



## DAFTAR PUSTAKA

- Alamanda, I. E., N. S. Handajani & A. Budiharjo. 2007. Penggunaan metode hematologi & pengamatan endoparasit darah untuk penetapan kesehatan ikan lele dumbo (*Clarias gariepinus*) di kolam budidaya Desa Mangkubumen Boyolali. Biodiversitas. 8: 34-38.
- Aly S.M, Y. A. G. Ahmed, A. A. A. Ghareeb & M. Fathi. 2008. Studies on *Bacillus subtilis* & *Lactobacillus acidophilus*, as potential probiotics, on the immune response & resistance of *Tilapia nilotica* (*Oreochromis niloticus*) to challenge infections. Fish & Shellfish Immunology. 25 (1-2):128-136.
- Amal, M.N.A., C. B. Koh, M. Nurliyana, M. Suhaiba, Z. Nor-Amalina, S. Santh, K. P. Diyana-Nadhirah, Yusof, M.T., Ina-Salwany, M.Y., & Zamri-Saad, M. 2017. A case of natural co-infection of tilapia lake virus & *Aeromonas veronii* in a Malaysian red hybrid tilapia (*Oreochromis niloticus* x *O. mossambicus*) farm experiencing high mortality. Aquaculture. 485 : 12-16.
- Amri, K. & Khairuman. 2002. Buku Pintar Budidaya 15 Ikan Konsumsi. Agromedia. Jakarta.
- Anderson, D. P. 1974. Fish Immunology. TFH Publication Inc. Washington.
- Anderson D.P. & A. K. Siwicki. 1994. Simplified assays for measuring nonspecific defense mechanisms in fish - Fish Health Section. Fisheries Society Meeting. Seattle.
- Argayosa, A. M. & Y. C. Lee. 2009. Identification of L-fucose-binding proteins from the nile tilapia (*Oreochromis niloticus* L.) serum. Fish & Shellfish Immunology. 27 (3): 478-485.
- Avnimelech, Y.T. 2009. Biofloc technology: A practical guide book. World Aquaculture Society. Louisiana.
- Avnimelech, Y. 1999. Carbon/nitrogen ratio as a control element in aquaculture systems. Aquaculture 176 (3-4): 227-235.
- Balcazar J. L., I. de Blas, Z. I. Ruiz, D. Cunningham, D. Vendrell & J. L. Muzquiz. 2006. The role of probiotics in aquaculture. Veterinary Microbiology. 114 (3-4): 173–186.
- Baratawidjaja, K. G. & I. Rengganis. 2012. Imunologi dasar. Balai Penerbit Fakultas Kedokteran Universitas Indonesia. Jakarta.
- Baratawidjaja, K.G. 1991. Immunologi dasar edisi kedua. Balai Penerbit Fakultas Kedokteran Universitas Indonesia. Jakarta.
- Baratawidjaja, K.G. 1993. Pengertian imunokompromais & respons imun. Balai Penerbit Fakultas Kedokteran Universitas Indonesia. Jakarta.



- Baya, A.M., Lupiani, B., Hetrick, F.M., Robertson, B.S., Lukacovic, R., May, E., & Puokish, C., 1990. Association of *Streptococcus* sp. with mortalities in the Chesapeake bay & its tributaries. Journal of Fish Diseases 19: 235-241.
- Beheraa, B.K., P. K. Pradhan, T. R. Swaminathan, N. Sood, P. Paria, A. Das, D. K. Verma, R. Kumar, M. K. Yadav, A. K. Dev, P. K. Parida, B. K. Das, K. K. Lal & J. K. Jena. 2017. Emergence of tilapia lake virus associated with mortalities of farmed nile tilapia *Oreochromis niloticus* (Linnaeus 1758) in India. Aquaculture. 484 : 168-174.
- Bellati, A.J. 1993. Imunnologi III. Gajah Mada University Press. Yogyakarta.
- Biller-Takahashi, J.D., L.S. Takahashi, F. Pilarski, F.A. Sebastiao, & E.C. Urbinati. 2013. Serum bactericidal activity as indicator of innate immunity in pacu *Piaractus mesopotamicus* (Holmberg, 1887). Medicine Veterinary Zootechnology. 65 (6): 1745-1751.
- Bintoro, A. J. 2002. Probiotik potential of *Lactobacillus acidophilus* & microflora as kefir as imunostimulan. Thesis. Departement of Animal Production. Faculty of Animal Science. Bogor Agricultural University. Bogor.
- Brooks, G.F., K. C. Carroll, J. S. Butel & S. A. Morse. 2007. Jawetz, Melnick, & Adelberg's Medical Microbiology. The McGraw-Hill Companies. United States of America.
- Chang, P.H. & J. A. Plumb. 1996. Histopathology of experimental *Streptococcus* sp. infection in tilapia *Oreochromis niloticus* L. & channel catfish *Ictalurus punctatus* Refinesque. Journal of Fish Diseases. 1(3): 251-253.
- Crab, R., Y. Avnimelech, T. Defoirdt, P. Bossier & W. Verstraete. 2007. Nitrogen removal techniques in aquaculture for sustainable production. Aquaculture. 270 (1-4): 1-14.
- Darma R.G., Sarjito & A. H. C. Haditomo. 2014. Efikasi perendaman ekstrak sambiloto (*Andrographis paniculata* Ness) dengan salinitas berbeda & pengaruhnya pada kelulushidupan serta indeks fagositosis ikan nila (*Oreochromis niloticus*) yang diinfeksi *Aeromonas hydrophila*. Journal of Aquaculture Management & Technology. 3(4): 222-229.
- Dellmann & Brown. 1989. Textbook Of Veterinary Histology. Universitas Indonesia Press. Jakarta.
- Dong, H.T., G. A. Atagubac, P. Khunraea, T. Rattanarojponga & S. Senapin. 2017. Evidence of TiLV infection in tilapia hatcheries in Thailand from 2012 to 2017 reveals probable global spread of the disease. Aquaculture. 479: 579-583.
- Dong, H.T., S. Siriroo, W. Meemetta, W. Santimanawong, W. Gangnonngiw, N. Pirarat, K. Khunrae & S. Senapin. 2017. Emergence of tilapia lake virus in Thailand & an alternative semi-nested RT-PCR for detection. Aquaculture: 476: 111-118.



- Elumalai M., C. Antununes & L. Guihernio. 2013. Effects of single metals & selected enzymes of *carcinus maens* water. *Air & Soil Pollution*. 141 (1- 4): 273-280.
- Eyngor, M., R. Zamostiano, J. E. K. Tsafack, A. Berkowitz, H. Bercovier, S. Tinman & A. Eldar. 2014. Identification of a novel RNA virus lethal to tilapia. *Journal of Clinical Microbiology*. 52 (12): 4137-4146.
- Fathi, M., C. Dickson, M. Dickson, W. Leschen, J. Baily, F. Muir, K. Ulrich & M. Weidmann. 2017. Identification of tilapia lake virus in Egypt in nile tilapia affected by 'summer mortality' syndrome. *Aquaculture*. 473: 430-432.
- Forsgren, A., D. Schmeling & P. G. Quie. 1974. Effect of tetracycline on the phagocytic function of human leukocytes. *Journal of Infectious Diseases*. 130:412-415.
- Fudenberg, H.H., D. P. Stites, J. L. Aldwell & J. V. Wells. 1977. Basic & clinical immunology. Lange Medical Publications Maruzen.
- Fuller, R. 1989. A review, probiotics in man & animals. *Journal of Applied Bacteriology*. 66: 365 – 378.
- Fuller, R. 1992. Probiotics, the scientific basis. Chapman & Hall. London.
- Gannam, A. L. & R. M. Schrock. 2001. Immunostimulants in fish diets. The Haworth Press. New York.
- Giyarti, D. 2000. Efektivitas ekstrak daun jambu biji (*Psidium guajava* L.) sambiloto (*Andrographis paniculata* (Burm. f.) Nees) & sirih (*Piper betle* L.) terhadap infeksi bakteri *Aeromonas hydrophila* pada ikan patin (*Pangasius hypophthalmus*). Skripsi. Fakultas Perikanan & Ilmu Kelautan. Institut Pertanian Bogor. Bogor.
- Gómez, G. D. & J. L. Balcazar. 2007. A review on the interactions between gutmicrobiota & innate immunity of fish. *Federation of European Microbiological Societies Immunology Medical Microbiology*. 52 (2): 145–154.
- Gram, L., J. Melchiorsen, B. Spanggaard, I. Huber & T. F. Nielsen. 1999. Inhibition of *Vibrio anguillarum* by *Pseudomonas fluorescens* AH2, a possible probiotic treatment of fish. *Applied & Environmental Microbiology* 65 (3): 969 – 973.
- Grinde, B., O. Lie, T. Poppe & R. Salte. 1988. Species & individual variation in lysozyme activity in fish of interest in aquaculture. *Aquaculture*. 68 (4): 299-304.
- Hanif, A., V. Bakopoulos & G.J. Dimitriadis. 2004. Maternal transfer of humoral specific & non-specific immune parameters to sea bream (*Sparus aurata*) larvae. *Fish & Shellfish Immunology*. 17 (5): 411-435.
- Hapsari, A. N. 2000. Efektifitas penambahan probiotik komersil terhadap perubahan kualitas air, kelulushidupan & pertumbuhan benih ikan nila. Skripsi. Universitas Diponegoro. Semarang.



- Harish, K. & T. Varghese. 2006. Probiotics in humans- evidence based review. Calicut Medical Journal. 4 (4):1-11.
- Hastuti, S. D. 2007. Evaluation of non-specific defence of tilapia (*Oreochromis sp.*) injected with LPS (Lipopolysaccharides) of *Aeromonas hydrophila*. Jurnal Protein.14 (1): 79-84
- Hastuti, S. D. 2013. Aplikasi antigen bakteri *Streptococcus agalactiae* sebagai kandidat vaksin untuk pencegahan penyakit streptococcosis pada ikan nila (*Oreochromis sp.*). Jurnal Gamma. 8 (2): 64-79.
- Irianto, A. 2003. Probiotik Akuakultur. Gadjah Mada University Press. Yogyakarta.
- Iskandar, A. 2003. Budidaya ikan nila merah (*Oreochromis sp.*). Karya Putra Darawati. Bandung.
- Isnansetyo, A., H.M. Irpani, T.A. Wulansari & N. Kasanah. 2014. Oral administration of alginate from a tropical brown seaweed *Sargassum* sp. to enhance non-spesific defence in walking catfish (*Clarias* sp.). Aquacultura Indonesiana. 15 (2): 14-20.
- Isnansetyo, A., Triyanto, K. H. Nitimulyo, M. Murdjani & L. Sholichah. 2005. Efektivitas vaksin polivalen untuk pengendalian vibriosis pada kerapu tikus (*Cromileptes altivelis*).Jurnal Perikanan. 7(2): 95-100.
- Jamilah I., A. Meryandini, I. Rusmana, A. Suwanto & N. R. Mubarik. 2009. Activity of proteolytic & amylolytic enzymes from *Bacillus* spp. isolated from shrimp ponds. Journal Microbiology Indonesia. 3(2):67-71.
- Jansen, M.D. & C. V. Mohan. 2017. Tilapia lake virus (TiLV): Literature review. CGIAR Research Program on Fish Agri-Food Systems. Working Paper: FISH-2017-04. Penang.
- Jawetz, E., J. L. Melnick & E. A. Adelberg. 2001. Medical Microbiology. Penerbit Salemba Medika. Jakarta.
- Johansson, M. W. & K. Soderhall. 1989. Cellular immunity in crustaceans & the proPO system.Trends in Parasitology. 5 (6): 171–176.
- Kamiso, H. N. 1998. Uji lapang penggunaan vaksin *Aeromonas hydrophilapada lele dumbo (Clarias gariepinus)*. Jurnal Perikanan. 1 (2):17-24.
- Kamiso, H. N., Triyanto & S.Hartati. 1997. Uji antigenisitas & efikasi *Aeromonas hydrophila* pada lele dumbo (*Clarias gariepinus*). Jurnal Perikanan. 1 (2):9-16.
- Karno, H.2007. Identifikasi protozoa parasitik pada kulit, insang & usus ikan mas (*Cyprinus Carpio*) & ikan nila (*Oreochromis sp.*) di Pasar Empang Bogor. Skripsi. Fakultas Kedokteran Hewan. Institut Pertanian Bogor. Bogor.
- Klont, G.W. 1994. Techniques in fish immunology. Departement of Fish & Wildliferesource. University of Idaho. Idaho.



- Kordi, M. G. H. K. 2010. Panduan lengkap memelihara ikan air tawar di kolam terpal. Andi Publisher. Yogyakarta.
- Lagler, K. F., J. E. Bardach. R. R. Miller & D. R. M. Passino. 1977. Ichthyology. John Wiley & Sons. London.
- Lazado, C. C. & C. M. Caipang. 2014. Mucosal immunity & probiotics in fish. Fish & Shellfish Immunology. 39 (1): 78-89.
- Lestari, W. 2015. Identifikasi ektoparasit ikan nila pada kolam IPAL. Skripsi. Universitas Islam Negeri Sunan Kalijaga. Yogyakarta.
- Lopez, J. 2000. Probiotic in animal nutrition. Asian - Australia Journal of Animal Sciences: 13: 12-36.
- Magnadottir, B. 2006. Innate immunity of fish (overview). Fish & Shellfish Immunology 20 (2): 137-151.
- Mahendra, B. 2006. Panduan Meracik Herbal. Penebar Swadaya. Jakarta.
- Maier, V.H., K.V. Dorn, B.K. Gudmundsdottir & G.H. Gudmundsson. 2008. Characterisation of cathelicidin gene family members in divergent fish species. Molecular Immunology. 45 (14): 3723–3730.
- Mandal, V.& N. C. Mandal. 2011. Probiotics: Biology, Genetics & Health Aspects. Springer. Berlin.
- Martins, M. L., J. L. P. Mourino, G.V. Amara, F. N. Vieira, G. Dotta, A. M. B. Jatoba, F. S. Pedrotti & G. T. Jeronimo. 2008. Haematological changes in nile tilapia experimentally infected with *Enterococcus* sp. Brazilian Journal Biology. 68: 657–661.
- Matsuyama, H.,E.P. Remy & T. Yano. 1992. Protective effect of schizophyllan & scleroglucan against *Streptococcus* sp. infection in yellowtail (*Seriola quinqueradiata*). Aquaculture. 101 (3-4):197-203.
- Minelli, E.B.& A. Benini.2008. Relationship between number of bacteria & their probiotic effect. Microbial Ecology in Health & Disease 20: 180-183.
- Montero, P., M. T. Solas, A. J. Borderias, M. Gomez-Guillen. 1998. Thermally induced aggregation of giant squid (*Dosidicus gigas*) mantle proteins: physicochemical contribution of added ingredients. Journal Agricultural &Food Chemistry. 46 (9): 3440-3446.
- Mudjiman, A. 2001. Makanan Ikan. Penebar Swadaya. Jakarta.
- Muhtadin, S. H. 2011. Studi perbandingan analisis kandungan gizi ikan nila *Oreochromis* sp. di Desa Pancana Kabupaten Barru & Lajoa Kabupaten Soppeng. Skripsi. Universitas Hasanuddin. Makassar.



- Mulder-Johnston, C. 1997. Edible & biodegradable polymer films: Challenges & opportunities, Jurnal Food Technology. 51(2): 61–74.
- Nayak, S. K. 2010. Probiotics & immunity: A fish perspective. Fish & Shellfish Immunology. 29 (1): 2-14.
- Novriadi, R., S. Agustatik, Hendrianto, R. Pramuanggit & A. H. Wibowo. 2014. Penyakit infeksi pada budidaya ikan laut di Indonesia. Balai Perikanan Budidaya Laut Batam. Batam. ISBN: 978-602-70003-1-5.
- Oda, K., H. Matsuda., T .Murakami., S. Katayama., T. Ohgitani & M. Yoshikawa. 2000. Adjuvant & haemolytic activities of 47 saponins derived from medicinal & food plants. Biological Chemistry. 381 (1): 67–74.
- Olivia-Teles, A. & P. Goncalves. 2001. Partisial replacement of fishmeal by brewers yeast *Saccharomyces cerevisiae*, in diets for sea bass *Dicentrarchus labrax* juveniles. Aquaculture. 202: 269-278.
- Puri, A., R. Saxena, R. P. Saxena, K. C. Saxena, V. Srivastav & J. S. Tandon. 1993. Immunostimulant agents from *Andrographis paniculata*. Journal Natural Products. 56 (7): 995-999.
- Putra, A. N., N. B. P. Utomo & Widanarni. 2015. Growth performance of tilapia (*Oreochromis niloticus*) fed with probiotic, prebiotic &synbiotic in diet. Pakistan Journal of Nutrition. 14(5): 263- 268.
- Putra, A. N. 2010. Kajian probiotik, prebiotik & sinbiotik untuk meningkatkan kinerja pertumbuhan ikan nila (*Oreochromis niloticus*). Tesis. Program Pasca Sarjana. Institut Pertanian Bogor. Bogor.
- Radji, M. 2012. Rekayasa genetika pengantar untuk profesi kesehatan. Penerbit SagungSeto. Jakarta.
- Rahmaningsih. 2012. Pengaruh ekstrak sidawayah dengan konsentrasi yang berbeda untuk mengatasi infeksi bakteri *Aeromonas hydrophila* pada ikan nila (*Oreochromis niloticus*). Jurnal Ilmu Perikanan & Sumberdaya Perairan. 1(1): 1-7.
- Ricky, B. 2008. Usaha pemeliharaan gurami (*Osphronemus gouramy*). Penebar Swadaya. Jakarta.
- Robertsen, B. 2006. The interferon system of teleost fish. Fish & Shellfish Immunology. 20 (2): 172–191.
- Saanin, H. 1984. Taksonomi &kunci identifikasi ikan. Binatjipta. Bandung.
- Sahan, A.& S. Duman. 2010. Effect of  $\beta$ -glucan on haematology of common carp (*Cyprinus carpio*) infected by ectoparasites. Mediterranean Aquaculture Journal. 1(1): 1-7.



- Sakai, M. 1999. Current research status of fish immunostimulants. *Journal of Aquaculture*, 172 (1-2): 63-92.
- Samsundari, S. 2006. Pengujian ekstrak temulawak & kunyit terhadap resistensi bakteri *Aeromonas hydrophila* yang menyerang ikan mas (*Cyprinus carpio*). *Jurnal Gamma*. 2(1) : 71-83.
- Septiarini, E.Harpeni & Wardiyanto. 2012. Pengaruh waktu pemberian probiotik yang berbeda terhadap imun non spesifik ikan mas (*Cyprinus caprio*) against *Aeromonas salmonicida*. *Jurnal Rekayasa & Teknologi Budidaya Perairan*. 1 (1): 39-46.
- Setiawati, J. E., Tarsim,Y. T. Adiputra & S. Hudaidah. 2013. Pengaruh penambahan probiotik pada pakan dengan dosis berbeda terhadap pertumbuhan, kelulushidupan, efisiensi pakan & retensi protein ikan patin (*Pangasius hypophthalmus*). *Jurnal Rekayasa & Teknologi Budidaya Perairan*.1 (2): 151-162.
- SIDATIK (Sistem Informasi Diseminasi Data & Statistik Kelautan & Perikanan). 2017. Produksi Perikanan Budidaya. <http://statistik.kkp.go.id/sidatikdev/2.php?x=3>. Diakses 15 Juli 2019.
- Stafford, J.L.& M. Belosevic. 2003. Transferrin & the innate immune response of fish: identification of a novel mechanism of macrophage activation. *Development Comparative Immunology*. 27 (6-7): 539–554.
- Sugiarto. 1988. Teknik pemberian ikan mujair & nila. CV Simplex. Jakarta.
- Suminto. 2008. Pertumbuhan bakteriprobiotik *Alkaligenus* sp. & *Flavobacterium* sp. yang diisolasi dari usus udang pada media kulturmolase & kaolin. *Jurnal Saintek Perikanan*. 4(1): 21-27.
- Supriyanto. 2010. Pengaruh pemberian probiotik dalam pelet terhadap pertumbuhan lele sangkuriang. *Jurnal Sains & Teknologi*. 8 (1): 17-25.
- Surachetpong, W., T. Janetanakit, N. Nonthabenjawan, P. Tattiyapong, K. Sirikanchana & A. Amonsin. 2017. Outbreaks of tilapia lake virus infection, Thailand. *Emerging Infectious Diseases*. 23(6): 1031-1033
- Suryani. 2006. Budidaya ikan air tawar. PT. Citra Adi Parama. Yogyakarta.
- Suyanto, S. R. 2010. Pemberian & pembesaran nila. Penebar Swadaya. Jakarta
- Suyanto. 1993. Nila. Penebar Swadaya.Jakarta.
- Syawal, H. & S. Hidayah. 2008. Pemberian ekstrak kayu siwak (*Salvadora persica* L.) untuk meningkatkan kekebalan ikan mas (*Cyprinus carpio* L.) yang dipelihara dalam keramba. *Biodiversitas*. 9 (1): 44-47.
- Tizard, I. R. 1988. Pengantar imunologi veteriner. Universitas Airlangga. Surabaya.



Uribe, C., H. Folch, R. Enriquez & G. Morgan. 2011. Innate & adaptive immunity in teleost fish: A review. *Veterinari Medicine*. 56 (10): 486-503.

Utami, D. T., S. B. Prayitno, S. Hastuti & A. Santika. 2013. Gambaran parameter hematologis pada ikan nila (*Oreochromis niloticus*) yang diberi vaksin DNA *Streptococcus iniae* dengan dosis yang berbeda. *Journal of Aquaculture Management & Technology*. 2 (4): 7-20.

Verschuere, L., G. Rombaut, P. Sorgeloos & W. Verstraete. 2000. Probiotic bacteria as biological control agents in aquaculture. *Microbiological & Molecular Biology*. 64 (4): 655 - 671.

Verstraete, W., N. Boon, T. Defroit, W. de Windt, & W. T. Van De. 2010. Hydroxybutyrate & poly-hydroxybutyrate as components of animal feed or feed additives. Patent Application Publication. April : 1-4.

Wang, X. & P. L. Conway. 2008. Specifically targeted probiotics can reduce antibiotics usage in animal production. *Asian-Australia Journal of Animal Sciences*. 13: 358-361.

Whyte, S.K. 2007. The innate immune response in finfish: a review of current knowledge. *Fish & Shellfish Immunology*. 23: 1127–1151.

Widanarni, D. Yuniasari, Sukenda & J. Ekasari. 2010. Nursery culture performance of *Litopenaeus vannamei* with probiotics addition & different C/N ratio under laboratory condition. *HAYATI Journal of Biosciences*. 17 (3):115-119.

Yin, G., G. Jeney, T. Racz, P. Xu, X. Jun & Z. Jeney. 2006. Effect of two chinese herbs (*Astragalus radix* & *Scutellaria radix*) on nonspecific immune response of tilapia, *Oreochromis niloticus*. *Aquaculture*: 253(4): 39-47.

Zhou X., Y. Wang & W. Li. 2009. Effect of probiotic on larvae shrimp (*Penaeus vannamei*) based on water quality, survival rate & digestive enzyme activities. *Aquaculture*. 287 (3): 349-353.

Zhou, X., Y. Wang, J. Yao & W. Li. 2010. Inhibition ability of probiotic, *Lactococcus lactis*, against *Aeromonas hydrophila* & study of its immunostimulatory effect in tilapia (*Oreochromis niloticus*). *International Journal of Engineering, Science & Technology*. 2 (7): 73-80.