

DAFTAR PUSTAKA

- Alloul, A., Wille, M., Lucenti, P., Bossier, P., Van Stappen, G., & Vlaeminck, S. E. 2021. Purple bacteria as added-value protein ingredient in shrimp feed: *Penaeus vannamei* growth performance, and tolerance against *Vibrio* and ammonia stres. *Aquaculture*, **530**.
<https://doi.org/10.1016/j.aquaculture.2020.735788>
- Alsaadi, A., Ganesen, S. S. K., Amelia, T. S. M., Moanis, R., Peeters, E., Vigneswari, S., & Bhupalan, K. 2022. Polyhydroxyalkanoate (PHA) Biopolymer Synthesis by Marine Bacteria of the Malaysian Coral Triangle Region and Mining for PHA Synthase Genes. *Microorganisms*, **10**(10).
<https://doi.org/10.3390/microorganisms10102057>
- Amar, E. C., Faisan Jr, J. P., & Gapasin, R. S. 2021. Field efficacy evaluation of a formalin-inactivated white spot syndrome virus (WSSV) vaccine for the preventive management of WSSV infection in shrimp grow-out ponds. *Aquaculture*, **531**.<https://doi.org/10.1016/j.aquaculture.2020.735907>
- Amelia, T. S. M., Amirul, A. A. A., & Bhupalan, K. 2018. Data on partial polyhydroxyalkanoate synthase genes (phaC) mined from *Aaptos aaptos* marine sponge-associated bacteria metagenome. *Data in Brief*, **16**: 75–80.
<https://doi.org/10.1016/j.dib.2017.11.011>
- Andryukov, B., Mikhailov, V., Besednova, N., & Somov, G. P. 2019. *Marine Science and Engineering The Biotechnological Potential of Secondary Metabolites from Marine Bacteria*. <https://doi.org/10.3390/jmse7070176>
- Angthong, P., Chaiyapechara, S., & Rungrassamee, W. 2023. Shrimp microbiome and immune development in the early life stages. In *Developmental and Comparative Immunology*, **147**. <https://doi.org/10.1016/j.dci.2023.104765>
- Arambul-Muñoz, E., Ponce-Palafox, J. T., Santos, R. C. D. L., Aragón-Noriega, E. A., Rodríguez-Domínguez, G., & Castillo-Vargasmachuca, S. G. (2019). Influence of stocking density on production and water quality of a photoheterotrophic intensive system of white shrimp (*penaeus vannamei*) in circular lined grow-out ponds, with minimal water replacement. *Latin American Journal of Aquatic Research*, **47**(3): 449–455.
<https://doi.org/10.3856/vol47-issue3-fulltext-7>
- Asmild, M., Hukom, V., Nielsen, R., & Nielsen, M. 2024. Is economies of scale driving the development in shrimp farming from *Penaeus monodon* to *Litopenaeus vannamei*? The case of Indonesia. *Aquaculture*, **579**.
<https://doi.org/10.1016/j.aquaculture.2023.740178>
- Baladtrat, N. K., Nurhudah, M., & Utari, H. B. 2022. Immune Response of White Shrimp (*Litopenaeus vannamei*) to Different Density and IMNV

Challenge. *Scientific Journal of Fisheries & Marine/Jurnal Ilmiah Perikanan dan Kelautan*, **14**(1).

- Budiyati, B., Renitasari, D., Saridu, S. A., Kurniaji, A., Anton, A., Supryady, S., Syahrir, M., Ihwan, I., & Hidayat, R. 2022. Monitoring Pemeliharaan Udang Vaname (*Litopenaeus vannamei*) Super Intensif Di Pt Makmur Persada, Bulukumba. *Jurnal Perikanan Unram*, **12**(3): 292-302. <https://doi.org/10.29303/jp.v12i3.309>
- Chaikaew, P., Rugkarn, N., Pongpipatwattana, V., & Kanokkantapong, V. 2019. Enhancing ecological-economic efficiency of intensive shrimp farm through in-out nutrient budget and feed conversion ratio. *Sustainable Environment Research*, **1**(1). <https://doi.org/10.1186/s42834-019-0029-0>
- Chumpol, S., Kantachote, D., Nitoda, T., & Kanzaki, H. 2018. Administration of purple nonsulfur bacteria as single cell protein by mixing with shrimp feed to enhance growth, immune response and survival in white shrimp (*Litopenaeus vannamei*) cultivation. *Aquaculture*, **489**: 85-95. <https://doi.org/10.1016/j.aquaculture.2018.02.009>
- Chumpol, S., Kantachote, D., Rattanachuay, P., Torpee, S., Nitoda, T., & Kanzaki, H. 2019. Optimization of culture conditions for production of antivibrio compounds from probiotic purple nonsulfur bacteria against acute hepatopancreatic necrosis disease-causing *Vibrio parahaemolyticus* and *Vibrio* spp. *Aquaculture*, **505**: 72-83. <https://doi.org/10.1016/j.aquaculture.2019.02.040>
- Chumpol, S., Kantachote, D., Rattanachuay, P., Vuddhakul, V., Nitoda, T., & Kanzaki, H. 2017. In vitro and in vivo selection of probiotic purple nonsulphur bacteria with an ability to inhibit shrimp pathogens: acute hepatopancreatic necrosis disease-causing *Vibrio parahaemolyticus* and other vibrios. *Aquaculture Research*, **48**(6): 3182-3197. <https://doi.org/10.1111/are.13149>
- Dara, A., Rahmat, M., & Pirdaus, P. 2023. Teknik Pemeliharaan Induk Udang Vaname (*Litopenaeus vannamei*) di PT Esaputlil Prakarsa Utama, Kabupaten Barru. *Jurnal Lemuru*, **5**(3): 464-471. <https://doi.org/10.36526/jl.v5i3.2996>
- Dhewantara, Y. L., Danakusumah, E., & Mubarok, H. A. 2022. Penambahan Probiotik *Lactobacillus Plantarum* Terhadap Pertumbuhan Udang Vaname (*Litopenaeus Vannamei*). *Journal of Aquaculture Science*, **7**(1). <https://doi.org/10.31093/joas.v7i1.207>
- El-Saadony, M. T., Swelum, A. A., Abo Ghanima, M. M., Shukry, M., Omar, A. A., Taha, A. E., Salem, H. M., El-Tahan, A. M., El-Tarabily, K. A., & Abd El-Hack, M. E. 2022. Shrimp production, the most important diseases that

- threaten it, and the role of probiotics in confronting these diseases: A review. In *Research in Veterinary Science*, **144**: 126–140. <https://doi.org/10.1016/j.rvsc.2022.01.009>
- Gao, W., Tian, L., Huang, T., Yao, M., Hu, W., & Xu, Q. 2016. Effect of salinity on the growth performance, osmolarity and metabolism-related gene expression in white shrimp *Litopenaeus vannamei*. *Aquaculture Reports*, **4**: 125–129. <https://doi.org/10.1016/j.aqrep.2016.09.001>
- Geetha, R., Avunje, S., Solanki, H. G., Priyadharshini, R., Vinoth, S., Anand, P. R., Ravisankar, T., & Patil, P. K. 2022. Farm-level economic cost of Enterocytozoon hepatopenaei (EHP) to Indian *Penaeus vannamei* shrimp farming. *Aquaculture*, **548**. <https://doi.org/10.1016/j.aquaculture.2021.737685>
- Ghosh, A. K. 2023. Functionality of probiotics on the resistance capacity of shrimp against white spot syndrome virus (WSSV). In *Fish and Shellfish Immunology*. **140**. Academic Press. <https://doi.org/10.1016/j.fsi.2023.108942>
- Govarthanan, M., Kamala-Kannan, S., Selvankumar, T., Mythili, R., Srinivasan, P., & Kim, H. 2019. Effect of blue light on growth and exopolysaccharides production in phototrophic *Rhodobacter* sp. BT18 isolated from brackish water. *International Journal of Biological Macromolecules*, **131**: 74–80. <https://doi.org/10.1016/j.ijbiomac.2019.03.049>
- Hsu, J. C. K., Huang, H. T., Lin, H. J., Chou, H. Y., Huang, P. Y., Prachumwat, A., & Chen, L. L. 2022. Applying Modified VP53A Recombinant Protein as an Anti-White Spot Syndrome Virus Biological Agent in *Litopenaeus vannamei* Farming. *Viruses*, **14**(7). <https://doi.org/10.3390/v14071353>
- Huang, M., Xie, J., Yu, Q., Xu, C., Zhou, L., Qin, J. G., Chen, L., & Li, E. 2020. Toxic effect of chronic nitrite exposure on growth and health in Pacific white shrimp *Litopenaeus vannamei*. *Aquaculture*, **529**. <https://doi.org/10.1016/j.aquaculture.2020.735664>
- Ismawati, I., Destryana, R. A., & Huzaimah, N. 2020. IMUNITAS UDANG VANNAME (*Litopenaeus vannamei*) YANG DIBERI PAKAN TAMBAHAN DAUN KASEMBUKAN (*Paederia foetida* Linn.). *Jurnal Kelautan: Indonesian Journal of Marine Science and Technology*, **12**(2): 201–206. <https://doi.org/10.21107/jk.v12i2.5998>
- Kementerian Kelautan dan Perikanan (KKP). 2025. Produksi Perikanan Budidaya Pembesaran Berdasarkan Tahun. Diakses pada 7 Januari, 2025 : <https://portaldata.kkp.go.id/datainsight/produksi-ikan-budidaya>
- Klaysubun, C., Chaichana, N., Suwannasin, S., Singkhamanan, K., Yaikhan, T., Kantachote, D., Pomwiset, R., Wonglapsuwan, M., & Surachat, K. 2024. Genomic Characterization of Probiotic Purple Nonsulfur Bacteria

- Cereibacter sphaeroides Strains S3W10 and SS15: Implications for Enhanced Shrimp Aquaculture. *Life*, **14**(12). <https://doi.org/10.3390/life14121691>
- Koga, A., Goto, M., Hayashi, S., Yamamoto, S., & Miyasaka, H. 2022a. Probiotic Effects of a Marine Purple Non-Sulfur Bacterium, *Rhodovulum sulfidophilum* KKMI01, on Kuruma Shrimp (*Marsupenaeus japonicus*). *Microorganisms*, **10**(2). <https://doi.org/10.3390/microorganisms10020244>
- Koga, A., Goto, M., Hayashi, S., Yamamoto, S., & Miyasaka, H. 2022b. Probiotic Effects of a Marine Purple Non-Sulfur Bacterium, *Rhodovulum sulfidophilum* KKMI01, on Kuruma Shrimp (*Marsupenaeus japonicus*). *Microorganisms*, **10**(2). <https://doi.org/10.3390/microorganisms10020244>
- Kuhn, D. D., Smith, S. A., Boardman, G. D., Angier, M. W., Marsh, L., & Flick, G. J. 2010. Chronic toxicity of nitrate to Pacific white shrimp, *Litopenaeus vannamei*: Impacts on survival, growth, antennae length, and pathology. *Aquaculture*, **309**(1–4): 109–114. <https://doi.org/10.1016/j.aquaculture.2010.09.014>
- Kulkarni, A., Krishnan, S., Anand, D., Kokkattunivarthil Uthaman, S., Otta, S. K., Karunasagar, I., & Kooloth Valappil, R. 2021. Immune responses and immunoprotection in crustaceans with special reference to shrimp. In *Reviews in Aquaculture*, **13**(1): 431–459. <https://doi.org/10.1111/raq.12482>
- Kumar, S., Verma, A. K., Singh, S. P., & Awasthi, A. 2023. Immunostimulants for shrimp aquaculture: paving pathway towards shrimp sustainability. In *Environmental Science and Pollution Research*, **30**(10): 25325–25343. <https://doi.org/10.1007/s11356-021-18433-y>
- Li, E., Chen, L., Zeng, C., Chen, X., Yu, N., Lai, Q., & Qin, J. G. 2007. Growth, body composition, respiration and ambient ammonia nitrogen tolerance of the juvenile white shrimp, *Litopenaeus vannamei*, at different salinities. *Aquaculture*, **265**(1–4): 385–390. <https://doi.org/10.1016/j.aquaculture.2007.02.018>
- Lin, Y. C., & Chen, J. C. 2003. Acute toxicity of nitrite on *Litopenaeus vannamei* (Boone) juveniles at different salinity levels. *Aquaculture*, **224**(1–4): 193–201. [https://doi.org/10.1016/S0044-8486\(03\)00220-5](https://doi.org/10.1016/S0044-8486(03)00220-5)
- Liu, F., Li, S., Yu, Y., Sun, M., Xiang, J., & Li, F. 2020. Effects of ammonia stress on the hemocytes of the Pacific white shrimp *Litopenaeus vannamei*. *Chemosphere*, **239**. <https://doi.org/10.1016/j.chemosphere.2019.124759>
- Medagoda, N., & Lee, K.-J. 2025. Vitamin B 12 is essential for growth, innate immunity, antioxidant capacity, fatty acid and amino acid metabolism and ammonia tolerance in Pacific white shrimp, *Penaeus vannamei*. <https://doi.org/10.21203/rs.3.rs-5783569/v1>

- Miyasaka, H., koga, A., & Maki, T. aki. 2023. Recent progress in the use of purple non-sulfur bacteria as probiotics in aquaculture. In *World Journal of Microbiology and Biotechnology*, **39**(6). B.V. <https://doi.org/10.1007/s11274-023-03592-6>
- Nonwachai, T., Purivirojku, W., Chuchird, N., & Limsuwan, C. 2011. Effects of dissolved oxygen levels on growth, survival and immune response of juvenile pacific white shrimp *Litopenaeus vannamei*. *Journal of Fisheries and Environment*, **35**(3): 1-10.
- Patkaew, S., Direkbusarakom, S., Hirono, I., Wuthisuthimethavee, S., Powtongsook, S., & Pooljun, C. 2024. Effect of supersaturated dissolved oxygen on growth-, survival-, and immune-related gene expression of Pacific white shrimp (*Litopenaeus vannamei*). *Veterinary World*, **17**(1): 50-58. <https://doi.org/10.14202/vetworld.2024.50-58>
- Rashid, N., Onwusogh, U., & Mackey, H. R. 2024. Exploring the metabolic features of purple non-sulfur bacteria for waste carbon utilization and single-cell protein synthesis. In *Biomass Conversion and Biorefinery*, **14**(12): 12653-12672. <https://doi.org/10.1007/s13399-022-03273-8>
- Risjani, Y., Mutmainnah, N., Manurung, P., Wulan, S. N., & Yunianta. 2021. Exopolysaccharide from *Porphyridium cruentum* (purpureum) is Not Toxic and Stimulates Immune Response against Vibriosis: The Assessment Using Zebrafish and White Shrimp *Litopenaeus vannamei*. *Marine Drugs*, **19**(3). <https://doi.org/10.3390/MD19030133>
- Rodriguez-Estrada, U., Tachibana, L., de Carla Dias, D., Ben-Hamed, S., Sampaio-Goncalves, G., Rosa Sussel, F., & Ranzani-Paiva, M. J. 2021. Dietary Pure Polyhydroxyalkanoate Effects on Growth, Nutrient Utilization, Apparent Digestibility, and Hematology in Nile Tilapia. *North American Journal of Aquaculture*, **83**(4), 240-254. <https://doi.org/10.1002/naaq.10183>
- Song, Y. L., & Li, C. Y. 2014. Shrimp immune system - Special focus on penaeidin. *Journal of Marine Science and Technology (Taiwan)*, **22**(1), 1-8. <https://doi.org/10.6119/JMST-013-0813-1>
- Song, Z., Li, K., & Li, K. 2024. Acute effects of the environmental probiotics *Rhodobacter sphaeroides* on intestinal bacteria and transcriptome in shrimp *Penaeus vannamei*. *Fish and Shellfish Immunology*, **145**. <https://doi.org/10.1016/j.fsi.2023.109316>
- Sudpraseart, C., Shinn, A. P., Pooljun, C., & Sirimanapong, W. 2025. Efficacy of *Rhodobacter sphaeroides* TISTR 1529 on the growth performance, immune response, and amino acid profile of Pacific whiteleg shrimp, *Penaeus vannamei*. *Aquaculture*, **599**. <https://doi.org/10.1016/j.aquaculture.2024.742081>

- Suwoyo, H. S., & Hendrajat, E. A. 2021. High density aquaculture of white shrimp (*Litopenaeus vannamei*) in controlled tank. *IOP Conference Series: Earth and Environmental Science*, **777**(1). <https://doi.org/10.1088/1755-1315/777/1/012022>
- Tao, L. tao, Lu, H., Xiong, J., Zhang, L., Sun, W. wen, & Shan, X. feng. (2024). The application and potential of postbiotics as sustainable feed additives in aquaculture. In *Aquaculture*, **592**. <https://doi.org/10.1016/j.aquaculture.2024.741237>
- Tierney, T. W., Fleckenstein, L. J., & Ray, A. J. 2020. The effects of density and artificial substrate on intensive shrimp *Litopenaeus vannamei* nursery production. *Aquacultural Engineering*, **89**. <https://doi.org/10.1016/j.aquaeng.2020.102063>
- Torpee, S., Kantachote, D., Rattanachuy, P., Chiayvareesajja, S., & Tantirungkij, M. 2021. Dietary supplementation with probiotic *Rhodobacter sphaeroides* SS15 extract to kontrol acute hepatopancreatic necrosis disease (AHPND)-causing *vibrio parahaemolyticus* in cultivated white shrimp. *Journal of Invertebrate Pathology*, **186**. <https://doi.org/10.1016/j.jip.2021.107585>
- Truong, H. T., Ho, T. T., Tran, H. N., Tran, V. Q. K., & Hoang, M. N. 2025. The use of supplementary feed with ethanol extract of *Syzygium nervosum* leaf to prevent acute hepancreatic necrosis (AHPND) in white shrimp (*Litopenaeus vannamei*). *Israeli Journal of Aquaculture - Bamidgeh*, **77**(1). <https://doi.org/10.46989/001c.129825>
- Usman, S., Masriah, A., & Jamaluddin, R. 2022. Pengaruh Padat Tebar Terhadap Kelangsungan Hidup dan Pertumbuhan Post Larva Udang Vaname (*Litopenaeus vannamei*) yang Dipelihara pada Wadah. *FISHIANA Journal of Marine and Fisheries*, **1**(1), 21-32.
- Wada, O. Z., Vincent, A. S., & Mackey, H. R. 2022. Single-cell protein production from purple non-sulphur bacteria-based wastewater treatment. In *Reviews in Environmental Science and Biotechnology*, **21**(4): 931–956. <https://doi.org/10.1007/s11157-022-09635-y>
- Wang, H., Yang, A., Zhang, G., Ma, B., Meng, F., Peng, M., & Wang, H. 2017. Enhancement of carotenoid and bacteriochlorophyll by high salinity stres in photosynthetic bacteria. *International Biodeterioration and Biodegradation*, **121**: 91–96. <https://doi.org/10.1016/j.ibiod.2017.03.028>
- Wang, W., Ishikawa, M., Koshio, S., Yokoyama, S., Dawood, M. A. O., Hossain, M. S., & Zaineldin, A. I. 2019. Interactive effects of dietary astaxanthin and cholesterol on the growth, pigmentation, fatty acid analysis, immune response and stres resistance of kuruma shrimp (*Marsupenaeus japonicus*). *Aquaculture Nutrition*, **25**(4), 946–958. <https://doi.org/10.1111/anu.12913>

- Yang, A., Zhang, G., Meng, F., Zhi, R., Zhang, P., & Zhu, Y. 2019. Nitrogen metabolism in photosynthetic bacteria wastewater treatment: A novel nitrogen transformation pathway. *Bioresource Technology*, **294**. <https://doi.org/10.1016/j.biortech.2019.122162>
- Yu, Q., Xie, J., Huang, M., Chen, C., Qian, D., Qin, J. G., Chen, L., Jia, Y., & Li, E. 2020. Growth and health responses to a long-term pH stress in Pacific white shrimp *Litopenaeus vannamei*. *Aquaculture Reports*, **16**. <https://doi.org/10.1016/j.aqrep.2020.100280>
- Zhang, D., Yang, H., Zhang, W., Huang, Z., & Liu, S. J. 2003. *Rhodocista pekingensis* sp. nov., a cyst-forming phototrophic bacterium from a municipal wastewater treatment plant. *International Journal of Systematic and Evolutionary Microbiology*, **53**(4), 1111–1114. <https://doi.org/10.1099/ijs.0.02500-0>
- Zhou, X. xia, Pan, Y. jiang, Wang, Y. bo, & Li, W. fen. 2007. In vitro assessment of gastrointestinal viability of two photosynthetic bacteria, *Rhodospseudomonas palustris* and *Rhodobacter sphaeroides*. *Journal of Zhejiang University. Science. B.*, **8**(9), 686–692. <https://doi.org/10.1631/jzus.2007.B0686>
- Zhu, B., Lu, X., Liu, Y., Wu, Z., Cai, H., Jin, S., Li, Z., Xie, J., Li, X., Sun, F., Ma, R., & Qian, D. 2022. Effects of *Enterocytozoon hepatopenaei* single-infection or co-infection with *Vibrio parahaemolyticus* on the hepatopancreas of *Penaeus vannamei*. *Aquaculture*, **549**. <https://doi.org/10.1016/j.aquaculture.2021.737726>