DAFTAR PUSTAKA

Ahmadi, A., Moghadamtousi, S. Z., Abubakar, S., Zandi, K. 2015. Antiviral Potential of Algae Polysaccharides Isolated from Marine Sources : A Review. Biomed Research International.

Alifuddin, M. 2007. Immunostimulan pada Organisme Perairan. *Jurnal Akuakultur Indonesia*, *1*(2), 87.

Al-Massarani, S. M. 2014 .*Phytochemical and Biological Properties of Sesquiterpene Constituens From the Marine Red Reaweed Laurencia*.

Amelia, S. Imunitas Terhadap Penyakit Infeksi. 2011. Universitas Sumatera Utara.

Amrillah, A. M., Widyarti, A., Kilawati, Y. 2015. Dampak Stres Salinitas Terhadap Prevalensi White Spot Syndrome Virus (WSSV) dab *Survival Rate* Udang Vannamei *(Litopenaus vannamei)* pada Kondisi Terkontrol. Research Journal of Life Science. Vol 2 (1).

Anderson, D. P. 1992. Immunostimulant, adjuvant and vaccine carrier in fish: Applications to aquaculture. Annual Review of Fish Diseases, 21: 281-307.

Arafani, L., Ghazali, M., Ali, M. 2016. Pelacakn Virus Bercak Putih pada Udang Vaname *(Litopenaeus vannamei)* di Lombok dengan Real-Time Polymerase Chain Reaction. Jurnal Veteriner. Vol 17 (1) : 88-95.

Bai, R. G., & Tuvikene, R. 2021. Potential antiviral properties of industrially important marine algal polysaccharides and their significance in fighting a future viral pandemic. *Viruses*, *13*(9).

Castro, R. I. Zarrab, & J. Lamas. 2004. Water-soluble Seaweed Extracts Modulate the Pantoea agglomerans lipopolysaccharide (LPS). Fish Shellfish Immunol, 10: 555–558.

Chen, Y. Y., Chen, J. C., Lin, Y. C., Yeh, S. T., Chao, K. P., & Lee, C. S. 2014. White Shrimp *Litopenaeus vannamei* that have received Petalonia binghamiae Extract Activate Immunity, Increase Immune Response and Resistance against *Vibrio alginolyticus. Aquaculture Research & Development.*

Ekawati, A. W., Nursyam, H., Widjayanto, E., & Marsoedi, M. 2012. Diatomae Chaetoceros ceratosporum dalam Formula Pakan Meningkatkan Respon Imun Seluler Udang Windu *(Penaeus monodon Fab.)*. *The Journal of Experimental Life Sciences*, *2*(1), 20–28.

Ellis, A. E., 1990. Lysozyme assay. In: Stolen, J.S., Fletcher, D.P., Anderson, B.S., Robertson, B.S. (Eds), *Techniques in Fish Immunology. SOS Publication, Fair Haven, NJ*, pp. 101-103.

Fabricius. (2022, Oktober 17). WoRMS – *World Register of Marine Species - Penaeus monodon* (Fabr, 1798). Retrieved from WoRMS – Woerld Register of Marine Species : https://www.marinespecies.org/aphia.php?p=taxdetails&id=210378.

Faqih, A. 2013. Teknologi Budidaya Udang Windu Air Tawar. Universitas Brawijaya Press. Malang.

[FAO] Food and Agriculture Organization. 2008. Cultured aquatic species information programme *(Penaeus monodon)* (Fabricius, 1798).

Harikrishnan, R., Kim, J., Balasundaram, C., Heo, M. 2012. Immunomodulatory effects of chitin and chitosan enriched diets in Epinephelus bruneus against Vibrio alginolyticus infection. Aquaculture 326-329:46-52.

Hudha, M. I., Sepdwiyanti, R., Sari, S. D. 2012. Ekstrak karaginan dari rumput laut Eucheuma Spinosum dengan Variasi Suhu Pelarut dan Waktu Operasi. Berkala Ilmiah Teknik Kimia 1: 17–20.

Iskandar, I. 2019. Sistem Pakar Diagnosa Penyakit Pada Udang Windu *(Penaeus Monodon)* Menggunakan Metode Bayes. *Simtek : Jurnal Sistem Informasi Dan Teknik Komputer*, *4*(1), 47–53.

Kasanah., Noer., Triyanto., Drajad S.S., Windi, A., dan Ali, I. 2015. Indones. J. Chem.15 (2), 201– 209.

Klontz, G.W. 1997. Fish hematology. Techniques in fish immunology-3. In Stolen et al. (Eds.). Sos Publications, Fair Haven, NJ 077043303, USA. p. 121—131.

Kono, T., R. Savan, and T. Itami. 2004. Detection of White Spot Sindrome Virus in Shrimp by Loop-Mediated Isothermal Amplification. J. Virol. Methods.115 : 59-65.

Kordi, K. 2010. *Budidaya udang laut*. Penerbit Andi. Yogyakarta, 80. Hal.

Kulkarni, A., Krishnan, S., Anand, D., Kokkattunivarthil Uthaman, S., Otta, S. K., Karunasagar, I., & Kooloth Valappil, R. 2021. Immune responses and immunoprotection in crustaceans with special reference to shrimp. *Reviews in Aquaculture*, *13*(1), 431–459.

Kwang, L. C. 1996. Immune Enhancer in the Control of Disease in Aquaculture. Encap Technology Pte. Ltd. 14, Besut Street, Jurong Town. Singapore : 99-128.

Kyaw, Pa. S. P. 2019. Morphology and distribution of Laurencia sp.1 (Ceramiales, Rhodophyta) from Myanmar. *Journal of Aquaculture & Marine Biology*, *8* (6), 190–196.

Lilisuriani. 2020. Serangan Penyakit Virus Pada Udang Di Tambak Tanpa Memperlihatkan Gejala Klinis. *Octopus : Jurnal Ilmi Perikanan*, *9* (1), 25–32.

Maghfiroh, Y. 2016. Pengaruh Penggunaan Isopropanol dengan Konsentrasi yang Berbeda Terhadap Nilai Rendemen Keraginan yang Diekstraksi dari Rumput Laut Halymenia durvillei (Doctoral Disertation, Universitas Airlangga).

Mahasri, G., Kusdarwati, R., Kismiyati, Rozi, & Gustrifandi, H. 2018. Effectivity of immunostimulant from Zoothamnium penaei protein membrane for decreasing the mortality rate of white shrimp *(Litopenaeus vannamei)* in traditional plus pond. *IOP Conference Series: Earth and Environmental Science*, *137*(1).

Mahab, A., Sawitri, M. E., Al Awwaly, K. U. 2017. Edible Film Protein Whey (Penambahan Lisozim Telur dan Aplikasi di Keju). Universitas Brawijaya Press. Malang.

Mai, W. J., dan Wang, W. N. 2010. Protection of Blue Shrimp *(Litopenaus stylirostris)* against the White Spot Syndrome Virus (WSSV) when Injected with Shrimp Lysozyme. Fish and Shellfish Immunology. Vol 28 (4) : 727-733.

Malole. B. dan Martin, 1987. Virologi. Pusat Antar Universitas. Institut Pertanian Bogor. Lembaga Sumberdaya Informasi. IPB.

Mameloco, E. J. G., & Traifalgar, R. F. M. 2020. Supplementation of combined mannan oligosaccharide and β-glucan immunostimulants improves immunological responses and enhances resistance of pacific whiteleg shrimp, *penaeus vannamei*, against vibrio parahaemolyticus infection. *International Aquatic Research*, *12*(4), 291–299.

Manoppo, H., dan Kolopita, M. E. F. 2014. Respon Imun Krustasea. Review Artikel. Vol 2 (2) : 22-26.

Mujiman, A. dan R. Suyanto. 2003. Budidaya Udang Windu. Penebar Swadaya. Jakarta. hal 211.

Mulyaningrum, S. R. H., Parenrengi, A., Tampangallo, B. R., & Trismawanti, I. 2018. *Respons imun udang windu*. *13*(129), 77–84.

Mulyani, A., Parenrengi., Sulaiman., Atmomarsono, M. 2004. Prevalensi, Intensitas dan Transmisi *White Spot Syndrome Virus* (WSSV) pada Budidaya Udang Windu *(Penaeus monodon).* J. Pen. Indonesia. 10 : 103-110.

Pangloli, N. Y. 2019.Evaluasi Potensi Ekstrak Rumput Laut *Halymenia* Sp. Sebagai Imunostimulan Pada Udang Windu (Penaeus Monodon Fabricius, 1798). Program Sarjana. Program Studi Budidaya Perairan. Jurusan Perikanan,Fakultas Ilmu Kelautan Dan Perikanan Universitas Hasanuddin, Makassar.

Pratiwi, R. 2008. Aspek biologi udang ekonomis penting. *Oseana*, 33 (2): 15-24.

Pratiwi, R. 2018. Aspek Biologi dan Ablasi Mata pada Udang Windu *Penaeus monodon* Suku Penaeide (Decapoda: Malacostraca). *Oseana*, *43* (2), 34–47.

Rahim, N., Wulan, S., Zainuddin, E. N. 2020. Potensi Ekstrak *Ulva reticulata* Dalam Meningkatkan Aktivitas Lisozim dan Diferansiasi Hemosit pada Udang Windu *(Penaeus monodon)*. Jurnal Aquafish Saintek, 1(1), 1-9.

Rahima, & Nurul, I. 2017. Pengujian Ekstrak Alga Laut Eucheuma Cottonii terhadap Udang Vanamei (Litopenaeus vannamei) yang Terinfeksi White Spot Syndrom Virus (WSSV). Universitas Brawijaya.

Rahma, H. N., Prayitno, S. B., & Haditomo, A. H. C. 2014. Infeksi *White Spot Syndrom Virus* (Wssv) Pada Udang Windu *(Penaeus Monodon Fabr.)* Yang Dipelihara Pada Salinitas Media Yang Berbeda. *Journal Of Aquaculture Management And Technology*. *3*(3): 26-34.

Ridlo, A., & Pramesti, R. 2009. *Aplikasi Ekstrak Rumput Laut Sebagai Agen Imunostimulan Sistem Pertahanan Non Spesifik Pada Udang (Litopennaeus vannamei). 14*(13), 133–137.

Rodriguez L., and Le Moullac G. 2000. State of the art of immunological tools and health control of penaeid shrimp. Aquaculture 191: 109-119.

Rowley, A. F. 1993. Collection, separation and identification of fish leukocytes In Stolen et al. (Eds.). Techniques in Fish Immunology-1. Sos Publications, Fair Haven, NJ 07760 USA. p. 113—136.

Rukyani, E. 2000. Masalah Penyakit Udang dan Harapan Solusinya. Akuakultur Nasional. Pusat Penelitian dan Pengembangan Perikanan. Jakarta.

Rustikawati, I. 2012. Efektivitas Ekstrak Sargassum Sp. Terhadap Diferensiasi Leukosit Ikan Nila *(Oreochromis Niloticus)* Yang Diinfeksi Streptococcus Iniae. *Jurnal Akuatika Indonesia*, *3*(2), 245375.

Sahabuddin., dan Suwoyo, S. 2018. Indeks Biologi Pakan Alami pada Budidaya Udang Windu *(Penaeus monodon)* Semi Intensif di Tambak Beton. Vol 7 (1).

Sakai, M. 1999. Current Research Status of Fish Immunostimulants. Aquaculture 172 : 63-92.

Satyantini, W. H., Kurniawan, A., & Kusdarwati, R. 2016. Penambahan Ekstrak Gracilaria verrucosa Terhadap Peningkatan Total Hemosit, Kelangsungan Hidup dan Respon Fisiologi Udang Galah *(Macrobrachium rosenbergii)*. Jurnal Akuatika Indonesia. Vol. 1 No. 2 : 120-129.

Sinurat, E., dan Kusumawati, R. 2017. Optimasi Metode Ekstraksi Fukoidan Kasar dari Rumput Laut Cokelat Sargassum binderi Sonder. Balai Besar Riset Pengolahan Produk dan Bioteknologi Kelautan dan Perikanan.

Soetomo, M. H. A. 2000. Teknik budidaya udang windu. Sinar Baru Algensindo. Bandung.

Tompo, A., Susianingsih, E., dan Nurbaya. 2012. Budidaya Udang Windu Melalui Penggunaan Bakteri, Probiotik, dan Imunostimulan Herbal Terhadap Sintasan dan Produktif. Prosiding Indoaqua-Forum Inovasi Teknologi Akuakultur.

Wahjuningrum, D., Sholeh, S. H., Nuryati, S. 2006. Pencegahan Infeksi Virus *White Spot Syndrome Virus* (WSSV) pada Udang Windu *Penaeus monodon* dengan Cairan Ekstrak Pohon Mangrove (CEPM) *Avicennia* sp. and *Sonneratia* sp. Jurnal Akuakultur Indonesia. Vol 5 (1) : 65-75.

Walker, P. J. and Cowley, J. A. 2003. *Viral Genetic Variation : Implications for Disease Diagnosis and Delection of Shrimp Pathogens*. Co-operative Research Centre of Aquaculture, CSIRO Tropical Aquaculture, PMB3 Indooroopily. Australia.

Wijesekara I, Pangestuti R, Kim S-K. 2011. Biological activities and potential health benefits of sulfated polysaccharides derived from marine algae. *Carbohydrate Polymers*, 84(1), 14-21. https://doi.org/10.1016/j.carbpol.2010.10.062

WoRMS – World Register of Marine Species – Laurencia sp. Retrieved from WoRMS – World Register of Marine Species: https://www.marinespecies.org/aphia.php?p=taxdetails&id=143914

Yano T. 1996. The nonspecific immune system: Humoral Defences . Didalam : Iwama G, Nakanishi T, editor. The Immune System: Organism, Pathogen and Environment. USA (US): Academic Press. hlm 105-1157.

Zhang, Z., Aweya, J. J., Yao, D., Zheng, Z., Tran, N. T., Li, S., & Zhang, Y. 2021. Ubiquitination as an Important Host-Immune Response Strategy in Penaeid Shrimp: Inferences From Other Species. *Frontiers in Immunology*, *12* (5), 1–11.

LAMPIRAN

Lampiran 1. Data rata-rata aktivitas lisozim.

Perlakuan	Hari			
	0	1	3	5
	Aktivitas Lisozim			
A (0)	$0.57{\pm}0.10^b$	$0.76{\pm}0.05^b$	$0.77{\pm}0.06^b$	$0.64{\pm}0.02^b$
B (10)	$0.74{\pm}0.13^b$	$0.85{\pm}0.07^b$	$0.82{\pm}0.03^{ba}$	$0.59{\pm}0.02^b$
C (30)	$0.83{\pm}0.15^b$	$0.81{\pm}0.04^b$	$0.92{\pm}0.06^a$	$0.65{\pm}0.06^b$
D (50)	$0.76{\pm}0.02^b$	$0.82{\pm}0.10^b$	$0.90{\pm}0.03^{ba}$	$0.60{\pm}0.02^b$

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
LAsatu	Between Groups	.012	3	.004	.773	.541
	Within Groups	.042	8	.005		
	Total	.054	11			
LAtiga	Between Groups	.041	3	.014	5.425	.025
	Within Groups	.020	8	.003		
	Total	.061	11			
LAlima	Between Groups	.008	3	.003	1.843	.218
	Within Groups	.011	8	.001		
	Total	.019	11			

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) Perlakuan	(J) Perlakuan	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
LAnol	A (0)	B (10)	-.17667	.09440	.311	-.4790	.1256
		C (30)	-.26667	.09440	.085	-.5690	.0356
		D (50)	-.19000	.09440	.260	-.4923	.1123
	B (10)	A (0)	.17667	.09440	.311	-.1256	.4790
		C (30)	-.09000	.09440	.778	-.3923	.2123
		D (50)	-.01333	.09440	.999	-.3156	.2890
	C (30)	A (0)	.26667	.09440	.085	-.0356	.5690
		B (10)	.09000	.09440	.778	-.2123	.3923
		D (50)	.07667	.09440	.847	-.2256	.3790
	D (50)	A (0)	.19000	.09440	.260	-.1123	.4923
		B (10)	.01333	.09440	.999	-.2890	.3156
		C (30)	-.07667	.09440	.847	-.3790	.2256
LAsatu	A (0)	B (10)	-.08667	.05897	.496	-.2755	.1022
		C (30)	-.04667	.05897	.856	-.2355	.1422
		D (50)	-.06333	.05897	.714	-.2522	.1255
	B (10)	A (0)	.08667	.05897	.496	-.1022	.2755
		C (30)	.04000	.05897	.902	-.1489	.2289
		D (50)	.02333	.05897	.978	-.1655	.2122
	C (30)	A (0)	.04667	.05897	.856	-.1422	.2355
		B (10)	-.04000	.05897	.902	-.2289	.1489
		D (50)	-.01667	.05897	.992	-.2055	.1722
	D (50)	A (0)	.06333	.05897	.714	-.1255	.2522
		B (10)	-.02333	.05897	.978	-.2122	.1655
		C (30)	.01667	.05897	.992	-.1722	.2055
LAtiga	A (0)	B (10)	-.04667	.04103	.679	-.1781	.0847
		C (30)	-.14333*	.04103	.033	-.2747	-.0119
		D (50)	-.12667	.04103	.059	-.2581	.0047
	B (10)	A (0)	.04667	.04103	.679	-.0847	.1781
		C (30)	-.09667	.04103	.164	-.2281	.0347
		D (50)	-.08000	.04103	.282	-.2114	.0514
	C (30)	A (0)	.14333*	.04103	.033	.0119	.2747
		B (10)	.09667	.04103	.164	-.0347	.2281
		D (50)	.01667	.04103	.976	-.1147	.1481
	D (50)	A (0)	.12667	.04103	.059	-.0047	.2581
		B (10)	.08000	.04103	.282	-.0514	.2114
		C (30)	-.01667	.04103	.976	-.1481	.1147
LAlima	A (0)	B (10)	.05333	.03073	.367	-.0451	.1517
		C (30)	-.00667	.03073	.996	-.1051	.0917
		D (50)	.04000	.03073	.587	-.0584	.1384
	B (10)	A (0)	-.05333	.03073	.367	-.1517	.0451
		C (30)	-.06000	.03073	.281	-.1584	.0384
		D (50)	-.01333	.03073	.971	-.1117	.0851
	C (30)	A (0)	.00667	.03073	.996	-.0917	.1051
		B (10)	.06000	.03073	.281	-.0384	.1584
		D (50)	.04667	.03073	.471	-.0517	.1451
	D (50)	A (0)	-.04000	.03073	.587	-.1384	.0584
		B (10)	.01333	.03073	.971	-.0851	.1117
		C (30)	-.04667	.03073	.471	-.1451	.0517

*. The mean difference is significant at the 0.05 level.

Lampiran 2. Data rata-rata sintasan

Dosis	H1	H2	H3	H4	H5	H6	H7
A = Kontrol	88,33	84	73	62	57,66	53	50,66
B = 0,2 mg	93	84	77,66	68,33	64,33	57,33	50,66
C = 0,6 mg	93	84	79,66	73	68,66	59,66	52,66
D = 1 mg	90,66	86	75,33	70,66	66	57,66	48,33

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Harisatu	Between Groups	44.917	3	14.972	.733	.561
	Within Groups	163.333	8	20.417		
	Total	208.250	11			
Haridua	Between Groups	9.000	3	3.000	.333	.802
	Within Groups	72.000	8	9.000		
	Total	81.000	11			
Haritiga	Between Groups	74.917	3	24.972	.806	.525
	Within Groups	248.000	8	31.000		
	Total	322.917	11			
Hariempat	Between Groups	201.667	3	67.222	2.871	.104
	Within Groups	187.333	8	23.417		
	Total	389.000	11			
Harilima	Between Groups	197.667	3	65.889	1.481	.292
	Within Groups	356.000	8	44.500		
	Total	553.667	11			
Harienam	Between Groups	70.917	3	23.639	.371	.776
	Within Groups	510.000	8	63.750		
	Total	580.917	11			
Haritujuh	Between Groups	28.250	3	9.417	.207	.889
	Within Groups	364.667	8	45.583		
	Total	392.917	11			

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) Perlakuan	(J) Perlakuan	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Harisatu	A 0	B 10	-4.66667	3.68932	.607	-16.4812	7.1478
		C 30	-4.66667	3.68932	.607	-16.4812	7.1478
		D 50	-2.33333	3.68932	.919	-14.1478	9.4812
	B 10	A 0	4.66667	3.68932	.607	-7.1478	16.4812
		C 30	.00000	3.68932	1.000	-11.8145	11.8145
		D 50	2.33333	3.68932	.919	-9.4812	14.1478
	C 30	A 0	4.66667	3.68932	.607	-7.1478	16.4812
		B 10	.00000	3.68932	1.000	-11.8145	11.8145
		D 50	2.33333	3.68932	.919	-9.4812	14.1478
	D 50	A 0	2.33333	3.68932	.919	-9.4812	14.1478
		B 10	-2.33333	3.68932	.919	-14.1478	9.4812
		C 30	-2.33333	3.68932	.919	-14.1478	9.4812
Haridua	A 0	B 10	.00000	2.44949	1.000	-7.8441	7.8441
		C 30	.00000	2.44949	1.000	-7.8441	7.8441
		D 50	-2.00000	2.44949	.845	-9.8441	5.8441
	B 10	A 0	.00000	2.44949	1.000	-7.8441	7.8441
		C 30	.00000	2.44949	1.000	-7.8441	7.8441
		D 50	-2.00000	2.44949	.845	-9.8441	5.8441
	C 30	A 0	.00000	2.44949	1.000	-7.8441	7.8441
		B 10	.00000	2.44949	1.000	-7.8441	7.8441
		D 50	-2.00000	2.44949	.845	-9.8441	5.8441
	D 50	A 0	2.00000	2.44949	.845	-5.8441	9.8441
		B 10	2.00000	2.44949	.845	-5.8441	9.8441
		C 30	2.00000	2.44949	.845	-5.8441	9.8441
Haritiga	A 0	B 10	-4.66667	4.54606	.740	-19.2248	9.8914
		C 30	-6.66667	4.54606	.497	-21.2248	7.8914
		D 50	-2.33333	4.54606	.954	-16.8914	12.2248
	B 10	A 0	4.66667	4.54606	.740	-9.8914	19.2248
		C 30	-2.00000	4.54606	.970	-16.5581	12.5581
		D 50	2.33333	4.54606	.954	-12.2248	16.8914
	C 30	A 0	6.66667	4.54606	.497	-7.8914	21.2248
		B 10	2.00000	4.54606	.970	-12.5581	16.5581
		D 50	4.33333	4.54606	.778	-10.2248	18.8914
	D 50	A 0	2.33333	4.54606	.954	-12.2248	16.8914
		B 10	-2.33333	4.54606	.954	-16.8914	12.2248
		C 30	-4.33333	4.54606	.778	-18.8914	10.2248
Hariempat	A 0	B 10	-6.33333	3.95109	.429	-18.9861	6.3194
		C 30	-11.00000	3.95109	.090	-23.6528	1.6528
		D 50	-8.66667	3.95109	.205	-21.3194	3.9861
	B 10	A 0	6.33333	3.95109	.429	-6.3194	18.9861
		C 30	-4.66667	3.95109	.654	-17.3194	7.9861
		D 50	-2.33333	3.95109	.932	-14.9861	10.3194
	C 30	A 0	11.00000	3.95109	.090	-1.6528	23.6528
		B 10	4.66667	3.95109	.654	-7.9861	17.3194
		D 50	2.33333	3.95109	.932	-10.3194	14.9861
	D 50	A 0	8.66667	3.95109	.205	-3.9861	21.3194
		B 10	2.33333	3.95109	.932	-10.3194	14.9861
		C 30	-2.33333	3.95109	.932	-14.9861	10.3194
Harilima	A 0	B 10	-6.66667	5.44671	.630	-24.1090	10.7756
		C 30	-11.00000	5.44671	.257	-28.4423	6.4423
		D 50	-8.33333	5.44671	.465	-25.7756	9.1090
	B 10	A 0	6.66667	5.44671	.630	-10.7756	24.1090
		C 30	-4.33333	5.44671	.855	-21.7756	13.1090
		D 50	-1.66667	5.44671	.989	-19.1090	15.7756
	C 30	A 0	11.00000	5.44671	.257	-6.4423	28.4423
		B 10	4.33333	5.44671	.855	-13.1090	21.7756
		D 50	2.66667	5.44671	.959	-14.7756	20.1090
	D 50	A 0	8.33333	5.44671	.465	-9.1090	25.7756
		B 10	1.66667	5.44671	.989	-15.7756	19.1090
		C 30	-2.66667	5.44671	.959	-20.1090	14.7756
Harienam	A 0	B 10	-4.33333	6.51920	.907	-25.2101	16.5434
		C 30	-6.66667	6.51920	.742	-27.5434	14.2101
		D 50	-4.66667	6.51920	.888	-25.5434	16.2101
	B 10	A 0	4.33333	6.51920	.907	-16.5434	25.2101
		C 30	-2.33333	6.51920	.983	-23.2101	18.5434
		D 50	-.33333	6.51920	1.000	-21.2101	20.5434
	C 30	A 0	6.66667	6.51920	.742	-14.2101	27.5434
		B 10	2.33333	6.51920	.983	-18.5434	23.2101
		D 50	2.00000	6.51920	.989	-18.8768	22.8768
	D 50	A 0	4.66667	6.51920	.888	-16.2101	25.5434
		B 10	.33333	6.51920	1.000	-20.5434	21.2101
		C 30	-2.00000	6.51920	.989	-22.8768	18.8768
Haritujuh	A 0	B 10	.00000	5.51261	1.000	-17.6533	17.6533
		C 30	-2.00000	5.51261	.983	-19.6533	15.6533
		D 50	2.33333	5.51261	.973	-15.3200	19.9867
	B 10	A 0	.00000	5.51261	1.000	-17.6533	17.6533
		C 30	-2.00000	5.51261	.983	-19.6533	15.6533
		D 50	2.33333	5.51261	.973	-15.3200	19.9867
	C 30	A 0	2.00000	5.51261	.983	-15.6533	19.6533
		B 10	2.00000	5.51261	.983	-15.6533	19.6533
		D 50	4.33333	5.51261	.859	-13.3200	21.9867
	D 50	A 0	-2.33333	5.51261	.973	-19.9867	15.3200
		B 10	-2.33333	5.51261	.973	-19.9867	15.3200
		C 30	-4.33333	5.51261	.859	-21.9867	13.3200

Lampiran 3. Penentuan dosis injeksi

Berdasarkan metode Chen et al., (2014) terdapat 3 konsentrasi ekstrak yang digunakan pada dosis 1, 3, dan 5 mg. Sehingga untuk membuat larutan sebanyak 10 ml digunakan dengan dosis 10, 30, 50 mg. Setiap udang yang diinjeksi diberikan sebanyak 0,2 ml/ekor, sehingga pada pemberian dosis yang berbeda setiap ekor mendapatkan :

Pada dosis 10 mg.

10 ml = 10 mg ekstrak

0,2 ml =X

$$X = \frac{0,2 \text{ ml x } 10 \text{ mg}}{10 \text{ ml}}$$

= 0,2 mg

Sehingga pada dosis 10 mg setiap udang yang diinjeksi ekstrak Laurencia sp. diberikan sebanyak 0,2 mg/ekor.

Pada dosis 30 mg.

10 ml = 30 mg ekstrak

0,2 ml =X

$$X = \frac{0,2 \text{ ml x } 30 \text{ mg}}{10 \text{ ml}}$$

= 0,6 mg

Sehingga pada dosis 30 mg setiap udang yang diinjeksi ekstrak Laurencia sp. diberikan sebanyak 0,6 mg/ekor.

Pada dosis 50 mg.

10 ml = 50 mg ekstrak

0,2 ml =X

$$X = \frac{0,2 \text{ ml x } 50 \text{ mg}}{10 \text{ ml}}$$

= 1 mg

Sehingga pada dosis 50 mg setiap udang yang diinjeksi ekstrak Laurencia sp. diberikan sebanyak 1 mg/ekor.

Lampiran 4. Dokumentasi Kegiatan
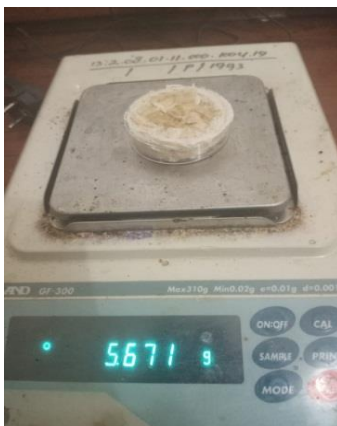

Rumput laut *Laurencia* sp.

Proses penjemuran

Menimbang rumput laut

Proses pembuatan ekstrak *Laurencia* sp.

Hasil Ekstrak Laurencia sp.

Proses penyuntikan

Hemosit Udang Windu

Pengamatan lisozim

Udang yang terinfeksi WSSV