# DAFTAR PUSTAKA


American Public Health Association (APHA). 1976. Standard methods for the examination of water and wastewater. 4th edition. American Public Health Association, Washington DC. 1193 p.

Anastasopoulou, A., Mytilineou, C., Smith, C. J., & Papadopoulou, K. N. (2013). Plastic debris ingested by deep-water fish of the Ionian Sea (Eastern Mediterranean). Deep-Sea Research I, 174, 11-13.

Abayomi, O. A., Range, P., Al-Ghouti, M. A., Obbard, J. P., Almeer, S. H., & Ben-Hamadou, R. (2017). Microplastics in coastal environments of the Arabian Gulf. *Marine Pollution Bulletin*, 124 (1), 181–188. https://doi.org/10.1016/j.marpolbul.2017.07.011

Abu-Hilal, A. H., & Al-Najjar, T. H. (2009). Plastic pellets on the beaches of the Northern Gulf of Aqaba, Red Sea. *Aquatic Ecosystem Health and Management*, 12 (4), 461–470. https://doi.org/10.1080/14634980903361200

Akhbarizadeh, R., Moore, F., Keshavarzi, B., & Moeinpour, A. (2017). Microplastics and potentially toxic elements in coastal sediments of Iran's main oil terminal (Khark Island). *Environmental Pollution*, 220, 720–731. https://doi.org/10.1016/j.envpol.2016.10.038

Akkajit, P., & Khongsang, A. (2022). Distribution of microplastics along Mai Khao Coastline, Phuket. *Journal of Engineering and Technological Sciences*, 54 (1). https://doi.org/10.5614/j.eng.technol.sci.2022.54.1.5

Alegre, A., Ménard, F., Tafur, R., Espinoza, P., Argüelles, J., Maehara, V., Flores, O., Simier, M., & Bertrand, A. (2014). Comprehensive model of jumbo squid dosidicus gigas trophic ecology in the Northern Humboldt current system. *PLoS ONE*, 9 (1). https://doi.org/10.1371/journal.pone.0085919

Aliabad, M. K., Nassiri, M., & Kor, K. (2019). Microplastics in the surface seawaters of Chabahar Bay, Gulf of Oman (Makran Coasts). *Marine Pollution Bulletin*, 143 (November 2018), 125–133. https://doi.org/10.1016/j.marpolbul.2019.04.037

Alimba, C. G., & Faggio, C. (2019). Microplastics in the marine environment: Current trends in environmental pollution and mechanisms of toxicological profile. *Environmental Toxicology and Pharmacology*, 68 (February), 61–74. https://doi.org/10.1016/j.etap.2019.03.001

Andrady, A. L. (2011). Microplastics in the marine environment. *Marine Pollution Bulletin*, 62 (8), 1596–1605. https://doi.org/10.1016/j.marpolbul.2011.05.030

Arias, A. H., Ronda, A. C., Oliva, A. L., & Marcovecchio, J. E. (2019). Evidence of microplastic ingestion by fish from the Bahía Blanca Estuary in Argentina, South America. *Bulletin of Environmental Contamination and Toxicology*, 102 (6), 750–756. https://doi.org/10.1007/s00128-019-02604-2

Azizi, A., Maulida, N., Setyowati, W. N., Fairus, S., & Puspito, D. A. (2022). Microplastic pollution in the water and sediment of Krukut River, Jakarta, Indonesia. *IOP Conference Series: Earth and Environmental Science*, 986 (1). https://doi.org/10.1088/1755-1315/986/1/012084

Baalkhuyur, F. M., Bin Dohaish, E. J. A., Elhalwagy, M. E. A., Alikunhi, N. M., Al Suwailem, A. M., Røstad, A., Coker, D. J., Berumen, M. L., & Duarte, C. M. (2018). Microplastic in the gastrointestinal tract of fishes along the Saudi Arabian Red Sea Coast. *Marine Pollution Bulletin*, 131 (April), 407–415. https://doi.org/10.1016/j.marpolbul.2018.04.040

Bajpai, S. K., Mary, G., & Chand, N. (2015). The use of cotton fibers as reinforcements in composites. *Biofiber Reinforcements in Composite Materials*, 320–341. https://doi.org/10.1533/9781782421276.3.320

Balamurugan, G., & Rafi, I. M. (2021). An experimental study on plastic paver tiles. *International Journal of Innovative Research in Scienci, Engineering and Technology (IJIRSET)*, 10 (May). https://doi.org/10.15680/IJIRSET.2021.1005023

Barletta, M., Costa, M. F., & Dantas, D. V. (2020). Ecology of microplastics contamination within food webs of estuarine and coastal ecosystems. *MethodsX*, 7. https://doi.org/10.1016/j.mex.2020.100861

Barot, A. A., Byblos roads marking and traffic signs LLC, D., & Emirates, U. A. (2019). Polyester the workhorse of polymers: A review from synthesis to recycling. 11 (2), 1–19. www.scholarsresearchlibrary.com

Bayo, J., Rojo, D., Martínez-Baños, P., López-Castellanos, J., & Olmos, S. (2021). Commercial gilthead seabream (Sparus aurata L.) from the mar menor coastal lagoon as hotspots of microplastic accumulation in the digestive system. *International Journal of Environmental Research and Public Health*, 18 (13). https://doi.org/10.3390/ijerph18136844

Beyl, S. (2019). *Hybrid Quantum Monte Carlo for Condensed Matter Models*. https://opus.bibliothek.uni-wuerzburg.de/frontdoor/index/index/docId/19122

Bissen, R., & Chawchai, S. (2020). Microplastics on beaches along the Eastern Gulf of Thailand – A preliminary study. *Marine Pollution Bulletin*, 157 (June), 111345. https://doi.org/10.1016/j.marpolbul.2020.111345

Blettler, M. C. M., Ulla, M. A., Rabuffetti, A. P., & Garello, N. (2017). Plastic pollution in freshwater ecosystems: macro-, meso-, and microplastic debris in a floodplain lake. *Environmental Monitoring and Assessment*, 189 (11). https://doi.org/10.1007/s10661-017-6305-8

Boerger, C. M., Lattin, G. L., Moore, S. L., & Moore, C. J. (2010). Plastic ingestion by planktivorous fishes in the North Pacific Central Gyre. *Marine Pollution Bulletin*, 60 (12), 2275–2278. https://doi.org/10.1016/j.marpolbul.2010.08.007

Boustead, I. (2005). *Polyvinylchloride (PVC) (Emulsion Polymerisation)*. *March*, 1–17.

Browne, M. A., Crump, P., Niven, S. J., Teuten, E., Tonkin, A., Galloway, T., & Thompson, R. (2011). Accumulation of microplastic on shorelines woldwide: sources and sinks. *Environmental Science and Technology*, 45 (21), 9175–9179. https://doi.org/10.1021/es201811s

Bucol, L. A., Romano, E. F., Cabcaban, S. M., Siplon, L. M. D., Madrid, G. C., Bucol, A. A., & Polidoro, B. (2020). Microplastics in marine sediments and rabbitfish (Siganus fuscescens) from selected coastal areas of Negros Oriental, Philippines. *Marine Pollution Bulletin*, 150 (October), 110685. https://doi.org/10.1016/j.marpolbul.2019.110685

Buwono, N. R., Risjani, Y., & Soegianto, A. (2021). Distribution of microplastic in relation to water quality parameters in the Brantas River, East Java, Indonesia. *Environmental Technology and Innovation*, 24, 101915. https://doi.org/10.1016/j.eti.2021.101915

Carbery, M., O'Connor, W., & Palanisami, T. (2018). Trophic transfer of microplastics and mixed contaminants in the marine food web and implications for human health. *Environment International*, 115 (December 2017), 400–409. https://doi.org/10.1016/j.envint.2018.03.007

Carpenter, E.J., Smith, K.L., 1972. Plastics on the Sargasso Sea surface. Science (80.). 175, 1240-1241. https://doi.org/10.1126/science.175.4027.1240

Cauwenberghe, L. Van, Galgani, F., Robbens, J., & Janssen, R. (2015). Microplastics in sediments: A review of techniques, occurrence and effects. *Marine Environmental Research*. https://doi.org/10.1016/j.marenvres.2015.06.007

Chatterjee, S., & Sharma, S. (2019). Microplastics in our oceans and marine health. *Field Actions Science Reports The Journal of Field Actions*, 19, 54–61.

Chu, C. C. (2013). Materials for absorbable and nonabsorbable surgical sutures. *In Biotextiles As Medical Implants*. Woodhead Publishing Limited. https://doi.org/10.1533/9780857095602.2.275

Cincinelli A., Scopetani C., Chelazzi D., Lombardini E., etc. 2017. Microplastic in the surface waters of the Ross Sea (Antartica) occurrence, distribution and characterictic by FTIR. Chemosphere 175: 391 – 399

Cole, M., Lindegue, P., Halsband, C., & Galloway, T. S. (2011). Microplastics as contaminants in the marine environment: A review. *Marine Pollution Bulletin*, 62 (12), 2588-2597. Https://Doi.Org/10.1016/J.Marpolbul.2011.09.025

Conkle, J. L., Baez Del Valle, C. D., & Turner, J. W. (2018). Are we underestimating microplastic contamination in aquatic environments? *Environmental Management*, 6111). Https://Doi.0rg/10.1007/500267-017 0947-8

Cordova, M. R. (2021). *Panduan Metode Sampling, Analisis, dan Identifikasi.*

Crump, A., Mullens, C., Bethell, E. J., Cunningham, E. M., Arnott, G., & Crump, A. (2020). *Microplastics Disrupt Hermit Crab Shell selection*. 1–4.

Darnilawati. (2020). *Pola distribusi kelomang di pantai momong Kecamatan*

*Lhoknga Kabupaten Aceh Besar sebagai penunjang praktikum ekologi hewan*.

de Haan, W. P., Sanchez-Vidal, A., & Canals, M. (2019). Floating microplastics and aggregate formation in the Western Mediterranean Sea. *Marine Pollution Bulletin*, 140 (December 2018), 523–535. https://doi.org/10.1016/j.marpolbul.2019.01.053

Dehaut, A., Cassone, A. L., Frère, L., Hermabessiere, L., Himber, C., Rinnert, E., Rivière, G., Lambert, C., Soudant, P., Huvet, A., Duflos, G., & Paul-Pont, I. (2016). Microplastics in seafood: benchmark protocol for their extraction and characterization. *Environmental Pollution*, 215, 223–233. https://doi.org/10.1016/j.envpol.2016.05.018

Di, M., & Wang, J. (2018). Microplastics in surface waters and sediments of the three Gorges Reservoir, China. *Science of the Total Environment*, *616–617*, 1620–1627. https://doi.org/10.1016/j.scitotenv.2017.10.150

Dobaradaran, S., Schmidt, T. C., Nabipour, I., Khajeahmadi, N., Tajbakhsh, S., Saeedi, R., Javad Mohammadi, M., Keshtkar, M., Khorsand, M., & Faraji Ghasemi, F. (2018). Characterization of plastic debris and association of metals with microplastics in coastline sediment along the Persian Gulf. *Waste Management*, 78, 649–658. https://doi.org/10.1016/j.wasman.2018.06.037

Downing, J. (2008). Comparison of suspended solids concentration (SSC) and turbidity. *Technical Review (App. Note Code: 2Q-AA), Campbell …, April*. http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Comparison+of+Suspended+Solids+Concentration+(SSC)+and+Turbidity#1

Dris, R., Gasperi, J., Saad, M., Mirande, C., & Tassin, B. (2016). Synthetic fibers in atmospheric fallout: a source of microplastics in the environment? *Marine Pollution Bulletin*, 104 (1–2), 290–293. https://doi.org/10.1016/j.marpolbul.2016.01.006

e Silva, P. H. S., & de Sousa, F. D. B. (2021). Microplastic pollution of Patos Lagoon, South of Brazil. *Environmental Challenges*, 4 (January 2021), 100076. https://doi.org/10.1016/j.envc.2021.100076

Eddy. 2008. Karakteristik limbah cair. Jurnal Ilmiah Teknik Lingkungan, Vol.2, No.2, p.20.

Eerkes-Medrano, D., Thompson, R. C., & Aldridge, D. C. (2015). Microplastics in freshwater systems: A review of the emerging threats, identification of knowledge gaps and prioritisation of research needs. *Water Research*, 75, 63–82. https://doi.org/10.1016/j.watres.2015.02.012

Effendi, H. 2003. *Telaah Kualitas Air: Bagi Pengelolaan Sumberdaya Alam dan Lingkungan Perairan.* Yogyakarta: Kanisius,

Esposito, G., Prearo, M., Renzi, M., Anselmi, S., Cesarani, A., Barcelò, D., Dondo, A., & Pastorino, P. (2022). Occurrence of microplastics in the gastrointestinal tract of benthic by–catches from an Eastern Mediterranean Deep–Sea Environment. *Marine Pollution Bulletin*, 174 (October 2021), 113231. https://doi.org/10.1016/j.marpolbul.2021.113231

Expósito, N., Rovira, J., Sierra, J., Folch, J., & Schuhmacher, M. (2021). Microplastics levels, size, morphology and composition in marine water, sediments and sand beaches. Case Study of Tarragona coast (Western Mediterranean). *Science of the Total Environment*, 786, 147453. https://doi.org/10.1016/j.scitotenv.2021.147453

Federer WT. 1963. *Experimental Design: Theory and Application.* New York: Macmillan.

Fehr, M., De Castro, M. S. M. V., & Calcado, M. D. R. (2000). A practical solution to the problem of household waste management in Brazil. *Resources, Conservation and Recycling*, 30 (3), 245-257. Https://Doi.org/10.1016/50921-3449(00)00063-X

Figueiredo, G. M., & Vianna, T. M. P. (2018). Suspended microplastics in a highly polluted bay: abundance, size, and availability for mesozooplankton. *Marine Pollution Bulletin*, 135 (July), 256–265. https://doi.org/10.1016/j.marpolbul.2018.07.020

Firdaus, M., Trihadiningrum, Y., & Lestari, P. (2020). Microplastic pollution in the sediment of Jagir Estuary, Surabaya City, Indonesia. *Marine Pollution Bulletin*, 150 (September), 110790. https://doi.org/10.1016/j.marpolbul.2019.110790

Forsberg, P. L., Sous, D., Stocchino, A., & Chemin, R. (2020). Behaviour of plastic litter in nearshore waters: First insights from wind and wave laboratory experiments. *Marine Pollution Bulletin*, 153 (October 2019), 111023. https://doi.org/10.1016/j.marpolbul.2020.111023

Frias, J., Pagter, E., Nash, R., O'Connor, I., Carretero, O., Filgueiras, A., Viñas, L., Gago, J., Antunes, J., Bessa, F., Sobral, P., Goruppi, A., Tirelli, V., Pedrotti, M. L., Suaria, G., Aliani, S., Lopes, C., Raimundo, J., Caetano, M., … Gerdts, G. (2018). Standardised protocol for monitoring microplastics in sediments. *JPI-Oceans BASEMAN Project*, *May*, 33. https://doi.org/10.13140/RG.2.2.36256.89601/1

Frias, J. P. G. L., Otero, V., & Sobral, P. (2014). Evidence of microplastics in samples of zooplankton from Portuguese Coastal Waters. *Marine Environmental Research*, 95, 89-95. Https://Doi.Org/10.1016/J.Marenvres.2014.01.001

Galli, M., Tepsich, P., Baini, M., Panti, C., Rosso, M., Vafeiadou, A., Pantelidou, M., Moulins, A., & Fossi, M. C. (2022). Microplastic abundance and biodiversity richness overlap: Identification of sensitive areas in the Western Ionian Sea. *Marine Pollution Bulletin*, 177 (September 2021).

Galloway, T. S., Cole, M., & Lewis, C. (2017). Interactions of microplastic debris throughout the marine ecosystem. *Nature Ecology and Evolution*, 1 (5), 1–8. https://doi.org/10.1038/s41559-017-0116

Gao, F., Li, J., Hu, J., Sui, B., Wang, C., Sun, C., Li, X., & Ju, P. (2021). The seasonal distribution characteristics of microplastics on bathing beaches along the Coast of Qingdao, China. *Science of the Total Environment*, 783, 146969.

https://doi.org/10.1016/j.scitotenv.2021.146969

GESAMP. (2019). Guidelines for the monitoring and assessment of plastic litter in the ocean. In *Rep. Stud. GESAMP* (Vol. 99). http://www.gesamp.org/publications/guidelines-for-the-monitoring-and assessment-of-plastic-litter-in-the-ocean

Gewert, B., Ogonowski, M., Barth, A., & MacLeod, M. (2017). Abundance and composition of near surface microplastics and plastic cebris in the Stockholm Archipelago, Baltic Sea. *Marine Pollution Bulletin*, 120 (1–2), 292–302. https://doi.org/10.1016/j.marpolbul.2017.04.062

Gewert, B., Plassmann, M. M., & Macleod, M. (2015). Pathways for degradation of plastic polymers floating in the marine environment. *Environmental Sciences: Processes and Impacts*, 17 (9), 1513–1521. https://doi.org/10.1039/c5em00207a

Ghazali T.M., Heriyanto T., Fitria D.M., dkk. 2020. Identifikasi jenis ikan di sepanjang pesisir Kelurahan Hajoran Kabupaten Tanapanuli tengah. Jurnal Enggano. 5 (3): 439 – 443. Https://Doi.Org/Doi 10.31186/jenggano.5.3.439-450

Gong, Y., Li, Y., Chen, X., & Yu, W. (2020). Trophic niche and diversity of a pelagic squid (Dosidicus gigas): A comparative study using stable isotope, fatty acid, and feeding apparatuses morphology. *Frontiers in Marine Science*, *7*(July), 1–10. https://doi.org/10.3389/fmars.2020.00642

Gong, Y., Wang, Y., Chen, L., Li, Y., Chen, X., & Liu, B. (2021). Microplastics in different tissues of a pelagic squid (Dosidicus gigas) in the Northern Humboldt Current Ecosystem. *Marine Pollution Bulletin*, 169 (April), 112509. https://doi.org/10.1016/j.marpolbul.2021.112509

Gorokhova, E. (2015). Screening for microplastic particles in plankton samples: How to integrate marine litter assessment into existing monitoring programs? *Marine Pollution Bulletin*, 99 (1–2), 271–275. https://doi.org/10.1016/j.marpolbul.2015.07.056

Griet, V., V.C.Lisbeth., J.Colin R., M.Antonio., G.Kit., F.Gabriella., K.Michiel. D.Jorge., B.Karen., R.Johan., D. Lisa. (2015). A critical view on microplastics quantification in aquatic organisms. *Enviromental Research*, 143: 46 -55.

Hanlon, R.T., Messenger, J.B., 2018. Cephalopod Behavior. Cambridge University Press, Cambridge.

Hastuti, A. R., Lumbanbatu, D. T. F., & Wardiatno, Y. (2019). The presence of microplastics in the digestive tract of commercial fishes off Pantai Indah Kapuk Coast, Jakarta, Indonesia. *Biodiversitas*, 20 (5), 1233–1242. https://doi.org/10.13057/biodiv/d200513

Hayes, A. (2021). Variation in polymer types and abundance of microplastics from two rivers and beaches in Adelaide, South Australia. *Marine Pollution Bulletin*, 172 (February 2021), 112842. https://doi.org/10.1016/j.marpolbul.2021.112842

Hernandez, E., Nowack, B., & Mitrano, D. M. (2017). Polyester textiles as a source of microplastics from households: A mechanistic study to understand microfiber release during washing. *Environmental Science and Technology*, 51 (12), 7036–7046. https://doi.org/10.1021/acs.est.7b01750

Hidalgo-Ruz, V., Gutow, L., Thompson, R. C., & Thiel, M. (2012a). Microplastics in the marine environment: A review of the methods used for identification and quantification. *Environmental Science and Technology*, 46 (6), 3060–3075. https://doi.org/10.1021/es2031505

Hidalgo-Ruz, V., Gutow, L., Thompson, R. C., & Thiel, M. (2012b). Microplastics in the marine environment: A review of the methods used for identification and quantification. *Environmental Science and Technology*, 46 (6), 3060–3075. https://doi.org/10.1021/es2031505

Hikmawati, N., Hartoko, A., & Sulardiono, B. (2014). *Distribution Analysis of MPT, Chlorophyll-a and Plankton on Catches of Anchovies (Stolephorus sp.) in Jepara Waters*. *3*(2), 109–118.

Irfan, M. A., Irwani, & Suwartimah, K. (2018). Studi biologi cumi-cumi Photololigo edulis yang terdapat di Perairan Pati. *Journal of Marine Research*, 7 (3), 169–177.

Ivar do Sul, J. A., Costa, M. F., Barletta, M., & Cysneiros, F. J. A. (2013). Pelagic microplastics around an archipelago of the equatorial Atlantic. *Marine Pollution Bulletin*, 75 (1–2), 305–309. https://doi.org/10.1016/j.marpolbul.2013.07.040

Iwanegbe, I., Iwanegbe, A. I., Ebabhamiegbebho, P. A., & Bello, Y. O. (2011). Effect of cures and storage periods on the sensory and microbial evaluation of smoke-dried, vacuum packaged rabbit meat products. *Pakistan Journal of Nutrition*, 10(11), 1032-1035. Https://Doi.Org/10.3923/Pjn.2011.1032.1035

Jabeen, K., Su, L., Li, J., Yang, D., Tong, C., Mu, J., & Shi, H. (2017). Microplastics and mesoplastics in fish from coastal and fresh waters Of China. *Environmental Pollution*, 221, 141-149. Https://Doi.Org/10.1016/J.Envpol.2016.11.055

Jambeck, J. R., & Johnsen, K. (2015). Citizen-based litter and marine debris data collection and mapping. *Computing in Science and Engineering*, 17 (4), 2–8. https://doi.org/10.1109/MCSE.2015.67

Joesidawati, M. I. (2018). Microplastic pollution along the coast of Tuban Regency. *Prosiding Seminar Nasional Hasil Penelitian Dan Pengabdian kepada Masyarakat III*, September, 7–15.

Jones-Williams, K., Galloway, T., Cole, M., Stowasser, G., Waluda, C., & Manno, C. (2020). Close encounters - Microplastic availability to pelagic amphipods in sub-antarctic and antarctic surface waters. *Environment International*, 140 (April), 105792. https://doi.org/10.1016/j.envint.2020.105792

Jualaong S., Pransilpa M., Pradit Siriporn., Towata P. 2021. Type and distribution of microplastics in beach sediment along the coast of the Eastern Gulf of

Thailand. *Journal of Marine Science and Engineering*. 1-10. https://doi.org/10.3390/jmse9121405

Kalogerakis, N., Karkanorachaki, K., Kalogerakis, G. C., Triantafyllidi, E. I., Gotsis, A. D., Partsinevelos, P., & Fava, F. (2017). Microplastics generation: Onset of fragmentation of polyethylene films in marine environment mesocosms. *Frontiers in Marine Science*, 4 (MAR), 1–15. https://doi.org/10.3389/fmars.2017.00084

Kama, Nur Asmi. 2020. Komposisi dan Konsentrasi Mikroplastik pada Kolom Air di Perairan Kecamatan Burau, Kabupaten Luwu Timur, Sulawesi Selatan. Skripsi. Makassar: Universitas Hasanuddin Makassar.

Kapo, F. A., Toruan, L. N. L., & Paulus, C. A. (2020). The types and abundance of microplastics in surface water at Kupang Bay (in Bahasa). *Jurnal Bahari Papadak*, 1 (1), 10–21.

Karami, A., Golieskardi, A., Ho, Y. Bin, Larat, V., & Salamatinia, B. (2017). Microplastics in eviscerated flesh and excised organs of dried fish. *Scientific Reports*, March, 1–9. https://doi.org/10.1038/s41598-017-05828-6

Karlsson, T. M., Arneborg, L., Broström, G., Almroth, B. C., Gipperth, L., & Hassellöv, M. (2018). The unaccountability case of plastic pellet pollution. *Marine Pollution Bulletin*, 129 (1), 52–60. https://doi.org/10.1016/j.marpolbul.2018.01.041

Karlsson, T. M., Vethaak, A. D., Almroth, B. C., Ariese, F., van Velzen, M., Hassellöv, M., & Leslie, H. A. (2017). Screening for microplastics in sediment, water, marine invertebrates and fish: Method development and microplastic accumulation. *Marine Pollution Bulletin*, 122 (1–2), 403–408. https://doi.org/10.1016/j.marpolbul.2017.06.081

Kataoka, T., Nihei, Y., Kudou, K., & Hinata, H. (2019). Assessment of the sources and inflow processes of microplastics in the river environments of Japan. *Environmental Pollution*, *244*, 958–965. https://doi.org/10.1016/j.envpol.2018.10.111

Kieu-Le, T. C., Tran, Q. V., Truong, T. N. S., & Strady, E. (2022). Anthropogenic fibres in white clams, Meretrix lyrata, cultivated downstream a developing megacity, Ho Chi Minh City, Viet Nam. *Marine Pollution Bulletin*, 174 (July 2021), 113302. https://doi.org/10.1016/j.marpolbul.2021.113302

Kim, I. S., Chae, D. H., Kim, S. K., Choi, S. B., & Woo, S. B. (2015). Factors influencing the spatial variation of microplastics on high-tidal coastal beaches in Korea. *Archives of Environmental Contamination and Toxicology*, 69 (3). https://doi.org/10.1007/s00244-015-0155-6

Koelmans, A. A. (2015). Modeling the role of microplastics in bioaccumulation of organic chemicals to marine aquatic organisms. *A Critical Review*. 309–324. https://doi.org/10.1007/978-3-319-16510-3

Kowalski, N., Reichardt, A. M., & Waniek, J. J. (2016). Sinking rates of microplastics and potential implications of their alteration by physical, biological, and chemical factors. *Marine Pollution Bulletin*, 109 (1), 310-319. Https://Doi.Org/10.1016/J.Marpolbul.2016.05.064

Kovač Viršek, M., Palatinus, A., Koren, Š., Peterlin, M., Horvat, P., & Kržan, A. (2016). Protocol for microplastics sampling on the sea surface and sample analysis. *Journal of Visualized Experiments : JoVE, 118*, 1–9. https://doi.org/10.3791/55161

Kühn, S., Rebolledo, E. L. B., & Franeker, J. A. van. (2015). Marine anthropogenic litter : Deleterious effects of litter on marine life. *In Marine Anthropogenic Litter*. https://doi.org/10.1007/978-3-319-16510-3

Kumar, P., Sai Ram, C., Srivastava, J. P., Behura, A. K., & Kumar, A. (2022). Synthesis of cotton fiber and its structure. *Natural and Synthetic Fiber Reinforced Composites, January*, 17–36. https://doi.org/10.1002/ 9783527832996.ch2

Kumar, V., Pallapa, M., & Rezai, P. (2016). *Polymers* (Issue July 2015). https://doi.org/10.1016/B978-0-12-803581-8.00522-1

Lebreton, L., & Andrady, A. (2019). Future scenarios of global plastic waste generation and disposal. *Palgrave Communications*, 5 (1), 1–11. https://doi.org/10.1057/s41599-018-0212-7

Lefebvre, C. (2021). Stranded in the High Tide Line: Spatial and temporal variability of beached microplastics in a semi-enclosed embayment (Arcachon, France). *Science of the Total Environment, 797*. https://doi.org/10.1016/j.scitotenv.2021.149144

Lefebvre, Charlotte, Rojas, I. J., Lasserre, J., Villette, S., Lecomte, S., Cachot, J., & Morin, B. (2021). Stranded in the high tide line: Spatial and temporal variability of beached microplastics in a semi-enclosed embayment (Arcachon, France). *Science of the Total Environment, 797*, 149144. https://doi.org/10.1016/j.scitotenv.2021.149144

Limonta, G., Mancia, A., Benkhalqui, A., Bertolucci, C., Abelli, L., Fossi, M. C., & Panti, C. (2019). Microplastics induce transcriptional changes, immune response and behavioral alterations in adult Zebrafish. *Scientific Reports*, 9 (1), 1–11. https://doi.org/10.1038/s41598-019-52292-5

Liu, H., Ge, J., Ma, E., & Yang, L. (2019). Advanced biomaterials for biosensor and theranostics. *In Biomaterials in Translational Medicine: A Biomaterials Approach*. Elsevier Inc. https://doi.org/10.1016/B978-0-12-813477-1.00010-4

Lusher, A. L., Burke, A., O'Connor, I., & Officer, R. (2014). Microplastic pollution in the Northeast Atlantic Ocean: Validated and opportunistic sampling. *Marine Pollution Bulletin*, 88 (1–2), 325–333. https://doi.org/10.1016/ j.marpolbul.2014.08.023

Lusher, A. L., Tirelli, V., O'Connor, I., & Officer, R. (2015). Microplastics in arctic polar waters: The first reported values of particles in surface and sub-surface samples. *Scientific Reports*, 5 (October), 1–9. https://doi.org/10.1038/

srep14947

Marlina, N., Hudori dan R. Hadifh. 2017. Pengaruh Kekasaran Saluran dan Suhu Air Sungai pada Parameter Kualitas Air, COD, TSS di Sungai Winongo Menggunakan Software QUAL2Kw. *Jurnal Sains dan Teknologi Lingkungan*. 9 (2): 122-133.

Masura, J., Baker, J., Foster, G., & Arthur, C. (2015). *Laboratory methods for the analysis of microplastics in the marine environment: Recommendations for quantifying synthetic particles in waters and sediments* (Issue July).

Mauludy, M. S., Yunanto, A., & Yona, D. (2019). Microplastic abundances in the sediment of coastal beaches in Badung, Bali. *Jurnal Perikanan Universitas Gadjah Mada*, 21 (2), 73. Https://Doi.Org/10.22146/Jfs.45871

McKeen. (2017). Permeability properties of plastics and elastomers 13 environmentally friendly polymers. *Permeability Properties of Plastics and Elastomers*, 305–323. https://doi.org/10.1016/B978-0-323-50859-9/00013-0

McKeen, L. W. (2013). *The effect of UV light and weather on plastics and elastomers*. https://doi.org/10.1016/B978-1-4557-2851-0.00005-0

Michida, Y., Chavanich, S., Chiba, S., Cordova, M. R., Cozsar Cabanas, A., Glagani, F., Hagmann, P., Hinata, H., Isobe, A., Kershaw, P., Kozlovskii, N., Li, D., Lusher, A. L., Marti, E., Mason, S. A., Mu, J., Saito, H., Shim, W. J., Syakti, A. D., … Wang, J. (2020). Guidelines for harmonizing ocean surface microplastic monitoring methods. *In Ministry of the Environment Japan* (Issue June). https://repository.oceanbestpractices.org/handle/11329/1361

Moret-Ferguson, S., Law, K. L., Proskurowski, G., Murphy, E. K., Peacock, E. E., & Reddy, C. M. (2010). The size, mass, and composition of plastic debris in the Western North Atlantic Ocean. *Marine Pollution Bulletin*, 60 (10), 1873-1878. Https://Doi.Org/10.1016/J.Marpolbul.2010.07.020

Moore, C.J., Moore, S.L., Leecaster, M.K., Weisberg, S.B., 2001. A comparison of plastic and plankton in the North Pacific Central Gyre. *Mar. Pollut. Bull.* 42, 1297-1300. https://doi.org/10.1016/S0025-326X(01)00114-X

Moulay, S. (2010). Chemical modification of poly(vinyl chloride)-still on the run. *Progress in Polymer Science (Oxford)*, 35 (3), 303–331. https://doi.org/10.1016/j.progpolymsci.2009.12.001

Naji, A., Esmaili, Z., & Khan, F. R. (2017). Plastic debris and microplastics along the beaches of the Strait of Hormuz, Persian Gulf. *Marine Pollution Bulletin*, 114 (2), 1057–1062. https://doi.org/10.1016/j.marpolbul.2016.11.032

Naji, A., Esmaili, Z., Mason, S. A., & Dick Vethaak, A. (2017). The occurrence of microplastic contamination in littoral sediments of the Persian Gulf, Iran. *Environmental Science and Pollution Research*, 24 (25), 20459–20468. https://doi.org/10.1007/s11356-017-9587-z

National Institute of Standards and Technology (NIST) https://physics.nist.gov/cgibin/Star/compos.pl?matno=136

Paler, M. K. O., Leistenschneider, C., Migo, V., & Burkhardt-Holm, P. (2021). Low microplastic abundance in Siganus spp. from the Tañon Strait, Central Philippines. *Environmental Pollution*, 284 (December 2021), 117166. https://doi.org/10.1016/j.envpol.2021.117166

Pan, Z., Guo, H., Chen, H., Wang, S., Sun, X., Zou, 9., ... Huang, J. (2019). Microplastics in the Northwestern Pacific: Abundance, distribution, and characteristics. *Science of the Total Environment,* 650, 1913-1922. Https://Doi.0rg/10.1016/J.Scitotenv.2018.09.244

Parvin F., Nath J., Hannan T., Tareq S. M. 2022. Proliferation of microplastics in commercial sea salts from the World Longest Sea Beach of Bangladesh. *Environment Advences* (7):1.

Pasisingi, N., TM Pratiwi, N., & Krisanti, M. (2014). Water quality of the Cileungsi River Upstream based on physical-chemical conditions. *Depik*, 3 (1), 56–64. https://doi.org/10.13170/depik.3.1.1376

Peda, C., Battaglia, P., D'alessandro, M., Laface, F., Malara, D., Consoli, P., ... Romeo, T. (2020). Coupling gastro-intestinal tract analysis with an airborne contamination control method to estimate litter ingestion in demersal elasmobranchs. *Frontiers In Environmental Science,* 8 (July), 1-13. Https://Doi.Org/10.3389/Fenvs.2020.00119

Peng, G., Zhu, B., Yang, D., Su, L., Shi, H., & Li, D. (2017). Microplastics in sediments of the Changjiang Estuary, China. *Environmental Pollution*, 225, 283–290. https://doi.org/10.1016/j.envpol.2016.12.064

Perikanan (2015). *Modul Mengidentifikasi Parameter Kualitas Air*. http://www.pusdik.kkp.go.id/uploads/files/Mengidentifikasi_Parameter_Kualitas_Air1.pdf

Plastic Europe (2020). Plastic-the facts 2020: An analysis of European plastics production, demand and waste data. http://www.plasticeurope.org.

Pradit, S., Noppradit, P., Goh, B. P., Sornplang, K., Ong, M. C., & Towatana, P. (2021). Occurrence of microplastics and trace metals in fish and shrimp from Songkhla Lake, Thailand during the COVID-19 Pandemic. *Applied Ecology and Environmental Research*, 19 (2), 1085–1106. https://doi.org/10.15666/aeer/1902_10851106

Prarat, P., & Hongsawat, P. (2022). Microplastic pollution in surface seawater and beach sand from the shore of Rayong Province, Thailand: Distribution, characterization, and ecological risk assessment. *Marine Pollution Bulletin*, 174 (December 2021), 113200. https://doi.org/10.1016/j.marpolbul.2021.113200

Prasetyo, D., Biologi, P. S., Sains, F., Teknologi, D. A. N., Islam, U., & Syarif, N. (2020). *Pencemaran Mikroplastik Menggunakan Sepia pharaonis di Pasar Pelelangan Ikan Muara Angke*.

Pratomo, A. (2020). *Modul Pembelajaran SMA Dinamika Hidrosfer Geografi Kelas X*.

Puskas, J. E., Chiang, K., & Barkakaty, B. (2014). Natural Rubber (NR) biosynthesis: Perspectives from polymer chemistry. *In Chemistry, Manufacture and Applications of Natural Rubber*. https://doi.org/10.1533/9780857096913.1.30

Qi, H., Fu, D., Wang, Z., Gao, M., & Peng, L. (2020). Microplastics occurrence and spatial distribution in seawater and sediment of Haikou Bay in the Northern South China Sea. *Estuarine, Coastal and Shelf Science*, 239 (March), 106757. https://doi.org/10.1016/j.ecss.2020.106757

Rahmadhani, Fitra. 2019. *Identifikasi Dan Analisis Kandungan Mikroplastik Pada Ikan Pelagis Dan Demersal Serta Sedimen Dan Air Laut Di Perairan Pulau Mandangin Kabupaten Sampang*. Skripsi, 1–66.

Reinold S., Herrera A., Saliu F., Gonzales C. H., etc. 2001. Evidence of microplastic ingestion by cultured European sea bass (Dicentrarchus labrax). *Marine Pollution Bulletin* (168): 165. https.//doi.org/10.1016/j.marpolbul.2021.112450

Rillig, M. C. (2012). Microplastic in terrestrial ecosystems and the soil? *Environmental Science and Technology*, 46 (12), 6453-6454. Https://Doi.Org/10.1021/Es302011r

Rist, S., Baun, A., Almeda, R., & Hartmann, N. B. (2019). Ingestion and effects of micro- and nanoplastics in Blue Mussel (Mytilus edulis) Larvae. *Marine Pollution Bulletin*, 140 (January), 423–430. https://doi.org/10.1016/j.marpolbul.2019.01.069

Rocha-Santos, T., & Duarte, A. C. (2014). A critical overview of the analytical approaches to the occurrence, the fate and the behavior of microplastics in the environment trends in analytical chemistry, 65 (December), 47-53. Https://Doi.Org/10.1016/J.Trac.2014.10.011

Rochman, C. M., Tahir, A., Williams, S. L., Baxa, D. V, Lam, R., Miller, J. T., Teh, F., Werorilangi, S., & Teh, S. J. (2015). Anthropogenic debris in seafood : Plastic debris and fibers from textiles in fish and bivalves sold for human consumption. *Nature Publishing Group*, September. https://doi.org/10.1038/srep14340

Rodgers, B., & Waddell, W. (2013). Tire engineering. *In The Science and Technology of Rubber, Fourth Edition* (Fourth Edi). Elsevier Inc. https://doi.org/10.1016/B978-0-12-394584-6.00014-5

Rosas-Luis, R., & Chompoy-Salazar, L. (2016). Description of food sources used by jumbo Squid Dosidicus gigas (D'Orbigny, 1835) in Ecuadorian waters during 2014. *Fisheries Research*, *173*, 139–144. https://doi.org/10.1016/j.fishres.2015.08.006

Rosas-Luis, Rigoberto. (2016). Description of plastic remains found in the stomach contents of the Jumbo Squid Dosidicus gigas landed in Ecuador during 2014. *Marine Pollution Bulletin*, 113 (1–2), 302–305. https://doi.org/10.1016/j.marpolbul.2016.09.060

Rummel, C. D., Löder, M. G. J., Fricke, N. F., Lang, T., Griebeler, E. M., Janke, M., & Gerdts, G. (2016). Plastic ingestion by pelagic and demersal fish from the North Sea and Baltic Sea. *Marine Pollution Bulletin*, 102 (1), 134–141. https://doi.org/10.1016/j.marpolbul.2015.11.043

Rosida, L. A., Anwar, M. S., Sholeh, O. M., Mushofa, A. S., & Prayogo, L. M. (2020). Least square. *Definitions*, 02 (02), 67–74. https://doi.org/10.32388/5088uu

Sadri, S. S., & Thompson, R. C. (2014). On the quantity and composition of floating plastic debris entering and leaving the Tamar Estuary, Southwest England. *Marine Pollution Bulletin*, 81 (1), 55–60. https://doi.org/10.1016/j.marpolbul.2014.02.020

Saha, M., Naik, A., Desai, A., Nanajkar, M., Rathore, C., Kumar, M., & Gupta, P. (2021). Microplastics in seafood as an emerging threat to marine environment: A case study in Goa, West Coast of India. *Chemosphere*, 270, 129359. https://doi.org/10.1016/j.chemosphere.2020.129359

Santana, M.F.M., L.G. Ascer, M.R. Custodio, F.T. Moreira and A. Turra. (2016). Microplastic contamination in natural mussel beds from a Brazilian urbanized coastal region: Rapid evaluation through bioassessment. *Marine Pollution Bulletin.* http://dx.doi.org/10.1016/j.marpolbul.2016.02.074

Saliu F.M., Varenelli M., Raguso C., Barana D., etc. 2021. The release process of microfibers from surgical face masks into the marine enviroment. *Environment advances* (4): 1–5. https.//doi.org/10.1016/j.envadv.2021.100042

Sastri, V. R. (2010). Commodity thermoplastics : Polyvinyl chloride, polyolefins, and polystyrene. *Plastics in Medical Devices*, 73–119. https://doi.org/10.1016/b978-0-8155-2027-6.10006-6

Sawalman, R., Zamani, N. P., Werorilangi, S., & Ismet, M. S. (2021). Akumulasi mikroplastik pada spesies ikan ekonomis penting di Perairan Pulau Barranglompo, Makassar. *Jurnal Ilmu Dan Teknologi Kelautan Tropis*, 13 (2), 241–259. https://doi.org/10.29244/jitkt.v13i2.34587

Shim, W. J., Hong, S. H., & Eo, S. (2018). Marine microplastics: Abundance, distribution, and composition. *In Microplastic Contamination in Aquatic Environments: An Emerging Matter of Environmental Urgency*. Elsevier Inc. https://doi.org/10.1016/B978-0-12-813747-5.00001-1

Shim, W. J., S. H. Hong and S. Eo (2017). Identification methods in microplastic analysis: A review. *Analytical Methods,* 9: 13841391.

Shit, S. C., & Shah, P. (2013). A review on silicone rubber. *National Academy Science Letters*, 36 (4), 355–365. https://doi.org/10.1007/s40009-013-0150-2

Shoji, S., & Masui, K. (2015). Encyclopedia of polymeric nanomaterials. *In Encyclopedia of Polymeric Nanomaterials*. https://doi.org/10.1007/978-3-642-29648-2

Sihombing, T. (2019). *Eksplorasi Keberadaan Mikroplastik pada Air dan*

*Sulcospira sp. di Hulu Sungai Brantas, Jawa Timur*.

Simon, M., N. van Alst and J. Vollertsen (2018). Quantification of microplastic mass and removal rates at wastewater treatment plants applying Focal Plane Array (FPA)-based Fourier Transform Infrared (FTIR) imaging. *Water Research*, 142, 1-9

Singh, B., Sharma, N., 2008. Mechanistic implications of plastic degradation. *Polymer Degradation and Stability*. 93, 561–584. https://doi.org/10.1016/ j.polymdegradstab.2007.11. 008

Smith, M., Love, D. C., Rochman, C. M., & Neff, R. A. (2018). Microplastics in seafood and the implications for human health. *Current Environmental Health Reports*, 5 (3), 375–386. https://doi.org/10.1007/s40572-018-0206-z

Song, Y. K., Hong, S. H., Jang, M., Han, G. M., Rani, M., Lee, J., & Shim, W.J. (2015). A comparison of microscopic and spectroscopic identification methods for analysis of microplastics in environmental samples. *Marine Pollution Bulletin*, 93 (1-2), 202-209. Https://Doi.Org/10.1016/J.Marpolbul. 2015.01.015

Stanton, T., Johnson, M., Nathanail, P., Gomes, R. L., Needham, T., & Burson, A. (2019). Exploring the efficacy of Nile Red in microplastic quantification: A costaining approach. *Environmental Science and Technology*, 6. Https://Doi.Org/10.1021/Acs.Estlett.9b00499

Stockin, K. A., Pantos, O., Betty, E. L., Pawley, M. D. M., Doake, F., Masterton, H., Palmer, E. I., Perrott, M. R., Nelms, S. E., & Machovsky-capuska, G. E. (2021). Fourier Transform Infrared ( FTIR ) analysis identifies microplastics in stranded common Dolphins (Delphinus delphis) from New Zealand Waters. *Marine Pollution Bulletin*, 173 (PB), 113084. https://doi.org/10.1016/ j.marpolbul.2021.113084

Sunitha, T. G., Monisha, V., Sivanesan, S., Vasanthy, M., Prabhakaran, M., Omine, K., Sivasankar, V., & Darchen, A. (2021). Micro-plastic pollution along the Bay of Bengal Coastal Stretch of Tamil Nadu, South India. *Science of the Total Environment*, 756 (xxxx), 144073. https://doi.org/10.1016/j.scitotenv.2020. 144073

Sutton, R., Mason, S. A., Stanek, S. K., Willis-Norton, E., Wren, I. F., & Box, C. (2016). Microplastic contamination in the San Francisco Bay, California, USA. *Marine Pollution Bulletin*, 109 (1), 230–235. https://doi.org/10.1016/ j.marpolbul.2016.05.077

Syahbudi, R. R. (2020). *Identifikasi Keberadaan dan Bentuk Mikroplastik pada Air dan Ikan di Sungai Code, D.I Yogyakarta*.

Ta, A. T., & Babel, S. (2020). Microplastics pollution with heavy metals in the aquaculture zone of the Chao Phraya River Estuary, Thailand. *Marine Pollution Bulletin*, 161 (October), 111747. https://doi.org/10.1016/ j.marpolbul.2020.111747

Tahir, A., & Rochman, C. M. (2014). Plastic particles in Silverside

(Stolephorusheterolobus) collected at Paotere Fish Market, Makassar. *International Journal of Agriculture System (IJAS)*, 2 (2), 163–168. https://doi.org/http://dx.doi.org/10.20956/ijas.v2i2.32

Tajwar, M., Yousuf Gazi, M., & Saha, S. K. (2022a). Characterization and spatial abundance of microplastics in the coastal regions of Cox's Bazar, Bangladesh: An integration of Field, Laboratory, and GIS Techniques. *Soil and Sediment Contamination*, 31 (1), 57–80. https://doi.org/10.1080/15320383.2021.1910622

Tajwar, M., Yousuf Gazi, M., & Saha, S. K. (2022b). Characterization and spatial abundance of microplastics in the coastal regions of Cox's Bazar, Bangladesh: An integration of field, laboratory, and GIS Techniques. *Soil and Sediment Contamination*, 31 (1), 57–80. https://doi.org/10.1080/15320383.2021.1910622

Tamrin, S., Yaqin, K., Rahim, S. W., & Inaku, D. F. (2021). *Microplastic Concentration in Asiatic Hard Clam Meretrix meretrix (Linneaus, 1758) from Lemo Beach, Burau District, Luwu Timur Regency, South Sulawesi*. https://doi.org/10.1088/1755-1315/763/1/012062

Tanaka, K., & Takada, H. (2016). Microplastic fragments and microbeads in digestive tracts of Planktivorous Fish from urban coastal waters. *Scientific Reports*, 6 (September), 1–8. https://doi.org/10.1038/srep34351

Terzi, Y., Gedik, K., Eryaşar, A. R., Öztürk, R. Ç., Şahin, A., & Yılmaz, F. (2022). Microplastic contamination and characteristics spatially vary in the Southern Black Sea Beach sediment and sea surface water. *Marine Pollution Bulletin*, 172-174 (December 2021). https://doi.org/10.1016/j.marpolbul.2021.113228

Thacker, R. W., Nagle, D. G., & Paul, V. J. (1997). Effects of repeated exposures to marine Cyanobacterial secondary metabolites on feeding by Juvenile Rabbitfish and Parrotfish. *Marine Ecology Progress Series*, 147 (1–3), 21–29. https://doi.org/10.3354/meps147021

Thompson, R. C., Moore, C. J., Saal, F. S., & Swan, S. H. (2009). *Plastics, the Environment and Human Health : Current Consensus and Future Trends*. 2009, 2153–2166. https://doi.org/10.1098/rstb.2009.0053

Tien, C. J., Wang, Z. X., & Chen, C. S. (2020). Microplastics in water, sediment and fish from the Fengshan River System: Relationship to aquatic factors and accumulation of polycyclic aromatic hydrocarbons by fish. *In Environmental Pollution* (Vol. 265). Elsevier Ltd. https://doi.org/10.1016/j.envpol.2020.114962

Tin C.T., Chiu M. C., Kuo M. H. 2022. A mini-review of strategies for quantifying anthropogenic activities in microplastic studies in aquatic environments. *Polymers* (14): 2 – 15. https.//doi.org/10.3390/polym14010198

Ter Halle, A., Ladirat, L., Gendre, X., Goudouneche, D., Pusineri, C., Routaboul, C., Tenailleau, C., Duployer, B., & Perez, E. (2016). Understanding the fragmentation pattern of marine plastic debris. *Environmental Science & Technology*, 50 (11), 5668-5675. Https://Doi.Org/10.1021/Acs.Est.6b00594

Tomasini, A., & León-Santiesteban, H. H. (2015). Nylon uses in biotechnology. *In Biocomposites: Design and Mechanical Performance* (Fourteenth, Vol. 2011, Issue June 2011). Elsevier Ltd. https://doi.org/10.1016/B978-1-78242-373-7.00006-8

Trestrail, C., Walpitagama, M., Hedges, C., Truskewycz, A., Miranda, A., Wlodkowic, D., ... Nugegoda, D. (2020). Foaming at the mouth: Ingestion of floral foam microplastics by aquatic animals. *Science of the Total Environment*, 705, 135826. Https://Doi.Org/10.1016/J.Scitotenv.2019.135826

Umaly, R.C. dan L.A Cuvin. 1988. Lymnology : Laboratory and Field Guide, Physicochemical Factor, Biological Factor. National Book Store, Inc. Publisher. Metro Manila 322p.

Uurasjärvi, E., Sainio, E., Setälä, O., Lehtiniemi, M., & Koistinen, A. (2021). Validation of an imaging FTIR spectroscopic method for analyzing microplastics ingestion by Finnish lake fish (Perca fluviatilis and Coregonus albula). *Environmental Pollution*, 288 (November 2020). https://doi.org/10.1016/j.envpol.2021.117780

Van Cauwenberghe, L., Claessens, M., Vandegehuchte, M. B., & Janssen, C. R. (2015). Microplastics are taken up by Mussels (Mytilus edulis) and Lugworms (Arenicola marina) living in Natural Habitats. *Environmental Pollution*, 199, 10–17. https://doi.org/10.1016/j.envpol.2015.01.008

Van Cauwenberghe, L., Claessens, M., Vandegehuchte, M., Janssen, C.R., 2014. XXII International Pigment Cell Conference (IPCC) "Bringing colors to life: Advances in pigment cell research and translation into clinical practice organised by the Asian Society for Pigment Cell Research (ASPCR), in partnership with the Dermatological, Pigment Cell & Melanoma Research. Ghent. https://doi.org/10.1111/pcmr.12292

Veerasingam, S., Saha, M., Suneel, V., Vethamony, P., Rodrigues, A. C., Bhattacharyya, S., & Naik, B. G. (2016). Characteristics, seasonal distribution and surface degradation features of microplastic pellets along the Goa Coast, India. *Chemosphere*, 159, 496-505. Https://Doi.Org/10.1016/J.Chemosphere.2016.06.056

Veerasingam, S., Ranjani, M., Venkatachalapathy, R., Bagaev, A., Mukhanov, V., Litvinyuk, D., ... Vethamony, P. (2020). Contributions of Fourier Transform Infrared Spectroscopy in microplastic pollution research: A review. *Critical Reviews in Environmental Science and Technology*, 0 (0), 1-63. Https://Doi.Org/10.1080/10643389.2020.1807450

Veerasingam S., Vethamony P., Aboobacker V. M., etc. (2021). Factor influencing the vertical distribution of microplastics in the beach sedimen around the Ras Rakan Island, Qatar. *Environmental Science and Pollution Research.* https.//doi.org/10.1007/s11356-02012100-4

Wagner, M., & Lambert, S. (2018). *Freshwater Microplastics - The Handbook of Environmental Chemistry 58*. https://doi.org/10.1007/978-3-319-61615-5

Wang, G., Lu, J., Li, W., Ning, J., Zhou, L., Tong, Y., Liu, Z., Zhou, H., &

Xiayihazi, N. (2021). Seasonal variation and risk assessment of microplastics in surface water of the Manas River Basin, China. *Ecotoxicology and Environmental Safety*, 208, 111477. https://doi.org/10.1016/j.ecoenv.2020.111477

Wang, J., Peng, J., Tan, Z., Gao, Y., Zhan, Z., Chen, Q., & Cai, L. (2017). Microplastics in the surface sediments from the Beijiang River Littoral Zone: Composition, abundance, surface textures and interaction with heavy metals. *Chemosphere*, 171, 248–258. https://doi.org/10.1016/j.chemosphere.2016.12.074

Wang, T., Zou, X., Li, B., Yao, Y., Zang, Z., Li, Y., Yu, W., & Wang, W. (2019). Preliminary study of the source apportionment and diversity of microplastics: Taking floating microplastics in the South China Sea as an Example. *Environmental Pollution*, 245, 965–974. https://doi.org/10.1016/j.envpol.2018.10.110

Wei, Y., Ma, W., Xu, Q., Sun, C., Wang, X., & Gao, F. (2022). Microplastic distribution and influence factor analysis of seawater and surface sediments in a typical bay with diverse functional areas: A case study in Xincun Lagoon, China. *Frontiers in Environmental Science*, 10 (February), 1–13. https://doi.org/10.3389/fenvs.2022.829942

Wicaksono, E. A. (2021). *Kajian Cemaran Mikroplastik pada Sungai-sungai di Kota Makassar serta Dampaknya terhadap Ikan Komersial*.

Wilson, D. R., Godley, B. J., Haggar, G. L., Santillo, D., & Sheen, K. L. (2021). The influence of depositional environment on the abundance of microplastic pollution on beaches in the Bristol Channel, UK. *Marine Pollution Bulletin*, 164. https://doi.org/10.1016/j.marpolbul.2021.111997

Wootton, N., Ferreira, M., Reis-Santos, P., & Gillanders, B. M. (2021). A comparison of microplastic in fish from Australia and Fiji. *Frontiers in Marine Science*, 8 (June). https://doi.org/10.3389/fmars.2021.690991

Wright, S. L., & Kelly, F. J. (2017). Plastic and human health: A micro issue? *Environmental Science and Technology*, 51 (12), 6634–6647. https://doi.org/10.1021/acs.est.7b00423

Wright, S. L., Thompson, R. C., & Galloway, T. S. (2013). The physical impacts of microplastics on marine organisms: A review. *Environmental Pollution* (Barking, Essex: 1987), 178 (March 2014), 483-492. Https://Doi.0rg/10.1016/J.Envpol.2013.02.031

Yahya Terzi, Gedik, K., Eryas, A. R., Çagrı, R., ¨Oztürk, Sahin, A., & Yılmaz, F. (2022). Microplastic contamination and characteristics spatially vary in the Southern Black Sea Beach sediment and sea surface water. *Marine Pollution Bulletin*, 174 (October 2021), 113228. https://doi.org/10.1016/j.marpolbul.2021.113228

Yudhantari C I A S., Hendrawan I G., Puspitha N L P R. 2019. Kandungaan Mikroplastik pada Saluran Pencernaan Ikan Lemuru Protolan (Sardinella Lemuru) Hasil Tangkapan di Selat Bali. *Jurnal of Marine Research and*

*Technology*. 2 (2) : 48-52.

Yona, D., Zahran, M. F., Fuad, M. A. Z., Prananto, Y. P., & Harlyan, L. I. (2021). *Mikroplastik di Perairan*.

Yonkos, L. T., Friedel, E. A., Perez-Reyes, A. C., Ghosal, S., & Arthur, C. D. (2014). Microplastics in four estuarine rivers in the Chesapeake Bay, U.S.A. *Environmental Science and Technology*, 48 (24), 14195–14202. https://doi.org/10.1021/es5036317

Zettler, E. R., Mincer, T. J., & Amaral-Zettler, L. A. (2013). Life in the "Plastisphere": Microbial communities on plastic marine debris. *Environmental Science and Technology*, 47 (13), 7137-7146. Https://Doi.Org/10.1021/Es401288x

Zhang, D., Cui, Y., Zhou, H., Jin, C., Yu, X., Xu, Y., Li, Y., & Zhang, C. (2020). Microplastic pollution in water, sediment, and fish from Artificial Reefs around the Ma'an Archipelago, Shengsi, China. *Science of the Total Environment*, 703, 134768. https://doi.org/10.1016/j.scitotenv.2019.134768

Zhang, K., Gong, W., Lv, J., Xiong, X., & Wu, C. (2015). Accumulation of floating microplastics behind the Three Gorges Dam. *Environmental Pollution*, 204, 117–123. https://doi.org/10.1016/j.envpol.2015.04.023

Zhang, S., Sun, Y., Liu, B., & Li, R. (2021). Full size microplastics in crab and fish collected from the mangrove wetland of Beibu Gulf: Evidences from Raman Tweezers (1–20 μm) and spectroscopy (20–5000 μm). *In Science of the Total Environment* (Vol. 759). https://doi.org/10.1016/j.scitotenv.2020.143504

Zhang, T., Song, K., Meng, L., Tang, R., Song, T., Huang, W., & Feng, Z. (2022). Distribution and characteristics of microplastics in Barnacles and Wild Bivalves on the Coast of the Yellow Sea, China. *Frontiers in Marine Science*, 8 (January), 1–12. https://doi.org/10.3389/fmars.2021.789615

Zhang, T., Sun, Y., Song, K., Du, W., Huang, W., Gu, Z., & Feng, Z. (2021). Microplastics in different tissues of Wild Crabs at three important fishing grounds in China. *Chemosphere*, 271 (November 2020), 129479. https://doi.org/10.1016/j.chemosphere.2020.129479

Zhao, J., Ran, W., Teng, J., Liu, Y., Liu, H., Yin, X., Cao, R., & Wang, Q. (2018). Microplastic pollution in sediments from the Bohai Sea and the Yellow Sea, China. *Science of the Total Environment*, 640–641, 637–645. https://doi.org/10.1016/j.scitotenv.2018.05.346

Zhao, S., Zhu, L., Wang, T., & Li, D. (2014). Suspended microplastics in the surface water of the Yangtze Estuary System, China: First observations on occurrence, distribution. *Marine Pollution Bulletin*, 86 (1–2), 562–568. https://doi.org/10.1016/j.marpolbul.2014.06.032

Zhu, X., Munno, K., Grbic, J., Werbowski, L. M., Bikker, J., Ho, A., Guo, E., Sedlak, M., Sutton, R., Box, C., Lin, D., Gilbreath, A., Holleman, R. C., Fortin, M.-J., & Rochman, C. (2021). Holistic assessment of microplastics and other anthropogenic microdebris in an Urban Bay Sheds Light on their sources and fate. *ACS ES&T Water*, 1 (6), 1401–1410. https://doi.org/10.1021/acsestwater.0c00292

Zhou, 0., Zhang, H., Fu, C., Zhou, Y., Dai, Z., Li, Y., Tu, C., & Luo, Y. (2018). The distribution and morphology of microplastics in coastal soils adjacent to the Bohai Sea and the Yellow Sea. *Geoderma*, 322, 201-208. Https://Doi.Org/10.1016/J.Geoderma.2018.02.015

Ziino, G., Nalbone, L., Giarratana, F., Romano, B., Cincotta, F., & Panebianco, A. (2021). Microplastics in vacuum packages of frozen and glazed icefish (Neosalanx spp.): A freshwater fish intended for human consumption. *Italian Journal of Food Safety*, 10 (4), 59–65. https://doi.org/10.4081/ijfs.2021.9974

Zobkov, M., & Esiukova, E. (2017). Microplastics in Baltic bottom sediments: Quantification procedures and first results. *Marine Pollution Bulletin*, 114 (2), 724–732. https://doi.org/10.1016/j.marpolbul.2016.10.060

**Lampiran 1** Dokumentasi

## A. Lokasi Pengambilan Sampel


Kawasan pemukiman padat penduduk


Area industri


Area wisata


Kawasan pemukiman kurang penduduk


Area pasar (pelelangan ikan)

## B. Sampel Kualitas Air dan Mikroplastik

Sampel kualitas air dan mikroplastik kondisi pasang 08 Oktober 2022

Sampel kualitas air dan mikroplastik kondisi surut 08 Oktober 2022

Sampel kualitas air dan mikroplastik kondisi pasang 15 Oktober 2022

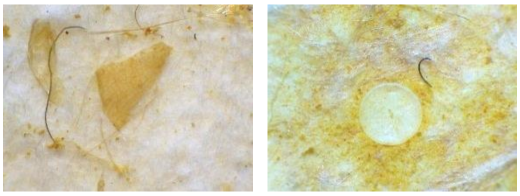
Sampel kualitas air dan mikroplastik kondisi surut 15 Oktober 2022

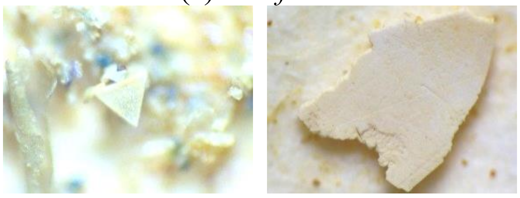

Sampel kualitas air dan mikroplastik kondisi pasang 22 Oktober 2022

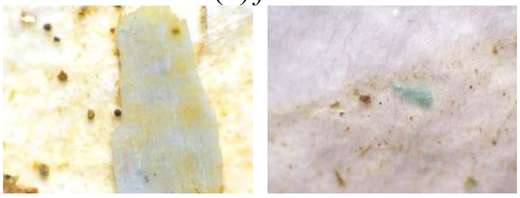
Sampel kualitas air dan mikroplastik kondisi surut 22 Oktober 2022

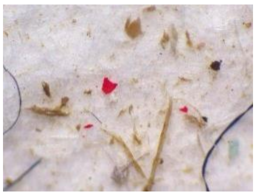
## C. Hasil Analisa Mikroplastik pada Air Laut


(a) *line/fiber*

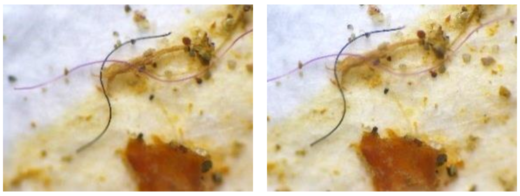

(b) *film*

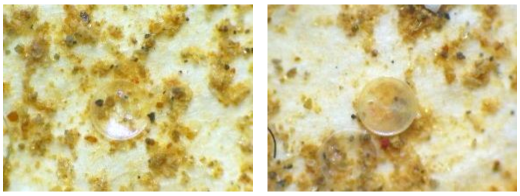

(c) *fragmen*


(d) *pellet*


(e) *foam*

Sampel 1A.P


(a) *line/fiber*


(b) *film*

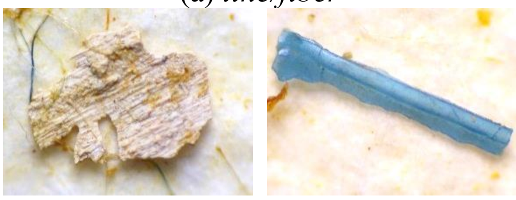

(c) *fragmen*

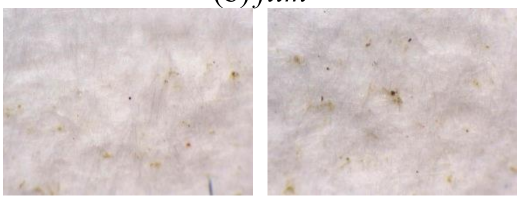

(d) *pellet*

Sampel 1B.P


(a) *line/fiber*

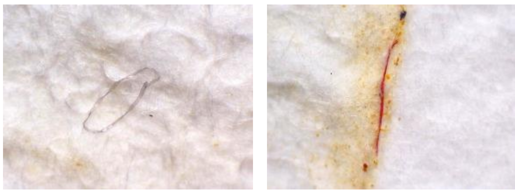

(b) *film*


(c) *fragmen*


(d) *pellet*

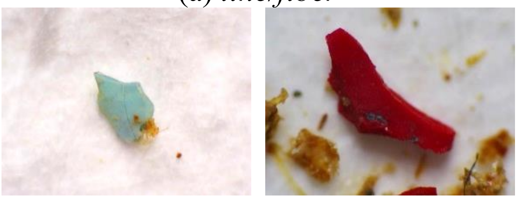
(e) *foam*

Sampel 2A.P

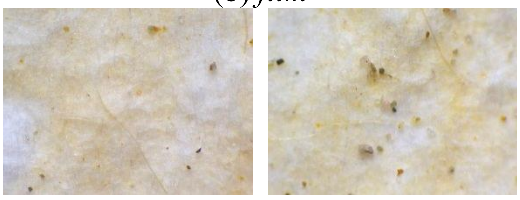


(a) *line/fiber*

(b) *film*

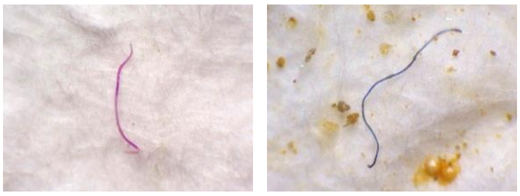


(c) *fragmen*



(d) *pellet*

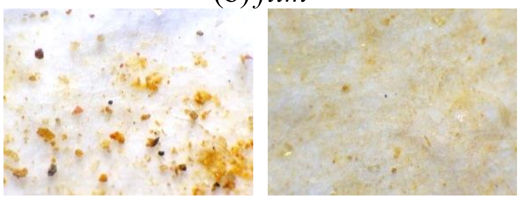
Sampel 2B.P



(a) *line/fiber*

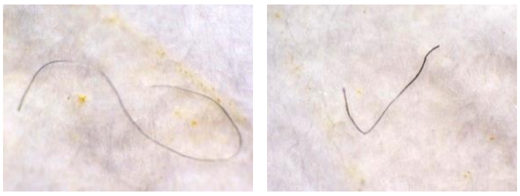
(b) *film*

(c) *fragmen*



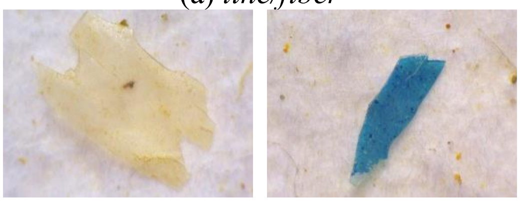
(d) *pellet*

Sampel 3A.P

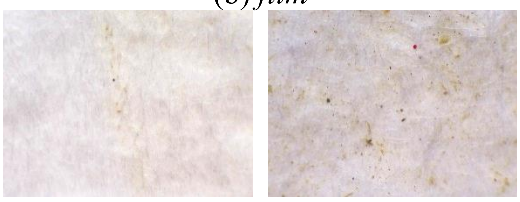


(a) *line/fiber*

(b) *film*

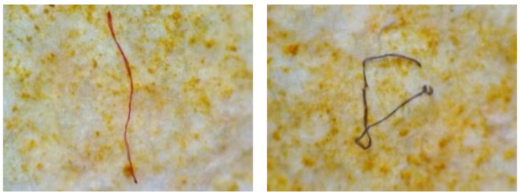


(c) *fragmen*

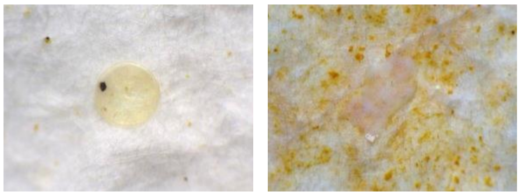


(d) *pellet*

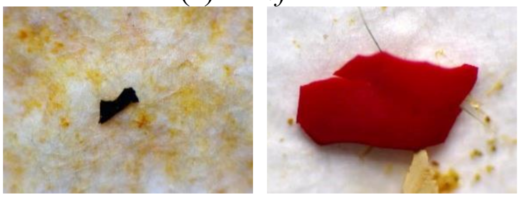
Sampel 3B.P



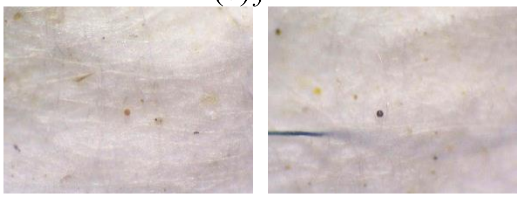
(a) *line/fiber*



(b) *film*

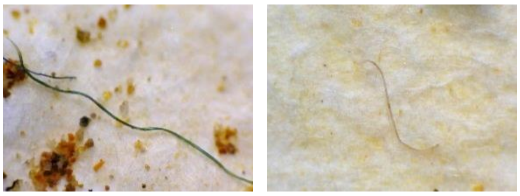


(c) *fragmen*

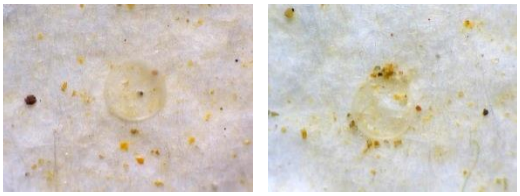


(d) *pellet*

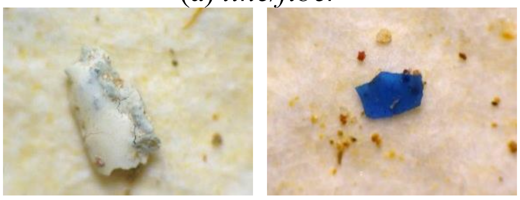
Sampel 4A.P



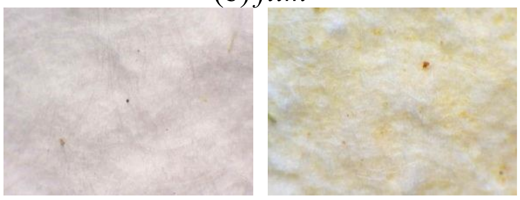
(a) *line/fiber*



(b) *film*



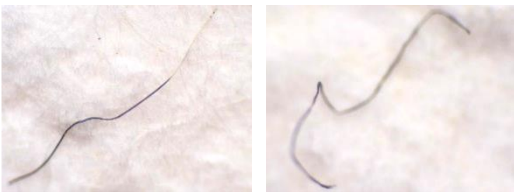
(c) *fragmen*



(d) *pellet*

(e) *foam*

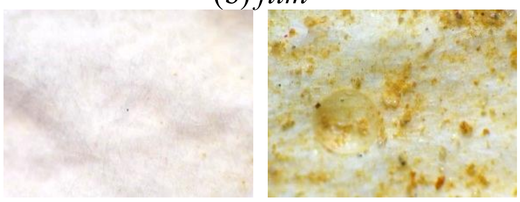
Sampel 4B.P



(a) *line/fiber*

(b) *film*

(c) *fragmen*



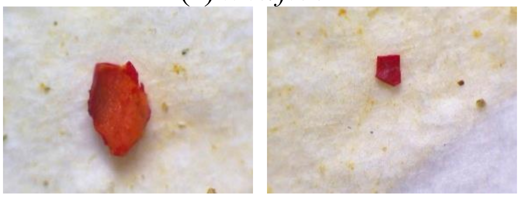
(d) *pellet*

(e) *foam*

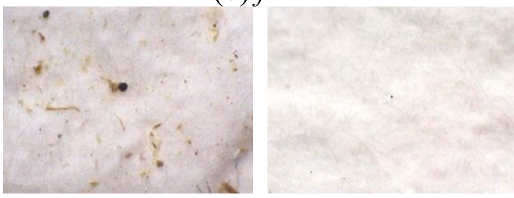
Sampel 5A.P

(a) *line/fiber*

(b) *film*



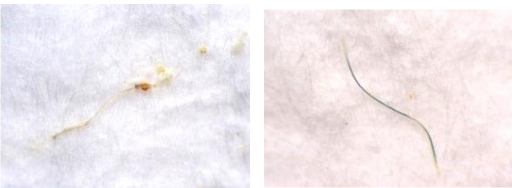
(c) *fragmen*



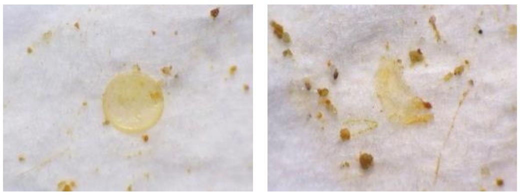
(d) *pellet*

(e) foam

Sampel 5B.P

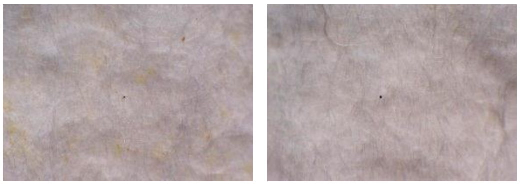


(a) *line/fiber*



(b) *film*

(c) *fragmen*

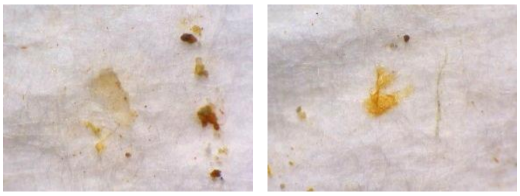


(d) *pellet*

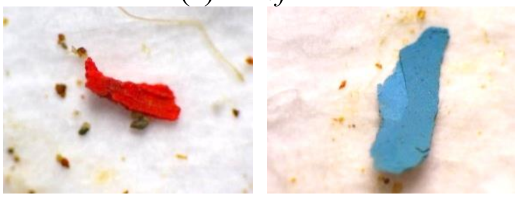
(e) *foam*

Sampel 1A.S

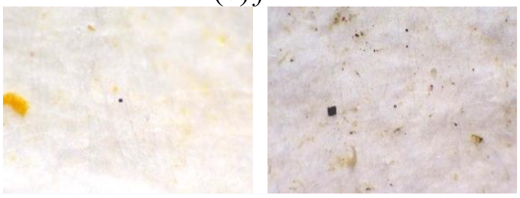
(a) *line/fiber*



(b) *film*

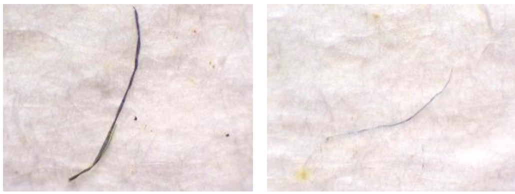


(c) *fragmen*

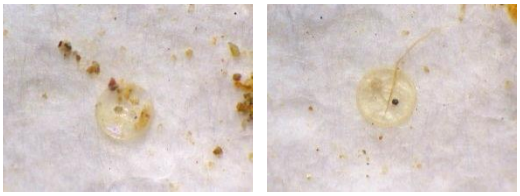


(d) *pellet*

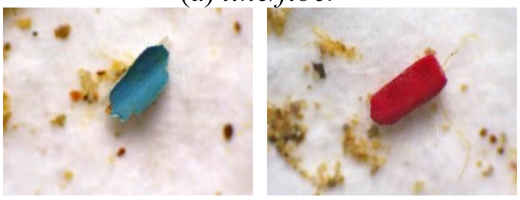
Sampel 1B.S



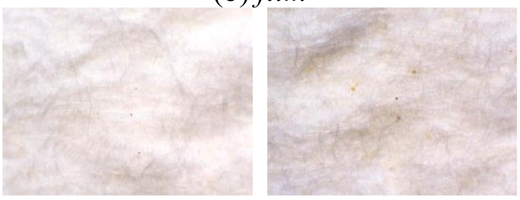
(a) *line/fiber*



(b) *film*



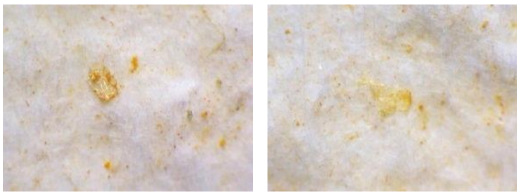
(c) *fragmen*



(d) *pellet*

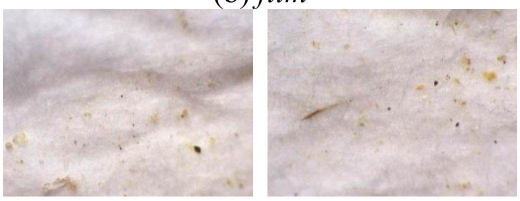
Sampel 2A.S

(a) *line/fiber*



(b) *film*

(c) *fragmen*

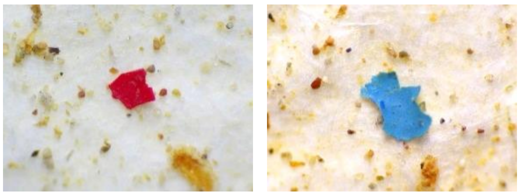


(d) *pellet*

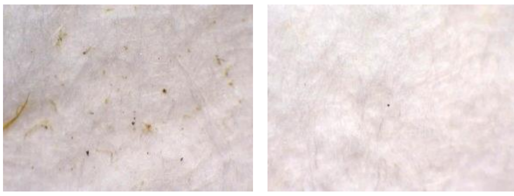
Sampel 2B.S

(a) *line/fiber*

(b) *film*



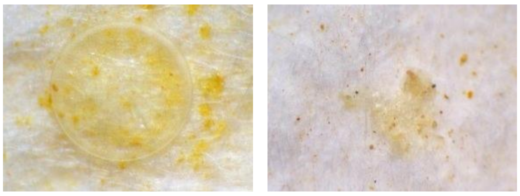
(c) *fragmen*



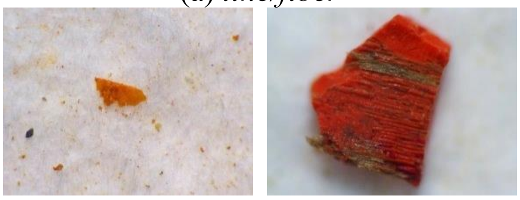
(d) *pellet*

Sampel 3A.S

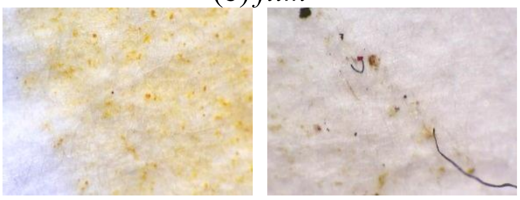
(a) *line/fiber*



(b) *film*



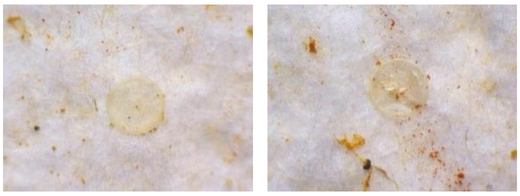
(c) *fragmen*



(d) *pellet*

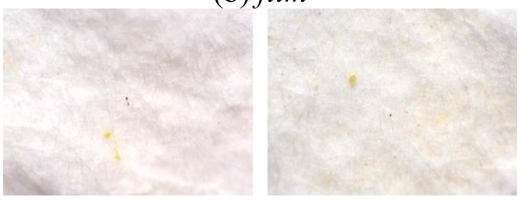
Sampel 3B.S

(a) *line/fiber*



(b) *film*

(c) *fragmen*

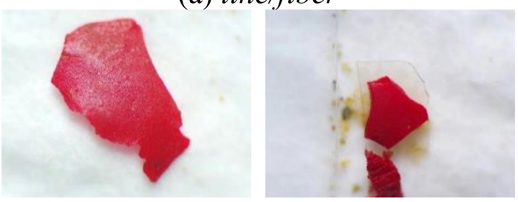


(d) *pellet*

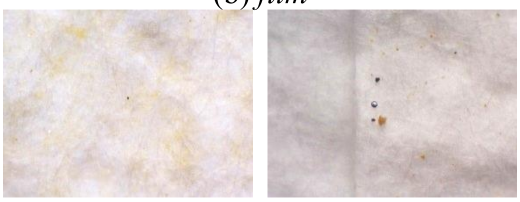
Sampel 4A.S

(a) *line/fiber*

(b) *film*

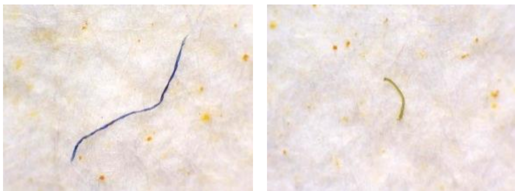
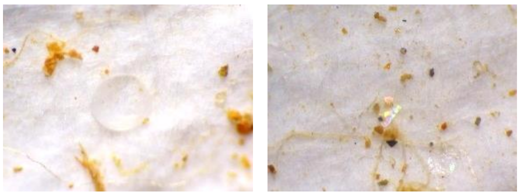


(c) *fragmen*

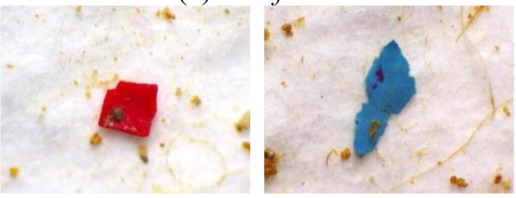


(d) *pellet*

Sampel 4B.S

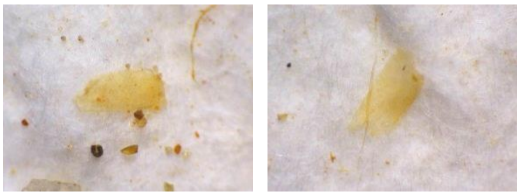



(a) *line/fiber* (b) *film*

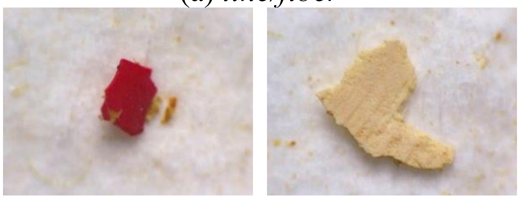
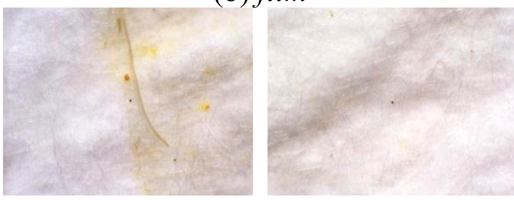



(c) *fragmen* (d) *pellet*

Sampel 5A.S

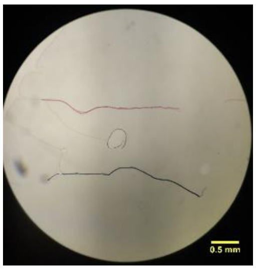
(a) *line/fiber* (b) *film*

(c) *fragmen* (d) *pellet*

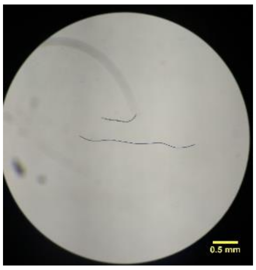
Sampel 5B.S

## D. Hasil Analisa Mikroplastik pada Biota

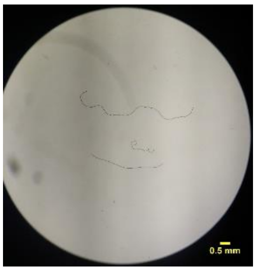


T1D

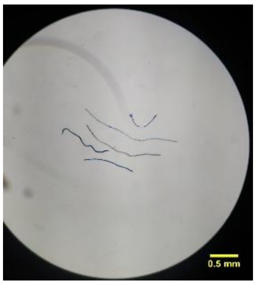
T2D



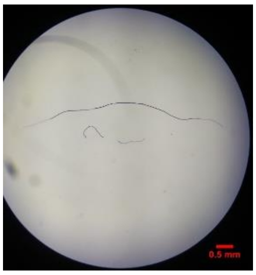
T3D



T1O



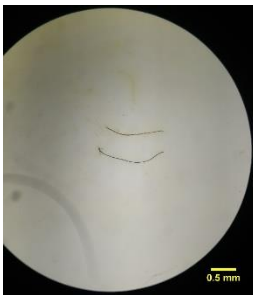
T3O



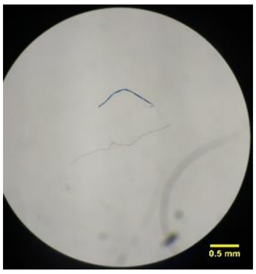
B1D

B2D

B1O



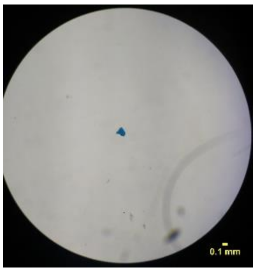
B3O



C2O

Kerang 1

Kerang 2



Kelomang 3

**Lampiran 2** Komposisi mikroplastik pada air laut dan biota

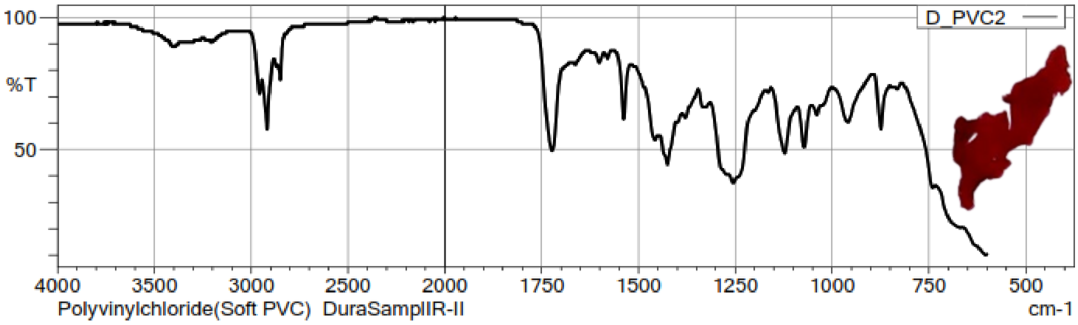
**A. Komposisi Mikroplastik pada Air Laut Kondisi Pasang**

| No. | Stasiun | Karakteristik Mikroplastik | | | |
|---|---|---|---|---|---|
| | | **Bentuk** | **Warna** | **Ukuran (mm)** | **Polimer** |
| 1. | 1A | *Line/Fiber* | Cokelat | 4,345 | *Cellulose Acetate* (CA) |
| 2. | | *Film* | Transparan | 0,749 | *Cellophane* (CP) |
| 3. | | *Fragmen* | Hitam | 2,510 | *Cellophane* (CP) |
| 4. | 1B | *Line/Fiber* | Hitam | 1,997 | *Polyamide* (*Nylon*) |
| 5. | | *Film* | Transparan | 1,487 | *Polypropylene* (PP) |
| 6. | | *Fragmen* | Putih | 2,041 | *Poly Vinyl Chloride* (PVC) |
| 7. | 2A | *Line/Fiber* | Jingga | 3,367 | *Polyamide* (*Nylon*) |
| 8. | | *Film* | Transparan | 0,469 | *Polyester* (PES) |
| 9. | | *Fragmen* | Hitam | 0,632 | *Poly Vinyl Chloride* (PVC) |
| 10. | 2B | *Line/Fiber* | Hitam | 1,336 | *Cellophane* (CP) |
| 11. | | *Film* | Transparan | 0,625 | *Cellophane* (CP) |
| 12. | | *Fragmen* | Hijau | 1,038 | *Polypropylene* (PP) |
| 13. | 3A | *Line/Fiber* | Cokelat | 2,368 | *Natural Rubber* (NR) |
| 14. | | *Film* | Transparan | 0,455 | PE-PP |
| 15. | | *Fragmen* | Putih | 3,751 | *Poly Vinyl Chloride* (PVC) |
| 16. | 3B | *Line/Fiber* | Hitam | 4,323 | *Cotton* |
| 17. | | *Film* | Transparan | 0,435 | *Polyester* (PES) |
| 18. | | *Fragmen* | Biru | 0,976 | *Poly Vinyl Chloride* (PVC) |
| 19. | 4A | *Line/Fiber* | Merah | 4,246 | *Cellulose Acetate* (CA) |
| 20. | | *Film* | Transparan | 0,478 | *Cellulose Acetate* (CA) |
| 21. | | *Fragmen* | Putih | 4,039 | *Poly Vinyl Chloride* (PVC) |
| 22. | 4B | *Line/Fiber* | Cokelat | 1,519 | *Polyacetylene* (PA) |
| 23. | | *Film* | Transparan | 1,834 | *Cellophane* (CP) |
| 24. | | *Fragmen* | Merah | 0,607 | *Poly Vinyl Chloride* (PVC) |
| 25. | 5A | *Line/Fiber* | Hitam | 2,704 | *Polyethylene Terephthalate* (PET) |
| 26. | | *Film* | Transparan | 0,426 | *Polyethylene Terephthalate* (PET) |
| 27. | | *Fragmen* | Jingga | 2,540 | *Poly Vinyl Chloride* (PVC) |
| 28. | 5B | *Line/Fiber* | Hitam | 2,506 | *Polyethylene Terephthalate* (PET) |
| 29. | | *Film* | Transparan | 0,478 | *Cellulose Acetate* (CA) |
| 30. | | *Fragmen* | Putih | 2,373 | *Poly Vinyl Chloride* (PVC) |

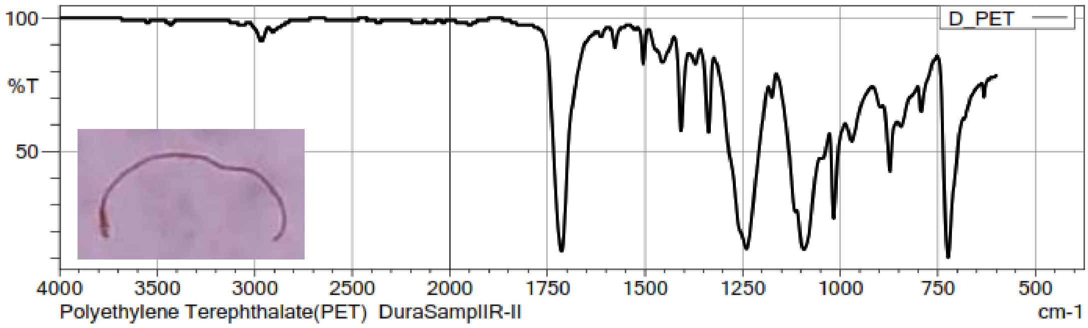
## B. Komposisi Mikroplastik pada Air Laut Kondisi Surut

| No. | Stasiun | Karakteristik Mikroplastik | | | |
|---|---|---|---|---|---|
| | | **Bentuk** | **Warna** | **Ukuran (mm)** | **Polimer** |
| 1. | 1A | *Line/Fiber* | Hitam | 1,421 | *Polyethylene Terephthalate* (PET) |
| 2. | | *Film* | Transparan | 0,506 | *Cellulose Acetate* (CA) |
| 3. | | *Fragmen* | Merah | 1,631 | *Poly Vinyl Chloride* (PVC) |
| 4. | 1B | *Line/Fiber* | Biru | 1,936 | *Polyethylene Terephthalate* (PET) |
| 5. | | *Film* | Transparan | 0,999 | *Polyamide* (Nylon) |
| 6. | | *Fragmen* | Merah | 2,449 | *Poly Vinyl Chloride* (PVC) |
| 7. | 2A | *Line/Fiber* | Hijau | 3,940 | *Polyamide* (*Nylon*) |
| 8. | | *Film* | Transparan | 0,487 | PE-PP |
| 9. | | *Fragmen* | Putih | 4,587 | *Poly Vinyl Chloride* (PVC) |
| 10. | 2B | *Line/Fiber* | Merah | 1,404 | *Polyethylene Terephthalate* (PET) |
| 11. | | *Film* | Transparan | 0,483 | *Cellulose Acetate* (CA) |
| 12. | | *Fragmen* | Biru | 2,917 | *Poly Vinyl Chloride* (PVC) |
| 13. | 3A | *Line/Fiber* | Biru | 1,633 | *Polyethylene Terephthalate* (PET) |
| 14. | | *Film* | Transparan | 0,565 | *Polyamide* (Nylon) |
| 15. | | *Fragmen* | Biru | 1,651 | *Poly Vinyl Chloride* (PVC) |
| 16. | 3B | *Line/Fiber* | Biru | 2,033 | *Polyethylene Terephthalate* (PET) |
| 17. | | *Film* | Cokelat | 0,841 | *Cellophane* (CP) |
| 18. | | *Fragmen* | Jingga | 1,215 | *Poly Vinyl Chloride* (PVC) |
| 19. | 4A | *Line/Fiber* | Hitam | 1,379 | *Polyethylene Terephthalate* (PET) |
| 20. | | *Film* | Transparan | 0,769 | *Polyamide* (*Nylon*) |
| 21. | | *Fragmen* | Biru | 2,777 | *Poly Vinyl Chloride* (PVC) |
| 22. | 4B | *Line/Fiber* | Hitam | 3,779 | *Cellulose Acetate* (CA) |
| 23. | | *Film* | Jingga | 2,030 | PE-PP |
| 24. | | *Fragmen* | Biru | 2,819 | *Poly Vinyl Chloride* (PVC) |
| 25. | 5A | *Line/Fiber* | Merah | 1,220 | *Polyethylene Terephthalate* (PET) |
| 26. | | *Film* | Transparan | 0,501 | *Poly Vinyl Chloride* (PVC) |
| 27. | | *Fragmen* | Putih | 4,808 | *Poly Vinyl Chloride* (PVC) |
| 28. | 5B | *Line/Fiber* | Biru | 1,886 | *Poly Vinyl Chloride* (PVC) |
| 29. | | *Film* | Jingga | 0,536 | *Cellophane* (CP) |
| 30. | | *Fragmen* | Merah | 1,560 | *Poly Vinyl Chloride* (PVC) |

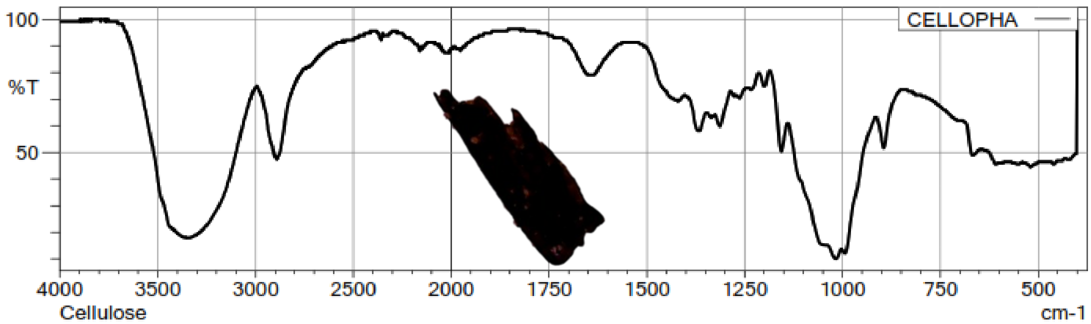
## C. Jenis Polimer Mikroplastik pada Air Laut



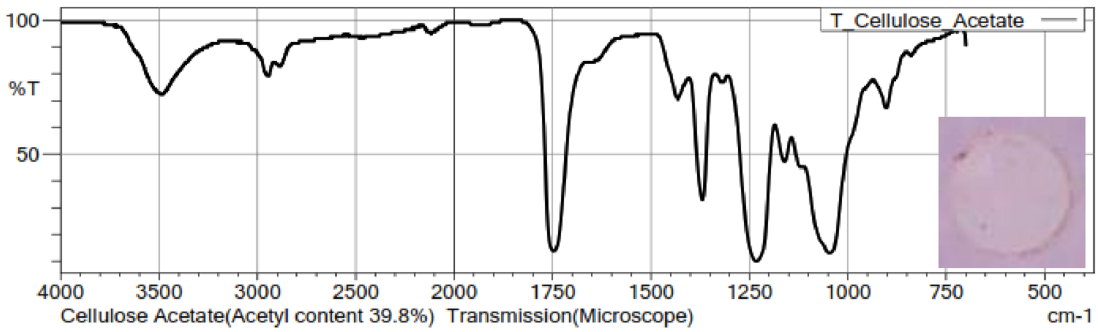

Spektrum hasil pengujian polimer *poly vinyl chloride* (PVC)



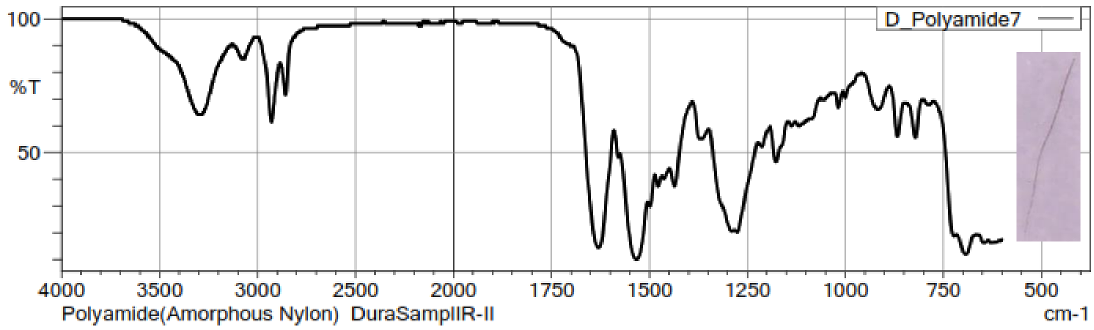

Spektrum hasil pengujian polimer *polyethylene terephthalate* (PET)



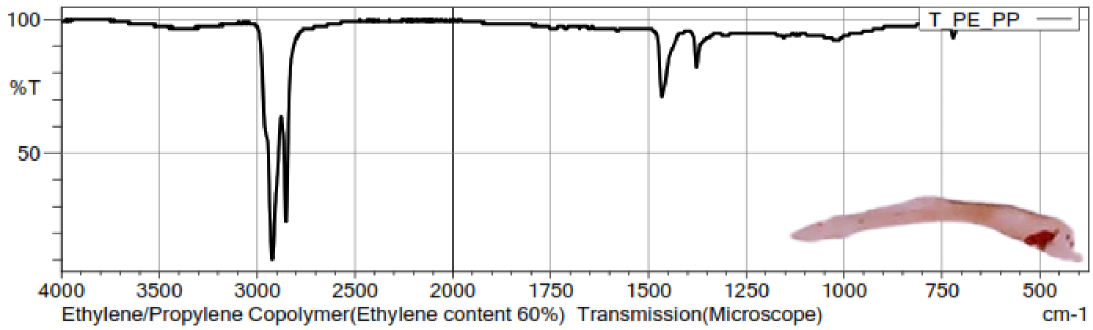

Spektrum hasil pengujian polimer *cellophane* (CP)



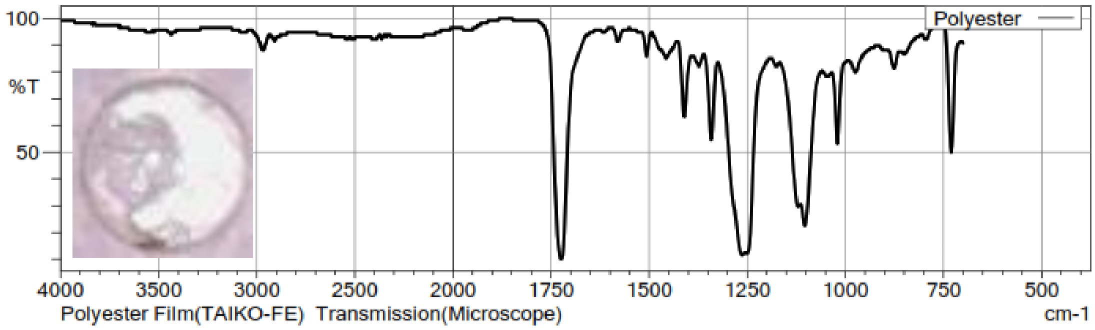

Spektrum hasil pengujian polimer *cellulose acetate* (CA)



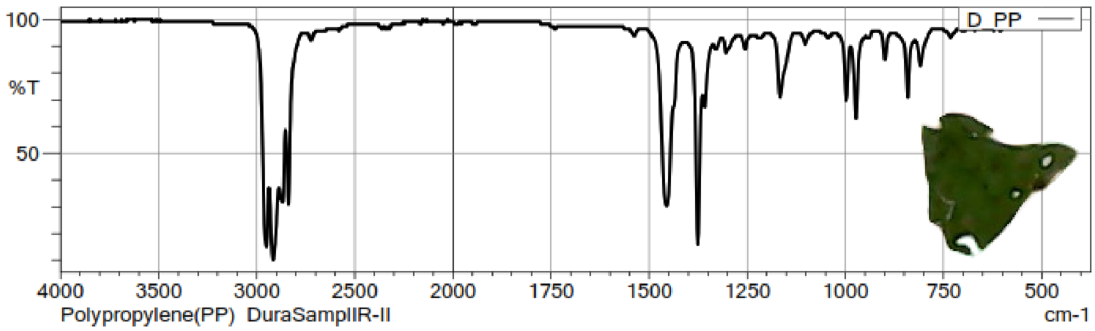

Spektrum hasil pengujian polimer *polyamide* (*nylon*)



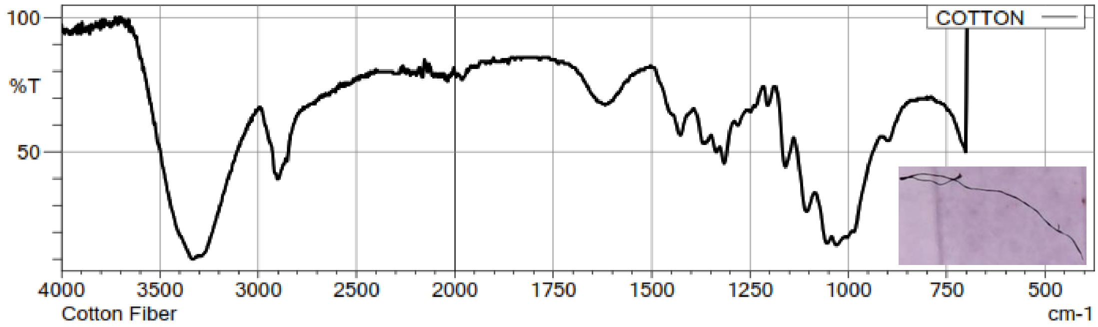

Spektrum hasil pengujian polimer PE-PP



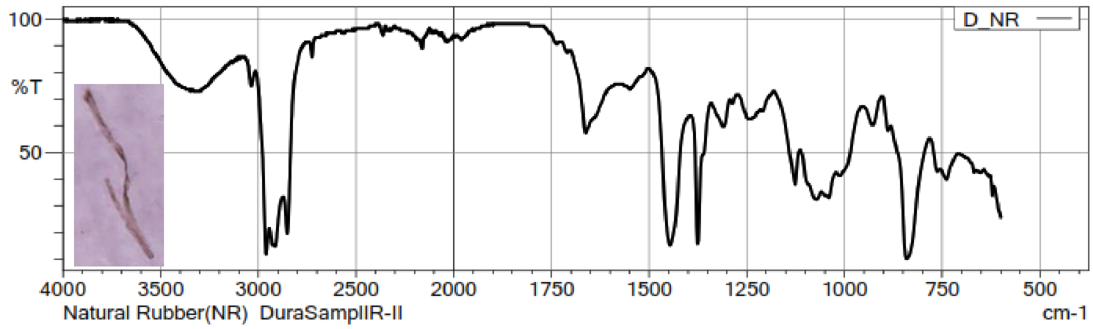

Spektrum hasil pengujian polimer *polyester* (PES)



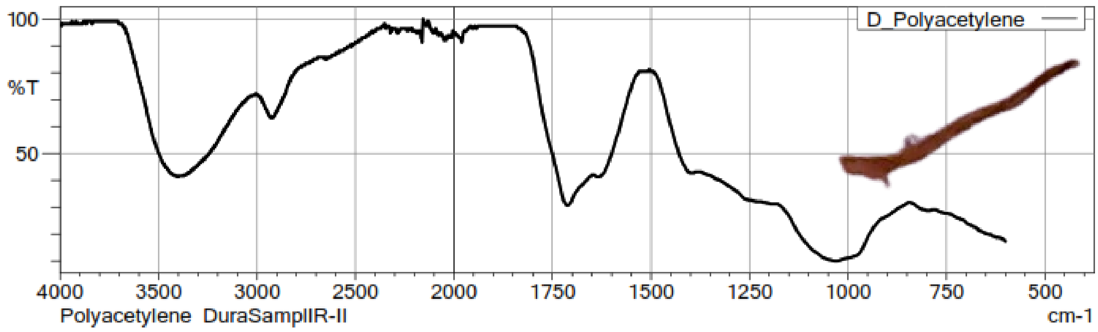

Spektrum hasil pengujian polimer *polypropylene* (PP)




Spektrum hasil pengujian polimer *cotton*




Spektrum hasil pengujian polimer *natural rubber* (NR)

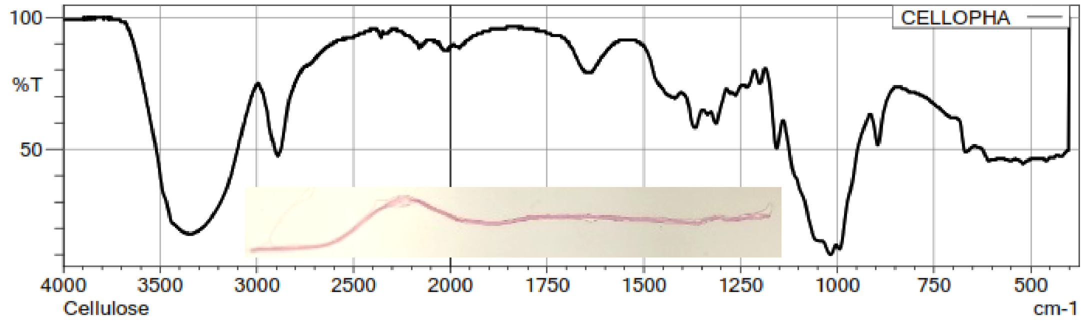



Spektrum hasil pengujian polimer *polyacetylene* (PA)

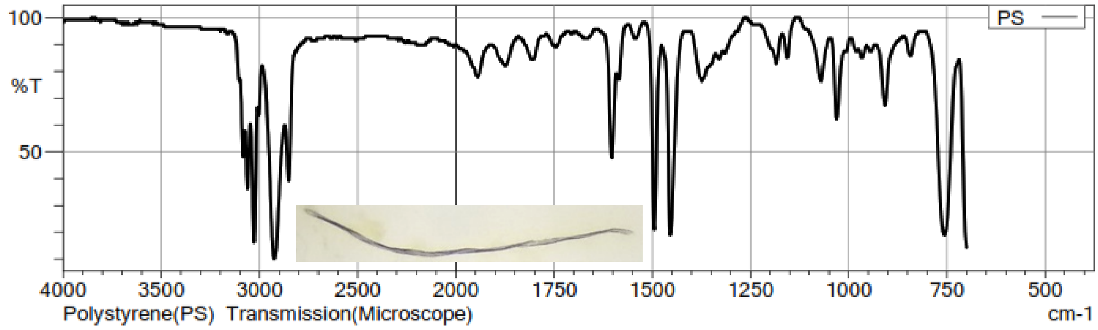
## D. Komposisi Mikroplastik pada Biota

| **No.** | **Biota** | **Kode Sampel** | **Karakteristik Mikroplastik (MP)** | | | |
|---|---|---|---|---|---|---|
| | | | **Bentuk** | **Warna** | **Ukuran (mm)** | **Polimer** |
| 1. | *Stolephorus sp.* (Daging) | T1D | *Line/Fiber* | Merah | 2,647 | *Cellophane* (CP) |
| | | | *Line/Fiber* | Biru | 1,257 | - |
| | | | *Line/Fiber* | Biru | 2,957 | *Cellophane* (CP) |
| 2. | | T2D | *Line/Fiber* | Biru | 0,962 | *Cellophane* (CP) |
| | | | *Line/Fiber* | Biru | 0,577 | - |
| 3. | | T3D | *Line/Fiber* | Biru | 2,331 | *Polystyrene* (PS) |
| | | | *Line/Fiber* | Biru | 0,761 | - |
| 4. | *Stolephorus sp.* (Organ) | T1O | *Line/Fiber* | Ungu | 3,925 | *Polyester* (PES) |
| | | | *Line/Fiber* | Biru | 2,504 | *Polyester* (PES) |
| 5. | | T2O | - | - | - | - |
| 6. | | T3O | *Line/Fiber* | Hitam | 1,531 | *Cellophane* (CP) |
| | | | *Line/Fiber* | Biru | 0,664 | - |
| | | | *Line/Fiber* | Biru | 1,808 | *Polystyrene* (PS) |
| | | | *Line/Fiber* | Biru | 1,08 | - |
| | | | *Line/Fiber* | Biru | 0,9 | - |
| 8. | *Siganus sp.* (Daging) | B1D | *Line/Fiber* | Hitam | 0,813 | *Cellophane* (CP) |
| | | | *Line/Fiber* | Biru | 0,972 | *Poly Vinyl Chloride* (PVC) |
| 9. | | B2D | *Fragmen* | Transparan | 1,148 | *Cellophane* (CP) |
| | | | *Line/Fiber* | Biru | 0,848 | - |
| | | | *Line/Fiber* | Hitam | 1,117 | *Polyester* (PES) |
| 10. | | B3D | - | - | - | - |
| 12. | *Siganus sp.* (Organ) | B1O | *Line/Fiber* | Hitam | 3,356 | *Cellophane* (CP) |
| | | | *Line/Fiber* | Hitam | 1,029 | - |
| | | | *Line/Fiber* | Biru | 1,536 | - |
| | | | *Line/Fiber* | Biru | 1,951 | - |
| | | | *Line/Fiber* | Biru | 1,973 | - |
| | | | *Line/Fiber* | Biru | 3,384 | *Polystyrene* (PS) |
| 13. | | B2O | - | - | - | - |
| 14. | | B3O | *Line/Fiber* | Hitam | 1,216 | *Polystyrene* (PS) |
| | | | *Line/Fiber* | Biru | 1,424 | *Cellophane* (CP) |
| 15. | *Loligo sp.* (Organ) | C1O | - | - | - | - |
| 16. | | C2O | *Line/Fiber* | Biru | 1,161 | - |
| | | | *Line/Fiber* | Biru | 1,98 | *Silikon Rubber* (SR) |
| 17. | | C3O | - | - | - | - |
| 21. | *Anadara granosa L.* | Kerang 1 | *Line/Fiber* | Biru | 1,092 | *Polystyrene* (PS) |
| 22. | | Kerang 2 | *Fragmen* | Abu-Abu | 2,05 | *Polypropylene* (PP) |
| | | | *Fragmen* | Abu-Abu | 0,408 | - |
| | | | *Fragmen* | Abu-Abu | 1,868 | - |
| 23. | | Kerang 3 | - | - | - | - |
| 24. | *Coenobita rugosus* | Kalomang 1 | - | - | - | - |
| 25. | | Kalomang 2 | - | - | - | - |
| 26. | | Kalomang 3 | *Fragmen* | Biru | 0,179 | PE-PP |

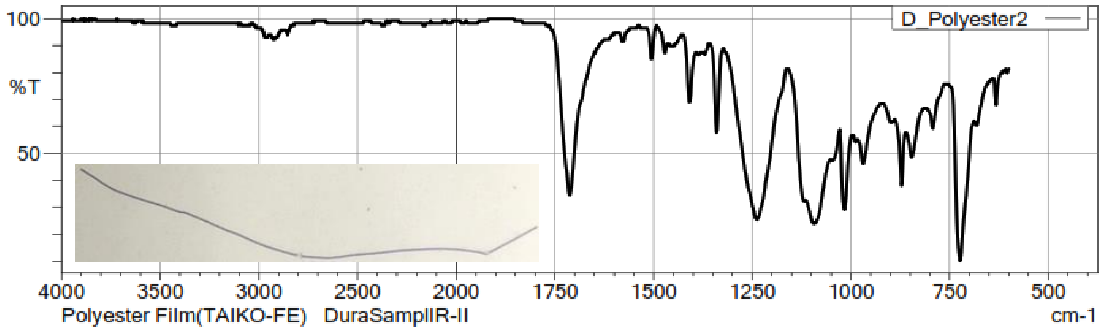
## E. Jenis Polimer Mikroplastik pada Biota



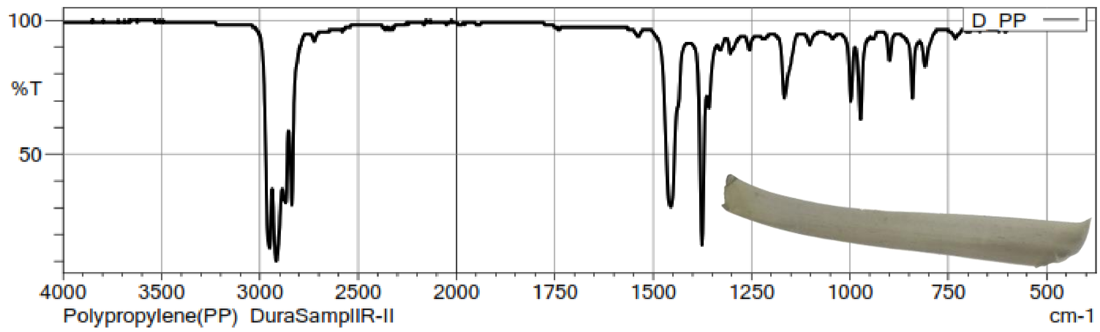

Spektrum hasil pengujian polimer *cellophane* (CP)



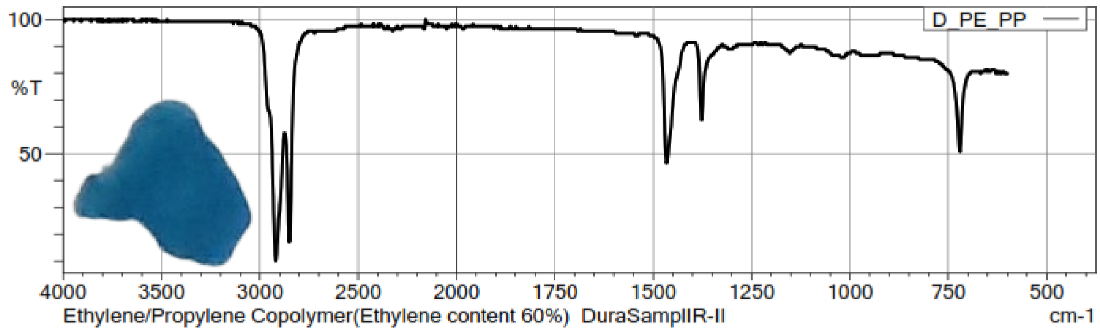

Spektrum hasil pengujian polimer *polystyrene* (PS)



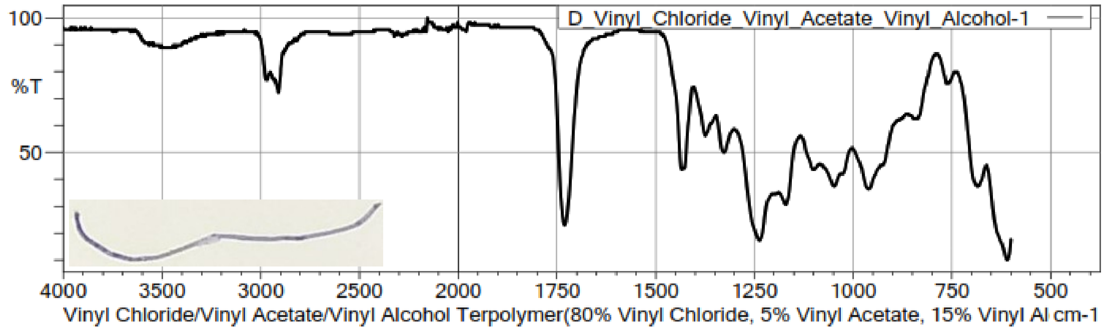

Spektrum hasil pengujian polimer *polyester* (PES)



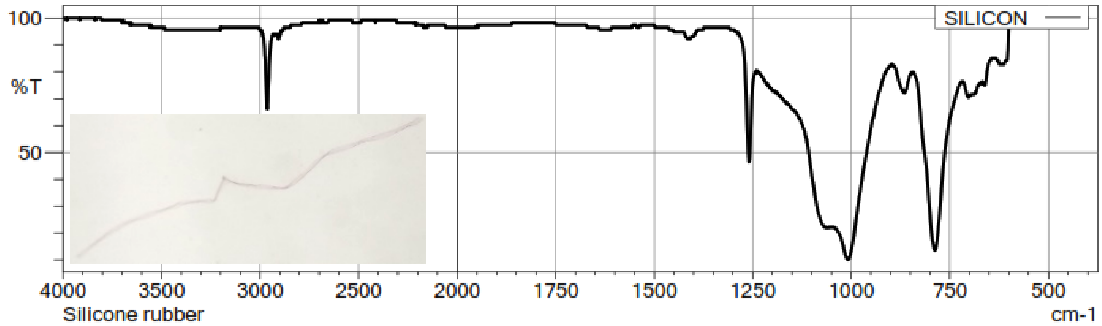

Spektrum hasil pengujian polimer *polypropylene* (PP)




Spektrum hasil pengujian polimer PE-PP




Spektrum hasil pengujian polimer *poly vinyl chloride* (PVC)




Spektrum hasil pengujian polimer *silicone rubber*

**Lampiran 3** Hasil analisa statistik

## A. Hasil Uji Normalitas

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Mikroplastik | ,189 | 60 | ,000 | ,881 | 60 | ,000 |
| Suhu | ,290 | 60 | ,000 | ,851 | 60 | ,000 |
| pH | ,200 | 60 | ,000 | ,742 | 60 | ,000 |
| Dissolved Oxygen (DO) | ,115 | 60 | ,048 | ,966 | 60 | ,090 |
| Total Suspended Solids (TSS) | ,227 | 60 | ,000 | ,836 | 60 | ,000 |
| Kekeruhan | ,149 | 60 | ,002 | ,832 | 60 | ,000 |
| Salinitas | ,279 | 60 | ,000 | ,771 | 60 | ,000 |
| Jarak Penarikan | ,339 | 60 | ,000 | ,637 | 60 | ,000 |
| Pasang dan Surut | ,339 | 60 | ,000 | ,637 | 60 | ,000 |
| Titik Sampel | ,158 | 60 | ,001 | ,888 | 60 | ,000 |

a. Lilliefors Significance Correction

## B. Hasil Uji Perbedaan Rata-Rata Jarak Penarikan, Kondisi Pasang Surut, dan Titik Pengambilan Sampel

**Case Processing Summary**

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Standardized Residual for MP | .100 | 60 | .200* | .956 | 60 | .031 |

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

**Levene's Test of Equality of Error Variances[a,b]**

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| MIKROPLASTIK | Based on Mean | 4.652 | 19 | 40 | .000 |
| | Based on Median | .537 | 19 | 40 | .927 |
| | Based on Median and with adjusted df | .537 | 19 | 15.552 | .901 |
| | Based on trimmed mean | 3.957 | 19 | 40 | .000 |

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.
a. Dependent variable: MIKROPLASTIK
b. Design: Intercept + JARAK + WAKTU + TITIK.S + JARAK * WAKTU + JARAK * TITIK.S + WAKTU * TITIK.S + JARAK * WAKTU * TITIK.S

**Tests of Between-Subjects Effects**

Dependent Variable: MIKROPLASTIK

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Corrected Model | 2489756.667[a] | 19 | 131039.825 | 45.286 | .000 |
| Intercept | 11757226.667 | 1 | 11757226.667 | 4063.160 | .000 |
| JARAK | 685656.600 | 1 | 685656.600 | 236.955 | .000 |
| WAKTU | 574281.667 | 1 | 574281.667 | 198.465 | .000 |
| TITIK.S | 845297.500 | 4 | 211324.375 | 73.031 | .000 |
| JARAK * WAKTU | 152409.600 | 1 | 152409.600 | 52.671 | .000 |
| JARAK * TITIK.S | 113370.233 | 4 | 28342.558 | 9.795 | .000 |
| WAKTU * TITIK.S | 90221.500 | 4 | 22555.375 | 7.795 | .000 |
| JARAK * WAKTU * TITIK.S | 28519.567 | 4 | 7129.892 | 2.464 | .061 |

**Tests of Between-Subjects Effects**

Dependent Variable: MIKROPLASTIK

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Error | 115744.667 | 40 | 2893.617 | | |
| Total | 14362728.000 | 60 | | | |
| Corrected Total | 2605501.333 | 59 | | | |

a. R Squared = ,956 (Adjusted R Squared = ,934)

## C. Hasil Uji Korelasi Suhu terhadap Kelimpahan Mikroplastik

**Correlations**

| | | | Mikroplastik | Suhu |
|---|---|---|---|---|
| Spearman's rho | Mikroplastik | Correlation Coefficient | 1,000 | ,794** |
| | | Sig. (2-tailed) | . | ,000 |
| | | N | 60 | 60 |
| | Suhu | Correlation Coefficient | ,794** | 1,000 |
| | | Sig. (2-tailed) | ,000 | . |
| | | N | 60 | 60 |

**. Correlation is significant at the 0.01 level (2-tailed).

## D. Hasil Uji Korelasi pH terhadap Kelimpahan Mikroplastik

**Correlations**

| | | | Mikroplastik | pH |
|---|---|---|---|---|
| Spearman's rho | Mikroplastik | Correlation Coefficient | 1,000 | ,327* |
| | | Sig. (2-tailed) | . | ,011 |
| | | N | 60 | 60 |
| | pH | Correlation Coefficient | ,327* | 1,000 |
| | | Sig. (2-tailed) | ,011 | . |
| | | N | 60 | 60 |

*. Correlation is significant at the 0.05 level (2-tailed).

## E. Hasil Uji Korelasi *Dissolved Oxygen* terhadap Kelimpahan Mikroplastik

**Correlations**

| | | | Mikroplastik | Dissolved Oxygen (DO) |
|---|---|---|---|---|
| Spearman's rho | Mikroplastik | Correlation Coefficient | 1,000 | -,784** |
| | | Sig. (2-tailed) | . | ,000 |
| | | N | 60 | 60 |
| | Dissolved Oxygen (DO) | Correlation Coefficient | -,784** | 1,000 |
| | | Sig. (2-tailed) | ,000 | . |
| | | N | 60 | 60 |

**. Correlation is significant at the 0.01 level (2-tailed).

## F. Hasil Uji Korelasi *Total Suspended Solids* terhadap Kelimpahan Mikroplastik

**Correlations**

| | | | Mikroplastik | Total Suspended Solids (TSS) |
|---|---|---|---|---|
| Spearman's rho | Mikroplastik | Correlation Coefficient | 1,000 | ,722** |
| | | Sig. (2-tailed) | . | ,000 |
| | | N | 60 | 60 |
| | Total Suspended Solids (TSS) | Correlation Coefficient | ,722** | 1,000 |
| | | Sig. (2-tailed) | ,000 | . |
| | | N | 60 | 60 |

**. Correlation is significant at the 0.01 level (2-tailed).

## G. Hasil Uji Korelasi Kekeruhan terhadap Kelimpahan Mikroplastik

**Correlations**

| | | | Mikroplastik | Kekeruhan |
|---|---|---|---|---|
| Spearman's rho | Mikroplastik | Correlation Coefficient | 1,000 | ,510** |
| | | Sig. (2-tailed) | . | ,000 |
| | | N | 60 | 60 |
| | Kekeruhan | Correlation Coefficient | ,510** | 1,000 |
| | | Sig. (2-tailed) | ,000 | . |
| | | N | 60 | 60 |

**. Correlation is significant at the 0.01 level (2-tailed).

## H. Hasil Uji Korelasi Salinitas terhadap Kelimpahan Mikroplastik

**Correlations**

| | | | Mikroplastik | Salinitas |
|---|---|---|---|---|
| Spearman's rho | Mikroplastik | Correlation Coefficient | 1,000 | ,695** |
| | | Sig. (2-tailed) | . | ,000 |
| | | N | 60 | 60 |
| | Salinitas | Correlation Coefficient | ,695** | 1,000 |
| | | Sig. (2-tailed) | ,000 | . |
| | | N | 60 | 60 |

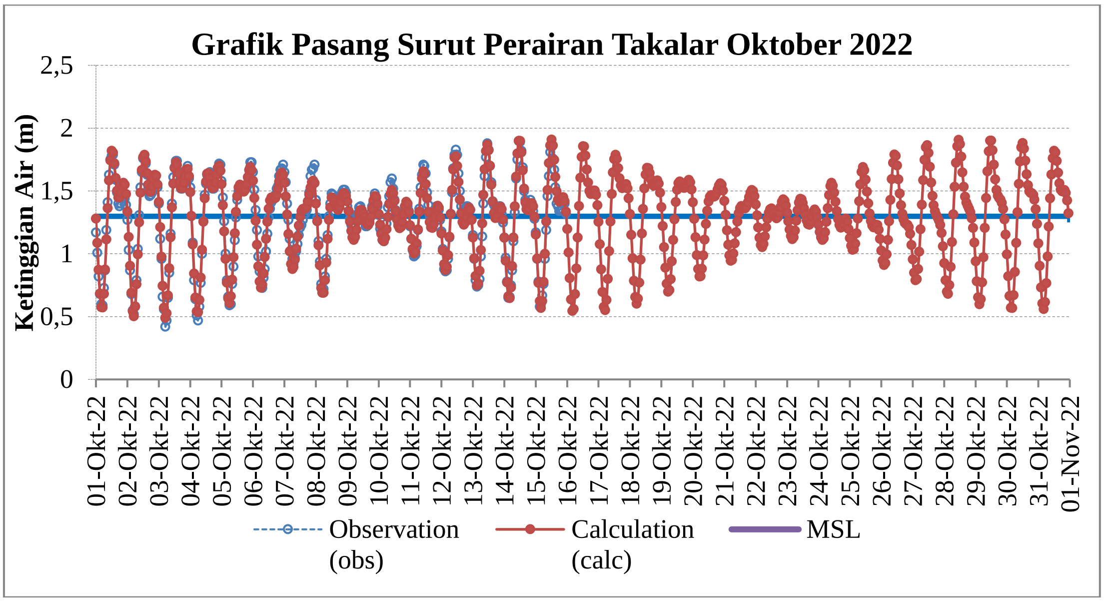
**. Correlation is significant at the 0.01 level (2-tailed).

**Lampiran 4** Data pasang surut

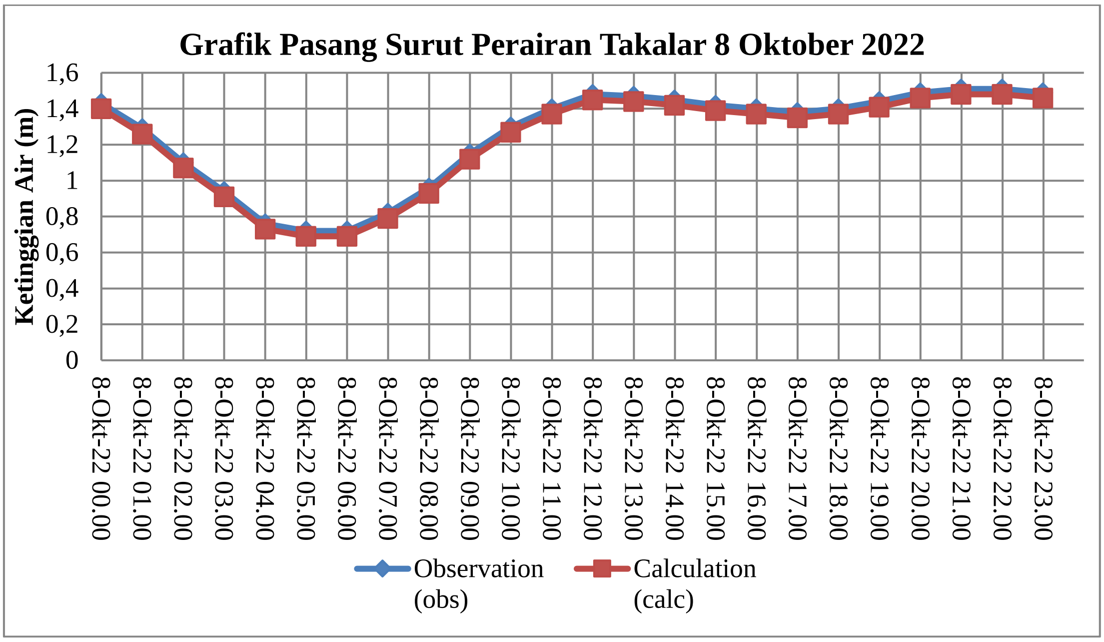
Tipe pasang surut perairan Galesong Utara Kabupaten Takalar tahun 2022

| Bulan | Bilangan Formzal (F) | Tipe Pasang Surut |
|---|---|---|
| Januari 2022 | 2,552 | Condong Harian Tunggal |
| Februari 2022 | 3,098 | Harian Tunggal |
| Maret 2022 | 1,720 | Condong Harian Tunggal |
| April 2022 | 3,035 | Harian Tunggal |
| Mei 2022 | 2,079 | Condong Harian Tunggal |
| Juni 2022 | 2,106 | Condong Harian Tunggal |
| Juli 2022 | 2,381 | Condong Harian Tunggal |
| Agustus 2022 | 3,042 | Harian Tunggal |
| September 2022 | 2,424 | Condong Harian Tunggal |
| Oktober 2022 | 2,705 | Condong Harian Tunggal |
| November 2022 | 2,618 | Condong Harian Tunggal |
| Desember 2022 | 2,317 | Condong Harian Tunggal |

Sumber : Badan Informasi Geospasial (2022)

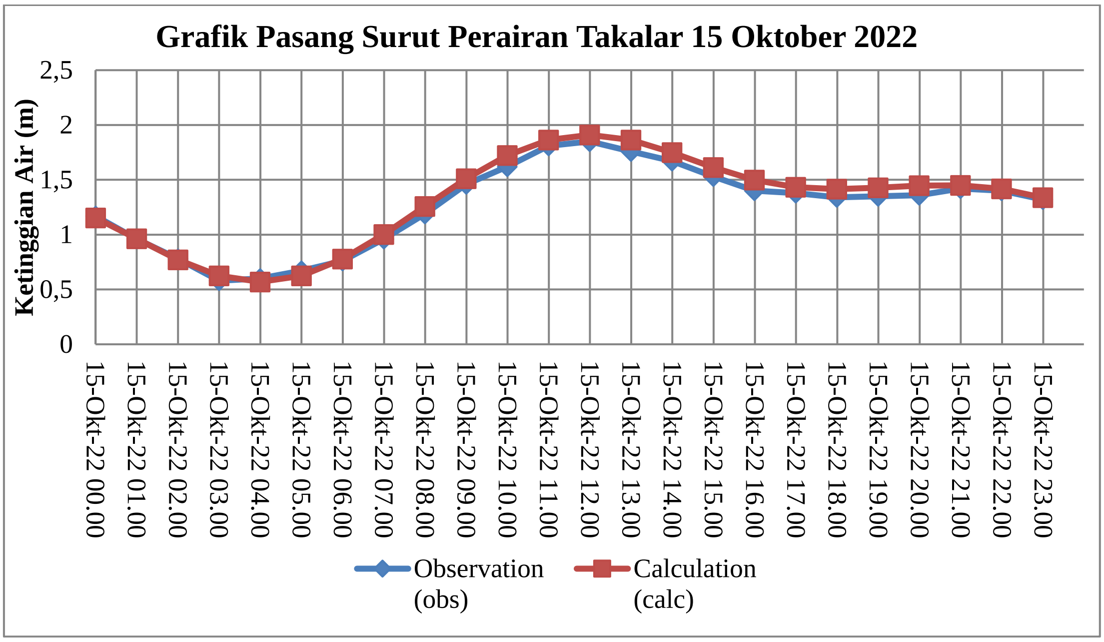



Grafik pasang surut perairan Galesong Utara Kab. Takalar bulan Oktober 2022
Sumber : Badan Informasi Geospasial (2022)



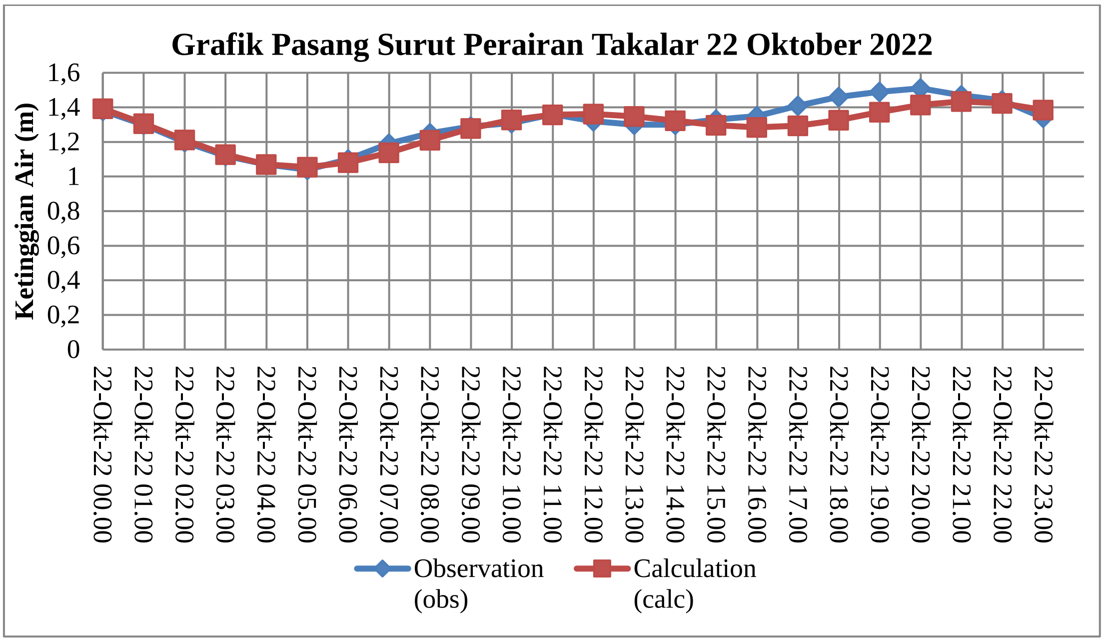

| Kondisi | Pukul (WITA) |
|---|---|
| Pasang | 07.00-12.00 dan 18.00-23.00 |
| Surut | 00.00-07.00 dan 13.00-18.00 |

Sumber : Badan Informasi Geospasial (2022)




| Kondisi | Pukul (WITA) |
|---|---|
| Pasang | 06.00-12.00 dan 18.00-23.00 |
| Surut | 00.00-06.00 dan 13.00-18.00 |

Sumber : Badan Informasi Geospasial (2022)




| Kondisi | Pukul (WITA) |
|---|---|
| Pasang | 06.00-12.00 dan 18.00-23.00 |
| Surut | 00.00-06.00 dan 13.00-18.00 |

Sumber : Badan Informasi Geospasial (2022)