

DAFTAR PUSTAKA

- Adejonwo, O. A., B. O. Omitoyin, E. K. Ajani, O. A. Ogunwole, and S. A. Omitoyin. 2020. Growth, gut morphology, and microflora of African catfish *Clarias gariepinus* fed mushroom (*Pleurotus pulmonarius*) stalk meal supplemented diets. *Croatian Journal of Fisheries*. 78 : 79 – 90.
- Ahn, J. C., W. S. Chong, J. H. Na, H. B. Yun, K. J. Shin, K. W. Lee, and J. T. Park. 2015. A evaluation of major nutrients of four farmed freshwater eel species (*Anguilla japonica*, *A. rostrata*, *A. bicolor pacifica* and *A. marmorata*). *Korean Journal FishAquatic Science*. 48(1) : 44 - 50.
- Ando, M., K. S. Marty, Wong, and Y. Takei. 2014. Mechanism of guanylin action on water and ion absorption at different regions of seawater eel intestine. *American Journal of Physiology-Regulatory, Integrative and Physiology*. 307(6) : 653 – 663.
- Arai T. 2014. Do we protect freshwater eels or do we drive them to extinction?. *Springer Plus*. 3(534) : 1 - 10.
- Arai, T. 2020. Ecology and evolution of migration in the freshwater eels of the genus *Anguilla* Schrank, 1798. *Heliyon*. 6 : 1 – 11.
- Bian, Y. H., X. Y. Xu, and Z. P. Duan. 2021. Effects of replacing fish meal with yeast culture on growth performance, serum biochemical indices and intestinal morphology of largemouth bass (*Micropterus salmoides*). *Chinese Journal of Animal Nutrition*. 33(9) : 5182 – 5192.
- Bianchi, G. 1985. Field guide to the commercial marine and brackish-water species of Tanzania. FAO, Roma.
- Caruso, G., M. G. Denaro, and L. Genovese. 2009. Digestive enzymes in some teleost species of interest for mediterranean aquaculture. *The Open Fish Science Journal*. 2(1) : 74 – 86.
- Cerezuela, R., J. Maseguer, and M. A. Esteban. 2011. Current knowledge in synbiotic use for fish aquaculture: A Review. *Journal Aquaculture Research and Development*. 1 - 7.
- Cresci, A., C. M. Durif, Claire, B. Paris, D. Shema, A. B. Skiftesvik, and H. I. Browman. 2019. Glass eels (*Anguilla anguilla*) imprint the magnetic direction of tidal currents from their juvenile estuaries. *Communication Biology*. 2(336) : 1 – 9.
- Crok, V. 2014. Slipping Away: International *Anguilla* Eel Trade and the Role of the Philippines. TRAFFIC and Zoological Society London, United Kingdom.
- Crook., Vicki, and M. Nakamura. 2013. Glass eels: Assessing supply chain and market impacts of a CITES listing on *Anguilla* species. *Traffic Bull*. 25. 24 - 30.

- Day, C. E. 2014. *Histopathology Methods and Protocols*. Humana Press. United State of America.
- Dewanti, A. R., A. O. Putri, I. Istiqomah, and A. Isnansetyo. 2022. Safety, adherence, enzymatic activities, and application effects of oral probiotic candidates for shortfin eel (*Anguilla bicolor bicolor*). *Jurnal Ilmiah Perikanan Dan Kelautan*. 14(2) : 203–213.
- Dey, P. 2018. *Basic and Advanced Laboratory Techniques in Histopathology and Cytology*. Singapore: Springer. 3, 5, 9-13, 18-27, 33, 41, 47, 69, 73, 77- 79.
- Doan, V. H., S. H. Hoseinifar, M. A. Esteban, M. Dadar, and T. T. N. Thu. 2019. Mushrooms, seaweed, and their derivatives as functional feed additives for aquaculture: an updated view. *Studies in Natural Products Chemistry*. 41 – 90.
- El-Saadony, M., M. Alagawany, A. K. Patra, I. Kar, R. Tiwari, M. A. O. Dawood, K. Dhama, and H. M. R. A. Latif. 2021. The functionality of probiotics in aquaculture: An overview. *Fish and Shellfish Immunology*. 117 : 36 – 52.
- Fekri, L., U. K. Pangerang, dan Halili. 2021. Makanan favorit sidat (*Anguilla marmorata*) di Sungai Bombana, Sulawesi Tenggara. *Warta Iktiologi*. 5(1) : 27 – 31.
- Firdasari, V., Yusfiati, dan R. Elvyra. 2014. Struktur usus ikan *Ompok hypophthalmus* (Bleeker 1846) dari perairan Sungai Siak Kota Pekanbaru. *Jurnal Online Mahasiswa Fakultas Ilmu Pengetahuan Alam Kampus Bina Widya Pekanbaru*. 1(2) : 439 – 444.
- Fujaya, Y. 2004. *Fisiologi Ikan. Dasar Pengembangan dan Teknik Perikanan*. Rineka Cipta, Jakarta.
- Haetami, K., Y. Mulyani, dan Aisyah. 2022. Pengaruh induksi probiotik *Bacillus* CgM22 pada pakan terhadap[pertambahan bobot ikan dan morfometrik villi usus ikan mas(*Cyprinus carpio*). *Jurnal Perikanan*. 12(3) : 395 – 407.
- Harun, H., M. Abdan., F. Supriyadi, Syahputra, S. Khairunnisak, R. Samsuli, and Sulni. 2023. Application of herbal probiotics in feed on growth and blood profile of elver eels (*Anguilla bicolor* McClelland, 1844). *Depik Jurnal Ilmu - Ilmu Perairan, Pesisir dan Perikanan*, 12(2) : 152 – 158.
- Helmiati, S., R. Rustadi, A. Isnansetyo, dan Z. Zuprizal. 2020. Evaluasi kandungan nutrient dan antinutrien tepung daun kelor terfermentasi sebagai bahan baku pakan ikan. *Jurnal Perikanan Universitas Gadjah Mada*: 22(2) : 149 – 158.
- Istiqomah, I., I. N. Atitus, A. F. Rohman, dan A. Isnansetyo. 2019. Isolasi bakteri selulolitik *Staphylococcus* sp. JC20 dari saluran pencernaan gurita (*Octopus* sp.) untuk kandidat probiotik ikan. *Jurnal Perikanan Universitas Gadjah Mada*. 21(2):93 – 98.

- Izzah, N., S. Arsad, dan A.W. Ekawati. 2019. Pengaruh penambahan probiotik dan minyak ikan pada pakan terhadap histopatologi lambung ikan sidat (*Anguilla* sp.). *Journal of Fisheries and Marine Research*. 3(1): 81-85.
- Jacoby, D. M. P., J. M. Casselman, V. Crook, M. B. Delucia, H. Ahn, K. Kaifu, T. Kurwie, P. Sasal, A. M. C. Silfvergrip, K. G. Smith, K. Uchida, A. M. Walker, and M. J. Gallock. 2015. Synergistic patterns of threat and the challenges facing global anguillid eel conservation. *Global Ecology and Conservation*. 4 : 321 – 333.
- Jahangiri, L. and M. A. Esteban. 2018. Administration of probiotics in the water in finfish Aquaculture Systems: A Review Fishes. 3(3): 1-13.
- Junqueira, L. C., and J. Carneiro. 1995. *Histologi Dasar*. Penerjemah: Dharma, A. Judul buku asli: *Basic Histology*. Penerbit Buku Kedokteran EGC. Jakarta. 2 - 3.
- Jusuf, A. A. 2009. *Histoteknik Dasar*. Bagian Histologi Fakultas Kedokteran. Universitas Indonesia, Jakarta
- Kaifu, K. 2019. Challenges in assessments of Japanese eel stock. *Marine Policy*. 102 : 1– 4.
- Kamta, H. N., D. Masyitha, dan Zanuiddin. 2018. Jumlah sel goblet pada usus proksimal dan usus distal belut sawah (*Monopterus albus*). *Jurnal Ilmiah Mahasiswa Veteriner*. 2(1) : 215 – 220.
- KKP. 2020. Sidat Indonesia di Pasar Dunia. Direktorat Jenderal Penguatan Daya Saing Produk Kelautan dan Perikanan.
- KKP. 2023. Produksi Perikanan. <https://statistik.kkp.go.id/home.php>. Diakses tanggal 4 Mei 2024.
- Klahan, R., N. Areechon, R. Yoonpundh, and A. Engkagul. 2009. Characterization and activity of digestive enzymes in different sizes of Nile Tilapia (*Oreochromis niloticus* L.). *Agricultural and Natural Resources*. 43(1) : 143–153.
- Lee, C. S., C. Lim, D. M. Gatlin, and C. D. Webster. 2015. *Dietary nutrients, additives, and fish health*. Wiley Blackwell. New Jersey. 355 p.
- Lee, S., K. Katya, A. Hamidoghli, J. Hong, D. J. Kim, and S. C. Bai. 2018. Synergistic effects of dietary supplementation of *Bacillus subtilis* WB60 and mannanoligosaccharide (MOS) on growth performance, immunity, and disease resistance in Japanese eel, *Anguilla japonica*. *Fish Shellfish Immunology*. 83 : 283-291.
- Lee, S., K. Katya, Y. Park, S. Won, M. Seong, A. Hamidoghli, and S. C. Bai. 2017. Comparative evaluation of dietary probiotics *Bacillus subtilis* WB60 and *Lactobacillus plantarum* KCTC3928 on the growth performance, immunological parameters, gut morphology and disease resistance in Japanese eel, *Anguilla japonica*. *Fish Shellfish Immunology*. 61 : 201 - 210.

- Mescher, A. L. 2018. Junqueira's Basic Histology: Text and Atlas. 15th ed. McGraw-Hill, New York. : 1 - 4, 15.
- Miao, S. Y., B. Han, J. T. Hu, J. Y. Zhu, X. Zhang, X. J. Dong, and G. H. Chen. 2020. Effects of adding different concentrations of tetracycline in feed on growth performance intestinal flora composition and tissue morphology of *Channa argus*. Journal Animal Nutrition. 32 : 1 – 10.
- Miranti, I. P. 2010. Pengolahan Jaringan untuk Penelitian Hewan Coba. Artikel Ilmiah Media Medika Muda,4 : 2-4.
- Mohan, K., A. M. Padmanaban, V. Uthayakumar, R. Chandirasekar, T. Muralisankar, and P. Santhanam. 2016. Effect of dietary *Ganoderma lucidum* polysaccharides on biological and physiological responses of the giant freshwater prawn *Macrobrachium rosenbergii*. Aquaculture. 464 : 42 – 49.
- Mohan, K., D. K. Rajan, T. Muralisankar, A. R. Ganesan, K. Marimuthu, and P. Sathishkumar. 2022. The potential role of medicinal mushrooms as prebiotics in aquaculture. Reviews in Aquaculture. 1300 – 1332.
- Muchlisin, Z. A., M. Sofyan, I. Dewiyanti, F.M. Nur, A.S. Batubara, N. Fadli, A.A. Muhammadar, D. Efizon, M. Fauzi, and M. N. Siti-Azizah. 2020. Data of feed formulation for indonesian short-fin eel, *Anguilla bicolor* McClelland, 1844Elver. Data in Brief. 30(105581): 1-5.
- Mulyani, I., R. Affandi, and D. Iswantini. 2016. Identification of digestive enzymes of *Anguilla bicolor bicolor* during seed eel phase in controlled container. International Organization of Scientific Research Journal of Pharmacy. 6(7) : 6 –11.
- Murti, F. A. U., M. N. Latifah, I. Istiqomah, S. Helmiati, A. Isnansetyo, R. Novriadi, and A. S. Kamarudin. 2023. Intestinal enzymes and lactid acid bacteria of red tilapia (*Oreochromis* sp.) fed black soldier fly (*Hermetia illucens*) larvae and probiotics.Aquacultura Indonesia. 24(1) : 20 – 29.
- Nguyen, A. T., K. Tsukamoto, and P. M. Lokman. 2018. Composition and distribution of freshwater eels *Anguilla* spp. in Vietnam. Fisheries Science. 84 : 987 – 994.
- Nijman, V. 2015. CITES-listings, EU eel trade bans and the increase of export of tropical eels out of Indonesia. Marine Policy. 58 : 36 – 41.
- Nishiyama, K., M. Sugiyama, and T. Mukai. 2016. Adhesion properties of lactic acid bacteria on intestinal mucin. Microorganisms. 4(3) : 1 – 18.

- Noor, A. Y. M., and Z. Abidin. 2019. Competitiveness of Indonesian eel (*Anguilla* sp) in international market. *Journal of Economic and Social of Fisheries and Marine*. 7(1) : 44 – 56.
- Okey, I. B., U. U. Gabriel, and S. N. Deekae. 2018. The Use of Synbiotics (Prebiotic and Probiotic) in Aquaculture Development. *Sumerianz Journal of Biotechnology*. 1(2) : 51 - 60.
- P.McDonough, S., and S. Teresa. 2017. *Necropsy Guide for Dogs, Cats and Small Mammals*. Wiley Balckwell. USA. Pp. 3-4, 165-166.
- Padra, J. T., H. Sundh, C. Jin, N. G. Karlsson, K. Sundell, and S. K. Linden. 2014. *Aeromonas salmonicida* binds differentially to mucins isolated from skin and intestinal regions of Atlantic salmon in an N-acetylneuraminic acid-dependent manner. *Infection and Immunity*. 82(12) : 5235 – 5245.
- Prabawati, E., S. Y. Hu, S. T. Chiu, R. Balantyne, Y. Risjani, and C. H. Liu. 2022. A synbiotic containing prebiotic prepared from a by-product of king oyster mushroom, *Pleurotus eryngii* and probiotic, *Lactobacillus plantarum* incorporated in diet to improve the growth performance and health status of white shrimp, *Litopenaeus vannamei*. *Fish and Shellfish Immunology*. 120 : 155 – 165.
- Pratiwi, H. C., and A. Manan. 2015. Teknik dasar histologi pada ikan gurami (*Osphronemus gouramy*). *Jurnal Ilmiah Perikanan dan Kelautan*. 7(2) : 153 – 157.
- Rahardjo, N. P. 2017. Pertumbuhan ikan sidat (*Anguilla bicolor*) pada fase elver dengan perendaman larutan triiodotironin pada dosis yang berbeda. Universitas Brawijaya. Skripsi.
- Ratucoreh, C. Y., and B. Retnoaji. 2018. The growth and histology structure of Indonesian eel (*Anguilla bicolor bicolor* McClelland, 1844) fed with microalgae. *AIP Conference Proceedings*. 2002(1) : 1 – 8.
- Rohman, A. F. 2018. Penapisan dan identifikasi bakteri proteolitik dari saluran pencernaan ikan laut. Universitas Gadjah Mada. Skripsi.
- Ruiz, M. L., M. S. Owatari, M. M. Yamashita, J. V. S. Ferrarezi, P. Garcia, L. Cardoso, M. L. Martins, and J. L. P. Mouriño. 2020. Histological effects on the kidney, spleen, and liver of Nile tilapia *Oreochromis niloticus* fed different concentrations of probiotic *Lactobacillus plantarum*. *Tropical Animal Health and Production*. 52(1) : 167 – 176.
- Sankar, H. H. S., J. Jose, R. Varadarajan, S. V. Bhanub, S. Joy, and B. Philip. 2014. Functional zonation of different digestive enzymes in *Etroplus suratensis* and *Oreochromis mossambicus*. *International Journal of Scientific and Research Publications*. 4(5):1–10
- Sari, P. M., D. Hariani, dan G. Trimulyono. 2018. Aplikasi probiotik, prebiotik dan sinbiotik pada pakan terhadap pertumbuhan ikan gurami (*Osphronemus gouramy* Lac.). *LenteraBio*. 7(2) : 136 – 141.

- Sewaka, M., C. Trullas, A. Chotiko, C. Rodkhum, N. Chansue, S. Boonanuntanasarn, and N. Pirarat. 2019. Efficacy of synbiotic Jerusalem artichoke and *Lactobacillus rhamnosus* GG-supplemented diets on growth performance, serum biochemical parameters, intestinal morphology, immune parameters and protection against *Aeromonas veronii* in juvenile red tilapia (*Oreochromis* spp.). *Fish and Shellfish Immunology*. 86 : 260 – 268.
- ShaoWei, Z., S. QingChao, and C. XueHao. 2016. Effect of dietary antimicrobial peptidessurfactin supplementation on parameters of intestinal health indices of genetically improved farmed tilapia (gift, *Oreochromis niloticus*). *Acta Hydrobiologica Sinica*. 40 (4) : 823–829.
- Shi, Y., D. Y. Ma, and S. W. S. W. Zhai. 2020. Revealing the difference of intestinal microbiota composition of cultured European eels (*Anguilla anguilla*) with different growth rates. *Israeli Journal of Aquaculture*. 72 : 1-12.
- Shiraishi, H. and V. Crook. 2015. Eel market dynamics: An analysis of *Anguilla* production, trade, and consumption in East Asia. 2nd ed. Traffic Report, Tokyo.
- Soeprijanto, A., G. Guntur, and M. Fakhri. 2018. Application of probiotic and fermented feed in the nursery of *Anguilla bicolor*. *Jurnal Perikanan Universitas Gadjah Mada*. 20(1) : 19 – 22.
- Sri, M., A. Ridwan, and Nurhidayat. 2020. Development of digestive tract of Indonesian shortfin eel (*Anguilla bicolor bicolor*). *Russian Journal of Agricultural and Socio-Economic Science*. 2(98) : 16 – 26.
- Su, X., D. Ji, J. Yao, Y. Zou, and M. Yan. 2022. Comparative analysis of intestinal characteristics of largemouth bass (*Micropterus salmoides*) and intestinal flora with different growth rates. *Fishes*. 7(65) : 1 – 13.
- Suvarna, S. K., C. Layton, and Bancroft, J. D. 2013. Bancroft's Theory Practice os Histological Techniques Seventh Edition. USA: Elsevier.
- Taufik, M., Hana, dan U. Susilo. 2017. Aktivitas protease dan amilase pada ikan sidat, *Anguilla bicolor* McClelland. *Scripta Biologica*. 4(3) : 183 – 188.
- Tias, N. R, P. 2023. Aplikasi bakteri nitrifikasi pada budidaya sidat (*Anguilla bicolor*) dengan sistem resirkulasi. Universitas Gadjah Mada. Skripsi.
- Triyanto, T., R. Affandi, M. M. Kamal, dan G. S. Haryani. 2020. Mengungkap potensi sumberdaya sidat kaca (*glass eel*) di muara - muara sungai di selatan Jawa Barat. *Warta Limnologi*. 64(1) : 1 - 6.
- Triyatmo, B., Rustadi, and A. Isnansetyo. 2020. Effects of probiotic dosage on water quality, total count of *Aeromonas* spp. and *Pseudomonas* spp. in eel *Anguilla bicolor* cultivation. *E3S Web of Conferences*. 147(1008) : 1 - 4.
- Van Ginneken, V. J. T., and G. E. Maes. 2005. The European eel (*Anguilla anguilla*, Linnaeus), its lifecycle, evolution and reproduction: a literature review. *Reviews in Fish Biology and Fisheries*. 15(4) : 367 - 398.

- Wahjuningrum, D., A. M. Hidayat, and T. Budiardi. 2018. Characterization of pathogenic bacteria in eel *Anguilla bicolor bicolor*. Jurnal Akuakultur Indonesia. 17(1) : 94 - 103.
- Watling, L. 2015. Feeding and digestive system. In: Functional Morphology and Diversity. Oxford Academic, United Kingdom.
- Wee, W., N. K. A. Hamid, K. Mat, R. I. A. R. Khalif, N. D. Rusli, M. M. Rahman, M. A. Kabir, and L. S. Wei. 2024. Aquaculture and Fisheries. 9 : 28 – 34.
- Weng, L., Z. Wang, W. Zhuang, T. Yang, X. Xu, J. Liu, J. Liu, Z. Xu, R. Chen, Q. Wang, S. Wang, Y. Cai, and H. Ying. 2023. Effect of replacing fish meal using fermented soybean meal on growth performance, intestine bacterial diversity, and key gene expression of largemouth bass (*Micropterus salmoides*). Fermentation. 9(520) : 2– 18.
- Widiastuti, N. 2013. Pengelolaan jamur tiram (*Pleurotus ostratus*) sebagai alternatif pemenuhan nutrisi. Jurnal Sains dan Teknologi Indonesia. 15(3) : 1 – 7.
- Widiantoro, W. 2020. Derajat kelangsungan hidup dan kesehatan ikan sidat (*Anguilla bicolor*) pada dua wilayah (tempat) pembesaran yang berbeda. Jurnal Aquafish Saintek. 1(1) : 35 – 38.
- Wijayanti, I. and E. S. S Setriyorini. 2018. Nutritional content of wild and cultured eel (*Anguilla bicolor*) from southern coast of central java. Ilmu Kelautan. 23(1) : 37– 44.
- Xia, Y., M. Lu, G. Chen, J. Cao, F. Gao, M. Wang, Z. Liu, D. Zhang, H. Zhu, and M. Yi. 2018. Effects of dietary *Lactobacillus rhamnosus* JCM1136 and *Lactococcus lactis* subsp. *lactis* JCM5805 on the growth, intestinal microbiota, morphology, immune response and disease resistance of juvenile Nile tilapia, *Oreochromis niloticus*. Fish Shellfish Immunology. 76: 368 - 379.
- Vetter, J. 2023. The Mushroom Glucans: Molecules of High Biological and Medicinal Importance. Foods. 12 : 1 – 19.
- Yusfiati, Y., R. Elvyra, dan R. Megawati. 2013. Mucus cell distribution at gastric and intestine of baung fish (*Mystus nemurus* CV) from Siak river. Prosiding Seminar Semirata Fakultas Matematika dan Ilmu Pengetahuan Alam Universitas Lampung 10 – 12 Mei 2013.
- Zhu, F., B. Du, Z. Bian, and B. Xu. 2015. Beta-glucans from edible and medicinal mushrooms: characteristics, physicochemical and biological activities. Journal of Food Composition and Analysis. 41 : 165 – 173.
- Zorriehzahra, M. J., S. T. Delshad, M. Adel, R. Tiwari, K. Karthik, K. Dhama, and C. C. Lazado. 2016. Probiotics as beneficial microbes in aquaculture: an update on their multiple modes of action: a review. Veterinary Quarterly. 36(4) : 228 – 241.

- Zulfahmi I., A. Ridwan, dan T. F. L. Djamar. 2015. Perubahan struktur histologis insang dan hati ikan nila (*Oreochromis niloticus* Linnaeus 1758) yang terpapar merkuri. *Jurnal Edukasi dan Sains Biologi*. 4(1) : 25 – 31.
- Zulfahmi, I., dan R. Humairani. 2018. Kondisi biometrik dan histologi usus ikan bandeng (*Chanos chanos* Forskall., 1755) yang diberi pakan berkomposisi tepung bungkil sawit. *Prosiding Seminar Nasional Biotik*. 607 – 613. Banda Aceh.