

DAFTAR PUSTAKA

- Abdel-Rahman Mohamed, A., Abdel Rahman, A. N., Salem, G. A., Deib, M. M. E., Nassan, M. A., Rhouma, N. R., & Khater, S. I. (2021). The Antioxidant Role of a Taurine-Enriched Diet in Combating the Immunotoxic and Inflammatory Effects of Pyrethroids and/or Carbamates in *Oreochromis niloticus*. *Animals*, 11(5), 1318. <https://doi.org/10.3390/ani11051318>
- Abotaleb, M. M., Soliman, H. M., Tawfik, R. G., Mourad, A., Khalil, R. H., & Abdel-Latif, H. M. R. (2024). Efficacy of combined inactivated vaccines against *Vibrio alginolyticus* and *Streptococcus agalactiae* infections in Nile tilapia in Egypt. *Aquaculture International*, 32(2), 1317–1334. <https://doi.org/10.1007/s10499-023-01218-0>
- Abraham, T. J., Namdeo, M. S., Adikesavalu, H., & Banerjee, S. (2019). Pathogenicity And Pathology Of *Streptococcus Agalactiae* In Challenged Mozambique Tilapia *Oreochromis Mossambicus* (Peters 1852) Juveniles. *Aquatic Research*, 182–190. <https://doi.org/10.3153/ar19017>
- Agarwal, S., Sahni, N., Hickey, J. M., Robertson, G. A., Sitrin, R., Cryz, S., Joshi, S. B., & Volkin, D. B. (2020a). Characterizing and Minimizing Aggregation and Particle Formation of Three Recombinant Fusion-Protein Bulk Antigens for Use in a Candidate Trivalent Rotavirus Vaccine. *Journal of Pharmaceutical Sciences*, 109(1), 394–406. <https://doi.org/10.1016/j.xphs.2019.08.001>
- Agarwal, S., Sahni, N., Hickey, J. M., Robertson, G. A., Sitrin, R., Cryz, S., Joshi, S. B., & Volkin, D. B. (2020b). Characterizing and Minimizing Aggregation and Particle Formation of Three Recombinant Fusion-Protein Bulk Antigens for Use in a Candidate Trivalent Rotavirus Vaccine. *Journal of Pharmaceutical Sciences*, 109(1), 394–406. <https://doi.org/10.1016/j.xphs.2019.08.001>
- Ahmad S, Baqar T, & Kumar R. (2023). A Comprehensive Review on Types of Vaccines: From Classic to Cutting-Edge. *Vaccines & Vaccination Open Access*, 8(2), 1–6. <https://doi.org/10.23880/vvoa-16000164>
- Ali, S., Ullah, W., Kamarulzaman, A. F. S., Hassan, M., Rauf, M., Khattak, M. N. K., & Dawar, F. U. (2023). Proteomic profile of epidermal mucus from *Labeo rohita* reveals differentially abundant proteins after *Aeromonas hydrophila* infection. *Fish and Shellfish Immunology Reports*, 5, 100115. <https://doi.org/10.1016/j.fsirep.2023.100115>
- Aly, S. M., Albutti, A. S., Rahmani, A. H., & Atti, N. M. A. (2015). The response of New-season Nile tilapia to *Aeromonas hydrophila* vaccine. *International Journal of Clinical and Experimental Medicine*, 8(3), 4508–4514.
- Amrullah, Baga I., Jaya A. A., & Wahidah. (2018). *Streptococcus agalactiae* whole cell bacteria toxin protein in Nile tilapia *Oreochromis niloticus* (Vol. 11, Issue 2). <http://www.bioflux.com.ro/docs/2018.460-468.pdf>
- Anderson, R. , Oosthuizen, R. , Maritz, R. , Theron, A. , & Van Rensburg, A. J. (1980). The effects of increasing weekly doses of ascorbate on certain cellular and humoral immune functions in normal volunteers. *The American Journal of Clinical Nutrition*, 33(1), 71–76. <https://doi.org/10.1093/ajcn/33.1.71>
- Angela Mariana Lusiastuti. (2022). Inovasi Pengembangan Vaksin untuk Budidaya Ikan Air Tawar Berkelanjutan. In *Inovasi Pengembangan Vaksin untuk Budidaya Ikan Air Tawar Berkelanjutan*. Penerbit BRIN. <https://doi.org/10.55981/brin.659>
- Ardeshtir, R. A., Zolgharnein, H., Movahedinia, A., Salamat, N., & Zabihi, E. (2017). Comparison of waterborne and intraperitoneal exposure to fipronil in the Caspian white

- fish (*Rutilus frisii*) on acute toxicity and histopathology. *Toxicology Reports*, 4, 348–357. <https://doi.org/10.1016/j.toxrep.2017.06.010>
- Arwin, M., Ijong, F. G., & Tumbol, R. (2016). Characteristics of *Aeromonas hydrophila* isolated from tilapia (*Oreochromis niloticus*). *Aquatic Science & Management*, 4(2), 52–55. <https://doi.org/10.35800/JASM.4.2.2016.14450>
- Ashari, C., Tumbol, R., & Kolopita, M. E. F. (2014). Diagnosa Penyakit Bakterial Pada Ikan Nila (*Oreochromis niloticus*) Yang Di Budi Daya Pada Jaring Tancap Di Danau Tondano. *Jurnal Penelitian Budidaya Perikanan*, 2(3), 24–30. <https://doi.org/10.35800/bdp.2.3.2014.5700>
- Bakker, N., Vervelde, L., Kanobana, K., Knox, D. P., Cornelissen, A. W. C. A., Vries, E. de, & Yatsuda, A. P. (2004). Vaccination against the nematode *Haemonchus contortus* with a thiol-binding fraction from the excretory/secretory products (ES). *Vaccine*, 22(5–6), 618–628. <https://doi.org/10.1016/j.vaccine.2003.08.025>
- Bedekar, M. K., & Kole, S. (2022). *Fundamentals of Fish Vaccination* (pp. 147–173). https://doi.org/10.1007/978-1-0716-1888-2_9
- Biller-Takahashi, J. D., & Urbinati, E. C. (2014). Fish immunology. The modification and manipulation of the innate immune System: Brazilian studies. *Anais Da Academia Brasileira de Ciencias*, 86(3), 1483–1495. <https://doi.org/10.1590/0001-3765201420130159>
- Bisi-Johnson, M. A., Adedeji, A. A., Sulaiman, A. A., Adefisoye, M. A., & Okoh, A. I. (2023). Isolation and genotypic characterization of extended-spectrum beta-lactamase-producing *Escherichia coli* O157:H7 and *Aeromonas hydrophila* from selected freshwater sources in Southwest Nigeria. *Scientific Reports*, 13(1). <https://doi.org/10.1038/s41598-023-38014-y>
- Bosisio, F., Fernandes, K., Rezende, O., & Barbieri, E. (2017). Alterations in the hematological parameters of Juvenile Nile Tilapia (*Oreochromis niloticus*) submitted to different salinities. *Pan-American Journal of Aquatic Sciences*, 12(2), 146–154. [https://panamjas.org/pdf_artigos/PANAMJAS_12\(2\)_146-154.pdf](https://panamjas.org/pdf_artigos/PANAMJAS_12(2)_146-154.pdf)
- Brudeseth, B. E., Wiulsrød, R., Fredriksen, B. N., Lindmo, K., Løkling, K.-E., Bordevik, M., Steine, N., Klevan, A., & Gravningen, K. (2013). Status and future perspectives of vaccines for industrialised fin-fish farming. *Fish & Shellfish Immunology*, 35(6), 1759–1768. <https://doi.org/10.1016/j.fsi.2013.05.029>
- Bunnoy, A., Thompson, K. D., Thangsunan, P., Chokmangmeepisarn, P., Yata, T., Pirarat, N., Kitiyodom, S., Thangsunan, P., Sukkarun, P., Prukbenjakul, P., Panthukumphol, N., Morishita, M., Srisapoome, P., & Rodkhum, C. (2023). Development of a bivalent mucoadhesive nanovaccine to prevent francisellosis and columnaris diseases in Nile tilapia (*Oreochromis niloticus*). *Fish & Shellfish Immunology*, 138, 108813. <https://doi.org/10.1016/j.fsi.2023.108813>
- Cai, X., Yang, S., Peng, Y., Tan, K., Xu, P., Wu, Z., Kwan, K. Y., & Jian, J. (2024). Regulation of PhoB on biofilm formation and hemolysin gene hlyA and ciaR of *Streptococcus agalactiae*. *Veterinary Microbiology*, 289, 109961. <https://doi.org/10.1016/j.vetmic.2023.109961>
- Cardoso, I. L., Soares, M. P., De Angelis, C., Ferri, G. H., Ishikawa, M. M., Jonsson, C. M., Rantin, F. T., & Sampaio, F. G. (2020). Physiological and biochemical responses of Nile tilapia (*Oreochromis niloticus*) to acute trichlorfon exposure. *International Aquatic Research*, 12(4), 243–253. <https://doi.org/10.22034/IAR.2020.1904943.1071>

- Cavalcante, R. B., Telli, G. S., Tachibana, L., Dias, D. de C., Oshiro, E., Natori, M. M., Silva, W. F. da, & Ranzani-Paiva, M. J. (2020). Probiotics, Prebiotics and Synbiotics for Nile tilapia: Growth performance and protection against *Aeromonas hydrophila* infection. *Aquaculture Reports*, 17. <https://doi.org/10.1016/j.aqrep.2020.100343>
- Cheng, F., Wang, Y., Bai, Y., Liang, Z., Mao, Q., Liu, D., Wu, X., & Xu, M. (2023). Research Advances on the Stability of mRNA Vaccines. In *Viruses* (Vol. 15, Issue 3). MDPI. <https://doi.org/10.3390/v15030668>
- Clausi, A. L., Morin, A., Carpenter, J. F., & Randolph, T. W. (2009). Influence of protein conformation and adjuvant aggregation on the effectiveness of aluminum hydroxide adjuvant in a model alkaline phosphatase vaccine. *Journal of Pharmaceutical Sciences*, 98(1), 114–121. <https://doi.org/10.1002/jps.21433>
- Clem, A. (2011). Fundamentals of vaccine immunology. *Journal of Global Infectious Diseases*, 3(1), 73. <https://doi.org/10.4103/0974-777X.77299>
- Cramer, J. P. (2019). Principles of Immunization. In *Travel Medicine* (pp. 65–73). Elsevier. <https://doi.org/10.1016/B978-0-323-54696-6.00009-4>
- Das, A., Vinayasree, V., Santhosh, C. R., & Sree Hari, S. (2012). Surveillance of *Aeromonas sobria* and *Aeromonas hydrophila* from commercial food stuffs and environmental sources. *Journal of Experimental Sciences*, 9, 36–42. <http://jexpsciences.com/>
- de Mecca, M. M., Castro, G. D., & Castro, J. A. (1993). Antioxidative stress therapy with dithiothreitol tetraacetate I. Protection against carbon tetrachloride induced liver necrosis. *Archives of Toxicology*, 67(8), 547–551. <https://doi.org/10.1007/BF01969267>
- de Veer, M. J., Holko, M., Frevel, M., Walker, E., Der, S., Paranjape, J. M., Silverman, R. H., & Williams, B. R. G. (2001). Functional classification of interferon-stimulated genes identified using microarrays. *Journal of Leukocyte Biology*, 69(6), 912–920. <https://doi.org/10.1189/jlb.69.6.912>
- Debnath, S. C., McMurtrie, J., Temperton, B., Delamare-Deboutteville, J., Mohan, C. V., & Tyler, C. R. (2023). Tilapia aquaculture, emerging diseases, and the roles of the skin microbiomes in health and disease. *Aquaculture International*, 31(5), 2945–2976. <https://doi.org/10.1007/s10499-023-01117-4>
- Deepmala, J., Deepak, M., Srivastav, S., Sangeeta, S., Kumar, S. A., & Kumar, S. S. (2013). Protective effect of combined therapy with dithiothreitol, zinc and selenium protects acute mercury induced oxidative injury in rats. *Journal of Trace Elements in Medicine and Biology*, 27(3), 249–256. <https://doi.org/10.1016/j.jtemb.2012.12.003>
- Delrue, I., Verzele, D., Madder, A., & Nauwynck, H. J. (2012). Inactivated virus vaccines from chemistry to prophylaxis: merits, risks and challenges. *Expert Review of Vaccines*, 11(6), 695–719. <https://doi.org/10.1586/erv.12.38>
- Dotta, G., de Andrade, J. I. A., Tavares Gonçalves, E. L., Brum, A., Mattos, J. J., Maraschin, M., & Martins, M. L. (2014). Leukocyte phagocytosis and lysozyme activity in Nile tilapia fed supplemented diet with natural extracts of propolis and *Aloe barbadensis*. *Fish and Shellfish Immunology*, 39(2), 280–284. <https://doi.org/10.1016/j.fsi.2014.05.020>
- Elbahnaswy, S., & Elshopakey, G. E. (2020). Differential gene expression and immune response of Nile tilapia (*Oreochromis niloticus*) challenged intraperitoneally with *Photobacterium damsela* and *Aeromonas hydrophila* demonstrating immunosuppression. *Aquaculture*, 526, 735364. <https://doi.org/10.1016/j.aquaculture.2020.735364>
- EL-Makhzangy, A., Ghaly, M., Mahmoud, S., & Awad, S. (2022). Inhibitory action of probiotic bacteria for some isolated and identified pathogenic bacteria from naturally

- infected Nile tilapia (*Oreochromis niloticus*). *Bulletin of Faculty of Science, Zagazig University*, 2022(3), 108–121. <https://doi.org/10.21608/bfszu.2022.147216.1153>
- El-Sayed, A. M., & Fitzsimmons, K. (2023). From Africa to the world—The journey of Nile tilapia. *Reviews in Aquaculture*, 15(S1), 6–21. <https://doi.org/10.1111/raq.12738>
- Evans, J. J., Pasnik, D. J., Klesius, P. H., & Al-Ablani, S. (2006). First report of *Streptococcus agalactiae* and *Lactococcus garviae* from a wild bottlenose dolphin (*Tursiops truncatus*). *Journal of Wildlife Diseases*, 42(3), 561–569. <https://doi.org/10.7589/0090-3558-42.3.561>
- Evensen, Ø. (2016). Development of Fish Vaccines: Focusing on Methods. In *Fish Vaccines* (pp. 53–74). Springer Basel. https://doi.org/10.1007/978-3-0348-0980-1_3
- Farias, T. H. V., Levy-Pereira, N., Alves, L. de O., Dias, D. de C., Tachibana, L., Pilarski, F., Belo, M. A. de A., & Ranzani-Paiva, M. J. T. (2016). Probiotic feeding improves the immunity of pacus, *Piaractus mesopotamicus*, during *Aeromonas hydrophila* infection. *Animal Feed Science and Technology*, 211, 137–144. <https://doi.org/10.1016/j.anifeedsci.2015.11.004>
- Fernandes, D. C., Eto, S. F., Baldassi, A. C., Balbuena, T. S., Charlie-Silva, I., de Andrade Belo, M. A., & Pizauro, J. M. (2024). Meningitis caused by *Aeromonas hydrophila* in *Oreochromis niloticus*: Proteomics and druggability of virulence factors. *Fish & Shellfish Immunology*, 151, 109687. <https://doi.org/10.1016/j.fsi.2024.109687>
- Fernandes, D. C., Eto, S. F., Claudiano, G. S., Marcusso, P. F., Vieira, F. C. F., Shimada, M. T., Silva, T. F. A., Souza, E. C., Salvador, R., Moraes, J. R. E., & Moraes, F. R. (2015). Humoral immune response in *Oreochromis niloticus*: modified direct agglutination test. *Comparative Clinical Pathology*, 24(3), 617–623. <https://doi.org/10.1007/s00580-014-1955-1>
- Gabriel, U. U., Akinrotimi, O. A., & Eseimokumo, F. (2011). Haematological Responses of Wild Nile Tilapia *Oreochromis niloticus* after Acclimation to Captivity. In *Jordan Journal of Biological Sciences* (Vol. 4, Issue 4). <https://jjbs.hu.edu.jo/FILES/v4n4/Paper%20Number%206.pdf>
- Galindo Peña, L. V., Pérez Cuervo, F. D., Murcia Ordoñez, B., Chaves Moreno, L. C., Martínez Moyano, E., Poche Ceballos, A. M., & Hernández Sánchez, J. H. (2019). Hematological parameters in *oreochromis niloticus* cultivated in tropical conditions in experimental farm Santo Domingo of University of Amazonia, Florencia, Caquetá, Colombia. *Scientia et Technica*, 24(1), 126. <https://doi.org/10.22517/23447214.20391>
- Ghaemmaghamian, Z., Zarghami, R., Walker, G., O'Reilly, E., & Ziaee, A. (2022). Stabilizing vaccines via drying: Quality by design considerations. *Advanced Drug Delivery Reviews*, 187, 114313. <https://doi.org/10.1016/j.addr.2022.114313>
- Gould, R. W., O'leary, P. J., Garrison, R. L., Rohovec, J. S., & Fryer, J. L. (1978). Spray Vaccination: A Method for the Immunization of Fish. *Fish Pathology*, 13(1), 63–68. <https://doi.org/10.3147/jsfp.13.63>
- Gracheva, A. V., Korchevaya, E. R., Ammour, Yu. I., Smirnova, D. I., Sokolova, O. S., Glukhov, G. S., Moiseenko, A. V., Zubarev, I. V., Samoilikov, R. V., Leneva, I. A., Svitich, O. A., Zverev, V. V., & Faizuloev, E. B. (2022). Immunogenic properties of SARS-CoV-2 inactivated by ultraviolet light. *Archives of Virology*, 167(11), 2181–2191. <https://doi.org/10.1007/s00705-022-05530-7>
- Gunanti, M., Wulansari, P. D., & Kinzella, K. (2019). The erythrocyte and leucocyte profile of saline tilapia (*Oreochromis Niloticus*) in a cultivation system with nanobubbles. *IOP*

- Conference Series: *Earth and Environmental Science*, 236(1).
<https://doi.org/10.1088/1755-1315/236/1/012089>
- Halimah, L. S. (2024). Jenis Dan Perkembangan Vaksin Terkini. *Medika Kartika Jurnal Kedokteran Dan Kesehatan, Volume 7 No 0*, 1–13. <https://doi.org/10.35990/mk.v7n0.p1-13>
- Ibrahim, D., I. Abdel Rahman, M. M., M. Abd El-Ghany, A., A. A. Hassanen, E., A. Al-Jabr, O., A. Abd El-Wahab, R., zayed, S., Abd El khalek Salem, M., Nabil El_Tahawy, S., Youssef, W., A. Tolba, H., E. Dawod, R., Taha, R., H. Arisha, A., & T.Y. Kishawy, A. (2024). *Chlorella vulgaris* extract conjugated magnetic iron nanoparticles in nile tilapia (*Oreochromis niloticus*): Growth promoting, immunostimulant and antioxidant role and combating against the synergistic infection with *Ichthyophthirius multifiliis* and *Aeromonas hydrophila*. *Fish & Shellfish Immunology*, 145, 109352. <https://doi.org/10.1016/j.fsi.2023.109352>
- Imtiaz, N., Anwar, Z., Waiho, K., Shi, C., Mu, C., Wang, C., & Qingyang, W. (2023). A review on aquaculture adaptation for fish treatment from antibiotic to vaccine prophylaxis. *Aquaculture International*, 32(3), 2643–2668. <https://doi.org/10.1007/s10499-023-01290-6>
- Jiskoot, W., Kersten, G. F. A., Mastrobattista, E., & Slütter, B. (2019). Vaccines. In *Pharmaceutical Biotechnology* (pp. 281–304). Springer International Publishing. https://doi.org/10.1007/978-3-030-00710-2_14
- Josefsberg, J. O., & Buckland, B. (2012). Vaccine process technology. *Biotechnology and Bioengineering*, 109(6), 1443–1460. <https://doi.org/10.1002/bit.24493>
- Kamali-Jamil, R., Shayestehpour, M., Sadigh, Z.-A., Taqavian, M., Shahkarami, M.-K., Esna-Ashari, F., Shahbazi, R., Mohammadi, A., Foroughi, A., & Romani, B. (2017). The Effect of Various Stabilizers on Preserving Immunogenicity of Lyophilized Mumps Vaccines. In *J Res Health Sci* (Vol. 17, Issue 4). www.umsha.ac.ir/jrhs
- Kayansamruaj, P., Areechon, N., & Unajak, S. (2020). Development of fish vaccine in Southeast Asia: A challenge for the sustainability of SE Asia aquaculture. *Fish & Shellfish Immunology*, 103, 73–87. <https://doi.org/10.1016/j.fsi.2020.04.031>
- Ke, X., Liu, Z., Chen, S., Chen, Z., Zhang, D., Gao, F., & Lu, M. (2021). The immune efficacy of a *Streptococcus agalactiae* immersion vaccine for different sizes of young tilapia. *Aquaculture*, 534. <https://doi.org/10.1016/j.aquaculture.2020.736289>
- Kelly, W. G., & Stolee, A. H. (1978). Stabilization of placental aromatase by dithiothreitol in the presence of oxidizing agents. *Steroids*, 31(4), 533–539. [https://doi.org/10.1016/0039-128X\(78\)90035-1](https://doi.org/10.1016/0039-128X(78)90035-1)
- Khansari, A. R., Wallbom, N., Sundh, H., Sandblom, E., Tort, L., & Jönsson, E. (2024). Sea water acclimation of rainbow trout (*Oncorhynchus mykiss*) modulates the mucosal transcript immune response induced by *Vibrio anguillarum* and *Aeromonas salmonicida* vaccine, and prevents further transcription of stress-immune genes in response to acute stress. *Fish & Shellfish Immunology*, 152, 109733. <https://doi.org/10.1016/j.fsi.2024.109733>
- KKP. (2022). *Laporan Kinerja Triwulan Dua 2022*. <https://kkp.go.id/an-component/media/upload-gambar-pendukung/DJPB/Laporan%20Kinerja/2.%20LKJ%20DJPB%20TW%202%202022.pdf>
- Klak, K., Maciuszek, M., Pijanowski, L., Marcinkowska, M., Homa, J., Verburg-van Kemenade, B. M. L., Rakus, K., & Chadzinska, M. (2024). Evolutionarily conserved

- mechanisms regulating stress-induced neutrophil redistribution in fish. *Frontiers in Immunology*, 15. <https://doi.org/10.3389/fimmu.2024.1330995>
- Klesius, P. H., Shoemaker, C. A., & Evans, J. J. (2000). Efficacy of single and combined *Streptococcus iniae* isolate vaccine administered by intraperitoneal and intramuscular routes in tilapia (*Oreochromis niloticus*). *Aquaculture*, 188(3–4), 237–246. [https://doi.org/10.1016/S0044-8486\(00\)00345-8](https://doi.org/10.1016/S0044-8486(00)00345-8)
- Klesius, P., & Rogers, W. (1995). Parasitism of catfish and other farm-raised food fish. *J.A.V.M.A.*, 207(11), 1473–1478. <https://doi.org/10.2460/javma.1995.207.11.1473>
- Kordon, A. O., Pinchuk, L., & Karsi, A. (2021). Adaptive Immune System in Fish. In *Turkish Journal of Fisheries and Aquatic Sciences* (Vol. 22, Issue 4). Central Fisheries Research Inst. <https://doi.org/10.4194/TRJFAS20235>
- Kristensen, D., & Chen, D. (2010). Stabilization of vaccines: Lessons learned. In *Human Vaccines* (Vol. 6, Issue 3, pp. 227–231). Landes Bioscience. <https://doi.org/10.4161/hv.6.3.11618>
- Kurniawan A, Sarjito, & Prayitno SB. (2014). Effect of *Anredera cordifolia* leaf extract on food toward hematology and survival rate of *Clarias gariepinus* infected by *Aeromonas caviae*. *Journal of Aquaculture Management and Technology*, 3(3), 76–85. media.neliti.com/media/publications/91772-ID-none.pdf
- Lai, R., Ogunsola, A. F., Rakib, T., & Behar, S. M. (2023). Key advances in vaccine development for tuberculosis—success and challenges. *Npj Vaccines*, 8(1), 158. <https://doi.org/10.1038/s41541-023-00750-7>
- Langenhof, M., Leong, S. S. J., Pattenden, L. K., & Middelberg, A. P. J. (2005). Controlled oxidative protein refolding using an ion-exchange column. *Journal of Chromatography A*, 1069(2), 195–201. <https://doi.org/10.1016/j.chroma.2005.01.063>
- Latifah, A. M., Titis, S., Ah Condro, H., Fajar, B., & Yuniarti, T. (2018). Penggunaan Ekstrak Kulit Buah Manggis (*Garcinia Mangostana*) Sebagai Antibakteri Untuk Mengobati Infeksi *Aeromonas Hydrophila* Pada Ikan Nila (*Oreochromis niloticus*). *Jurnal Sains Akuakultur Tropis*, 2(2), 36–43.
- Li, H., Cao, J., Han, Q., Li, Z., Zhuang, J., Wang, C., Wang, H., Luo, Z., Wang, B., & Li, A. (2024). Protease SfpB plays an important role in cell membrane stability and immune system evasion in *Streptococcus agalactiae*. *Microbial Pathogenesis*, 192, 106683. <https://doi.org/10.1016/j.micpath.2024.106683>
- Lukman, B., Roslindawani, M. N., Azzam-Sayuti, M., Norfarrah, M. A., Annas, S., Ina-Salwany, M. Y., Zamri-Saad, M., Nor-Yasmin, A. R., Amin-Nordin, S., Barkham, T., & Amal, M. N. A. (2023). Disease development in red hybrid tilapia following single and co-infection with tilapia lake virus and *Streptococcus agalactiae*. *Aquaculture*, 567, 739251. <https://doi.org/10.1016/j.aquaculture.2023.739251>
- Lusiastuti, A. (2022). Inovasi Pengembangan Vaksin untuk Budidaya Ikan Air Tawar Berkelanjutan. In *Inovasi Pengembangan Vaksin untuk Budidaya Ikan Air Tawar Berkelanjutan*. Penerbit BRIN. <https://doi.org/10.55981/brin.659>
- Magnadóttir, B. (2006). Innate immunity of fish (overview). *Fish and Shellfish Immunology*, 20(2), 137–151. <https://doi.org/10.1016/j.fsi.2004.09.006>
- Magnadóttir, B. (2010). Immunological Control of Fish Diseases. *Marine Biotechnology*, 12(4), 361–379. <https://doi.org/10.1007/s10126-010-9279-x>
- Megarani, D. V., Hardian, A. B., Arifianto, D., Santosa, C. M., & Salasia, S. I. O. (2020). Comparative Morphology and Morphometry of Blood Cells in Zebrafish (*Danio rerio*), Common Carp (*Cyprinus carpio carpio*), and Tilapia (*Oreochromis niloticus*). *Journal of*

- the American Association for Laboratory Animal Science*, 59(6), 673–680. <https://doi.org/10.30802/AALAS-JAALAS-20-000013>
- Miles, A. P., McClellan, H. A., Rausch, K. M., Zhu, D., Whitmore, M. D., Singh, S., Martin, L. B., Wu, Y., Giersing, B. K., Stowers, A. W., Long, C. A., & Saul, A. (2005). Montanide® ISA 720 vaccines: quality control of emulsions, stability of formulated antigens, and comparative immunogenicity of vaccine formulations. *Vaccine*, 23(19), 2530–2539. <https://doi.org/10.1016/j.vaccine.2004.08.049>
- Mondal, H., & Thomas, J. (2022). A review on the recent advances and application of vaccines against fish pathogens in aquaculture. *Aquaculture International*, 30(4), 1971–2000. <https://doi.org/10.1007/s10499-022-00884-w>
- Monir, M. S., Yusoff, M. S. M., Zulperi, Z. M., Hassim, H. A., Zamri-Saad, M., Amal, M. N. A., Salleh, A., Mohamad, A., Yie, L. J., & Ina-Salwany, M. Y. (2021). Immuno-protective efficiency of feed-based whole-cell inactivated bivalent vaccine against *Streptococcus* and *Aeromonas* infections in red hybrid tilapia (*Oreochromis niloticus* × *Oreochromis mossambicus*). *Fish and Shellfish Immunology*, 113, 162–175. <https://doi.org/10.1016/j.fsi.2021.04.006>
- Muchlisin, Z. A., Arisa, A. A., Muhammadar, A. A., Fadli, N., Arisa, I. I., & Siti-Azizah, M. N. (2016). Growth performance and feed utilization of keureling (Tor tambra) fingerlings fed a formulated diet with different doses of vitamin E (alpha-tocopherol). *Archives of Polish Fisheries*, 24(1), 47–52. <https://doi.org/10.1515/aopf-2016-0005>
- Munang'andu, H. M., & Evensen, Ø. (2019). Correlates of protective immunity for fish vaccines. *Fish and Shellfish Immunology*, 85, 132–140. <https://doi.org/10.1016/j.fsi.2018.03.060>
- Musante, L., Saraswat, M., Duriez, E., Byrne, B., Ravidà, A., Domon, B., & Holthofer, H. (2012). Biochemical and Physical Characterisation of Urinary Nanovesicles following CHAPS Treatment. *PLoS ONE*, 7(7), e37279. <https://doi.org/10.1371/journal.pone.0037279>
- Nafiqoh, N., Novita, H., Sugiani, D., Gardenia, L., Taukhid, T., Widyaningrum, A., & Susanti, D. R. (2022). *Aeromonas hydrophila* AHL 0905-2 and *Streptococcus agalactiae* N14G as Combined Vaccine Candidates for Nile Tilapia. *HAYATI Journal of Biosciences*, 29(2), 137–145. <https://doi.org/10.4308/hjb.29.2.137-145>
- Noor, M., Azmai, A., & Saad, M. Z. (2011). Streptococcosis in Tilapia (*Oreochromis niloticus*): A Review. *Pertanika J. Trop. Agric. Sci*, 34(2), 195–206. <https://www.researchgate.net/publication/220038542>
- Ock, S. A., Bhak, J. S., Balasubramanian, S., Lee, H. J., Choe, S. Y., & Rho, G. J. (2003). Different activation treatments for successful development of bovine oocytes following intracytoplasmic sperm injection. *Zygote*, 11(1), 69–76. <https://doi.org/10.1017/S0967199403001096>
- Oliveira, Thaís. F., Quieróz, G. A., Leibowitz, M. P., & Gomes Leal, C. A. (2022). Development of an inactivated whole cell vaccine through immersion for immunoprophylaxis of *Francisella orientalis* infections in Nile tilapia (*Oreochromis niloticus* L.) fingerlings and juveniles. *Fish & Shellfish Immunology*, 127, 405–411. <https://doi.org/10.1016/j.fsi.2022.06.040>
- Palanikani, R., Kanagaraj, & Chanthini, M.-P., Soranam, R., Thanigaivel, A., Karthi, S., Senthil-Nathan, S., Arunachalam, & Murugesan, G. (2020). Efficacy of *Andrographis paniculata* supplements induce a non-specific immune system against the pathogenicity of

- Aeromonas hydrophila* infection in Indian major carp (*Labeo rohita*). *Environ Sci Pollut Res*, 27, 23420–23436. <https://doi.org/10.1007/s11356-019-05957-7>
- Panjiasih Susmiarsih, T. (2019). Kajian DNA Rekombinan pada Vaksin DNA dan Vaksin Subunit Protein. *Majalah Kesehatan Pharmamedika*, 10(2), 108. <https://doi.org/10.33476/mkp.v10i2.730>
- Pasnik, D. J., Evans, J. J., Panangala, V. S., Klesius, P. H., Shelby, R. A., & Shoemaker, C. A. (2005). Antigenicity of *Streptococcus agalactiae* extracellular products and vaccine efficacy. *Journal of Fish Diseases*, 28(4), 205–212. <https://doi.org/10.1111/j.1365-2761.2005.00619.x>
- Pattipeiluhu, S., Laimeheriwa, B. M., Amarens, A., & Lekatompessy B A Jurusan, P. (2022). Impact of *Aeromonas hydrophila* infection on clinical signs and blood parameter of Nile Tilapia *Oreochromis niloticus*. *Journal of Fisheries and Marine Research*, 6(3), 6–13. <http://jfmr.ub.ac.id>
- Peng, Y., Tao, J., Kuang, S., Jiang, M., Peng, X., & Li, H. (2021). Identification of Polyvalent Vaccine Candidates From Extracellular Secretory Proteins in *Vibrio alginolyticus*. *Frontiers in Immunology*, 12. <https://doi.org/10.3389/fimmu.2021.736360>
- Piek, C. J., Teske, E., van Leeuwen, M. W., & Day, M. J. (2012). Good agreement of conventional and gel-based direct agglutination test in immune-mediated haemolytic anaemia. *Acta Veterinaria Scandinavica*, 54(1). <https://doi.org/10.1186/1751-0147-54-10>
- Pollard, A. J., & Bijker, E. M. (2021). A guide to vaccinology: from basic principles to new developments. *Nature Reviews Immunology*, 21(2), 83–100. <https://doi.org/10.1038/s41577-020-00479-7>
- Puig, O., Caspary, F., Rigaut, G., Rutz, B., Bouveret, E., Bragado-Nilsson, E., Wilm, M., & Séraphin, B. (2001). The tandem affinity purification (TAP) method: A general procedure of protein complex purification. *Methods*, 24(3), 218–229. <https://doi.org/10.1006/meth.2001.1183>
- Qazi, B. S., Tang, K., & Qazi, A. (2011). Recent Advances in Underlying Pathologies Provide Insight into Interleukin-8 Expression-Mediated Inflammation and Angiogenesis. *International Journal of Inflammation*, 2011, 1–13. <https://doi.org/10.4061/2011/908468>
- Raju, T., Manchanayake, T., Danial, A., Zamri-Saad, M., Azmai, M. N. A., Md Yasin, I. S., Mohd Nor, N., & Salleh, A. (2023). Evaluating the Intestinal Immunity of Asian Seabass (*Lates calcarifer*, Bloch 1790) following Field Vaccination Using a Feed-Based Oral Vaccine. *Vaccines*, 11(3), 602. <https://doi.org/10.3390/vaccines11030602>
- Redmond, A. K., Zou, J., Secombes, C. J., MacQueen, D. J., & Dooley, H. (2019). Discovery of all three types in cartilaginous fishes enables phylogenetic resolution of the origins and evolution of interferons. *Frontiers in Immunology*, 10(JULY). <https://doi.org/10.3389/fimmu.2019.01558>
- Reyes, A. T., Raymundo, A. K., Baldrias, L. R., Paller, V. G., & Dalmacio, I. F. (2021). Occurrence of *Streptococcus* spp. on Farmed Nile tilapia (*Oreochromis niloticus* L. *International Journal of Agricultural Technology*, 17(3), 1041–1060. <https://ijat-aatsea.com>
- Reynalta, R., Yuhana, M., & Lusiastuti, A. M. (2019a). Effectivity of *Streptococcus agalactiae* bacterial vaccine with different coatings for increasing the immunity system on nile tilapia *Oreochromis niloticus* (Linnaeus, 1758). *Jurnal Iktiologi Indonesia*, 19(2), 205. <https://doi.org/10.32491/jii.v19i2.478>
- Reynalta, R., Yuhana, M., & Lusiastuti, A. M. (2019b). Effectivity of *Streptococcus agalactiae* bacterial vaccine with different coatings for increasing the immunity system on nile tilapia

- Oreochromis niloticus* (Linnaeus, 1758). *Jurnal Iktiologi Indonesia*, 19(2), 205. <https://doi.org/10.32491/jii.v19i2.478>
- Riauwyaty, M., & Syawal, D. H. (2016). Blood Description of *Oreochromis niloticus* in Pond Cultures in Marpoyan Damai Subdistrict of Pekanbaru City. *Jurnal Perikanan Dan Kelautan*, 21(1), 1–6. <https://media.neliti.com/media/publications/296067-gambaran-darah-ikan-nila-oreochromis-nil-e9ee38ab.pdf>
- Ridzuan, M. S. M., Abdullah, A., Ramly, R., Mansor, N. N., Ramli, N., & Firdaus-Nawi, Mohd. (2022). Current status and advances of fish vaccines in Malaysia. *Veterinary World*, 465–482. <https://doi.org/10.14202/vetworld.2022.465-482>
- Robertsen, B. (2006). The interferon system of teleost fish. *Fish and Shellfish Immunology*, 20(2), 172–191. <https://doi.org/10.1016/j.fsi.2005.01.010>
- Romstad, A. B., Reitan, L. J., Midtlyng, P., Gravningen, K., & Evensen, Ø. (2013). Antibody responses correlate with antigen dose and in vivo protection for oil-adjuvanted, experimental furunculosis (*Aeromonas salmonicida* subsp. *salmonicida*) vaccines in Atlantic salmon (*Salmo salar* L.) and can be used for batch potency testing of vaccines. *Vaccine*, 31(5), 791–796. <https://doi.org/10.1016/j.vaccine.2012.11.069>
- Sahoo, S., Banu, H., Prakash, A., & Tripathi, G. (2021). Immune System of Fish: An Evolutionary Perspective. *Antimicrobial Immune Response*, 1–21. <https://doi.org/10.5772/intechopen.99541>
- Sallusto, F., Lanzavecchia, A., Araki, K., & Ahmed, R. (2010). From Vaccines to Memory and Back. *Immunity*, 33(4), 451–463. <https://doi.org/10.1016/j.immuni.2010.10.008>
- Sánchez Ortiz, I. A., Xavier Bastos, R. K., Teixeira Lanna, E. A., Viana Santana, F. de F., Teixeira, T. C., & da Matta, S. L. P. (2022). Evaluation of acute toxicity of ammonia in Genetically Improved Farmed Tilapia. *Aquaculture Reports*, 27. <https://doi.org/10.1016/j.aqrep.2022.101325>
- Sanders, B., Koldijk, M., & Schuitemaker, H. (2015). Inactivated Viral Vaccines. In *Vaccine Analysis: Strategies, Principles, and Control* (pp. 45–80). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-662-45024-6_2
- Santoso, B. B., Basuki, F., Program, H., Perairan, S. B., Perikanan, J., Perikanan, F., Kelautan, I., Diponegoro, U., & Soedarto Tembalang-Semarang, J. (2013). Analysis of 5th Generation (F5) Nila Larasati (*Oreochromis niloticus*) Hybrid Immunity System Infected by Bacteria *Streptococcus agalactiae* with Different Concentration. *Journal of Aquaculture Management and Technology*, 2(3), 64–75. <http://ejournal-s1.undip.ac.id/index.php/jfpik>
- Schumacher, J., Bacic, T., Staritzbichler, R., Daneschdar, M., Klamp, T., Arnold, P., Jäggle, S., Türeci, Ö., Markl, J., & Sahin, U. (2018). Enhanced stability of a chimeric hepatitis B core antigen virus-like-particle (HBcAg-VLP) by a C-terminal linker-hexahistidine-peptide. *Journal of Nanobiotechnology*, 16(1). <https://doi.org/10.1186/s12951-018-0363-0>
- Sebastião, F. A., Nomura, ; D, Sakabe, ; R, & Pilarski, ; F. (2011). Hematology And Productive Performance Of Nile Tilapia (*Oreochromis niloticus*) Naturally Infected With *Flavobacterium columnare*. *Brazilian Journal of Microbiology*, 42, 282–289.
- Secombes, C. J., & Wang, T. (2012). The innate and adaptive immune system of fish. In *Infectious Disease in Aquaculture* (pp. 3–68). Elsevier. <https://doi.org/10.1533/9780857095732.1.3>
- Shahin, K., Shinn, A. P., Metselaar, M., Ramirez-Paredes, J. G., Monaghan, S. J., Thompson, K. D., Hoare, R., & Adams, A. (2019). Efficacy of an inactivated whole-cell injection vaccine for Nile tilapia, *Oreochromis niloticus* (L), against multiple isolates of *Francisella*

- noatunensis subsp. orientalis from diverse geographical regions. *Fish and Shellfish Immunology*, 89, 217–227. <https://doi.org/10.1016/j.fsi.2019.03.071>
- Shahjahan, M., Islam, M. J., Hossain, M. T., Mishu, M. A., Hasan, J., & Brown, C. (2022). Blood biomarkers as diagnostic tools: An overview of climate-driven stress responses in fish. *Science of The Total Environment*, 843, 156910. <https://doi.org/10.1016/j.scitotenv.2022.156910>
- Sharma, G., & Chadha, P. (2024). Toxic effects of aniline in liver, gills and kidney of freshwater fish *Channa punctatus* after acute exposure. *Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology*, 281, 109916. <https://doi.org/10.1016/j.cbpc.2024.109916>
- Shelby, R. A., Shoemaker, C. A., Klesius, P. H., & Evans, J. J. (2001). Development of an Indirect ELISA to Detect Humoral Response to *Streptococcus iniae* Infection of Nile Tilapia, *Oreochromis niloticus*. *Journal of Applied Aquaculture*, 11(3), 35–44. https://doi.org/10.1300/J028v11n03_03
- Shirajum Monir, M., Yusoff, S. M., Mohamad, A., & Ina-Salwany, M. Y. (2020). Vaccination of Tilapia against Motile *Aeromonas* Septicemia: A Review. *Journal of Aquatic Animal Health*, 32(2), 65–76. <https://doi.org/10.1002/aah.10099>
- Sholichah, L., Yuhana, M., Lusiastuti, A. M., & Prihadi, T. H. (2016). Potency And Efficacy Test Of A Vaccine In Addition With Adjuvant Against Koi Herpesvirus In Koi (*Cyprinus carpio*). *Indonesian Aquaculture Journal*, 11(1), 41–47. <http://ejournal-balitbang.kkp.go.id/index.php/iaj>
- Sirimanapong, W., Thompson, K. D., Kledmanee, K., Thaijongrak, P., Collet, B., Ooi, E. L., & Adams, A. (2014). Optimisation and standardisation of functional immune assays for striped catfish (*Pangasianodon hypophthalmus*) to compare their immune response to live and heat killed *Aeromonas hydrophila* as models of infection and vaccination. *Fish & Shellfish Immunology*, 40(2), 374–383. <https://doi.org/10.1016/j.fsi.2014.07.021>
- Sonoda, K., Sakaguchi, M., Okamura, H., Yokogawa, K., Tokunaga, E., Tokiyoshi, S., Kawaguchi, Y., & Hirai, K. (2000). Development of an Effective Polyvalent Vaccine against both Marek's and Newcastle Diseases Based on Recombinant Marek's Disease Virus Type 1 in Commercial Chickens with Maternal Antibodies. *Journal of Virology*, 74(7), 3217–3226. <https://doi.org/10.1128/JVI.74.7.3217-3226.2000>
- Sugiani, D., Harris, E., & Angela Mariana Lusiastuti. (2012). Pengaruh Ko-Infeksi Bakteri *Streptococcus Agalactiae* Dengan *Aeromonas Hydrophila* Terhadap Gambaran Hematologi Dan Histopatologi Ikan Tilapia (*Oreochromis niloticus*). *J. Ris. Akuakultur*, 7(1), 85–91. <https://doi.org/10.15578/jra.7.1.2012.85-91>
- Sugiani, D., Nafiqoh, N., Novita, H., Sumiati, T., Andriyanto, S., Taukhid, & Lusiastuti, A. M. (2021). Safety and efficacy test to immersion vaccine against *Streptococcus agalactiae* and *Aeromonas hydrophila* for Tilapia (*Oreochromis niloticus*). *E3S Web of Conferences*, 322. <https://doi.org/10.1051/e3sconf/202132202004>
- Sugiani, D., Purwaningsih, U., & Angela Mariana Lusiastuti. (2018). The efficacy of freeze dried whole cell vaccine *Aeromonas hydrophila* against motile *aeromonas* septicemia on catfish, tilapia, and gourami. *Jurnal Riset Akuakultur*, 13(2), 159–167. <http://ejournal-balitbang.kkp.go.id/index.php/jra>
- Sugito, Nurliana, Aliza, D., & Samadi, dan. (2014). Differential Leukocytes and Survival of Tilapia Fish Challenged with *Aeromonas hydrophila* and Given Heat Stress and Supplemented with Willow Leaf Powder. *Jurnal Kedokteran Hewan*, 8(2), 158–163. <https://doi.org/10.21157/j.ked.hewan.v8i2.2652>

- Sukenda, Febriansyah, T. R., & Nuryati, S. (2014). Whole-cell vaccine of *Streptococcus agalactiae* in *Oreochromis* sp. with immersion method. *Jurnal Akuakultur Indonesia*, 13(1), 83–93. <https://doi.org/10.19027/jai.13.83-93>
- Sukenda, S., Carman, O., Rahman, R., Hidayatullah, D., & Yumaidawati, N. S. (2017). Vaccination in Nile tilapia broodstock with whole cell vaccine and disease resistance in its fry against *Aeromonas hydrophila*. *Jurnal Akuakultur Indonesia*, 16(2), 268. <https://doi.org/10.19027/jai.16.2.268-276>
- Sukkarun, P., Kitiyodom, S., Kamble, M. T., Bunnoy, A., Boonanuntanasarn, S., Yata, T., Boonrungsiman, S., Thompson, K. D., Rodkhum, C., & Pirarat, N. (2024). Systemic and mucosal immune responses in red tilapia (*Oreochromis* sp.) following immersion vaccination with a chitosan polymer-based nanovaccine against *Aeromonas veronii*. *Fish & Shellfish Immunology*, 146, 109383. <https://doi.org/10.1016/j.fsi.2024.109383>
- Sukkarun, P., Kitiyodom, S., Yostawornkul, J., Chain, P., Yata, T., Rodkhum, C., Boonrungsiman, S., & Pirarat, N. (2022). Chitosan-polymer based nanovaccine as promising immersion vaccine against *Aeromonas veronii* challenge in red tilapia (*Oreochromis* sp.). *Fish and Shellfish Immunology*, 129, 30–35. <https://doi.org/10.1016/j.fsi.2022.08.035>
- Sumiati, T., Nuryati, S., & Lusiastuti, A. (2015). Development of ELISA method to detect specific immune response in Nile tilapia (*O. niloticus*) vaccinated against *A. hydrophila* and *S. agalactiae*. *J. Riset. Akuakultur*, 10(2), 243–250. <https://doi.org/10.15578/jra.10.2.2015.243-250>
- Taufik, I., & Lusiastuti, M. A. (2016). Keefektifan Vaksin *Streptococcus Agalactiae* untuk Mencegah *Streptococcosis* pada Ikan Nila The Effectiveness of a *Streptococcus agalactiae* Vaccine for the Prevention of *Streptococcosis* on Nile Tilapia (*Oreochromis niloticus*) (Vol. 2, Issue 2).
- Taukhid, T., Purwaningsih, U., & Lusiastuti, A. M. (2014). Efikasi Beberapa Sediaan Vaksin *Streptococcus agalactiae*-N14G untuk Pencegahan Penyakit *Streptococcosis* pada Ikan Nila, *Oreochromis niloticus*. *Jurnal Riset Akuakultur*, 9(2), 295. <https://doi.org/10.15578/jra.9.2.2014.295-305>
- Thi, Q. V. C., Dung, T. Q., Hien, H. N., Trung, N. B., Dung, T. T., & Thuy, N. P. (2023). Antibacterial activity of lactic acid bacteria from various freshwater fish species against pathogenic bacteria in caged red tilapia (*Oreochromis* sp.). *Biodiversitas*, 24(6), 3373–3383. <https://doi.org/10.13057/biodiv/d240633>
- Tort, L., Balasch, J. C., & Mackenzie, S. (2003). Fish immune system. A crossroads between innate and adaptive responses. *Inmunología*, 22(3), 277–286. <https://www.academia.edu/download/43923557/602.pdf>
- Uribe, C., Folch, H., Enriquez, R., & Moran, G. (2011). Innate and adaptive immunity in teleost fish: a review. In *Review Article Veterinarni Medicina* (Vol. 56, Issue 10).
- Utami, D. T., Budi Prayitno, S., Hastuti, S., & Santika, A. (2013). Haematological Performances in Tilapia (*Oreochromis niloticus*) was given by DNA Vaccine *Streptococcus iniae* with The Different Doses. *Journal of Aquaculture Management and Technology*, 2(4), 7–20. <http://ejournal-s1.undip.ac.id/index.php/jfpik>
- Vaz Rodrigues, M., Falcone-Dias, M. F., Juliana Francisco, C., Silva David, G., da Silva, R. J., & Araújo Júnior, J. P. (2019). *Aeromonas hydrophila* in Nile tilapia (*Oreochromis niloticus*) from Brazilian aquaculture: a public health problem. *Emergent Life Sciences Research*, 5(1), 48–55. <https://doi.org/10.31783/elsr.2019.514855>

- Velázquez, J., Cruz, L., Pérez-Bernal, M., Valdivia, O., Haidar, A., Rodríguez, A., Herrera, F., González, O., Morales, A., Ulloa, L., Blanco, R., Pérez, J., Dorta, D., Luna, Y., Garay, H. E., Abreu, D. D., Ramos, Y., Besada, V., Cabrera, Y., ... Carpio, Y. (2023). Monoclonal antibody generated against Nile tilapia (*Oreochromis niloticus*) IgT heavy chain using a peptide-based strategy. *Fish and Shellfish Immunology Reports*, 4. <https://doi.org/10.1016/j.fsirep.2023.100093>
- Vetter, V., Denizer, G., Friedland, L. R., Krishnan, J., & Shapiro, M. (2018). Understanding modern-day vaccines: what you need to know. *Annals of Medicine*, 50(2), 110–120. <https://doi.org/10.1080/07853890.2017.1407035>
- Walters, A. A., Krastev, C., Hill, A. V. S., & Milicic, A. (2015). Next generation vaccines: Single-dose encapsulated vaccines for improved global immunisation coverage and efficacy. In *Journal of Pharmacy and Pharmacology* (Vol. 67, Issue 3, pp. 400–408). Blackwell Publishing Ltd. <https://doi.org/10.1111/jphp.12367>
- Wan, Y., Hickey, J. M., Bird, C., Witham, K., Fahey, P., Forster, A., Joshi, S. B., & Volkin, D. B. (2018). Development of Stabilizing Formulations of a Trivalent Inactivated Poliovirus Vaccine in a Dried State for Delivery in the Nanopatch™ Microprojection Array. *Journal of Pharmaceutical Sciences*, 107(6), 1540–1551. <https://doi.org/10.1016/j.xphs.2018.01.027>
- Wangkaghart, E., Deville, S., Wang, B., Srisapoom, P., Wang, T., & Secombes, C. J. (2021). Immune response and protective efficacy of two new adjuvants, Montanide™ ISA 763B VG and Montanide™ GEL02, administered with a *Streptococcus agalactiae* ghost vaccine in Nile tilapia (*Oreochromis niloticus*). *Fish & Shellfish Immunology*, 116, 19–29. <https://doi.org/10.1016/j.fsi.2021.06.014>
- Watanabe, H., & Fukui, Y. (2006). Effects of dithiothreitol and boar on pronuclear formation and embryonic development following intracytoplasmic sperm injection in pigs. *Theriogenology*, 65(3), 528–539. <https://doi.org/10.1016/j.theriogenology.2005.04.031>
- Weinfurter, D. (2018). CHAPTER 1.4. Analysis of Disulfide Bond Formation in Therapeutic Proteins (pp. 81–98). <https://doi.org/10.1039/9781788013253-00081>
- Widyaningrum, H., Simanjutak, S. B. I., & Susatyo, P. (2017). Leukocyte Differential of Gourami Fish (*Osphronemus Gouramy* Lac.) With Different Levels of *Spirulina Platensis* Supplementation in Feed. *Scripta Biologica*, 4(1), 37–40. <https://doi.org/10.20884/1.sb.2017.4.1.383>
- Wu, X., Xing, J., Tang, X., Sheng, X., Chi, H., & Zhan, W. (2022). Protective cellular and humoral immune responses to *Edwardsiella tarda* in flounder (*Paralichthys olivaceus*) immunized by an inactivated vaccine. *Molecular Immunology*, 149, 77–86. <https://doi.org/10.1016/j.molimm.2022.06.008>
- Wufuer, R., Fan, Z., Yuan, J., Zheng, Z., Hu, S., Sun, G., & Zhang, Y. (2022). Distinct Roles of Nrf1 and Nrf2 in Monitoring the Reductive Stress Response to Dithiothreitol (DTT). *Antioxidants*, 11(8), 1535. <https://doi.org/10.3390/antiox11081535>
- Xing, J., Singh, S., Zhao, Y., Duan, Y., Guo, H., Hu, C., Ma, A., George, R., Xing, J. Z., Kalluri, A., Macwan, I., Patra, P., & Chen, J. (2017). Increasing vaccine production using pulsed ultrasound waves. *PLOS ONE*, 12(11), e0187048. <https://doi.org/10.1371/journal.pone.0187048>
- Yamaguchi, T., Quillet, E., Boudinot, P., & Fischer, U. (2019). What could be the mechanisms of immunological memory in fish? *Fish & Shellfish Immunology*, 85, 3–8. <https://doi.org/10.1016/j.fsi.2018.01.035>

- Yan, Y., Huo, X., Ai, T., & Su, J. (2020). β -glucan and anisodamine can enhance the immersion immune efficacy of inactivated cyprinid herpesvirus 2 vaccine in *Carassius auratus gibelio*. *Fish & Shellfish Immunology*, 98, 285–295. <https://doi.org/10.1016/j.fsi.2020.01.025>
- Yanong, R. P. E., & Francis-Floyd, R. (2019). *Streptococcal Infections of Fish*. <https://edis.ifas.ufl.edu/publication/FA057>
- Zhang, J., Hu, Y., Sun, Q., Li, X., & Sun, L. (2021). An inactivated bivalent vaccine effectively protects turbot (*Scophthalmus maximus*) against *Vibrio anguillarum* and *Vibrio harveyi* infection. *Aquaculture*, 544, 737158. <https://doi.org/10.1016/j.aquaculture.2021.737158>
- Zhang, L., Wang, W., & Wang, S. (2015). Effect of vaccine administration modality on immunogenicity and efficacy. *Expert Review of Vaccines*, 14(11), 1509–1523. <https://doi.org/10.1586/14760584.2015.1081067>
- Zhao, Y., Zhou, J., Dai, S., Liu, X., & Zhang, X. (2022). Isolation and Identification of an α -Galactosidase-Producing *Lactosphaera pasteurii* Strain and Its Enzymatic Expression Analysis. *Molecules*, 27(18). <https://doi.org/10.3390/molecules27185942>
- Zhu, C., Zhang, N., Jing, D., Liu, X., Zeng, Z., Wang, J., Xiao, F., Zhang, H., Chi, H., Wan, C., Lin, P., Gong, H., & Wu, Y. (2023a). Characterization and evaluation of an oral vaccine via nano-carrier for surface immunogenic protein (Sip) delivery against *Streptococcus agalactiae* infection. *International Journal of Biological Macromolecules*, 235. <https://doi.org/10.1016/j.ijbiomac.2023.123770>
- Zhu, C., Zhang, N., Jing, D., Liu, X., Zeng, Z., Wang, J., Xiao, F., Zhang, H., Chi, H., Wan, C., Lin, P., Gong, H., & Wu, Y. (2023b). Characterization and evaluation of an oral vaccine via nano-carrier for surface immunogenic protein (Sip) delivery against *Streptococcus agalactiae* infection. *International Journal of Biological Macromolecules*, 235. <https://doi.org/10.1016/j.ijbiomac.2023.123770>
- Zou, J., Carrington, A., Collet, B., Dijkstra, J. M., Yoshiura, Y., Bols, N., & Secombes, C. (2005). Identification and Bioactivities of IFN- γ in Rainbow Trout *Oncorhynchus mykiss*: The First Th1-Type Cytokine Characterized Functionally in Fish 1. In *The Journal of Immunology* (Vol. 175). <http://journals.aai.org/jimmunol/article-pdf/175/4/2484/1207807/2484.pdf>