

DAFTAR PUSTAKA

- Ahmadifar, E., A.G.H. Takami., and M. Sudagar. 2009. Growth Performance, Survival and Immunostimulation, of Beluga (*Huso huso*) Juvenile Following Dietary Administration of Alginic Acid (Ergosan). *Pakistan Journal of Nutrition* 8 : 3-10.
- Alexander, J.B., and G.A. Ingram. 1992. Noncellular Nonspecific Defense Mechanisms of Fish. *Annual Review of Fish Disease* 2 : 79-249.
- Alagappan, K.M., B. Deivasigamani, S. Kumaran, and M. Sakthivel. 2009. Histopathological Alteration in Estuarine Catfish (*Arius maculatus*; Thunberg, 1972) Due to *Aeromonas hydrophila* Infection. *World Journal of Fish and Marine Science* 3 : 185-189.
- Almatsier dan Sunita. 2009. *Prinsip Dasar Ilmu Gizi*. PT Gramedia Pustaka Utama. Jakarta.
- Amalia, R. Subandiyono, dan E. Arini. 2013. Pengaruh Penggunaan Papain terhadap Tingkat Pemanfaatan Protein Pakan dan Pertumbuhan Lele dumbo Dumbo (*Clarias gariepinus*). *Journal of Aquaculture Management and Technology* 2 : 136-143.
- Austin, B. and D.A. Austin. 2007. *Bacterial Fish Pathogens. Disease in farmed and wild fish*. Fourth edition. Ellis Horwood limited. England.
- Azka, A., Nurjanah, dan A.M Jacob. 2015. Profil Asam Lemak, Asam Amino, Total Karotenoid, dan A-Tokoferol Telur Ikan Terbang. *Jurnal Pengolahan Hasil Perikanan Indonesia* 18 : 250-261.
- Bachtiar, Y. Subchan, T. Wahyu, dan S. Nanik. 2012. Pengaruh ekstrak alga cokelat (*Sargassum* sp.) terhadap pertumbuhan bakteri *Escherichia coli*. *Journal of Marine and Coastal Science* 1: 53-60.
- Basmal, J. 2012. Pengaruh Penambahan Tepung Kepala Udang terhadap Peningkatan Unsur Hara N pada Pembuatan Pupuk Organik Rumput Laut. *Prosiding Universitas Gadjah Mada*. Yogyakarta.
- Baratawidjaja, K.G. 2006. *Imunologi Dasar*. Balai Penerbit Fakultas Kedokteran Universitas Indonesia. Yogyakarta.
- Buentello, J., A.M. Reyes-Becerril, M.J. Romero-Geraldo, and F.J. Ascencio-Valle. 2007. Effects of Dietary Arginine on Hematological Parameters and Innate Immune Function of Channel Catfish. *Journal of Aquatic Animal Health* 19 : 195-203.
- Budhiyanti, S.A., S. Raharjo, D.W. Marseno, and I.Y.B. Lelana. 2012. Antioxidant Activity of Brown Algae *Sargassum* Species Extract from The Coastline of Java Island. *American Journal of Agricultural and Biological Sciences* 7 : 337-346.
- Campos-Vallette, M.M., N.P. Chandia., E. Clavijo., D. Leal., B. Matsuhira., I.O. Osorio-Roman, and S. Torres. 2009. Characterization on sodium alginate and its block fractions by surface-enhanced raman spectroscopy. *Journal of Raman Spectroscopy* 41: 758-763.

- Chandia, N.P., B. Matsuhira., E. Mejias, and A. Moenne. 2004. Alginic acid in *Lessonia vadosa*: partial hydrolysis and elicitor properties of the polymannuronic acid fraction. *Journal of Applied Phycology* 16: 127-133.
- Carraschi, P.S., C. Claudinei, G.M.N. Joaquim, R. Flavio, D.R.J. Oswaldo, N.N. Antonio, and L.B. Neida. 2012. Evaluation of Experimental Infection With *Aeromonas hydrophila* In Pacu (*Piaractus mesopotamicus*). *International Journal of Fisheries and Aquaculture* 4 : 81-84.
- Cahyono, B. 2009. *Budidaya Lele dumbo dan Betutu*. Pustaka Mina. Jakarta.
- Cavalier-Smith, T. and E.E. Chao. 2006. Phylogeny and megasystematics of phagotrophic heterokonts (Kingdom Chromista). *Journal of Molecular Evolution* 62: 388–420.
- Effendi, H. 2003. *Telaah Kualitas Air Bagi Pengelolaan Sumberdaya dan Lingkungan Perairan*. Kanisius. Yogyakarta.
- Ghufron, M.H. dan K. Kordi. 2010. *Budidaya Ikan Lele dumbo di Kolam Ikan Terpal*. Lily Publisher. Yogyakarta.
- Grimble R.F. and F.K. Grimble. 1998. Immunonutrition : role of sulfur amino acid, related amino acid and polyamine. *Journal of Nutrition* 14 : 605 -610.
- Gomez, R. Geovanny, J.L. Balcazar, and M.A. Shen. 2007. Probiotics Control Agents in Aquaculture. *Journal of ocean university of China* 6 : 76-80.
- Guiry, M.D. and G.M. Guiry. 2017. *AlgaeBase*. World-wide electronic publication, National University of Ireland, Galway. <<http://www.algaebase.org>>. Diakses tanggal 22 November 2017.
- Hazzulli, N.J., A. Setyawan, dan E. Harpeni. 2015. Imunogenisitas Kombinasi Vaksin Inaktif Whole Cell *Aeromonas salmonicida* dan Vitamin C Pada Ikan Mas (*Cyprinus carpio*). *Jurnal Rekayasa dan Teknologi Budidaya Perairan* 3 : 360-365.
- Han, Y., R. Han, S. Koshio, M. Ishikawa, S. Yokoyama, and J. Gao. 2014. Interactive effects of dietary valine and leucine on two size of Japanese founder. *Paralichthys olivaceus*. *Aquaculture* 432 : 130-138.
- Halver, J.E. and R.W. Hardy. 2002. *Fish Nutrition Third Edition*. Elsevier Science. United State of America.
- Hee, H.N. and M. Kottelat. 2007. The Identity of *Clarias batrachus* (Linnaeus, 1758), with The Designation of a Neotype (Teleostei : Clariidae). *Zoological Journal of The Linnean Society* 153 : 725–732.
- Husni, A., Subaryono, Y. Pranoto, Tazwir, dan Ustadi. 2012. Pengembangan metode ekstraksi alginat dari rumput laut *Sargassum* sp. sebagai bahan pengental. *Agriculture Technology* 32: 1-8.
- Isnansetyo, A., H.M. Irpani, T.A. Wulansari, and 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.

- İspir Ü, C. Türk, M. Kırıcı, M. Taysı, and M. Özcan. 2016. Immunization of rainbow trout (*Oncorhynchus mykiss*) with alginate microparticles containing inactivated *Flavobacterium psychrophilum*. *Su Ürünleri Dergisi* 33: 233-240.
- Irianto, A. 2005. *Patologi Ikan Teleostei*. Gadjahmada University Press. Yogyakarta.
- Ip, Y.K., S.F. Chew, J.M. Wilson, and D.J. Randall. 2004. Defences against ammonia toxicity in tropical air-breathing fishes exposed to high concentrations of environmental ammonia: a review. *Journal of Comparative Physiology* 174: 565–575.
- Jayanudin, A.Z. Lestari, dan F. Nurbayanti. 2014. Pengaruh Suhu dan Rasio Pelarut Ekstraksi terhadap Rendemen dan Viskositas Natrium Alginat dari Rumput Laut Cokelat (*Sargassum* Sp.). *Jurnal Integrasi Proses* 5 : 51-55.
- Johnny, F., K. Mahardika, I.N.A. Giri, dan D. Roza. 2007. Penambahan Vitamin C Dalam Pakan Untuk Meningkatkan Imunitas Benih Ikan Kerapu Macan, *Epinephelus fuscoguttatus* Terhadap Infeksi *Viral Nervous Necrosis*. *Jurnal Akuakultur Indonesia* 6: 43-53.
- Kadi, A. 2005. Beberapa Catatan Kehadiran Marga *Sargassum* di Perairan Indonesia. *Jurnal Oseana* 30: 19-29.
- Kanimozhi, S., M. Krishnaveni, B. Deivasigmani, T. Rajasekar, and P. Priyadarshni. 2013. Immunostimulation effects of *Sargassum whitti* on *Mugil cephalus* against *Pseudomonas fluorescence*. *International journal of current microbiology applied science* 2: 93-103.
- Khara, H., M. Sayyadborani, Sayyad and M. Borani. 2016. Effects of α -Tocopherol (vitamin E) and Ascorbic Acid (Vitamin C) and Their Combination on Growth, Survival and Some Haematological and Immunological Parameters of Caspian Brown Trout, *Salmo trutta caspius* juveniles. *Turkish Journal of Fisheries and Aquatic Sciences* 16: 385-393.
- Khairuman, dan K. Amri. 2008. *Budidaya Ikan Lele dumbo Secara Intensif*. Agro Media Pustaka. Jakarta.
- Khotimah, K., Darius dan B.B. Sasmito. 2013. Uji Aktivitas Senyawa Aktif Alga Coklat (*Sargassum fillipendulla*) Sebagai Antioksidan Pada Minyak Ikan Lemuru (*Sardinella longiceps*). *Jurnal mahasiswa hasil perikanan Universitas Brawijaya* 1 : 10-20.
- Kiron, V., J. Puangkaew, K. Ishizaka, S. Satoh, and T. Watanabe. 2004. Antioxidant status and nonspecific immune responses in rainbow trout (*Oncorhynchus mykiss*) fed two levels of vitamin E along with, three lipid sources. *Aquaculture* 234 : 361-379.
- KKP. 2018. Subsektor Perikanan Budidaya Sepanjang Tahun 2017 Menunjukkan Kinerja Positif. <<http://kkp.go.id/djpb>>. Diakses tanggal 22 Mei 2018.

- Leal, D., B. Matsuhira., M. Rossi and F. Caruso. 2008. FT-IR spectra of alginic acid block fractions in three species of brown seaweeds. *Carbohydrate Research* 343: 308-316.
- Li, P., Y. Long, Yin, D. Li, S.W. Kim, and G. Wu. 2007. Amino acids and immune function. *Journal of Nutrition* 98 : 237–252.
- Lu, Y., X.P. Liang, M. Jin, P. Sun, H.N. Ma, Y. Yuan, and Q.C. Zhou. 2016. Effects of dietary vitamin E on the growth performance, antioxidant status and innate immune response in juvenile yellow catfish (*Pelteobagrus fulvidraco*). *Aquaculture* 464 : 609–617.
- Lukistyowati, I. dan Kurniasih. 2012. Pelacakan Gen Aerolysin dari *Aeromonas hydrophila* pada Ikan Mas yang diberi Pakan Ekstrak Bawang Putih. *Jurnal Veteriner* 13 : 43-50.
- Mas'ud, F. 2013. Efektifitas *Candida* Sp. Sebagai Imunostimulan pada Ikan Lele Dumbo (*Clarias gariepinus*) Terhadap Infeksi *Aeromonas hydrophilla*. *Jurnal Ilmu Eksakta* 1: 32-59.
- Mir, I.N., N.P. Sahu, A.K. Pal, and M. Makesh. 2017. Synergistic effect of l-methionine and fucoidan rich extract in eliciting growth and non-specific immune response of *Labeo rohita* fingerlings against *Aeromonas hydrophila*. *Aquaculture* 479 : 396-403
- Mirshafiey, A. and B.H.A. Rehm. 2009. Alginate and Its Comonomer Mannuronic Acid: Medical Relevance as Drug. In: Rehm BHA (ed) *Alginates. Biology and Applications*. Berlin.
- Mushollaeni, W. dan E. Rusdiana. 2011. Karakterisasi Natrium Alginat dari *Sargassum* sp., *Turbinaria* sp., dan *Padina* sp. *Jurnal Teknologi dan Industri Pangan* 22 : 26-32.
- Muslikha, S. Pujiyanto, S.N. Jannah, dan H. Novita. 2016. Isolasi, Karakterisasi *Aeromonas hydrophila* Dan Deteksi Gen Penyebab Penyakit *Motile Aeromonas Septicemia* (Mas) Dengan 16s Rrna dan Aerolysin Pada Ikan Lele dumbo (*Clarias* Sp.). *Jurnal Biologi* 5 : 1-7.
- Murphy, K. 2012. *Janeway's Immunobiology*. 8th Edition. Garland Science. New York.
- NRC. 1993. *Nutrient Requirements of Fish*. National Academy Press. Washington, DC.
- Nguyen, T.N., and D.A. Davis. 2009. Methionine requirement in practical diets of juvenile Nile tilapia, *Oreochromis niloticus*. *Journal of The World Aquaculture Society* 40 : 410–416.
- Ojerio, T., V. Corre, A. Valeriano, Toledo, N. Andrino, K. Grace, M. Nievaes, Lovelyn, and F.M. Traifalgar. 2017. Alginic Acid As Imunostimulant: Effects Of Dose And Frequency On Growth Performance, Immune Responses, And White Spot Syndrome Virus Resistance In Tiger Shrimp *Penaeus monodon* (Fabricius, 1798). *Aquaculture International* 26 : 267-278.
- Oladele, O.O., B.E. Olufemi, G.A. Oladosu, L.O. Ajayl, A.A. Adediji, and I.O. Arasi. 2011. Arborescent Organ Necrosis Syndrome in Catfish, *Clarias gariepinus* (Burchell): A Case Report. *Journal of Fish Diseases* 34: 801-804.

- Pakidi, C.S. dan H.S. Suwoyo. 2016. Potensi dan Pemanfaatan Bahan Aktif Alga Cokelat *Sargassum* Sp. Jurnal Ilmu Perikanan 5 : 488-498.
- Pamungkas, W. 2013. Aplikasi Vitamin E Dalam Pakan: Kebutuhan Dan Peranan Untuk Meningkatkan Reproduksi, Sistem Imun, Dan Kualitas Daging Pada Ikan. Media Akuakultur 8 : 145-150.
- Padayatty, S.J., Katz, A. Wang, Y. Eck, P.O. Kwon, and J.H. Lee. 2003. Vitamin C as an Antioxidant Evaluation of its role in Disease Prevention. Journal of the American Collage of Nutrition 22 : 18-35.
- Pawar, S.N. and K.J. Edgar. 2012. Alginate derivatization: A review of chemistry, properties and applications. Biomaterials 33: 3279-3305.
- Raa, J., G. Roerstad, R. Engstad, and B. Robertsen. 1992. The use of imunostimulants to increase resistance of aquatic organism to microbial infection. In : Diseases in Asian aquaculture. Fish Health Section. Asian Fisheries Society. Manila.
- Rahma, F.W., G. Mahasri, dan L. Surmartiwi. 2015. Pengaruh pemberian ekstrak *Sargassum* sp. Dengan pelarut metanol pada pakan terhadap jumlah eritrosit dan differensial leukosit ikan lele dumbo dumbo (*Clarias gariepinus*). Jurnal Ilmiah Perikanan dan Kelautan 7 : 213-218.
- Rahmaningsih, S. 2012. Pengaruh Ekstrak Sidawayah dengan Konsentrasi yang Berbeda untuk Mengatasi Infeksi Bakteri *Aeromonas hydrophila* pada Ikan Nila (*Oreochromis niloticus*). Jurnal Ilmu Perikanan dan Sumberdaya Perairan 1 : 1-8.
- Rahmaningsih, S. 2016. Hama & Penyakit Ikan. Deepublish. Yogyakarta.
- Saanin, S. 1968. Taksonomi dan Kunci Identifikasi Ikan. Binacipta. Jakarta.
- Sarianoferni, D.A.V. Paramita, dan D. Mulawarmanti. 2017. Pengaruh Pemberian Alga Coklat (*Sargassum* sp.) Terhadap Enzim Katalase Kelenjar Submandibularis Tikus Rattus Novergicus Strain Wistar Akibat Iradiasi Linear Energy Transfer (Let) Rendah. Qanun Medika 1 : 1-10.
- Septiana, A.T, dan A. Asnani. 2012. Kajian Sifat Fisiko Kimia Ekstrak Rumput Laut Coklat *Sargassum duplicatum* Menggunakan Berbagai Pelarut dan Metode Ekstraksi. Agrountek 6 : 22-28.
- Sinurat, E., dan R. Marliani. 2017. Karakteristik Na-alginat dari rumput laut cokelat *Sargassum crassifolium* dengan perbedaan alat penyaring. Jurnal Pengolahan Hasil Perikanan Indonesia 20 : 351-361.
- Silberfeld, T., F. Rousseau and B. de Reviers. 2014. An Updated Classification of Brown Algae (Ochrophyta, Phaeophyceae). Cryptogamie Algologie 35 :117-156.
- Standar Nasional Indonesia [SNI]. 2002. Ikan Lele dumbo Dumbo (*Clarias gariepinus*) Bagian 5 : Produksi Kelas Pembesaran di Kolam. SNI : 01-6484.5-2002. Badan Standardisasi Nasional.

- Sholikhah, H.E. 2009. Efektivitas Campuran Meniran (*Phyllanthus niruri*) dan Bawang Putih (*Allium sativum*) dalam Pakan Untuk Pengendalian Infeksi Bakteri *Aeromonas hydrophila* pada ikan lele dumbo (*Clarias* sp.). Fakultas Perikanan dan Ilmu Kelautan. Institut Pertanian Bogor. Skripsi.
- Sohne, K.S., M.K. Kim, J.D. Kim and I.K. Han. 2000. The role of immunostimulants in monogastric animal and fish – review. *Journal of Animal Science* 13: 1178-1187.
- Stickney, R.R. 2005. *Aquaculture : An Introductory Text*. CABI Publishing. USA.
- Szekalska, M., M. Wróblewska, K. Sosnowska, and K. Winnicka. 2016. Influence of Sodium Alginate on Hypoglycemic Activity of Metformin Hydrochloride in the Microspheres Obtained by the Spray Drying. *International Journal of Polymer Science* 2016 : 1-12.
- Sohne, K.S., M.K. Kim, J.D. Kim and I.K. Han. 2000. The role of immunostimulants in monogastric animal and fish – review. *Journal of Animal Science* 13: 1178-1187.
- Suprpto, N.S. dan L.S. Samtafsir. 2013. *Bioflok Rahasia Sukses Teknologi Budidaya Lele dumbo*. Agro media. Depok.
- Suyanto, S.R. 2008. *Budidaya Ikan Lele dumbo*. Penebar Swadaya. Jakarta.
- Tambunan, A.P.M., Rudiyansyah, dan Harlia. 2013. Pengaruh Konsentrasi Na_2CO_3 Terhadap Rendemen Natrium Alginat Dari *Sargassum cristaefolium* Asal Perairan Lemukutan. *Jurnal Kajian Komunikasi* 2 : 112-117.
- Uribe, C., H. Folch, R. Enriquez and G. Moran. 2011. Innate and adaptive immunity in teleost fish: a review. *Veterinari Medicina Journal* 56 : 486–503.
- Webster, C.D., and C.E. Lim. 2002. *Nutrien Requirements and Feeding of Finfish for Aquaculture*. CABI Publishing. New York.
- Winarno, F.G. 1990. *Teknologi Pengolahan Rumput Laut*. Pustaka Sinar Harapan. Jakarta.
- Wilson, R. P., O.W.J. Allen, E.H. Robin-son, and W.E. Poe. 1978. Tryptophan and threonine requirements of fingerling channel catfish. *Journal of Nutrition* 108: 1595-1599
- Yulianto, K. 2007. Penelitian Isolasi Alginat Algae Laut Coklat dan Prospek Menuju Industri. *Prosiding Seminar Riptek Kelautan Nasional* p : 104-108.
- Yudiati, E., A. Isnansetyo, Murwantoko, Ayuningtyas, Triyanto and C.R. Handayani. 2016. Innate Immune Stimulating and genes up-regulating activities of three types of alginate from *Sargassum siliquosum* in Pacific white shrimp, *Litopenaeus vannamei*. *Fish and Shellfish Immunology* 54: 46-53.
- Zhang, D., D.H. Xu, and C. Shoemaker. 2016. Experimental induction of motile *Aeromonas* septicemia in channel catfish (*Ictalurus punctatus*) by waterborne challenge with virulent *Aeromonas hydrophila*. *Aquaculture Reports* 3 : 18–23.
- Zhoua, Q., M. Jin, Z.E. Cassian, X. Lianga, and K. Maib. 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.

Zhao, H., H.J. Ma, and S.N. Gao. 2017. Evaluation of dietary vitamin E supplementation on growth performance and antioxidant status in hybrid snakehead (*Channa argus* × *Channa maculata*). *Aquaculture Nutrition* 24 :625–632.