2024>
- Piao, Y., Liu, Y., & Xie, X. (2013). Change Trends of Organ Weight Background Data in *Sprague Dawley* Rats at Different Ages. *Journal of Toxicologic Pathology*, 26(1), 29–34. <https://doi.org/10.1293/tox.26.29>
- Pradono, J., Ondri Dwi Sampurno, Halim, F. X. S., Widowati, L., Imaningsih, N., Handayani, S., Isnawati, A., Delima, Lestari, C. W., Rooslamati, I., M. Karyana, Raharni, Rita Marleta Dewi, Lisdawati, V., & Setyawati, V. (2019). *Bunga Rampai Uji Klinik*. Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan.
- Prayoga, D. G. E., Nocianitri, K. A., & 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 (ITEPA)*, 8(2), 111. <https://doi.org/10.24843/itepa.2019.v08.i02.p01>
- Purnamasari, E., Purwaningsih, E., Mukhtar, D., & Giantini, A. (2024). Pengaruh Stres Oksidatif Pada Ginjal Terhadap Kadar Klotho. *Medika Al-Khairaat*, 6(2), 623–630.
- Purnomo, H., & Syamsul, E. S. (2017). *Statistika Farmasi*. Penerbit Grafika Indah.
- Quintero, A. D. C., & De Jesús, R. (2023). Hematological, biochemical, and growth parameters of *Sprague Dawley* rat of the Scientific Research and High Technology Services Institute of Panama. *Revista Veterinaria*, 34(1), 19. <https://doi.org/10.30972/vet.3416606>
- Rafe, M. A. S. R., Gaina, C. D., & Ndaong, N. A. (2020). Gambaran Histopatologi Ginjal Tikus Putih (*Rattus norvegicus*) Jantan yang Diberi Infusa Pare Lokal Pulau Timor. *Jurnal Veteriner Nusantara*, 3(1), 61–73.
- Rahmawati, I., Azizi, D. H., Wibowo, J. N., Reza, M., Fachri, B. A., Palupi, B., Rizkiana, M. F., Amini, H. W., Ramadhana, I., & Setiawan, F. A. (2025). A Comparison of Unconventional Microwave and Ultrasound-Assisted Extraction Methods used for Flavonoids. *Makara Journal of Science*, 29(1). <https://doi.org/10.7454/mss.v29i1.2317>
- Rahmawaty, Samosir, J. B., Batubara, R., & Rauf, A. (2019). Diversity And Distribution Of Medicinal Plants In The Universitas Sumatera Utara Arboretum Of Deli Serdang, North Sumatra, Indonesia. *Biodiversitas Journal of Biological Diversity*, 20(5). <https://doi.org/10.13057/biodiv/d200539>
- Ramos, T. M., Benedito-Fort, J., Watson, N. J., Ruiz-López, I. I., Che-Galicia, G., & Corona-Jiménez, E. (2020). Effect of Solvent Composition And Its Interaction

- With Ultrasonic Energy On The Ultrasound-Assisted Extraction Of Phenolic Compounds From Mango Peels (*Mangifera indica* L.). *Food and Bioproducts Processing*, 122, 41–54. <https://doi.org/10.1016/j.fbp.2020.03.011>
- Resti, I. A., & Parbuntari, H. (2022). Identifikasi Senyawa Metabolit Sekunder Ekstrak Jamur Tiram Putih (*Pleurotus ostreatus* L.). *Jurnal Periodic Jurusan Kimia UNP*, 11(2), 65. <https://doi.org/10.24036/p.v11i2.114563>
- Riana, E. N., Ischak, N. I., Hrp, C. L. F., Ayudia, E. I., Khairani, I. A., Lubis, Ni. A., Prabandari, A. S., Miftahurrahmah, Sari, M. S., Mulyana, J. S., & Isdaryanti. (2023). *Toksikologi Dasar*. Yayasan Kita Menulis.
- Rienoviar, -, Heliawati, L., & Khoiriyah, A. (2019). Aktivitas Antioksidan dan Identifikasi Senyawa Aktif dalam Ekstrak Buah Andaliman (*Zanthoxylum acanthopodium* DC.). *Warta Industri Hasil Pertanian*, 36(2), 124. <https://doi.org/10.32765/wartaihp.v36i2.5668>
- Rogers, A. B., & Dintzis, R. Z. (2018). Hepatobiliary System. In *Comparative Anatomy and Histology* (pp. 229–239). Elsevier. <https://doi.org/10.1016/B978-0-12-802900-8.00013-0>
- Rohma, S., & Utami, D. (2024). Uji Toksisitas Akut Ekstrak Daun Sirih Keraton (*Cissus discolor*) Yang Berpotensi Sebagai Obat Antihipertensi. *Duta Pharma Journal*, 4(2).
- Rosidah, I., Ningsih, S., Renggani, T. N., Agustini, K., & Efendi, J. (2020). Profil Hematologi Tikus (*Rattus norvegicus*) Galur *Sprague-Dawley* Jantan Umur 7 dan 10 Minggu. *Jurnal Bioteknologi & Biosains Indonesia*, 7(1), 136–145.
- Rosidah, R., Zaitun Hasibuan, P. A., Haro, G., Masri, P., & Satria, D. (2018). Antioxidant Activity of Alkaloid Fractions of *Zanthoxylum acanthopodium* DC Fruits With 1,1-diphenyl-2-picrylhydrazyl Assay. *Asian Journal of Pharmaceutical and Clinical Research*, 11(13), 33. <https://doi.org/10.22159/ajpcr.2018.v11s1.26560>
- Ruiz-Rosado, J. D. D., Robledo-Avila, F., Cortado, H., Rangel-Moreno, J., Justice, S. S., Yang, C., Spencer, J. D., Becknell, B., & Partida-Sanchez, S. (2021). Neutrophil-Macrophage Imbalance Drives the Development of Renal Scarring during Experimental Pyelonephritis. *Journal of the American Society of Nephrology*, 32(1), 69–85. <https://doi.org/10.1681/ASN.2020030362>
- Safitri, R. A., Rahayu, M. P., & Widodo, G. P. (2023). Uji Aktivitas Antiinflamasi Ekstrak Batang Karamunting (*Rhodomyrtus tomentosa*) Terhadap Tikus Jantan Galur *Wistar*: Test of Antiinflammatory Activity Extract of Karamunting (*Rhodomyrtus tomentosa*) Stem to Male Rat *Wistar* Strain. *Jurnal Surya Medika*, 9(1), 330–334. <https://doi.org/10.33084/jsm.v9i1.5202>

- Sangi, M., Runtuwene, M. R. J., & Simbala, H. E. I. (2008). *Analisis Fitokimia Tumbuhan Obat di Kabupaten Minahasa Utara*. 1(1).
- Sari, M., & Nawawi. (2023). Hepatoprotektif Ekstrak Batang Bajakah (*Spatholobus littoralis* Hassk) Induksi Tetraklorida (CCL4). *BIOEDUSAINS: Jurnal Pendidikan Biologi Dan Sains*, 6(2), 492–500. <https://doi.org/10.31539/bioedusains.v6i2.5895>
- Sari, W. (2019). *Aplikasi Sel Punca pada Uji Toksisitas*.
- Satria, D., Silalahi, J., Haro, G., Ilyas, S., & Zaitun Hasibuan, P. A. (2019). Chemical Analysis and Cytotoxic Activity of N-Heksane Fraction of *Zanthoxylum acanthopodium* DC. Fruits. *Rasayan Journal of Chemistry*, 12(02), 803–808. <https://doi.org/10.31788/RJC.2019.1225180>
- Schelling, J. R. (2016). Tubular Atrophy In The Pathogenesis Of Chronic Kidney Disease Progression. *Pediatric Nephrology*, 31(5), 693–706. <https://doi.org/10.1007/s00467-015-3169-4>
- Seely, J. C., Hard, G. C., & Blankenship, B. (2018). Kidney. In *Boorman's Pathology of the Rat* (pp. 125–166). Elsevier. <https://doi.org/10.1016/B978-0-12-391448-4.00011-3>
- Setyaputri, N. A. R. (2019). *Pengaruh Pemberian Ekstrak Bunga Rosela (Hibiscus sabdariffa L.) terhadap Perubahan Gambaran Histopatologi Hepar Tikus (Rattus norvegicus) yang Diinduksi Etanol 20%* [Universitas Pembangunan Nasional "Veteran Jakarta"]. <http://repository.upnvj.ac.id/id/eprint/1413>
- Shafaei, H., Esmaeili, A., Rad, J. S., Delazar, A., & Behjati, M. (2012). *Citrullus colocynthis* As A Medicinal or Poisonous Plant: A Revised Fact. *Journal of Medicinal Plants Research*, 6(36), 4922–4927. <https://doi.org/10.5897/JMPR11.264>
- Sharon, Y. (2024). *Brine Shrimp Lethality Test (BSLT) dari Ekstrak Etanol Buah Andaliman (Zanthoxylum acanthopodium) dengan Metode Ekstraksi Ultrasonik* [Universitas Pembangunan Nasional "Veteran" Jakarta]. <http://repository.upnvj.ac.id/id/eprint/31652>
- Shylla, A., Pathaw, D., & Roy, B. (2022). Toxicological Assessment of Methanolic Fruit Extract of *Zanthoxylum acanthopodium* DC. in Swiss Albino Mice: Acute and Sub-acute Toxicity Study. *Toxicology International*, 75–93. <https://doi.org/10.18311/ti/2022/v29i1/28051>
- Siahaan, G. S., Lintong, P. M., & Loho, L. L. (2016). Gambaran Histopatologik Ginjal Tikus *Wistar (Rattus norvegicus)* yang Diinduksi Gentamisin dan Diberikan Ubi Jalar Ungu (*Ipomoea batatas* L. Poir). *Jurnal e-Biomedik*, 4(1). <https://doi.org/10.35790/ebm.4.1.2016.12229>

- Sibero, M. T., Siswanto, A. P., Murwani, R., Frederick, E. H., Wijaya, A. P., Syafitri, E., Farabi, K., Saito, S., & Igarashi, Y. (2020). Antibacterial, Cytotoxicity And Metabolite Profiling Of Crude Methanolic Extract From Andaliman (*Zanthoxylum acanthopodium*) fruit. *Biodiversitas Journal of Biological Diversity*, 21(9). <https://doi.org/10.13057/biodiv/d210928>
- Silalahi, S., Megaputri, T. R., & . D. (2019). Effect Of Extraction Solvent On Total Flavonoid Content Of Andaliman Fruit (*Zanthoxylum acanthopodium* DC). *Pro Food*, 5(2), 540–543. <https://doi.org/10.29303/profood.v5i2.103>
- Simanullang, R. H., Situmorang, P. C., Herlina, M., Noradina, Silalahi, B., & Manurung, S. S. (2022). Histological Changes Of Cervical Tumours Following *Zanthoxylum acanthopodium* DC Treatment, And Its Impact On Cytokine Expression. *Saudi Journal of Biological Sciences*, 29(4), 2706–2718. <https://doi.org/10.1016/j.sjbs.2021.12.065>
- Simbolon, B., Yulizal, O., Hutapea, A., & Handoko, E. (2024). The effect of Andaliman (*Zanthoxylum acanthopodium* DC.) Fruit Extracted With Ethanol On TNF- α and TRPA-1 Levels In Type II Diabetes-Induced Mice. *Journal of Advanced Veterinary and Animal Research*, 11(2), 284. <https://doi.org/10.5455/javar.2024.k774>
- Singh, P., Sharma, S., & Rath, S. K. (2022). A Versatile Flavonoid Quercetin: Study of Its Toxicity and Differential Gene Expression in The Liver of Mice. *Phytomedicine Plus*, 2(1), 100148. <https://doi.org/10.1016/j.phyplu.2021.100148>
- Situmorang, P. C., Ilyas, S., Hutahaean, S., Rosidah, & Manurung, R. D. (2020). Acute Toxicity Test and Histological Description of Organs After Giving Nano Herbal Andaliman (*Zanthoxylum acanthopodium*). *Rasayan Journal of Chemistry*, 13(02), 780–788. <https://doi.org/10.31788/RJC.2020.1325621>
- Stanek, M., Rotkiewicz, T., Sobotka, W., Bogusz, J., Otrocka-Domagala, I., & Rotkiewicz, A. (2015). The Effect of Alkaloids Present in Blue Lupine (*Lupinus angustifolius*) Seeds on The Growth Rate, Selected Biochemical Blood Indicators and Histopathological Changes in The Liver of Rats. *Acta Veterinaria Brno*, 84(1), 55–62. <https://doi.org/10.2754/avb201585010055>
- Suhita, N. L. P. R., Sudira, I. W., & Winaya, I. B. O. (2013). Histopatologi Ginjal Tikus Putih Akibat Pemberian Ekstrak Pegagan (*Centella asiatica*) Peroral. *Buletin Vetiver Udayana*, 5(2), 71–78.
- Sulasmi, E. S., Saptasari, M., Mawaddah, K., & Ama Zulfia, F. (2019). Tannin Identification of 4 Species Pterydophyta from Baluran National Park. *Journal of Physics: Conference Series*, 1241(1), 012002. <https://doi.org/10.1088/1742-6596/1241/1/012002>

- Susanti, N., Situmorang, E., & Fitri, W. (2020). Effectiveness of The Antibacterial Activity of n-Hexane Andaliman (*Zanthoxylum acanthopodium* DC) Extract Against *Bacillus subtilis*, *Salmonella typhi*, and *Staphylococcus aureus*. *Journal of Physics: Conference Series*, 1462(1), 012072. <https://doi.org/10.1088/1742-6596/1462/1/012072>
- Syaputri, I., Girsang, E., & Chiuman, L. (2022). Test of Antioxidant And Antibacterial Activity of Ethanol Extract of Andaliman Fruit (*Zanthoxylum acanthopodium* DC.) With Dpph (1.1-Diphenyl-2-Picrylhydrazil) Trapping Method And Minimum Inhibitory Concentration. *International Journal of Health and Pharmaceutical (IJHP)*, 2(2), 215–224. <https://doi.org/10.51601/ijhp.v2i2.36>
- Tandi, J., Dewi, N. P., Wirawan, R. C., & Surat, M. R. (2020). Potency of Seaweed (*Eucheuma cottonii* J.Agardh) Against Nephropathy Diabetic Male White Rats (*Rattus norvegicus*). *Jurnal Farmasi Galenika (Galenika Journal of Pharmacy) (e-Journal)*, 6(2). <https://doi.org/10.22487/j24428744.2020.v6.i2.15046>
- Tri, R., Yasni, S., Muhandri, T., & Yuliani, S. (2022). Pengaruh Metode Ekstraksi Terhadap Kualitas Ekstrak Kulit Manggis (*Garcinia mangostana* L.). *JURNAL UNITEK*, 15(2), 198–211. <https://doi.org/10.52072/unitek.v15i2.389>
- Utari, A., & Warly, L. (2021). Tannin Contents of Jackfruit Leaves (*Artocarpus heterophyllus*) Extract and Moringa Leaves (*Moringa oleifera*) Extract as Functional Additive Feed in Ruminan Livestock. *IOP Conference Series: Earth and Environmental Science*, 757(1), 012054. <https://doi.org/10.1088/1755-1315/757/1/012054>
- Wang, Z., Han, H., Wang, C., Zheng, Q., Chen, H., Zhang, X., & Hou, R. (2021). Hepatotoxicity of Pyrrolizidine Alkaloid Compound Intermedine: Comparison with Other Pyrrolizidine Alkaloids and Its Toxicological Mechanism. *Toxins*, 13(12), 849. <https://doi.org/10.3390/toxins13120849>
- Wati, D. P., Ilyas, S., & Yurnadi. (2024). *Prinsip Dasar Tikus Sebagai Model Penelitian*. USU Press.
- Wicitra, R. P. (2017). *Uji Toksisitas Akut Ekstrak Metanol Batang Kayu Kuning (Arcangelista flava (L.) Merr.) Terhadap Kadar Kreatinin dan Histopatologi Ginjal Mencit Betina Galur BALB/C*. Universitas Jember.
- Wilson, D. E., & Reeder, D. M. (2005). *Mammal Species of The World: A Taxonomic and Geographic Reference* (3rd ed., Vol. 1). Johns Hopkins University Press.
- Wisløff, H., Uhlig, S., Scheie, E., Loader, J., Wilkins, A., & Flåøyen, A. (2008). Toxicity Testing Of Saponin-Containing Yucca Schidigera Roetzl. Juice In Relation To Hepato- And Nephrotoxicity Of *Nartheceium ossifragum* (L.) Huds. *Toxicon*, 51(1), 140–150. <https://doi.org/10.1016/j.toxicon.2007.08.016>

- Yanti, Theodorus Eko Pramudito, & Nerissa Nuriasari and Katarina Juliana. (2011). Lemon Pepper Fruit Extract (*Zanthoxylum acanthopodium* DC.) Suppresses the Expression of Inflammatory Mediators in Lipopolysaccharide-Induced Macrophages In Vitro. *American Journal of Biochemistry and Biotechnology*, 7(4), 190–195. <https://doi.org/10.3844/ajbbsp.2011.190.195>
- Yonzon, R., & Rai, S. (2016). *Zanthoxylum acanthopodium* DC. (Rutaceae)—A Favourable Ethnomedicinal Fruit for The Local Inhabitants of Darjeeling Himalaya of West Bengal, India. *Journal of Complementary Medicine & Alternative Healthcare*, 1(1). <https://doi.org/10.19080/JCMAH.2016.01.555554>
- Zainuddin, Z., Syahputri, F. O., Masyitha, D., Aisyah, S., Iskandar, C. D., Rahmi, E., & Riandi, L. V. (2023). *Gambaran Histologi dan Histomorfometri Ginjal Kalkun (Meleagris gallopavo) pada Tingkatan Umur Berbeda*. 7(1).
- Zaman, M. A. K., Azzeme, A. M., Ramli, S. N., Shaharuddin, N. A., Ahmad, S., & Abdullah, S. N. A. (2020). Solvent Extraction And Its Effect On Phytochemical Yield And Antioxidant Capacity Of Woody Medicinal Plant, *Polyalthia bullata*. *BioResources*, 15(4), 9555–9568. <https://doi.org/10.15376/biores.15.4.9555-9568>
- Zanotti, A., Baldino, L., Scognamiglio, M., & Reverchon, E. (2023). Supercritical Fluid Extraction of Essential Oil and Sclareol from a Clary Sage Concrete. *Molecules*, 28(9), 3903. <https://doi.org/10.3390/molecules28093903>
- Zmarowski, A., Beekhuijzen, M., Lensen, J., & Emmen, H. (2012). Differential Performance Of *Wistar* Han And *Sprague Dawley* Rats In Behavioral Tests: Differences In Baseline Behavior And Reactivity To Positive Control Agents. *Reproductive Toxicology*, 34(2), 192–203. <https://doi.org/10.1016/j.reprotox.2012.05.091>