

## DAFTAR PUSTAKA

- Affandi, R. and U.M. Tang. 2002. Fisiologi hewan air. Universitas Riau Press. Riau.
- Agrawal, S. S. and V. K. Singh. 1999. Immunomodulators : A Review of studies on Indian medicinal plants and synthetic peptides part I: Medicinal Plants. PINSA B65. Nos 3 & 4: 179-204.
- Almatsier, S. 2002. Prinsip dasar ilmu gizi. PT Gramedia Pustaka Utama. Jakarta.
- Amlacher, E. 1970. Textbook of fish disease. Publication Neptune City . New Jersey. USA
- Anderson, D. P. and Siwicki. 1994. Simplified assay for measuring nonspecific defence mechanism in fish. Fish Health section. American Fisheries Meeting. Seattle, Washington, 1-26.
- Anonim. 2017. Sodium Alginate. FAO Corporate document repository, produce by agriculture and consumer protection. <http://www.fao.org/>. Diakses tanggal 16 Oktober 2017.
- Anonim. 2018. Triptofan (tryptophan) sumber, fungsi, manfaat, dosis dan efek samping. <http://www.referensisehat.com/2015/08/triptofan-sumber-fungsi-manfaat-dosis-efek-samping.html>. Diakses tanggal 16 Januari 2018.
- Appleton, J. 2002. Arginine: Clinical potential of a semi-essential amino acid. *Alternative Medicine Review*. 7:512-522.
- Apriyandi, R. 2008. Perbandingan hematologi ikan baung (*Mystus nemurus* CV) yang dipelihara dalam kolam dan keramba. Skripsi. Fakultas Perikanan dan Ilmu Kelautan. Universitas Riau.
- Asminatun. 2010. Pembuatan Pakan Ikan Berdasarkan Konsep Protein Ideal Yang Ramah Lingkungan. *Jurnal UI Untuk Bangsa, Seri Kesehatan, Sains, dan Teknologi*. 1:70-78
- Baratawidjaja, K. G. 2006. *Imunologi dasar*, edisi VII. Balai Penerbit Fakultas Kedokteran Universitas Indonesia. Jakarta.
- Basmal, J., B.S.B. Utomo, Tazwir, Murdinah, T. Wikanta, E. Marraskuranto, R. Kusumawati. 2013. Membuat Alginat dari Rumput Laut *Sargassum*. Penebar Swadaya, Jakarta.
- Biswas, P., A. K. Pal., N. P. Sahu, A. K. Reddy, A. K. Prusty dan S. Misra. 2007. Lysine and/or phytase supplementation in the diet of *Penaeus monodon* (Fabricius) juveniles: Effect on growth, body composition and lipid profile. *Aquaculture* 265:253–260.
- Bittencourt, N. L. R., L. M. Molinary, D. O. Scoaris, R. B. Pedroao, C. V. Nakamura, B. A. A., Filho, and B. P. D. Filho. 2003. Haematological and biochemical values for

- nile tilapia *Oreochromis niloticus* cultured in semi-intensive system. *Biological Sciences*, 25:385-389.
- Blaxhall, P. C. and K. W. Daisley. 1973. Routine hematological methods for use with fish blood. *J. Fish Biology* 5: 557–581.
- Bold H. C. dan M. J. Wyne. 1985. Introduction to the algae, structure and reproduction. Second Edition. Prntice-Hall. New Jersey.
- Bricknell, I., and R.A. Dalmo. 2005. The use immunostimulants in fish larval aquaculture. *Fish and Shellfish Immunology*. 19: 457-472.
- Buentello, J. A., M. R. Becerril, M. D. J. R. Geraldo, and F. D. J. A. Valle. 2007. Effects of Dietary Arginine on Hematological Parameters and Innate Immune Function of Channel Catfish. *Journal of Aquatic Animal Health*. 19:195-203.
- Castro, R., I. Zarra, J. Lamas. 2003. Water-soluble seaweed extract modulate the respiratory burst ativity of turbot phagocytes. *Aquaculture*. 229:67-68.
- Cavalier-Smith, T. and E.E. Chao. 2006. Phylogeny and megasystematics of phagotrophic heterokonts (Kingdom Chromista). *Journal of Molecular Evolution*. 62: 388–420.
- Dabrowski, K. 1991. Comparative bioavailability of ascorbic acid and its stable form in rainbow trout. *School of Natural Resources. The Ohio State University Columbus*. 344-356.
- Dawson, E. Yale. 1954. Marine Plants in the Vicinity of the Institute Oceanographique de Nha Trang. Vietnam.
- Desi dan Dwi, 2009. Gizi dalam kesehatan reproduksi. Nuha Medika. Yogyakarta.
- Erika, Y. 2008. Gambaran diferensiasi leukosit pada ikan mujair (*Oreochromis mossambica*) di Daerah Ciampea Bogor. (Skripsi). Institut Pertanian Bogor.
- Esmaeli, B. and H. Khara. 2014. Growth performance, hematology and immunological parameters of rainbow trout, *Oncorhynchus mykiss*, fed with diets containing different levels of vitamin e and folic acid. *Iranian Journal of Fisheries Sciences*. 13: 931- 943.
- Fajarwati, L., H. Suprpto, dan S. A. Sudjarwo. 2012. Pemberian vitamin c melalui pengkayaan *Daphnia* untuk meningkatkan pertahanan tubuh ikan koi (*Cyprinus carpio*) terhadap serangan bakteri *Aeromonas hydrophilla*. *Media Jurnal of Aquaculture And Fish Health*. 1:1-3.
- Fischer, Uwe., K. Utke, T. Sornamoto, B. Köller, M. Ototake, and T. Nakanishi. 2006. Cytotoxic activities of fish leucocytes. *Fish & Shellfish Immunology*. 20: 209-226.
- Food Chemical Codex. 2004. Food Chemical Codex. 5th ed. National Academic of Science. Washington D.C. 5:155-195;

- Fujaya, Y. 2004. Fisiologi ikan. Rineka Cipta. Jakarta.
- Gómez, G. D. and J. L. Balázar. 2007. A review on the interactions between gut microbiota and innate immunity of fish. *Immunology Medicine Microbiology*. 52: 145–154.
- Habte-Tsion, H., X. Ge, B. Liu, J. Xie, M. Ren, Q. Zhou, L. Miao, L. Pan and R. Chen. 2015. A deficiency or an excess of dietary threonine level affects weight gain, enzyme activity, immune response and immune-related gene expression in juvenile blunt snout bream (*Megalobrama amblycephala*). *Fish and Shellfish Immunology* 42: 439–446.
- Handayani, T., Sutarno, dan A. D. Setyawan. 2004. Analisis komposisi nutrisi rumput laut *Sargassum crassifolium* J. Agardh. *Biofarmasi*. 2:45-52.
- Husni A, Subaryono, Pranoto Y, Tazwir, Ustadi. 2012. Pengembangan metode ekstraksi alginat dari rumput laut *Sargassum* sp. sebagai bahan pengental. *Agriculture Technology*. 32: 1-8.
- Irianto, A. 2005. Patologi ikan teleostei. Gadjah Mada University Press. Yogyakarta 256p
- Isnansetyo, A., A. Fikriyah, N. Kasanah, Murwantoko. 2016. Non-specific immune potentiating activity of fucoidan from a tropical brown algae (Phaeophyceae), *Sargassum cristaefolium* in tilapia (*Oreochromis niloticus*). *Aquaculture Int*.
- Isnansetyo, A., H. M. Irpani, T. A. 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*. 15:14-20.
- Jain, N.C. 1993. *Essentials of Veterinary Hematology*. Lea and Febiger Publishing. Philadelphia. 417p.
- Johny, F. D. Roza, K. Mahardika, Zafran dan A. Prijono. 2005. Penggunaan imunostimulan untuk meningkatkan kekebalan non spesifik benih ikan kerapu lumpur, *Epinephelus coioides* terhadap infeksi virus irido. *Jurnal Penelitian Perikanan Indonesia*, 11: 75- 85.
- Jothisaraswathi, S., B. Babu, and R. Rengasamy. 2006. Seasonal studies on alginate and its composition II: *Turbinaria conoides* (J.Ag.) Kütz. (Fucales, Phaeophyceae). *Journal Applied Phycology*. 18: 161–166.
- Kadi, A. 2005. Beberapa Catatan Kehadiran Marga *Sargassum* di Perairan Indonesia. Bidang Sumberdaya Laut, Puslitbang Oseanologi-LIPI. Jakarta.
- Kaminska, A.S., G. Matysik, M.W. Kosior, H. Donica, I. Sowa. 2009. Thin-layer chromatography of sugars in plant material. *Universitatis Marine Curie Sklodowska Lublin, Polonia*. 22:2-4.
- Karta Saputra dan Warsetyo, 2003. Ilmu gizi korelasi gizi, kesehatan dan produktivitas kerja. Rineka Cipta. Jakarta.

- Kennel KA, Drake MT, dan Hurley DL. 2010. Vitamin D deficiency in adults: when to test and how to treat. *Mayo Clin Proc.* 85: 752-758.
- Khairuman, and K. Amri. 2002. *Budidaya lele lokal secara intensif*. Agromedia Pustaka, Jakarta.
- King, A.H. 1983. Brown seaweed extracts (alginates). In M. Glicksman (ed). *Food Hydrocolloids*. Boca Raton, FL: CRC Press. 115–188.
- Kirk and Othmer. 1994. *Encyclopedia of chemical technology*. 4<sup>th</sup> Ed. John Wiley and Sons. New York. 844-847
- KKP. 2017. *Lele Bioflok, Solusi Penuhi Kebutuhan Gizi Masyarakat*. <http://kkp.go.id/2017/07/21/lele-bioflok-solusi-penuhi-kebutuhan-gizi-masyarakat/>. Diakses tanggal 19 November 2017.
- Kresno, S. B. 2001. *Imunologi : Diagnosis dan prosedur laboratorium*. Edisi Ketiga. Fakultas Kedokteran. Universitas Indonesia. Jakarta.
- Kumari, J. and P.K. Sahoo. 2006. Non-specific immune response of healthy and immunocompromised Asian catfish (*Clarias batrachus*) to several immunostimulants. *Aquaculture* 255: 133–141.
- Lamid, A. 1995. Vitamin E sebagai antioksidan. *Media Litbangkes*. 5:14-16.
- Mahyuddin, K. 2007. *Panduan lengkap agribisnis lele*. Penebar Swadaya. Jakarta.
- Masuelli, M. A. dan C. Illanes. 2014. Review of the characterization of sodium alginate by intrinsic viscosity measurements. comparative analysis between conventional and single point methods. *International Journal of BioMaterials Science and Engineering*. 1:1-11.
- Masumoto, T., H. Hosokawa., and S. Shimeno. 1991. Ascorbic acids role in aquaculture nutrition. P:42-48. Dalam: D.M. Akiyama and R.K.H. Tan (Ed). *Proceeding of the aquaculture feed and nutrition workshop*. Thailand and Indonesia September 19-25, 1991. American Soybean Association, Singapore.
- McHugh D. J. 2008. *Production, Properties and Uses of Alginates*. In *Production and Utilization of Products from Commercial Seaweeds*. FAO Corporate Document Repository.
- McHugh, D. J. 2003. *A Guide to the seaweed industry*. FAO Fisheries Technical Paper 441. Rome.
- Mulyanto. 1992. *Lingkungan hidup untuk ikan*. Departemen Pendidikan dan Kebudayaan. Jakarta.
- Murugaian, P., V. Ramamurthy, N. Karmegam. 2008. Effect of temperature on the behavioural and physiological responses of catfish, *Mystus gulio* (Hamilton). *Journal of Applied Science Research* 4: 1454–1457.

- National Research Council. 1993. Nutrient requirements of fish. National Academy Press. Washington.
- Nguyen, L. and D. A. Davis. 2016. Comparison of crystalline lysine and intact lysine used as a supplement in practical diets of channel catfish (*Ictalurus punctatus*) and Nile tilapia (*Oreochromis niloticus*). *Aquaculture*. 464:331-339.
- Nuranto. 1991. Pengaruh vitamin C terhadap pertumbuhan ikan lele (*Clarias batrachus*). Tesis Program Pasca Sarjana. Institut Pertanian Bogor.
- Palego, L., L. Betti, A. Rossi, and G. Giannaccini. 2015. Tryptophan biochemistry: structural, nutritional, metabolic, and medical aspects in humans. *Journal of Amino Acid*. 1-13.
- Parera, H.A.A.C. and A. Pathiratne. 2008. Enhancement of immune responses in Indian Carp, *Catla catla*, following administration of levamisole by immersion. *Diseases in Asian Aquaculture VI*. Manila: 129–142.
- Pawar.S.N., K.J. Edgar. 2012. Alginate derivatization: A review of chemistry, properties and applications. *Biomaterials*. 33: 3279-3305.
- Pellitero, P.A., Palenzuela, and A.S. Bobadilla. 2008. Histopathology and cellular response in *Enteromyxum leei* (*Myxozoa*) infections of *Diplodus puntazzo* (Teleostei). *Parasitology International*. 57:110-120.
- Pillay, T. V. R. 1990. *Aquaculture, principles and practices*. Fishing News Books, Oxford, London, Edinburgh, Cambridge, Victoria.
- Poedjiadi, A. 1994. *Dasar-Dasar Biokimia*. UI-Press. Jakarta.
- Pramesti, A. R. 2012. Absorbent dressing sponge berbasis alginat-kitosan berkurkumin untuk luka derajat eksudat sedang-besar. Skripsi. Universitas Airlangga
- Rahma, W. F., G. Mahasri dan L. Surmartiwi. 2015. Pengaruh pemberian ekstrak *Sargassum* sp. dengan pelarut metanol pada pakan terhadap jumlah eritrosit dan differensial leukosit ikan lele dumbbo (*Clarias gariepinus*). *Jurnal Ilmiah Perikanan dan Kelautan*. 7:213-217.
- Rasyaf, M., 1994. *Makanan broiler*. Kanisius. Yogyakarta.
- Rasyid, A. 2003. Algae cokelat (Phaeophyta) sebagai sumber alginat. *Oseana*. 28:33-38.
- Rasyid, A. 2009. Perbandingan kualitas natrium alginat beberapa jenis alga cokelat. *Oseanologi dan Limnologi Indonesia*. 35:57-64.
- Rauta, R. P., B. Nayak and S. Das. 2012. Immune System and Immune Responses in Fish and their role in comparative immunity study: a model for higher organisms. *Immunology Letters*. 148:23– 33.
- Rinø, E. R. E. Olsen, J. L. G. Vecino<sup>3</sup>, S. Wadsworth<sup>3</sup> and S. K. Song. 2012. Use of immunostimulants and nucleotides in aquaculture: a review. *Journal Marine Science Resource Development*. 2:1-21.

- Robertsen, B. 2006. The interferon system of teleost fish. *Fish and Shellfish Immunology*. 20:172–191.
- Rode, A. 2004. Isolierung und Charakterisierung von bakteriellen extrazellulären polymeren Substanzen aus Biofilmen. Fakultät für Naturwissenschaften. Universität Duisburg- Essen. Dissertation.
- Saanin, H. 1989. Taksonomi dan kuntji identifikasi ikan. Binatjipta. Bogor.
- Sakai, M. 1999. Current research status of fish immunostimulants. *Aquaculture*. 172: 63– 92.
- Salasia, S.I.O., D. Sulanjari, dan A. Ratnawati. 2001. Studi Hematologi Ikan Air Tawar. *Jurnal Biologi*. 2:710-723.
- Santiañez, W. J. E. and G. C. Trono Jr. 2013. Taxonomy of the Genus *Sargassum* (Fucales, Phaeophyceae) from Alabat Island, Quezon, Northeastern Philippines. University of the Philippines Diliman. Philippines.
- Saputra, E. A. 2008. Kondisi darah ikan bawal air tawar (*Colossoma macropomum*) yang dipelihara di kolam budidaya. Skripsi. Fakultas Perikanan dan Ilmu Kelautan. Universitas Riau.
- Sarathi, M., I. Ahmed, C. Venkatesan, G. Balasubramaniyan, J. Prebavathy, and A. S. S. Hameed. 2007. Comparative study on immune response of *Fenneropenaeus indicus* to *Vibrio alginolyticus* and white spot syndrome virus. *Aquaculture*. 271:8-20.
- Sari-Chmayssem, N., S. Taha, H. Mawlawi, J. P. Guégan., J. Jeftić, and T. Benvegnu. 2015. Extracted and Depolymerized Alginates From Brown Algae *Sargassum vulgare* of Lebanese Origin: Chemical, Rheological, and Antioxidant Properties. *Journal of Applied Phycology*. 28:1915-1929.
- Satrisno, P.A., Windarti and R.M. Putra. 2013. Blood condition of *Clarias batrachus* from Kampar and Siak Rivers, Riau Province. *Jurnal Fakultas Ilmu Kelautan dan Perikanan*. Universitas Riau: 1–15.
- Secombes, C.J. and T.C. Flecher. 1992. The role of phagocytes in the protective mechanisms of fish. *Annual Review of Fish Diseases*. 2: 53-71.
- Sediaoetama, A. D., 2009. Vitamin a. in: ilmu gizi. Dian Rakyat. Jakarta.
- Septiarini, Harpeni E, Wardiyanto. 2012. Pengaruh waktu pemberian probiotik yang berbeda terhadap respon imun non–spesifik ikan gurami (*Osporonemus gouramy* L.) yang diuji tantang dengan bakteri *Aeromonas salmonicida*. *Jurnal Rekayasa dan Teknologi Budidaya Perairan*. 1:1–8.
- Setyabudi, A.M.A., Grant, B.F. and Halver Halver, J.E., 1992. Pengaruh L-Ascorbyl-2-Phosphate (ASPP) Pada Pertumbuhan dan Resistensi Ikan Rainbow trout (*Onchorhyncus mykiss*) Terhadap Infection Hematoporetic Necrosis Virus

- (IHNV). Prosiding Seminar II Penyakit Ikan dan Udang, Balitbang Pertanian. 71 – 82.
- Silberfeld, T., F. Rousseau and B. de Reviers. 2014. An Updated Classification of Brown Algae (Ochrophyta, Phaeophyceae). *Cryptogamie Algologie*. 35(2):117-156.
- Siswanto, Budisetyawati, dan F. Ernawati. 2013. Peran beberapa zat gizi mikro dalam sistem imunitas. *Gizi Indonesia*. 36:57-64.
- Sitompul, S. 1997. Komposisi asam-asam amino dari biji-bijian dan kacang-kacangan. *Lokakarya Fungsional Non Peneliti*. 98-102.
- Sitompul, S. 2004. Analisis asam amino dalam tepung ikan dan bungkil kedelai. *Buletin Teknik Pertanian*. 9:33-37.
- SNI 01-6484.5-2002. 2002. Ikan lele dumbo produksi kelas pembesaran di kolam.
- Stafford, J.L., and 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.
- Sudarmadji, S. 1989. *Analisa Bahan Makanan dan Pertanian*. Liberty. Yogyakarta.
- Sundari, L., , C, M Srilestari dan H, I, Wahyuni., 2004. Komposisi Lemak Tubuh Kelinci Yang Mendapat Pakan Pellet Dengan Berbagai Aras Lisin. *Fakultas Peternakan Universitas Diponegoro*. Semarang.
- Suprayudi, M. A., E. Mursitorini, dan D. Jusadi. 2006. Pengaruh pnegkayaan *Artemia sp.* dengan EPA (Asam Eksospetanat, C20:5n-3) dan DHA (Asam Dokosaheksanat, C22:6n-3) terhadap kelangsungan hidup rajungan (*Portunus pelagicus*). *Jurnal Akuakultur Indonesia*. 5:119–126.
- Suprijatna, E. Umiyati dan A. Ruhyat, K. 2005. *Ilmu dasar ternak unggas*. Penebar Swadaya. Jakarta.
- Susanto, H. 1988. *Budidaya ikan lele*. Penerbit Kanisius. Yogyakarta.
- Suyanto, S.R. 2006. *Budidaya Ikan Lele*. Penebar Swadaya. Jakarta. 158 hal.
- Tacon, A.G.J. 1987. *The Nutrition And Feeding Of Farmed Fish And Shrimp - A Training Manual 1. The Essential Nutrients*. Food and Agriculture Organization of The United Nations Brasilia, Brazil.
- Tewary A. and B.C. Patra. 2008. Use of vitamin C as an immunostimulant. Effecton growth, nutritional quality, and immune response of *Labeo rohita* (Ham.). *Fish Physiol Biochem*. 34: 251-259.
- Tizard I. 1982. *Veterinary immunology, An introduction*. Ed Ke-3. W.B. Saunders Company. Canada.

- Triana, V. 2006. Macam-macam Vitamin dan Fungsinya Dalam Tubuh Manusia. *Jurnal Kesehatan Masyarakat*, 1(1):40-47.
- Uribe, C., H. Folch, R. Enriquez, and G. Morgan. 2011. Innate and Adaptive Immunity in Teleost Fish: A Review. *Veterinari Medicine*. 10: 486-503.
- Waryono, T. 2001. Biogeografi alga makro (rumput) laut di kawasan pesisir Indonesia. *Kumpulan Makalah Periode 1987-2008*. 1-6.
- Whittington, R. J., B. L. Munday, M. Akhlaghi, G. L. Reddacliff, and J. Carson. 1994. Humoral and peritoneal cell responses of rainbow trout (*Oncorhynchus mykiss*) to ovalbumin, *Vibrio anguillarum* and Freund's complete adjuvant following intraperitoneal and bath immunization. *Fish and Shellfish Immunology*. 4:475-488.
- Widyani R. Rr. 1999. Persyaratan asam amino pembatas utama pada pakan broiler. Universitas Gajah Mada. Yogyakarta.
- Wilson, R. P. and J. E. Halver. 1986. Protein and amino acid requirements of fishes. *Annual Reviews*. 6:225-244.
- Wilson, R. P., Allen, O. W. Jr. , Robinson, E. H., and Poe, W. E. 1978. Tryptophan and threonine requirements of fingerling channel catfish. *Journal Nutrition*. 108:595-599
- Winarno, F.G. 1990. Kimia pangan dan gizi. PT. Gramedia Pusaka Utama. Jakarta.
- Winarno, F.G. 1990. Teknologi pengolahan alginat. Badan Riset Kelautan dan Perikanan. Jakarta.
- Yeh, S.P., C.A. Chang, and C.Y. Chang. 2008. Dietray sodium alginate administration affects fingerling growth and resistance to *Streptococcus* sp. and *Iridovirus*, and juvenile nonpesific immune response of the orange spotted grouper *Ephinephelus coioides*. *Fish and Shellfish Immunology*. 25:19-27.
- 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.
- Zhou, Q., M. Jin, Z.C. Elmada, X. Liang and K Mai. 2015. Growth, immune response and resistance to *Aeromonas hydrophila* of juvenile yellow catfish, *Pelteobagrus fulvidraco*, fed diets with different arginine levels. *Aquaculture* 437: 84–91.