

## DAFTAR PUSTAKA

- Abbas, A.K., Lichtman, A.H., Poher, J.S., Conlin, A. 2010. Cellular and Molecular Immunology. 5th ed. Philadelphia; WB Saunders Company.
- Abbas, A.K., Lichtman, A.H. and Pillai, S., 2013, Cellular and Molecular Immunology, 7th edn, Elsevier, Philadelphia, 12-15: 329-333. 619.
- Affandi R, dkk. (2013). Pemeliharaan Ikan Sidat dengan Sistem Air Bersirkulasi. Jurnal Ilmu Pertanian Indonesia (JIPI), 18 (1): 55-60.
- Alifuddin, M. 2002. Immunostimulation in Aquatic Animals. Indonesian Journal of Aquaculture. Vol 1 (2): 87–92.
- Alamanda, I.E., Handajani, N.S., dan Budiharjo, A. 2007. Penggunaan Metode Hematologi dan Pengamatan Endoparasit Darah untuk Penetapan Kesehatan Ikan Lele Dumbo (*Clarias gariepinus*) di Kolam Budidaya Desa Mangkubumen Boyolali. Jurnal Biodiversitas 8 (1) :34-38.
- Arief, M. 2014. Pemberian Probiotik yang berbeda pada Pakan Komersil terhadap Pertumbuhan Retensi Protein dan Serat Kasar pada Ikan Nila (*Oreochromis sp*). Argoveteriner. 1 (2): 88-93 hlm.
- Arkoosh, M.R, and Kaattari, S.L.1991. Development of immunological memory in rainbow trout (*Oncorhynchus mykiss*). I. An immunochemical and cellular analysis of the B cell response. Developmental and Comparative Immunology. 15: 279–293.
- Arwin, M., Ijong, Frans G., and Tumbol, Reiny. 2016. Characteristics of *Aeromonas hydrophila* isolated from tilapia (*Oreochromis niloticus*). *Aquatic Science & Management*. Vol. 4 : (2). 52-55.
- Atitus, Imelda Novita. 2018. Isolasi dan Identifikasi Bakteri Selulolitik dari Beberapa Jenis Ikan Laut. Skripsi. Universitas Gadjah Mada.
- Balcazar, J.L., I. de Blas, I. Ruiz-Zarzuola, D. Cunningham, D. Vendrell & J.L Muzquiz. 2006. The role of probiotics in aquaculture. *Vet. Microbiol.* 114: 173-186.
- Baratawidjaja, K.G. & I. Rengganis. 2004. *Imunologi Dasar*, Edisi Keenam. Badan Penerbit Fakultas Kedokteran Universitas Indonesia. Jakarta.

- Bijanti, R. 2009. Bahan Ajar Patologi Klinik Veteriner, Kimia Klinik Veteriner. Edisi Pertama, Departemen Kedokteran Dasar Veteriner.
- Boeuf, G. and Payan, P. (2001) How Should Salinity Influence Fish Growth? Comparative Biochemistry and Physiology-Part C: Toxicology & Pharmacology. 130: 411-423.
- Cappuccino, James G and Sherman, Natalie. 2014. MICROBIOLOGY Laboratory Manual Tenth Edition. Pearson Education, Inc., Permissions Department, 1900 E. Lake Ave., Glenview.
- Damayanti, R., Hanafi, A., & Cahyadi, A. 2018. Pengaruh Kepuasan Kerja Terhadap Kinerja Karyawan (Studi Kasus Karyawan Non Medis RS Islam Siti Khadijah Palembang). Jembatan: Jurnal Ilmiah Manajemen, 15 (2): 75- 86.
- Deelder, C.L., 1984. Synopsis of biological data on the eel, *Anguilla anguilla* (Linnaeus, 1758). FAO Fish. Synop. (80, Rev. 1):73 p.
- Dewanti, Tiara. 2018 Penggunaan Bakteri Probiotik Sebagai Bahan Pakan dalam Budidaya Sidat (*Anguilla* Sp) Fase Glass Eel. Universitas Pendidikan Indonesia.
- Dinoto, Achmad., Rini Handayani, Ninu Setianingrum, Heddy Julistiono. 2020. *Culturable gut bacteria of Ikan Batak (Neolissochilus sumatranus Weber & de Beaufort, 1916) collected in Toba Samosir, Indonesia*. Biodiversitas Journal of Biological Diversity. Vol. 21 (10).
- Facklam, R. and Elliott, J. 1995. Identification, Classification, and Clinical Relevance of Catalase-Negative, Gram-Positive Cocci, Excluding the Streptococci and Enterococci. Clinical Microbiology Reviews. 8 : 479-495.
- FAO. 2020. *Anguilla*. Global Forest Resources Assesment. Rome.
- Feliatra, I. Effendi dan E. Suryadi. 2004. Isolasi dan Identifikasi Bakteri Probiotik dari Ikan Kerapu Macan (*Ephinephelus fuscogatus*) dalam Upaya Efisiensi Pakan Ikan. Jurnal Natur Indonesia, 6 (2): 75-80.
- Fraser, T.W.K., Rønneseth, A., Haugland, G.T., Fjellidal, P.G., Mayer, I and Wergeland, H.I. 2012. The Effect of Triploidy and Vaccination on Neutrophils and B-Cells in the Peripheral Blood and Head Kidney of 0+ And 1+ Atlantic Salmon (*Salmo Salar L*). Post-Smolts. Fish & Shellfish Immunology. 33 : 60–66.

Fujaya Y. 2004. Fisiologi Ikan (dasar pengembangan teknik perikanan). Rineka Cipta, Jakarta.

Gandasoebrata, R. 2007. Clinical Laboratory Guide. Dian Rakyat. Jakarta.

Gatesoupe, F. J. 2008. Updating the Importance of Lactic Acid Bacteria in Fish farming: natural occurrence and probiotic treatments. *J. Mol. Microbiol. Biotechnol.*, 14(1–3): 107–114.

Gomez, R.G. & J.L. Balcazar. 2007. A review on the interactions between gut microbiota and innate immunity of fish. *Immunology Medicine Microbiology* 52: 145-154.

Grinde, B., O. Lie, T. Poppe & R. Salte. 1988. Species and individual variation in lysozyme activity in fish of interest in aquaculture. *Aquaculture* 68: 299- 304.

Gusman, E. 2011. Sistem Pertahanan Tubuh Ikan: Respon Pertahanan Adaptif, Major Histocompatibility Complex (MHC), Reseptor Sel T, Sitokin.

Haghighi M., Sharif Rohani M., Pourmoghim, H., Samadi M., Tavoli M., Eslami M., Yusefi R. 2017. Enhancement of immune responses of rainbow trout (*Oncorhynchus mykiss*) fed a diet supplemented with Aloe vera extract. *Iranian Journal of Fisheries Sciences*. 16(3) : 884-896.

Hastuti, U.S., Nugraheni, F.S.A., and Asna, P.M. 2017. Identification and Determination of Protein Hydrolysis Index in Proteolytic Bacteria from Mangrove Soil in Margomulyo, Balikpapan. *Proceeding Biology Education Conference*. Vol 14 (1) : 265 – 270.

Hastuti, S.D. dan Karoror, R.J. 2007. Pengaruh Pemberian LPS (*Lipopolisacharida*) terhadap Aktivitas Fagositosis dan Jumlah Eritrosit Darah Ikan Nila (*Oreochromis sp.*). *Jurnal Protein* 15 (1): 10-5

Hemraj, Vashist. Diksha, Sharma. Avneet, Gupta. 2013. A Review on Commonly Used Biochemical Test for Bacteria. *Innovare Journal of Life Science*. Vol 1: (1), 1-7.

Hidayat, D., Ade, D., S, Yulisma. 2013. Kelangsungan hidup, pertumbuhan dan efisiensi pakan ikan gabus (*Channa striata*) yang diberi pakan berbahan baku tepung keong mas (*Pomacea sp.*). *Jurnal akuakultur rawa indonesia*. 1 (2): 161–172.

Hugh, R. and Leifson, E. (1953) The Taxonomic Significance of Fermentative versus Oxidative Metabolism of Carbohydrates by Various Gram Negative Bacteria. *Journal of Bacteriology*, 66, 24-26.

- Indrawati, A., Anggoro, S., Suradi, W.S. 2016. Pemetaan Potensi Ikan Sidat (*Anguilla bicolor bicolor*) pada Perairan Sungai di Kabupaten Purworejo. Prosiding Seminar Nasional Tahunan Ke-V Hasil-Hasil Penelitian Perikanan dan Kelautan. 669-679.
- Irianto. A. 2003. Probiotik Aquaculture. Cetakan I. Gadjah Mada Universitas Press. Bulaksumur. Yogyakarta. 125 hlm.
- Isnansetyo, A., H.M. Irpani., Wulansari dan N. Kasanah. 2014. Oral Administration of Alginate from A Tropical Brown Seaweed, *Sargassum* sp. to Enhance Non-Specific Defense in Walking Catfish (*Clarias* sp.). *Aquacultura Indonesiana*. 15 (1) : 14-20.
- Istiqomah, I., Isnansetyo, A., Atitus, I.N., dan Rohman, A.F. 2019. Isolation of Cellulolytic Bacteria *Staphylococcus* sp. JC20 from the Digestive Tract of Octopus (*Octopus* sp.) for Fish Probiotic Candidates. *Fisheries Journal Universitas Gadjah Mada*. 21(2) : 93-98.
- Izzah, N., Sulastri A., dan Ekawati, A.W. 2019. Pengaruh Penambahan Probiotik dan Minyak Ikan pada Pakan Terhadap Histopatologi Lambung Ikan Sidat (*Anguilla* sp.). *Journal of Fisheries and Marine Research*. Vol.3 (1) : 81-85.
- Jana, S.C., Bettencourt-Dias, M., Durand, B., Megraw, T.L. 2016. *Drosophila melanogaster* as a model for basal body research. *Cilia* 5 : (22).
- Kavitha, M., R. Manickam, Perumal, P. 2018. Evaluation of Probiotic Potential of *Bacillus* spp. Isolated from The Digestivetract of Freshwater Fish *Labeo calbasu* (Hamilton,1822). *Aquaculture Reports* 11 (2018) 59–69. <https://doi.org/10.1016/j.aqrep.2018.07.001>
- Kaleeswaran, B., Ilavenil, S., Ravikumar, S. 2012. Changes in biochemical, histological and specific immune parameters in *Catla catla* (Ham.) by *Cynodon dactylon* (L.). *Journal of King Saud University – Science*. 24 : 139-152.
- Khasani, I. 2007. Aplikasi Probiotik Menuju Sistem Budidaya Perikanan Berkelanjutan. *Media Akuakultur* 2(2) :1-3.
- Kuroki, M., Aoyama, J., Wouthuyzen, S., Sumardhiharga, K., Miller, M.J., dan Tsukamoto, K. 2007. Age and growth of *Anguilla bicolor bicolor* leptocephali in the eastern Indian Ocean. *Journal of Fish Biology*. 70(2): 583–50.

Levani, Yelvi. 2018. Perkembangan Sel Limfosit B dan Penandanya Untuk Flowcytometry. Fakultas Kedokteran Universitas Muhammadiyah, Surabaya.

Lanier, Lewis L. 2005. NK cell recognition. *Annu Rev Immunol.* 23 : 225-74.

Lin, F., Dandan, Y., Yawen, C., Fletcher, E., Haifeng, S., Bangxing, H., and Yang, Z. 2018. Cloning, purification and enzymatic characterization of recombinant human superoxide dismutase 1 (hSOD1) expressed in *Escherichia coli*. Vol. 65. <https://doi.org/10.18388/abp.20172350>.

Lv-yun Zhu, Li Nie, Guan Zhu, Li-xin Xiang, Jian-zhong Shao. 2013. Advances in Research of Fish Immune-Relevant Genes: A Comparative Overview of Innate and Adaptive Immunity in Teleost. *Developmental and Comparative Immunology.* 39: 39–62.

Lygren, B., Hamre, K., and Waagbø, R. 1999. Effects of Dietary Pro and Antioxidants on Some Protective Mechanisms and Health Parameters in Atlantic Salmon. *Journal of Aquatic Animal Health.* 11: 211-221.

Magnadottir, B. 2006. Innate immunity of fish (overview). *Fish and Shellfish Immunology.* 20: 137-151.

Melliawati, R., Djohan, A.C., dan Yopi. 2015. Selection of Lactic Acid Bacteria as Protease Enzyme Producers. *Proceedings of the National Seminar on Indonesian Biodiversity Society.* Vol 1 (2) : 184-188.

Muthmainnah, D., Honda, S., NK Suryati., D.Oktaviani., S.Siriraksophon., T Amornpiyakrit., BI Prisantoso. 2015. Current Status And Problems Of The Catch Statistics On *Anguillid* Eel Fishery In Indonesia. *Mar. Res. Indonesia* 41(1): 1–13.

Mruthyunjaya. 1980. Indian Council of Agricultural Research, New Delhi, India

Nayak SK. 2010. Probiotics and immunity: A fish perspective. *Fish & Shellfish Immunology.* 29: 2-14.

Nelson, J.S. 2006. *Fishes of the World.* John Wiley & Sons, Inc, New Jersey.

Nugroho, R.A., dan Nur, F.M. 2018. Potensi Bahan Hayati Sebagai Imunostimulan Hewan Akuatik. Penerbit Deepublish. CV BUDI UTAMA.

- Octarina, Y., Prasetyono, E., Febrianti, D., dan Robin. 2018. The Effectiveness of Ciplukan Leaf Extract (*Physalis angulata* L.) Against Immune System Tilapia (*Oreochromis niloticus*). *Journal of Aquaculture Research*. Vol 13 (3) : 259-265.
- Olivia, A. & Teles. 2012. Nutrition and health of aquaculture fish. *Journal of Fish Diseases* 35: 83-108.
- Pitcher, D.G., Saunders, A., Owe, R.J. 1989. Rapid extraction of bacterial genomic DNA with guanidium thiocyanate. *Lett Appl Microbiol* 8: 151–156.
- Prangdimurti, E. 2001. Probiotik dan efek Perlindungan terhadap Kanker Kolon. Program Pasca sarjana 10 Institut Pertanian Bogor. 14 hlm. (Tidak diterbitkan).
- Ponsen, S., Narkkong, N.A., Pamok, S., & Aengwanich, W. (2009). Comparative hematological values, morphometric and morphological observation of the blood cell in capture and culture asian Eel, *Monopterus albus* (Zuiew). *American Journal of Animal and Veterinary Sciences*, 4(2), 32-36.
- Putra, A. N. 2010. Kajian Probiotik, Prebiotik dan Sanbiotik Untuk Meningkatkan Kinerja Pertumbuhan Ikan Nila (*Oreochromis niloticus*). Tesis. IPB: Bogor. 109 hlm. (tidak diterbitkan).
- Rahim, N., Wulan, S., Zainuddin, Elmi, N. 2020. Potensi Ekstrak *Ulva reticulata* Dalam Meningkatkan Aktivitas Lisozim Dan Diferansiasi Hemosit Pada Udang Windu (*Penaeus monodon*). *Jurnal Aquafish Saintek*. Vol 1 (1) : 1-9, 2776-0898.
- Rawlings, N.D., Barrett, A.J. and Bateman, A. 2010. MEROPS: the peptidase database. *Nucleic Acids Res*. D227–D233.
- Rohman, A. F. 2018. Penapisan dan Identifikasi Bakteri Proteolitik dari Saluran Pencernaan Ikan Laut. Skripsi. Universitas Gadjah Mada.
- Sabdaningsih, A., Budiharjo, A., Kusdiyantini, E. 2013. Isolation and Morphological Characterization of Colony of Red Algae Association Bacteria (Rhodophyta) From Kutuh Waters, Bali. *Jurnal Biologi*. Vol 2 : (2), 11-17.
- Sahu, M. K., N. S. Swarnakumar., K. Sivakumar., T. Thangaradjou., L. Kannan. 2008. Probiotics in aquaculture: importance and future perspectives. *Indian J. Microbiol*. 48:299–308.

Samaranayake, L. 2012. Essential microbiology for dentistry. 4rd ed. Hongkong: Elsevier. H. 100-15.

Saurabh, S., dan Sahoo, P.K. 2008. Lysozyme: an important defence molecule of fish innate immune system. Fish Health Management Division. Central Institute of Freshwater Aquaculture, Kausalyaganga, Bhubaneswar. 751-002.

Setiawati, J., Tarsim, E., Adiputra, Y. T. dan Hudaida, S. 2013. Pengaruh Penambahan Probiotik pada Pakan Dengan Dosis Berbeda Terhadap Pertumbuhan, Kelulushidupan, Efisiensi Pakan dan Retensi Protein Ikan Patin (*Pangasius hypophthalmus*). *Jurnal Rekayasa dan Teknologi Budi daya Perairan*. 1 (2): 125- 127.

Septiarini, E.H., dan Wardiyanto. 2012. Pengaruh Waktu Pemberian Probiotik Yang Berbeda Terhadap Respon Imun Non-Spesifik Ikan Mas (*Cyprinus Carpio L.*) Yang Diuji Tantang Dengan Bakteri *Aeromonas Salmonicida*. *E-Jurnal Rekayasa Dan Teknologi Budidaya Perairan*. Vol I : (1). 2302-3600

Shekarabi, S.P.H., Mehrgan, M.S., Ramezani, F., Dawood, M.A.O., Doan, H.V., Moonmanee, T., AbdulHamid, N.K.A., AbdulKari, Z. 2022. Effect of dietary barberry fruit (*Berberis vulgaris*) extract on immune function, antioxidant capacity, antibacterial activity, and stress-related gene expression of Siberian sturgeon (*Acipenser baerii*). *Aquaculture Reports*. Vol : (23). 101041.

Shoemaker, C.A., P.H. Klesius, and J.J. Evans. 2001. Prevalence of *Streptococcus iniae* in tilapia, hybrid striped bass, and channel catfish on commercial fish farms in the United States. *American Journal of Veterinary Research*. (62): 174-177.

Sholeh, S.A. 2004. Peranan jumlah shelter yang berbeda terhadap pertumbuhan dan kelangsungan hidup benih ikan sidat (*Anguilla sp.*) [skripsi]. Bogor (ID). Institut Pertanian Bogor.

Smith, A.C. and M.A. Hussey. 2005. Gram Stain Protocol. <http://www.microbelibrary.org/component/resource/gram-stain/2886-gram-stain-protocols>

Soleha, S., dan Retnaningrum, E. 2020. Screening and molecular identification of lipolytic bacteria from spent bleaching earth. *BIODIVERSITAS*. 1412-033. Vol 21: (9), 2085-4722.

- Sritunyalucksana, K., Johansson, M.W, Keyser, P., Soderhall, K. 2000. Crustacean Haemocytes and Haematopoiesis. *Aquaculture*. 191: 45-52.
- Stafford, J.L. & M. Belosevic. 2003. Transferrin and the innate immune response of fish: Identification of a novel mechanism of macrophage activation. *Development Comparative Immunology* 27: 539-554.
- Suminto., dan Chilmawati, Diana. 2015. Pengaruh Probiotik Komersial pada Pakan Buatan terhadap Pertumbuhan, Efisiensi Pemanfaatan Pakan, dan Kelulushidupan Benih Ikan Gurami (*Osphronemus Gouramy*) D35-D75. *Journal of Fisheries Science and Technology*. Jurnal Saintek Perikanan Vol.11.(1):11-16.
- Swain, P., dan Nayak, N.K. 2009. Role of Maternally Derived Immunity in Fish. *Journal Fish & Shellfish Immunology* 27: 89-99.
- Tan, Heng Yih., Sai-Wei Chen, Shao-Yang Hu. 2019. Improvements in the growth performance, immunity, disease resistance, and gut microbiota by the probiotic *Rummeliibacillus stabekisii* in Nile tilapia (*Oreochromis niloticus*). *Fish and Shellfish Immunology*. 92: 265–275.
- Tarigan, N., F.Meiyasa., G.K.Efruan., D.A. Sitaniapessy., dan D.U. Pati. 2019. Application of Probiotics for the Growth of Catfish (*Clarias batrachus*) in Malumbi Village, East Sumba. *Jurnal Mitra*. 3 (1): 50-57.
- Triyatmo, B., Rustadi., dan Isnansetyo, Alim. 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: 01008. <https://doi.org/10.1051/e3sconf/202014701008>
- Uribe, C., H. Folch, R. Enriquez & G. Morgan. 2011. Innate and adaptive immunity in teleost fish: A review. *Veterinary Medicine* 10: 486-503.
- Watson, A.K., Kaspar, H., Lategan, M.J., Gibson, L. 2008. Probiotics in aquaculture: The need, principles and mechanisms of action and screening processes. *Aquaculture*. 274: 1-14.
- Whyte, S.K. 2007. The innate immune response in finfish: a review of current knowledge. *Fish and Shellfish Immunology*. 23: 1127-1151.



- Yin, Guojun., L. Ardo., K.D. Thompson., A. Adams., Z. Jeney., and G. Jeney. 2009. Chinese herbs (*Astragalus radix* and *Ganoderma lucidum*) Enhance Immune Response of Carp, *Cyprinus carpio*, and Protection Against *Aeromonas hydrophila*. *Fish and Shellfish Immunology*. 26 : 140–145.
- Yousefian, M., dan Amiri, M.S. 2009. A Review of The Use Of Prebiotic In Aquaculture for Fish and Shrimp. *African Journal of Biotechnology*. 8 (25): 7313-7318.
- Yudiati E., A. Isnansetyo, Murwantoko, Ayuningtyas, Triyanto dan C.R. Handayani. 2016. Innate Immune Stimulating and Immune Genes Up-Regulating Activities of Three Types of Alginate from *Sargassum siliquosum* in Pacific White Shrimp, *Litopenaeus vannamei*. *Fish & Shellfish Immunology*. 54:46-53.
- Zingoni, Alessandra., Ardolino, Michele., Santoni, Angela., and Cerboni, Cristina. 2010. NKG2D and DNAM-1 activating receptors and their ligands in NK-T cell interactions: role in the NK cell-mediated negative regulation of T cell responses. *Frontiers Immunol.* 3: 408.
- Zonneveld, N., E.A. Huisman & J.H. Boon. 1991. Prinsip-Prinsip Budidaya Ikan. Gramedia Pustaka, Jakarta, 318 p.