

DAFTAR PUSTAKA

- Abarike, E. D., Dandi, S. O., & Ampofo-Yeboah, A. (2022). A blend of Guava, Bitter, and Neem Leaf extracts improves haematology and resistance to co-infection of *Streptococcus agalactiae* and *Aeromonas jandaie* but not Liver health in Nile tilapia. *Fish and Shellfish Immunology Reports*, 3(July), 100066. <https://doi.org/10.1016/j.fsirep.2022.100066>
- Ali, E., Islam, M. S., Hossen, M. I., Khatun, M. M., & Islam, M. A. (2021). Extract of neem (*Azadirachta indica*) leaf exhibits bactericidal effect against multidrug resistant pathogenic bacteria of poultry. *Veterinary Medicine and Science*, 7(5), 1921–1927. <https://doi.org/10.1002/vms3.511>
- Andhiarto, Y., Andayani, R., & Ilmiyah, N. H. (2019). Uji Aktifitas Antibakteri Ekstrak Etanol 96% Dengan Metode Ekstraksi Perkolasi Terhadap Pertumbuhan Bakteri *Staphylococcus aureus*. 2(1), 102–111.
- Asni, Rahim, & Marwayanti. (2020). Sistem Akuaponik Dapat Meningkatkan Pertumbuhan dan Tingkat Kelangsungan Hidup Ikan Mas (*Cyprinus carpio*). *Jurnal Veteriner*, 21(36), 136–142. <https://doi.org/10.19087/jveteriner.2020.21.1.136>
- Aulia, A. M. S., Budi, D. S., Fasya, A. H., Kenconoajati, H., & Azhar, M. H. (2019). Virus Detection of Pacific White Shrimp (*Litopenaeus vannamei*) at Fish Quarantine Center, Quality Control, and Security of Fishery Product in Surabaya I. 4(2), 83–90.
- Baker-Austin, C., Trinanes, J., Gonzalez-Escalona, N., & Martinez-Urtaza, J. (2017). Non-Cholera Vibrios: The Microbial Barometer of Climate Change. *Trends in Microbiology*, 25(1), 76–84. <https://doi.org/10.1016/j.tim.2016.09.008>
- Basir, B., Isnansetyo, A., Istiqomah, I., & Jabbar, F. B. A. (2020). Toksisitas Daun Miana (*Coleus scutellarioides* (L) Benth) Sebagai Antibakteri Pada Udang Vannamei (*Litopenaeus vannamei*). *SIGANUS: Journal of Fisheries and Marine Science*, 1(2), 56–61. <https://doi.org/10.31605/siganus.v1i2.653>
- Binta, B.-M., Dematus, O. K., & Dadi, M. H. (2022a). Nematicidal Activity of Methanolic Extracts of Leaf , Stem Bark , and Root of Nematicidal Activity of Methanolic Extracts of Leaf , Stem Bark , and Root of *Azadirachta Indica* (Neem) Against Haemonchus Contortus. June. <https://doi.org/10.47191/ijpbms/v2-i6-04>
- Binta, B.-M., Dematus, O. K., & Dadi, M. H. (2022b). Nematicidal Activity of Methanolic Extracts of Leaf , Stem Bark , and Root of Nematicidal Activity of Methanolic Extracts of Leaf , Stem Bark , and Root of *Azadirachta Indica* (Neem) Against Haemonchus Contortus. June, 130–136. <https://doi.org/10.47191/ijpbms/v2-i6-04>
- Bolaji, O., Abolade, Y. A., Aduwa, S., Isiaka, A. B., Durodola, O., Adeoye, A., Adeoye, T. O., Bamidele, A. A., Akagbue, B. O., Aminu, M. B., & Siame, T. (2024). Potential health and environmental benefits of the identified phytochemicals screening of (*Azadirachta indica*) neem leaves in Bauchi Metropolis , Bauchi Potential health and environmental benefits of the identified phytochemicals screening of (*Azadirac*. March. <https://doi.org/10.30574/gscbps.2024.26.3.0037>
- BPOM. (2020). Badan Pengawas Obat dan Makanan. November.
- BPOM. (2022). Badan pengawas obat dan makanan republik indonesia.
- BPS. (2022). Produksi Perikanan Budidaya Menurut Komoditas Utama. 1–23.
- Candra, A., Fahrimal, Y., Yusni, Y., Azwar, A., & Santi, T. D. (2024). Phytochemistry and antifatigue activities of *Carica papaya* leaf from geothermal, coastal and urban areas, Indonesia. *Narra J*, 4(1), e321. <https://doi.org/10.52225/narra.v4i1.321>
- Caro, L. F. A., Mai, H. N., Kanrar, S., Cruz-Flores, R., & Dhar, A. K. (2020). A mutant of *Vibrio parahaemolyticus* pirABvp (+) that carries binary toxin genes but does not cause acute hepatopancreatic necrosis disease. *Microorganisms*, 8(10), 1–13. <https://doi.org/10.3390/microorganisms8101549>
- Ceccarelli, D., Hasan, N. A., Huq, A., & Colwell, R. R. (2013). Distribution and dynamics of epidemic and pandemic *Vibrio parahaemolyticus* virulence factors. *Frontiers in Cellular and Infection Microbiology*,

3(DEC), 1–9. <https://doi.org/10.3389/fcimb.2013.00097>

- Chaweepack, T., Muenthaisong, B., Chaweepack, S., & Kamei, K. (2015). The Potential of Galangal (*Alpinia galanga* Linn.) Extract against the Pathogens that Cause White Feces Syndrome and Acute Hepatopancreatic Necrosis Disease (AHPND) in Pacific White Shrimp (*Litopenaeus vannamei*). *International Journal of Biology*, 7(3), 8–17. <https://doi.org/10.5539/ijb.v7n3p8>
- Chunguang, W., Jingyun, F., Ying, L., & Zengguo, H. (2023). Isolation, identification, and characterization of *Vibrio parahaemolyticus* phage Vpas_PP24 WU. *March*. <https://doi.org/10.13344/j.microbiol.china.220316>
- Dahlan, J., Hamzah, M., & Kurnia, A. (2019). Pertumbuhan Udang Vaname (*Litopenaeus vannamei*) yang Dikultur pada Sistem Bioflok dengan Penambahan Probiotik The Growth of Vaname white shrimp (*Litopenaeus vannamei*) cultured in bioflock system probiotic Supplement. 1(1), 19–27.
- Davis, W. W., & Stout, T. R. (1971). Disc plate method of microbiological antibiotic assay. I. Factors influencing variability and error. *Applied Microbiology*, 22(4), 659–665. <https://doi.org/10.1128/aem.22.4.659-665.1971>
- Devi, S. A., Setyati, W. A., Wulandar, D. A., Saputra, E., & Sakti, I. M. (2018). Bioaktivitas Antivibrosis dan Identifikasi Yeast Dari Sedimen Ekosistem Mangrove Karimunjawa. 3(2), 156–163.
- Dewatisari, W. F., Rumiyantri, L., & Rakhmawati, I. (2018). Rendemen dan Skrining Fitokimia pada Ekstrak Daun *Sansevieria* sp. Rendemen and Phytochemical Screening using Leaf extract of Sansevieria Sp. January. <https://doi.org/10.25181/jppt.v17i3.336>
- Dhanani, T., Shah, S., Gajbhiye, N. A., & Kumar, S. (2017). Effect of extraction methods on yield, phytochemical constituents and antioxidant activity of *Withania somnifera*. *Arabian Journal of Chemistry*, 10(June 2014), S1193–S1199. <https://doi.org/10.1016/j.arabjc.2013.02.015>
- Dugassa, H., & Gaetan, D. G. (2018). Biology of White Leg Shrimp, *Penaeus vannamei*: Review. *World Journal of Fish and Marine Sciences*, 10(2), 5–17. <https://doi.org/10.5829/idosi.wjfm.2018.05.17>
- Effendi, M.I. 1986. *Biologi Perikanan: Study Natural History*. Fakultas Perikanan Institut Pertanian Bogor.
- Farabi, A. I., & Latuconsina, H. (2023). Manajemen Kualitas Air pada Pembesaran Udang Vaname (*Litopenaeus vannamei*) di UPT. BAPL (Budidaya Air Payau dan Laut) Bangil Pasuruan Jawa Timur. *Jurnal Riset Perikanan Dan Kelautan*, 5(1), 1–13. <https://doi.org/10.33506/jrpk.v5i1.2097>
- Fisayomi, O. O., Adekanmi Adeyinka, A., Adegboye, M. A., Oyindamola, O. F., & S., A. A. (2022). Comparison of Neem Leaf (*Azadirachta Indica* A. Juss) and Scent Leaf (*Ocimum Gratissimum*) Phytochemical and Nutritional Properties. October 2021.
- Fu, J., Li, Y., Zhao, L., Wu, C., & He, Z. (2023). Characterization of vB_ValM_bacteriophage infecting *Vibrio alginolyticus* and *Vibrio parahaemolyticus*. *May*, 1–20. <https://doi.org/10.3389/fmicb.2023.1105924>
- Górniak, I., Bartoszewski, R., & Króliczewski, J. (2019). Comprehensive review of antimicrobial activities of plant flavonoids. In *Phytochemistry Reviews* (Vol. 18, Issue 1). <https://doi.org/10.1007/s11101-018-9591-z>
- Haifa-Haryani, W. O., Azzam-Sayuti, M., Amatul-Samahah, M. A., Chin, Y. K., Zamri-Saad, M., Annas, S., Natrah, I., Amal, M. N. A., & Ina-Salwany, M. Y. (2023). Characterization of the Virulency of *Vibrio* spp. in Giant Tiger Shrimp (*Penaeus monodon*) from Peninsular Malaysia. *Aquaculture Research*, 2023. <https://doi.org/10.1155/2023/7259748>
- Hammed, A. M., Awe, F. A., Amosu, A. O., & Fashina-Bombata, H. A., Olanloye, A. O. (2017). Antibacterial activities of Neem leave (*Azadirachta indica*) extracts on African mud Catfish *Clarias gariepinus* (Burchell, 1822). *The Experiment*, 42(4), 2453–2462.
- Han, J. E., Lee, S. C., Park, S. C., Jeon, H. J., Kim, K. Y., Lee, Y. S., Park, S., Han, S. H., Kim, J. H., & Choi, S. K. (2020). Molecular detection of Enterocytozoon hepatopenaei and *Vibrio parahaemolyticus*-associated acute hepatopancreatic necrosis disease in Southeast Asian *Penaeus vannamei* shrimp imported into Korea. *Aquaculture*, 517, 734812.

<https://doi.org/10.1016/j.aquaculture.2019.734812>

- Han, J. E., Tang, K. F. J., Tran, L. H., & Lightner, D. V. (2015). Photorhabdus insect-related (Pir) toxin-like genes in a plasmid of *Vibrio parahaemolyticus*, the causative agent of acute hepatopancreatic necrosis disease (AHPND) of shrimp. *Diseases of Aquatic Organisms*, 113(1), 33–40. <https://doi.org/10.3354/dao02830>
- Harlina, H., Saenong, M., Syahrul, S., Hamdillah, A., & Tangdilintin, I. S. (2023). The Use of (*O. Basilicum*) Extract to Treat Litopenaeus vannamei Disease the Infected Bacteria *Vibrio parahaemolyticus*. *Asian Journal of Fisheries and Aquatic Research*, 25(6), 35–42. <https://doi.org/10.9734/ajfar/2023/v25i6715>
- Hasnaeni, Wisdawati, & Usman, S. (2019). Pengaruh Metode Ekstraksi Terhadap Rendemen Dan Kadar Fenolik Ekstrak Tanaman Kayu Beta-Beta (*Lunasia amara Blanco*) (The Effect of Extraction Method on Yield Value and Phenolic Content of Beta-Beta. 5(2), 175–182. <https://doi.org/10.22487/j24428744.2019.v5.i2.13149>
- Heng, S. P., Letchumanan, V., Deng, C. Y., Ab Mutalib, N. S., Khan, T. M., Chuah, L. H., Chan, K. G., Goh, B. H., Pusparajah, P., & Lee, L. H. (2017). *Vibrio vulnificus*: An environmental and clinical burden. *Frontiers in Microbiology*, 8(MAY). <https://doi.org/10.3389/fmicb.2017.00997>
- Hernández-Cabanyero, C., Carrascosa, E., Jiménez, S., & Fouz, B. (2023). Exploring the Effect of Functional Diets Containing Phytobiotic Compounds in Whiteleg Shrimp Health: Resistance to Acute Hepatopancreatic Necrotic Disease Caused by *Vibrio parahaemolyticus*. *Animals*, 13(8), 1–17. <https://doi.org/10.3390/ani13081354>
- Herrera-Calderon, O., Ejaz, K., Wajid, M., Shehzad, M., Tinco-Jayo, J. A., Enciso-Roca, E., Franco-Quino, C., Yuli-Posadas, R. Á., & Chumpitaz-Cerrate, V. (2019). *Azadirachta indica*: Antibacterial activity of neem against different strains of bacteria and their active constituents as preventive in various diseases. *Pharmacognosy Journal*, 11(6), 1597–1604. <https://doi.org/10.5530/PJ.2019.11.244>
- Hidayatullah, S. H., & Mourisa, C. (2023). Uji efektivitas akar karamunting (*Rhodomyrtus tomentosa* (Aiton) Hassk) terhadap pertumbuhan bakteri *Staphylococcus Aureus*. *Jurnal Ilmiah Kohesi*, 7(1), 34–40.
- Hirono, I., & Angulo, C. (2017). Short communication Recombinant PirA-like toxin protects shrimp against challenge with *Vibrio parahaemolyticus*, the aetiological agent of acute hepatopancreatic necrosis disease. 16, 1–5. <https://doi.org/10.1111/jfd.12625>
- Integrated Taxonomic Information System (ITIS),(2023) *Azadirachta indica* A. Juss, TSN:290112,https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=29012&print
- Ibrahim, N., & Kebede, A. (2020). In vitro antibacterial activities of methanol and aqueous leave extracts of selected medicinal plants against human pathogenic bacteria. *Saudi Journal of Biological Sciences*, 27(9), 2261–2268. <https://doi.org/10.1016/j.sjbs.2020.06.047>
- Ibrahim, R. E., Elshopakey, G. E., Abdelwarith, A. A., Younis, E. M., Ismail, S. H., Ahmed, A. I., El-Saber, M. M., Abdelhamid, A. E., Davies, S. J., El-Murr, A., & Abdel Rahman, A. N. (2023). Chitosan neem nanocapsule enhances immunity and disease resistance in Nile tilapia (*Oreochromis niloticus*). *Heliyon*, 9(9), e19354. <https://doi.org/10.1016/j.heliyon.2023.e19354>
- Islam, S. I., Mahfuj, S., Baqar, Z., Asadujjaman, M., Islam, M. J., Alsiwiehri, N., Almeahmadi, M., Sanjida, S., & Ahammad, F. (2024). Bacterial diseases of Asian sea bass (*Lates calcarifer*): A review for health management strategies and future aquaculture sustainability. *Heliyon*, 10(9), e29793. <https://doi.org/10.1016/j.heliyon.2024.e29793>
- Islas, J. F., Acosta, E., G-Buentello, Z., Delgado-Gallegos, J. L., Moreno-Treviño, M. G., Escalante, B., & Moreno-Cuevas, J. E. (2020). An overview of Neem (*Azadirachta indica*) and its potential impact on health. *Journal of Functional Foods*, 74(August), 104171. <https://doi.org/10.1016/j.jff.2020.104171>
- Javandira, C., Ayu, I. G., Yuniti, D., & Widana, I. G. (2022). Pengaruh Pestisida Daun Mimba terhadap

- Mortalitas Kutu Daun (*Aphis craccivora* Koch) pada Tanaman Kacang Panjang (The Effect of Neem Leaf Pesticide on Mortality of Aphids (*Aphis craccivora* Koch) on Long Bean Plant). 5(3), 485–491.
- Jayadi, M., Prajitno, A., & Maftuch. (2016). The identification of *Vibrio* Spp . Bacteria from *Litopenaeus Vannamei* infected by White Feces Syndrome. 9(07), 448–452.
- Kurnianto, M. A., & Syahbanu, F. (2023). Resistensi antibiotik pada rantai pasok pangan: tren, mekanisme resistensi, dan langkah pencegahan. *Agrointek: Jurnal Teknologi Industri Pertanian*, 17(3), 608–621. <https://doi.org/10.21107/agrointek.v17i3.14771>
- Kalatzis, P. G., Castillo, D., Katharios, P., & Middelboe, M. (2018). Bacteriophage interactions with marine pathogenic vibrios: Implications for phage therapy. *Antibiotics*, 7(1), 1–23. <https://doi.org/10.3390/antibiotics7010015>
- Kana, R. K., & Kumar, R. (2021). Pharmacological and Therapeutical overview of neem (*Azadirachta indica*): A nature ' s drugstore. March 2018.
- Kasnir, M., Harlina, & Rosmiati. (2014). Water Quality Parameter Analysis for the Feasibility of Shrimp Culture in Takalar Tegency, Indonesia.
- Kavitha, Raja, Kamaraj, Karthik, R. B. B., & Perumal. (2017). In vitro Antimicrobial Activity of *Azadirachta indica* (Leaves) against Fish Pathogenic Bacteria Isolated from Naturally Infected *Dawkinsia filamentosa* (Blackspot barb). *Medicinal & Aromatic Plants*, 06(03). <https://doi.org/10.4172/2167-0412.1000294>
- Khaled, F. M., Haitham, Q., M, D. S., Moath, A., & Yassin, A. A. (2023). *Azadirachta indica* (Neem) Leaf : chemical composition and antibacterial activity as determined by different polarity solvents. 18(August 2019), 55–62.
- Khayyat, S. A., & Roselin, L. S. (2018). Recent progress in photochemical reaction on main components of some essential oils. *Journal of Saudi Chemical Society*, 22(7), 855–875. <https://doi.org/10.1016/j.jscs.2018.01.008>
- Kongchum, P., Chimtong, S., & Prapaiwong, N. (2022). Association between single nucleotide polymorphisms of nLvALF1 and PEN2-1 genes and resistance to *Vibrio parahaemolyticus* in the Pacific white shrimp *Litopenaeus vannamei*. *Aquaculture and Fisheries*, 7(4), 373–381. <https://doi.org/10.1016/j.aaf.2021.08.003>
- Kumar, D., Rahal, A., & Malik, J. K. (2016). Neem Extract. *Nutraceuticals: Efficacy, Safety and Toxicity*, 585–597. <https://doi.org/10.1016/B978-0-12-802147-7.00043-7>
- Kumar, R., Ng, T. H., Chang, C. C., Tung, T. C., Lin, S. S., Lo, C. F., & Wang, H. C. (2020). Bile acid and bile acid transporters are involved in the pathogenesis of acute hepatopancreatic necrosis disease in white shrimp *Litopenaeus vannamei*. *Cellular Microbiology*, 22(1). <https://doi.org/10.1111/cmi.13127>
- Kumar, V., Roy, S., Behera, B. K., Bossier, P., & Das, B. K. (2021). Acute hepatopancreatic necrosis disease (Ahpnd): Virulence, pathogenesis and mitigation strategies in Shrimp aquaculture. *Toxins*, 13(8), 1–28. <https://doi.org/10.3390/toxins13080524>
- Lee, C. Te, Chen, I. T., Yang, Y. T., Ko, T. P., Huang, Y. T., Huang, J. Y., Huang, M. F., Lin, S. J., Chen, C. Y., Lin, S. S., Lightner, D. V., Wang, H. C., Wang, A. H. J., Wang, H. C., Hor, L. I., & Lo, C. F. (2015). The opportunistic marine pathogen *Vibrio parahaemolyticus* becomes virulent by acquiring a plasmid that expresses a deadly toxin. *Proceedings of the National Academy of Sciences of the United States of America*, 112(39), E5445. <https://doi.org/10.1073/pnas.1517100112>
- Legesse, A. B., Emire, S. A., Dadi, D. W., & Tadesse, M. G. (2024). Impact of Drying Method and Solvent Extraction on Ethiopian *Verbascum sinaiticum* (*Qetetina*) Leaves : Metabolite Profiling and Evaluation of Antioxidant Capacity Impact of Drying Method and Solvent Extraction on Ethiopian *Verbascum sinaiticum* (*Qetetina*). April. <https://doi.org/10.3390/pr12050914>
- Lepidoptera, J. E. S., Kofi, S., Adjei, F., Abraham, J., & Addo, E. (2021). Potential of neem extracts as natural insecticide against fall armyworm (*Spodoptera frugiperda* (J. E. Smith) (Lepidoptera:

Noctuidae). 4.

- Letchumanan, V., Loo, K.-Y., Law, J. W.-F., Wong, S. H., Goh, B.-H., & Lee, N.-S. A. M. L.-H. (2019). *Vibrio parahaemolyticus*: The Protagonist Causing Foodborne Diseases.
- Letchumanan, V., Yin, W. F., Lee, L. H., & Chan, K. G. (2015). Prevalence and antimicrobial susceptibility of *Vibrio parahaemolyticus* isolated from retail shrimps in Malaysia. *Frontiers in Microbiology*, 6(JAN), 1–11. <https://doi.org/10.3389/fmicb.2015.00033>
- Liu, Z., Ran, Q., Luo, J., Shen, Q., Zhang, T., Fang, S., Pan, K., & Long, L. (2024). Correlation analysis of secondary metabolites and disease resistance activity of different varieties of Congou black tea based on LC-MS/MS and TCMS. *Food Chemistry: X*, 101331. <https://doi.org/10.1016/j.fochx.2024.101331>
- Lozano, R., & Abad, S. M. (2023). Practical scoring system for diagnosis presumptive of acute necrosis of the hepatopancreas (AHPND) in shrimp *Penaeus*. 1177–1189. <https://doi.org/10.1007/s10499-022-01020-4>
- Lozano, R., Selene, O., Rosales, M. A., & Soto, S. A. (2023). Time course of acute hepatopancreatic necrosis disease (AHPND) in the Pacific white shrimp *Penaeus vannamei* by wet mount analysis. *Aquaculture International*, 0123456789. <https://doi.org/10.1007/s10499-023-01272-8>
- Mahenda, A. A., Munir, M., & Sari, D. (2023). The Influence of Adding Api-Api Mangrove Leaf Extract as an Immunostimulant on Vaname Shrimp Against Vibriosis Disease Caused by *Vibrio parahaemolyticus* Bacteria. 1(12), 1068–1088.
- Manchanayake, T., Salleh, A., Amal, M. N. A., Yasin, I. S. M., & Zamri-Saad, M. (2023). Pathology and pathogenesis of *Vibrio* infection in fish: A review. *Aquaculture Reports*, 28(April 2022), 101459. <https://doi.org/10.1016/j.aqrep.2022.101459>
- Manerlin, G. S. K., Limanan, D., Ferdinal, F., & Yulianti, E. (2023). Identifikasi fitokimia dan kapasitas total antioksidan daun mimba (*Azadirachta indica* A. Juss) serta uji toksisitasnya terhadap larva *Artemia salina* Leach. 5(1), 59–66.
- Marbun, J., Harpeni, E., & Wardyanto1, W. (2019). Handling white feces disease in vaname shrimp *Litopenaeus vannamei* using application of feed mixed with red galangal Rhizome extract *Alpinia purpurata* k. schum. 8(2), 76–86. <https://doi.org/10.13170/depik.8.2.13570>
- Mat, Z., Iehata, S., Ikhwanuddin, M., Badrul, M., Khairul, M., Dinh, T., Sorgeloos, P., Yik, Y., & Lian, L. (2020). Immune and bacterial toxin genes expression in different giant tiger prawn, *penaeus monodon* post-larvae stages following AHPND-causing strain of *vibrio parahaemolyticus* challenge. *Aquaculture Reports*, 16(September 2019), 100248. <https://doi.org/10.1016/j.aqrep.2019.100248>
- Matthew, A. O., Olusola, E., Olatokunbo, Ademola Adejuyigbe, A., & Adebola, J. (2020). Anti-malarial Activity of Total Saponins from *Terminalia avicennioides* and Its Effect on Liver and Haematological of Infected Mice. 2(2), 5–6.
- Miklasińska-Majdanik, M., Kępa, M., Wojtyczka, R. D., Idzik, D., & Wąsik, T. J. (2018). Phenolic compounds diminish antibiotic resistance of *staphylococcus aureus* clinical strains. *International Journal of Environmental Research and Public Health*, 15(10). <https://doi.org/10.3390/ijerph15102321>
- Moh, J. H. Z., Waiho, K., Fazhan, H., Shaibani, N., Manan, H., Sung, Y. Y., Ma, H., & Ikhwanuddin, M. (2021). Effect of Noni, *Morinda citrifolia* fruit extract supplementation on the growth performances and physiological responses of the hepatopancreas of Whiteleg shrimp, *Penaeus vannamei* Post Larvae. *Aquaculture Reports*, 21, 100798. <https://doi.org/10.1016/j.aqrep.2021.100798>
- Mukhtarini. (2014). Ekstraksi, Pemisahan Senyawa, dan Identifikasi Senyawa Aktif. *J. Kesehatan*, VII(2), 361. <https://doi.org/10.1007/s11293-018-9601-y>
- Natasya, S., Rusydi, R., Ayuzar, E., Khalil, M., & Adhar, S. (2022). Pengaruh Ekstrak Daun Mimba (*Azadirachta indica*) Dalam Mengobati Infeksi Bakteri *Vibrio alginolyticus* Pada Udang Vaname (*Litopenaeus vannamei*). 12(2), 268–279.

- Naz, H., Aisha Akram, N., Ashraf, M., Ingo Hefft, D., & Latief Jan, B. (2022). Leaf extract of neem (*Azadirachta indica*) alleviates adverse effects of drought in quinoa (*Chenopodium quinoa Willd.*) plants through alterations in biochemical attributes and antioxidants. Saudi Journal of Biological Sciences, 29(3), 1367–1374. <https://doi.org/10.1016/j.sjbs.2022.01.038>
- Naz, H., Aisha, N., Ashraf, M., Ingo, D., & Latief, B. (2022). Leaf extract of neem (*Azadirachta indica*) alleviates adverse effects of drought in quinoa (*Chenopodium quinoa Willd.*) plants through alterations in biochemical attributes and antioxidants Hira. Saudi Journal of Biological Sciences, 29(3), 1367–1374. <https://doi.org/10.1016/j.sjbs.2022.01.038>
- Novianty, N. U. (2021). Pengaruh Pemberian Daun Mimba (*Azadirachta indica* juss.) Tumbuh Terhadap Pengurtan Luka Ikan Zebra.
- PERMEN-KP-75. (2016). Peraturan Kelautan Dan Perikanan Republik Indonesia Nomor No.75/PERMEN-KP/2016 Tentang Pedoman Umum Pembesaran Udang Windu (*Penaeus Monodon*) Dan Udang Vaname (*Litopenaeus Vannamei*). Kkp, 1–43.
- Prateek, V. S., Neralla, M., V, B., & Satheesh, T. (2023). Comparative Extraction and Bioactive Potential of the Leaf Extracts of *Azadirachta indica* for Combatting Postoperative Head and Neck Infections: An In Vitro Study. Cureus, 15(12), 1–8. <https://doi.org/10.7759/cureus.51303>
- Pratiwi, Y. L. (2022). Secara In Vitro Terhadap Ekstrak Etanol Daun Mimba (*Azadirachta Indica*) Skripsi Secara In Vitro Terhadap Ekstrak Etanol Daun Mimba (*Azadirachta Indica*).
- Purnamasari, I., Purnama, D., & Utami, M. A. F. (2017). Pertumbuhan Udang Vaname (*Litopenaeus vannamei*) Di Tambak Intensif. Biodiversitas, 21(10), 4695–4701. <https://doi.org/10.13057/biodiv/d211031>
- Putra, A., Yumna, A. S., Alfiaz, A. T., Nugraha, B. A., Sartika, D., Ramadiansyah, F., Novela, M., Chairani, N. J. D., Samsuardi, S., Ramadhan, S., Wake, Y. D., Ilham, I., & Suharyadi, S. (2024). Analisis Kualitas Air Pada Budidaya Udang Vaname (*Litopenaeus vannamei*) Sistem Intensif. Jurnal Perikanan Unram, 13(3), 871–878. <https://doi.org/10.29303/jp.v13i3.569>
- Rahayu, E. D. S., Harlia, E., & Marlina, E. T. (2018). Hambat Bakteri Total Di Ruang Penampungan Susu Effectiveness of *Azadirachta indica* A . Juss (Neem) Leaves As a Natural Desinfectant on Inhibition Potential Total of Bacteria in Milk Room Program Studi Agroteknologi , Fakultas Pertanian , Universitas Merd. 4(1), 47–59.
- Ratmawati, I. (2019). Tanaman Mimba (*Azadirachta indica* A.Juss) Berpotensi sebagai Pestisida Nabati. 1–5. <https://dkpp.probolinggakab.go.id/wp-content/uploads/2019/05/Tanaman-Mimba.pdf>
- Rudi, M., Sukenda, S., Pasaribu, W., & Hidayatullah, D. (2019). Seaweed extract of *Gracilaria verrucosa* as an antibacterial and treatment against *Vibrio harveyi* infection of *Litopenaeus vannamei*. Jurnal Akuakultur Indonesia, 18(2), 120–129. <https://doi.org/10.19027/jai.18.2.11-20>
- Ruwandha, D., Riset, J. K., Kimia, P. S., Islam, U., Raden, N., & Palembang, F. (2021). Uji Aktivitas Tanin Daun Mimba (*Azadirachta indica*) Terhadap Bakteri *Salmonella typhi* Derys Ruwandha, Dwi Fitri Yani * , Damayanti Iskandar. Jurnal Kimia Riset, 6(1), 77–85.
- Salamah, N., & Widyasari, E. (2015). Aktivitas Antioksidan Ekstrak Metanol Daun Kelengkeng (*Euphoria longan* (L) Steud.) Dengan Metode Penangkapan Radikan 2,2'-Difenil-1-Pikrilhidrazil. Pharmacia, 5(1), 25–34.
- Saweng, C. F. I. J., Sudimartini, L. M., & Suartha, I. N. (2020). Uji Cemaran Mikroba pada Daun Mimba (*Azadirachta Indica* A. Juss) Sebagai Standarisasi Bahan Obat Herbal. Indonesia Medicus Veterinus, 9(2), 270–280. <https://doi.org/10.19087/imv.2020.9.2.270>
- Saxena, A., Arivaradarajan, P., Mukhopadhyay, A. K., & Nandi, S. P. (2021). Bactericidal effect of Neem (*Azadirachta indica*) leaf extract on *Helicobacter pylori*. Journal of Environmental Biology, 42(6), 1591–1597. <https://doi.org/10.22438/jeb/42/6/MRN-2070>
- Saxena, R. C. (2015). Mimba untuk Pengendalian Hama dan Konservasi Lingkungan yang Berkelanjutan. 24, 1–27.

- Shahidi, F., & Dissanayaka, C. S. (2023). Phenolic-protein interactions: insight from in-silico analyses – a review. *Food Production, Processing and Nutrition*, 5(1). <https://doi.org/10.1186/s43014-022-00121-0>
- Sieberi, B. M., Omwenga, G. I., Wambua, R. K., Samoei, J. C., & Ngugi, M. P. (2020). Screening of the Dichloromethane: Methanolic Extract of *Centella asiatica* for Antibacterial Activities against *Salmonella typhi*, *Escherichia coli*, *Shigella sonnei*, *Bacillus subtilis*, and *Staphylococcus aureus*. *Scientific World Journal*, 2020. <https://doi.org/10.1155/2020/6378712>
- Singh, A. A., Naaz, Z. T., Rakaseta, E., Perera, M., Singh, V., Cheung, W., Mani, F., & Nath, S. (2023). Antimicrobial activity of selected plant extracts against common food borne pathogenic bacteria. *Food and Humanity*, 1(April), 64–70. <https://doi.org/10.1016/j.foohum.2023.04.002>
- Singha, A. A., Zafiar, Tasmeen Naazb Edward, R., Perera, M., Vrinda, S., Wilson, C., Francis, M., Swastika, N., & A. (2023). Antimicrobial activity of selected plant extracts against common food borne pathogenic bacteria. *The Virtual Museum of Bacteria*, 1(April), 1. <https://doi.org/10.1016/j.foohum.2023.04.002>
- Siregar, T., Hendra, B., & Syafitri, E. (2021). Isolasi dan identifikasi *Vibrio parahaemolyticus* Pada Udang Vaname (*Litopenaeus vannamei*) Penyebab Penyakit Vibriosis. 1(1), 7–14. <https://doi.org/10.46576/jai.v1i1.1389>
- Soto-rodriguez, S. A., Development, A. C., Gomez-gil, B., Development, A. C., Lozano-olvera, R., Development, A. C., & Development, A. C. (2018). Pathological , Genomic and Phenotypical Characterization of *Vibrio parahaemolyticus* , Causative Agent of Acute Hepatopancreatic Necrosis Disease (AHPND) in Mexico. January 2019. <https://doi.org/10.33997/j.afs.2018.31.S1.007>
- Sudarwati, T. P. L., & Fernanda, M. A. H. F. (2019). Aplikasi dan Manfaat Daun Pepaya (*Carica papaya*) Sebagai Biolarvasida Terhadap Larva *Aedes aegypti*.
- Sumino, Saputra, I., & Mude, H. (2020). Peran Cara Karantina Ikan Yang Baik (Ckib) Dalam Pencegahan. October. <https://doi.org/10.31186/jenggano.5.2.258-272>
- Sunandi, E., Nugroho, S., & Rizal, J. (n.d.). Rancangan Acak Lengkap Dengan Subsampel. *Statistika*.
- Supono. (2019). *Teknologi Produksi Udang*. April, 1–64.
- Supono, Siti Ning, M., & Yeni, E. (2022). Efektivitas Ekstrak Mangrove *Rhizophora Apiculata* (Tomlinson, 1986) Dalam Menghambat *Vibrio Parahaemolyticus* Penyebab Penyakit Pada Udang Vaname *Litopenaeus vannamei* (Boone, 1931) Effectiveness. 7(June), 1–5.
- Supriatna, Mahmudi, M., Musa, M., & Kusriani. (2020a). Hubungan pH Dengan Parameter Kualitas Air Pada Tambak Intensif Udang Vaname (*Litopenaeus vannamei*). *JFMR-Journal of Fisheries and Marine Research*, 4(3), 368–374. <https://doi.org/10.21776/ub.jfmr.2020.004.03.8>
- Supriatna, Mahmudi, M., Musa, Mu., & Kusriani. (2020b). Hubungan Ph Dengan Parameter Kualitas Air Pada Tambak Intensif Udang Vannamei (*Litopenaeus vannamei*). *Journal of Fisheries and Marine Research*, 4(3), 368–374. <http://jfmr.ub.ac.id>
- Talpur, A. D., & Ikhwanuddin, M. (2013). *Azadirachta indica* (neem) leaf dietary effects on the immunity response and disease resistance of Asian seabass, *Lates calcarifer* challenged with *Vibrio harveyi*. *Fish and Shellfish Immunology*, 34(1), 254–264. <https://doi.org/10.1016/j.fsi.2012.11.003>
- Tang, K., Brett, M., Melba G, B.-R., & Victoria, A.-S. (2020). *FAO Fisheries and Aquaculture Circular Nfia / C1190 (En) Shrimp Acute Hepatopancreatic Necrosis Disease Strategy Manual Fisheries And Strategy Manual (Vol. 1190, Issue December)*. <https://doi.org/10.4060/cb2119en>
- Tatli Cankaya, I. I., & Somuncuoglu, E. I. (2021). Potential and Prophylactic Use of Plants Containing Saponin-Type Compounds as Antibiofilm Agents against Respiratory Tract Infections. *Evidence-Based Complementary and Alternative Medicine*, 2021. <https://doi.org/10.1155/2021/6814215>
- Thakur, B. K., Kumar, A., & Kumar, D. (2019). Green synthesis of titanium dioxide nanoparticles using *Azadirachta indica* leaf extract and evaluation of their antibacterial activity. *South African Journal of Botany*, 124, 223–227. <https://doi.org/10.1016/j.sajb.2019.05.024>

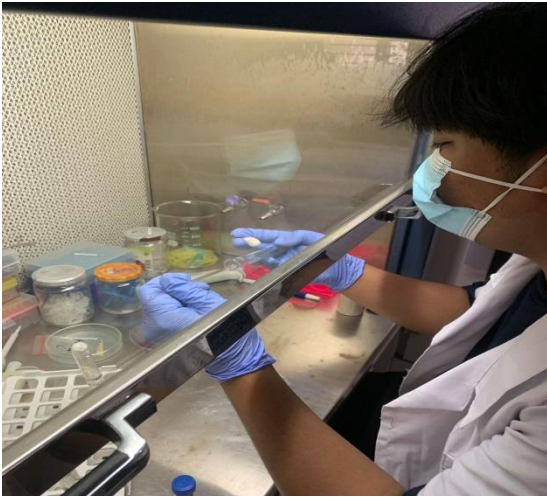
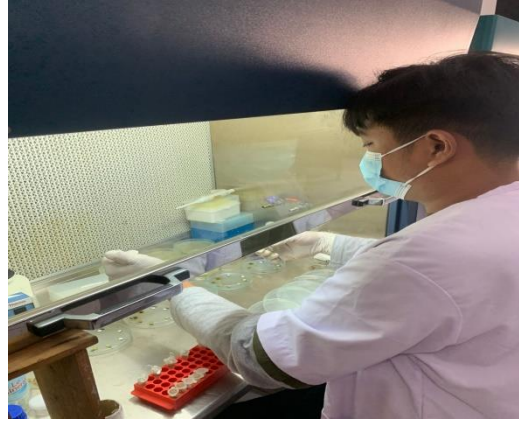
- Thammattinna, K., Egan, M. K. E., Htoo, H. H., Khanna, K., Sugie, J., Nideffer, J. F., Villa, E., Tassanakajon, A., Pogliano, J., Nonejuie, P., & Chaikereeratsak, V. (2020). A novel vibriophage exhibits inhibitory activity against host protein synthesis machinery. *Scientific Reports*, 10(1), 1–14. <https://doi.org/10.1038/s41598-020-59396-3>
- Thorner, K., Verner-Jeffreys, D., Hinchliffe, S., Rahman, M. M., Bass, D., & Tyler, C. R. (2020). Evaluating antimicrobial resistance in the global shrimp industry. *Reviews in Aquaculture*, 12(2), 966–986. <https://doi.org/10.1111/raq.12367>
- Tiple, R., Jamane, S., Khobragade, D., & Sharma, S. (2023). Synergistic Antifungal Bioassay of Neem Leaves Extract with Essential Oils against Dermatophytes. *International Journal of Pharmaceutical Quality Assurance*, 14(4), 1144–1150. <https://doi.org/10.25258/ijpqa.14.4.49>
- Tunggal, T., Prihatanti, R., & Sofia, N. (2024). Phytochemical Scrinng And Determination Of Secondary Metabolitical Capacity Of Butterfly Leaves (*Bauhinia Purpurea L*) As A Guide For Wound Healing In Women After (*Bauhinia Purpurea L*) Como Guia Para A CicatrizaçãO De. 1–30.
- Utami, W., Sarjito, & Desrina. (2016). Pengaruh salinitas terhadap efek infeksi *Vibrio harveyi* pada udang vaname (*Litopenaeus vannamei*). *Journal of Aquaculture Management and Technology*, 5(1), 82–90. <https://ejournal3.undip.ac.id/index.php/jamt/article/view/10691p>
- Vicencio, M. C. G. (2020). Antibacterial efficacy of leaf extracts of *Paederia foetida* Linnaeus. *Journal of Chemical Research Advances*, 02(01), 01–05.
- Virshette, S. J., Patil, M. K., Udgir, A. S., Shaikh, J. R., & Dhas, M. S. (2020). Phytochemical constituents of different extracts of *Azadirachta indica* leaves in urine solvent of non- pregnant cow. August.
- Wahyulianingsih, Handayani, S., & Malik, A. (2016). Penetapan Kadar Flavonoid Total Ekstrak Daun Cengkeh (*Syzygium aromaticum* (L.) Merr & Perry). 3(2).
- Wang, Y., Abdullah, Zhang, C., Li, Y., Zhang, H., Wang, J., & Feng, F. (2020). Effects of dietary glycerol monolaurate on the growth performance, digestive enzymes, body composition and non-specific immune response of white shrimp (*Litopenaeus vannamei*). *Aquaculture Reports*, 18, 100535. <https://doi.org/10.1016/j.aqrep.2020.100535>
- Wari, L. H., Damayanti, A. A., & Azhar, F. (2020). Respon Pemberian Ekstrak Daun Mimba *Azadirachta indica* Pada Sistem Imun Ikan Nila (*Oreochromis niloticus*) Response of Neem Leaves *Azadirachta indica* Extract Immune System of (*Oreochromis niloticus*) Menurut penelitian Ambarwati. 5(April), 8–19.
- Witria, & Muhammad, Z. (2021). Pengaruh Ekstrak Daun Mimba (*Azadirachta indica*) Terhadap Histamin Daging Ikan Tongkol Abu. *Journal.lpb.Ac.Id/Index.Pjp/Jphpi*, 24, 209–217.
- WoRMS. (2022). Klasifikasi *Panaeus vannamei* di akses pada 21 juli 2024. <https://www.marinespecies.org/aphia.php?p=taxdetails&id=377748>
- Yan, Y., Li, X., Zhang, C., Lv, L., Gao, B., & Li, M. (2022). Research Progress on Antibacterial Activities and Mechanisms of Natural AAlkaloids: A Review. *Frontiers in Pharmacology*, 13. <https://doi.org/10.3389/fphar.2022.805986>
- Yasin, M. I. (2021). Determinasi Residu Antibiotik Golongan Tetracyclinedan Quinolonepada Udang Vaname (*Litopenaeus Vannamei*) Di Kabupaten Polewali Mandar Menggunakan High Performance Liquid Chromatograph. *Jurnal Ilmiah Maju*, 4(1), 52–60. <http://ojs.balitbang.sulbarprov.go.id/index.php/maju/article/view/94>
- Yeoh, H. I., Izzatty, R., Furusawa, G., Amirul, A. A. A., Shu-Chien, A. C., & Sung, Y. Y. (2021). The *Vibrio*-predatory filamentous bacteria effectively removed acute hepatopancreatic necrosis disease (AHPND) causative *Vibrio parahaemolyticus* in vitro. *Aquaculture Reports*, 21(August), 100910. <https://doi.org/10.1016/j.aqrep.2021.100910>
- You, H. J., Lee, J. H., Oh, M., Hong, S. Y., Kim, D., Noh, J., Kim, M., & Kim, B. S. (2021). Tackling *Vibrio parahaemolyticus* in ready-to-eat raw fish flesh slices using lytic phage VPT02 isolated from market oyster. *Food Research International*, 150(PA), 110779. <https://doi.org/10.1016/j.foodres.2021.110779>

- Yu, P., Shan, H., Cheng, Y., Ma, J., Wang, K., & Li, H. (2022). Translucent disease outbreak in *Penaeus vannamei* post-larva accompanies the imbalance of pond water and shrimp gut microbiota homeostasis. *Aquaculture Reports*, 27(November), 101410. <https://doi.org/10.1016/j.aqrep.2022.101410>
- Yulianto, D., & Savitri, S. R. (2019). Perbandingan Kadar Flavonoid Total Ekstrak Etanolik Beluntas (*Pluchea Indica* L.) Berdasarkan Variasi Konsentrasi Pelarut Secara Spektrofotometer UV-VIS. *Surya Medika: Jurnal Ilmiah Ilmu Keperawatan Dan Ilmu Kesehatan Masyarakat*, 14(1), 18–25. <https://doi.org/10.32504/sm.v14i1.104>
- Yunita, M., Ohiwal, M., Elfitrasya, M. Z., & Rahawarin, H. (2023). Antibacterial activity of *Paederia foetida* leaves using two different extraction procedures against pathogenic bacteria. *Biodiversitas*, 24(11), 5920–5927. <https://doi.org/10.13057/biodiv/d241110>
- Yuri, P. U., Nurzadrina, W., Ainun, J., Rahma, M., & Imelda, D. (2024). Physicochemical Determination Of Ethyl Acetate Extract And N-Hexane Extract Of *Azadiractha Indica* A. Juss Leaves. *International Journal Of Health & Medical Research*, 03(01), 1–7. <https://doi.org/10.58806/ijhmr.2024.v3i1n01>
- Zainuddin, E. N., Anshary, H., Huyyirnah, H., Hiola, R., & Baxa, D. V. (2019). Antibacterial activity of *Caulerpa racemosa* against pathogenic bacteria promoting “ice-ice” disease in the red alga *Gracilaria verrucosa*. *Journal of Applied Phycology*, 31(5), 3201–3212. <https://doi.org/10.1007/s10811-019-01805-w>
- Zaujat, R. C., Setyaningsih, S., & Lusiastuti, A. M. (2016). Prevalensi dan Karakterisasi Molekuler Infectious Myonecrosis Virus (IMNV) di Sentra Budidaya Udang Vaname (*Litopenaeus vannamei*) Propinsi Banten. 4(2), 88–96.
- Zhang, X., Sun, J., Chen, F., Qi, H., Chen, L., Sung, Y. Y., Huang, Y., Lv, A., & Hu, X. (2021). Phenotypic and genomic characterization of a *Vibrio parahaemolyticus* strain causing disease in *penaeus vannamei* provides insights into its niche adaptation and pathogenic mechanism. *Microbial Genomics*, 7(5). <https://doi.org/10.1099/MGEN.0.000549>
- Zheng, Z., Wang, F., Aweya, J. J., Li, R., Yao, D., Zhong, M., Li, S., & Zhang, Y. (2017). Department of Biology Department of Biology and Guangdong Provincial Key laboratory of Marine Biotechnology ., In *Fish and Shellfish Immunology* (Issue 2018). Elsevier Ltd. <https://doi.org/10.1016/j.fsi.2017.12.032>

LAMPIRAN

Lampiran 1. Dokumentasi kegiatan penelitian







Lampiran 2 . Hasil uji Anova aktivitas antibakteri

Descriptives

Ujiantibakteri

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
					100mg/ml	3		
75mg/ml	3	11.533	.5686	.3283	10.121	12.946	10.9	12.0
50mg/ml	3	10.133	.1155	.0667	9.846	10.420	10.0	10.2
Total	9	11.489	1.2077	.4026	10.561	12.417	10.0	13.2

ANOVA

Ujiantibakteri

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.676	2	5.338	32.242	.001
Within Groups	.993	6	.166		
Total	11.669	8			

Ujiantibakteri

Tukey B^a

Perlakuan	N	Subset for alpha = 0.05		
		1	2	3
50mg/ml	3	10.133		
75mg/ml	3		11.533	
100mg/ml	3			12.800

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 3. Hasil SPSS Uji Anova SR

Descriptives

Survival Rate

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
					0 mg/ml	3		
12,5 mg/ml	3	.533	.1528	.0882	.154	.913	.4	.7
25 mg/ml	3	.667	.1528	.0882	.287	1.046	.5	.8
50 mg/ml	3	.800	.1000	.0577	.552	1.048	.7	.9
Total	12	.567	.2387	.0689	.415	.718	.1	.9

ANOVA

Survival Rate

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.467	3	.156	7.778	.009
Within Groups	.160	8	.020		
Total	.627	11			

Survival Rate

Tukey B^a

Perlakuan	N	Subset for alpha = 0.05	
		1	2
0 mg/ml	3	.267	
12,5 mg/ml	3	.533	.533
25 mg/ml	3		.667
50 mg/ml	3		.800

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 4. Hasil SPSS Uji Anova SGR

Descriptives

SGR

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
					kontrol	3		
12,5 mg/ml	3	6.9767	.93029	.53710	4.6657	9.2876	5.91	7.62
25 mg/ml	3	7.4400	.38974	.22502	6.4718	8.4082	7.21	7.89
50 mg/ml	3	7.7867	.27227	.15720	7.1103	8.4630	7.48	8.00
Total	12	7.0942	.83104	.23990	6.5661	7.6222	5.35	8.00

ANOVA

SGR

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.383	3	1.461	3.636	.064
Within Groups	3.214	8	.402		
Total	7.597	11			

SGR

Tukey B^a

Perlakuan	N	Subset for alpha =
		0.05
		1
kontrol	3	6.1733
12,5 mg/ml	3	6.9767
25 mg/ml	3	7.4400
50 mg/ml	3	7.7867

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 5. Hasil SPSS Uji Anova Koloni Bakteri

Descriptives

Total Koloni

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
					kontrol	3		
12,5 mg/ml	3	194.00	46.130	26.633	79.41	308.59	146	238
25 mg/ml	3	177.33	38.423	22.184	81.89	272.78	133	201
50 mg/ml	3	131.00	29.547	17.059	57.60	204.40	98	155
Sebelum Injeksi	3	73.67	18.037	10.414	28.86	118.47	55	91
Total	15	161.53	65.209	16.837	125.42	197.65	55	273

ANOVA

Total Koloni

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	44625.733	4	11156.433	7.485	.005
Within Groups	14906.000	10	1490.600		
Total	59531.733	14			

Total Koloni

Tukey B^a

Perlakuan	N	Subset for alpha = 0.05		
		1	2	3
Sebelum Injeksi	3	73.67		
50 mg/ml	3	131.00	131.00	
25 mg/ml	3		177.33	177.33
12,5 mg/ml	3		194.00	194.00
kontrol	3			231.67

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 6 . Variasi gejala klinis udang vaname selama pemeliharaan

Hari	Gejala	Perlakuan											
		A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3
0	I	-	-	-	-	-	-	-	-	-	-	-	-
	II	-	-	-	-	-	-	-	-	-	-	-	-
	III	-	-	-	-	-	-	-	-	-	-	-	-
	IV	-	-	-	-	-	-	-	-	-	-	-	-
	V	-	-	-	-	-	-	-	-	-	-	-	-
4	I	+	+	+	+	+	-	+	+	+	+	+	-
	II	+	+	-	-	+	+	-	+	-	+	-	+
	III	+	+	-	+	+	-	+	-	-	-	-	-
	IV	-	+	-	-	-	-	-	-	-	-	-	-
	V	+	-	+	+	+	+	-	-	-	+	+	+
8	I	+	+	+	+	+	-	+	+	+	-	+	-
	II	+	+	-	-	+	+	-	+	-	-	-	+
	III	+	-	+	+	-	+	+	-	+	-	-	+
	IV	+	-	-	-	+	-	-	-	+	+	-	-
	V	-	+	-	-	-	-	-	-	-	-	-	-
12	I	+	+	+	+	-	-	+	-	+	+	+	-
	II	+	+	+	-	+	+	-	+	-	-	-	+
	III	+	-	-	-	-	-	-	-	+	-	-	-
	IV	-	+	-	+	-	-	-	-	-	-	-	-
	V	+	-	+	-	+	+	-	-	-	-	-	-

Keterangan : (+) menandakan munculnya gejala klinis, tanda (-) tidak munculnya gejala klinis

I = Warna pucat





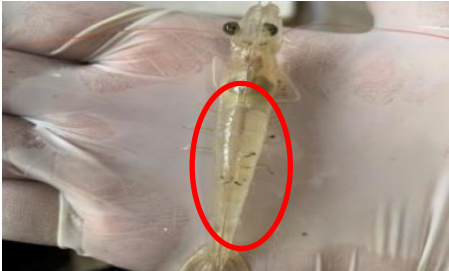
II = Hepatopankreas pucat

III = Usus kosong

IV = Uropoda nekrosis

V = Abdomen nekrosis

Lampiran 7 .Tampak Gejala klinis morfologi udang

Gejala	Keterangan	References
	Warna memucat (V. Kumar <i>et al.</i> , 2021)	
	Hepatopankreas Memucat (Mahenda <i>et al.</i> , 2023)	
	Usus kosong (V. Kumar <i>et al.</i> , 2021)	
	Uropoda necrosis (V. Kumar <i>et al.</i> , 2021)	
	Abdomen necrosis (Mahenda <i>et al.</i> , 2023)	