DAFTAR PUSTAKA

Agustina, D. Y., Suprapto, D., & Soedarto, J. (2019). Kandungan logam berat timbal (pb) pada ikan nila (*Oreochromis niloticus*) di Sungai Tenggang, Semarang, Jawa Tengah. Journal of maquares 8(3), 1-9. https://ejournal3.undip.ac.id/index.php/maquares

Al-Fatih, A. N. F. (2021). Identifikasi mikroplastik pada sistem pencernaan ikan nila (*Oreochromis niloticus*) di Kali Pelayaran Kabupaten Sidoarjo. Env. Poll. Journal 1(3), 237–244. https://ecotonjournal.id/index.php/epj

Alam, F. C., Sembiring, E., Muntalif, B. S., & Suendo, V. (2019). Microplastic distribution in surface water and sediment river around slum and industrial area (case study: Ciwalengke River, Majalaya district, Indonesia). Chemosphere 224, 637–645.

Ali, H.; El-Dein, H. G.; Al-Khouly, K. & Rady, M. (2023). Histological and histochemical effects of microplastics administration in *Oreochromis niloticus* fingerlings. Egyptian academic journal of biological sciences, d histology and histochemistry. 15(2), 1-13

Ambarsari, D. A., & Anggiani, M. (2022). Kajian kelimpahan mikroplastik pada sedimen di wilayah perairan laut Indonesia. Oseana 47(1), 20–28.

Ammar, E., Mohamed, M. S. & Sayed, A. E. D. (2022). Polyethylene microplastics increases the tissue damage caused by 4-nonylphenol in the common carp (*Cyprinus carpio*) juvenile. Frontiers in Marine Science. 9, 1-13.

Amponsah, A.K., Afrifa, E.A., Essandoh, P.K., & Enyoh, C.E. (2024). Evidence of microplastics accumulation in the gills and gastrointestinal tract of fishes from an estuarine system in Ghana. Heliyon 10, 2-13.

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

Aryani, D., Khalifa, M. A., Herjayanto, M., Solahudin, E. A., Rizki, E. M., Halwatiyah, W., Istiqomah, H., Maharani, S. H., Wahyudin, H., dan Pratama, G. (2021). Penetration of microplastics (polyethylene) to several organs of nile tilapia (*Oreochromis niloticus*). IOP Conference Series: Earth and Environmental Science 715(1). https://doi.org/10.1088/1755-1315/715/1/012061

Barnes, D. K. A., Galgani, F., Thompson, R. C., & Barlaz, M. (2009). Accumulation and fragmentation of plastic debris in global environments. Philosophical transactions of the royal society b: biological sciences 364(1526), 1985–1998. https://doi.org/10.1098/rstb.2008.0205

Bigliardi, P. L., Alsagoff, S. A. L., El-Kafrawi, H. Y., Pyon, J. K., Wa, C. T. C., & Villa, M. A. (2017). Povidone iodine in wound healing: A review of current concepts and practices. International journal of surgery 44, 260–268. https://doi.org/10.1016/j.ijsu.2017.06.073

Browne, M. A., Dissanayake, A., Galloway, T. S., Lowe, D. M., & Thompson, R. C. (2008). Ingested microscopic plastic translocates to the circulatory system of the mussel, *Mytilus edulis* (L). Environmental Science and Technology 42(13), 5026–5031. https://doi.org/10.1021/es800249a

Browne, M. A., Niven, S. J., Galloway, T. S., Rowland, S. J., & Thompson, R. C. (2013). Microplastic moves pollutants and additives to worms, reducing functions linked to health and biodiversity. Current Biology 23(23), 2388–2392. https://doi.org/10.1016/j.cub.2013.10.012

Buwono, N. R., Risjani, Y., & Soegianto, A. (2022). Oxidative stress responses of microplastic-contaminated *Gambusia affinis* obtained from the Brantas River in East Java, Indonesia. Chemosphere *293*, 133543.

Campanale, C., Massarelli, C., Savino, I., Locaputo, V., & Uricchio, V. F. (2020). A detailed review study on potential effects of microplastics and additives of concern on human health. International Journal of Environmental Research and Public Health 17(4). https://doi.org/10.3390/ijerph17041212

Cantu, E., Rivera, M., Lacy, B., & Rahman, M. S. (2023). Effects of short-term exposure to a pesticide mixture on free-swimming behavior in goldfish, *Carassius auratus*. Journal of Hazardous Materials Advances *11*. https://doi.org/10.1016/j.hazadv.2023.100350

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

Chae, Y., & An, Y. J. (2017). Effects of micro- and nanoplastics on aquatic ecosystems: Current research trends and perspectives. Marine Pollution Bulletin 124(2), 624–632. https://doi.org/10.1016/j.marpolbul.2017.01.070

Chagas, T. Q., Freitas, Í. N., Montalvão, M. F., Nobrega, R. H., Machado, M. R. F., Charlie-Silva, I., et al. (2021). Multiple endpoints of polylactic acid biomicroplastic toxicity in adult zebrafish (*Danio rerio*). Chemosphere *277*. https://doi.org/10.1016/j.chemosphere.2021.130279

Chapman K. E., Hoffmann G. R., Doak S. H. & Jenkins G. J. S. (2017). Investigation of J-shaped dose-responses induced by exposure to the alkylating agent N-methyl-N-nitrosourea Mutat. Res. Toxicol. Environ 819, 38–4

Chen, G., Li, Y., & Wang, J. (2021). Occurrence and ecological impact of microplastics in aquaculture ecosystems. Chemosphere 274. https://doi.org/10.1016/j.chemosphere.2021.129989

Chen, J., Deng, Y., Chen, Y., Peng, X., Qin, H., Wang, T., & Zhao, C. (2022). Distribution patterns of microplastics pollution in urban fresh waters: a case study of rivers in Chengdu, China. International Journal of Environmental Research and Public Health 19(15). https://doi.org/10.3390/ijerph19158972

Chen, X., Liu, S., Ding, Q., Teame, T., Yang, Y., Ran, C., Zhang, Z., & Zhou, Z. (2023). Research advances in the structure, function, and regulation of the gill barrier in teleost fish. Water Biology and Security 2(2). https://doi.org/10.1016/j.watbs.2023.100139

Choi, J. S., Jung, Y. J., Hong, N. H., Hong, S. H., & Park, J. W. (2018). Toxicological effects of irregularly shaped and spherical microplastics in a marine teleost, the sheepshead minnow (*Cyprinodon variegatus)*. Marine Pollution Bulletin *129*(1), 231–240. https://doi.org/10.1016/j.marpolbul.2018.02.039

Cole, M., Lindeque, P., Fileman, E., Halsband, C., Goodhead, R., Moger, J., & Galloway, T. S. (2013). Microplastic ingestion by zooplankton. Environmental Science and Technology 47(12), 6646–6655.

Cole, M., Lindeque, 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

Cormier, B., Cachot, J., Blanc, M., Cabar, M., Clérandeau, C., Dubocq, F., L., et al. (2022). Environmental microplastics disrupt swimming activity in acute exposure in *Danio rerio* larvae and reduce growth and reproduction success in chronic exposure in D. *rerio* and *Oryzias melastigma*. Environmental Pollution 308. https://doi.org/10.1016/j.envpol.2022.119721

Djawad, M. I., Namba, K., Matsuura, J., & Uematsu, K. (1996). Oxygen consumption of ayu larvae in fasting condition. J. Fac. Appl. Biol. Sci., Hiroshima Univ 35, 149–161.

Donaldson, M. R., Hinch, S. G., Jeffries, K. M., Patterson, D. A., Cooke, S. J., Farrell, A. P., dan Miller, K. M. (2014). Species and sex-specific responses and recovery of wild, mature pacific salmon to an exhaustive exercise and air exposure stressor. Comparative Biochemistry and Physiology - A Molecular and Integrative Physiology *173*, 7–16.

Eberemu,N. C., Hamza, S. K. dan Aliyu, U. M. (2024). Occurrence of microplastics in the tissues of nile tilapia (*Oreochromis niloticus*) from Zobe Dam, Katsina State, Nigeria. Sahel Journal of Life Sciences FUDMA 2(2), 83-96.

Effendi, H. (2003). Telaah kualitas air bagi pengelolaan sumber daya dan lingkungan perairan. Kanisius. Yogyakarta

Eriksen, M., Lebreton, L. C. M., Carson, H. S., Thiel, M., Moore, C. J., Borerro, J. C., Galgani, F., Ryan, P. G., & Reisser, J. (2014). Plastic pollution in the world's oceans: more than 5 trillion plastic pieces weighing over 250,000 tons afloat at sea. Plose One *9*(12). https://doi.org/10.1371/journal.pone.0111913

Espinosa, C., Esteban, M. Á., & Cuesta, A. (2019). Dietary administration of PVC and PE microplastics produces histological damage, oxidative stress and immunoregulation in European sea bass (*Dicentrarchus labrax* L.). Fish and Shellfish Immunology *95*, 574–583. https://doi.org/10.1016/j.fsi.2019.10.072

El-Hack, A. M. E.; El-Saadony, M.T.; Nader M.M.; Salem H. M.; El-Tahan A.M.; Soliman S.M. & Khafaga A.F. (2022). Effect of environmental factors on growth performance of nile tilapia (*Oreochromis niloticus*). Int. J. Biometeorol 66(11), 2183-2194.

Fachrul, M. F., & Rinanti, A. (2018). Bioremediasi pencemar mikroplastik di ekosistim perairan menggunakan bakteri indigenous (bioremediation of microplastic pollutant in aquatic ecosystem by indigenous bacteria). Seminar Nasional Kota Berkelanjutan, 302–312. https://doi.org/10.25105/psnkb.v1i1.2910

Ferreira, M. W., Costa, D. V. d., Leal, C. A. G., Figueiredo, H. C. P., & Rosa, P. V. (2015). Dietary oil sources on the innate immunity and resistance of nile tilapia, *Oreochromis niloticus*, to *Streptococcus agalactiae* challenge. Journal of the World Aquaculture Society 46(3), 252–262.

Geyer, R. (2020). Production, use, and fate of synthetic polymers. Plastic Waste and Recycling, 13–32. https://doi.org/10.1016/b978-0-12-817880-5.00002-5

Guerrera, M. C., Aragona, M., Porcino, C., Fazio, F., Laurà, R., Levanti, M., et al. (2021). Micro and nano plastics distribution in fish as model organisms: histopathology, blood response and bioaccumulation in different organs. Applied Sciences (Switzerland) 11(13). https://doi.org/10.3390/app11135768

Gunadi. (2020). Bahaya plastik bagi kesehatan lingkungan. Seminar Nasional Pengabdian Masyarakat LPPM UMJ 103, 2714-6286.

Guzzetti, E., Sureda, A., Tejada, S., & Faggio, C. (2018). Microplastic in marine organism: Environmental and toxicological effects. Environmental Toxicology and Pharmacology 64, 164–171. https://doi.org/10.1016/j.etap.2018.10.009

Hamed, M., Soliman, H. A. M., Badrey, A. E. A., & Osman, A. G. M. (2021). Microplastics induced histopathological lesions in some tissues of tilapia (*Oreochromis niloticus*) early juveniles. Tissue and Cell 71. https://doi.org/10.1016/j.tice.2021.101512

Hamed, M., Soliman, H. A. M., Osman, A. G. M., & Sayed, A. E. D. H. (2019). Assessment the effect of exposure to microplastics in nile tilapia (Oreochromis niloticus) early juvenile: I. blood biomarkers. Chemosphere 228, 345–350. https://doi.org/10.1016/j.chemosphere.2019.04.153

Hamed, M., Soliman, H. A. M., Osman, A. G. M., dan Sayed, A. E. D. H. (2020). Antioxidants and molecular damage in nile tilapia (*Oreochromis niloticus*) after exposure to microplastics. Environmental Science and Pollution Research 27(13), 14581–14588.

Hasan, A. K. M. M.; Hamed, M.; Hasan, J.; Martyniuk, C. J.; Niyogi, S.; & Chivers, D. P. A. (2024). A review of the neurobehavioural, physiological, and reproductive toxicity of microplastics in fishes. Ecotoxycology and Environmental Safety 282, 1-17.

Hasanah, A. N., Aryani, D., Radityani, F. A., Nuryadin, D. F. E., & Azkia, L. I. (2023). Karakteristik mikroplastik pada ikan layang (*Decapterus ruselli*) dan ikan nila (*Oreochromis niloticus*) di Pasar Rau, Kota Serang. Habitus Aquatica 4(1). https://doi.org/10.29244/haj.4.1.1

Hawke, A. M., Trujillo, J. E., Oey, I., Giteru, S. G., & Allan, B. J. M. (2024). Exposure to petroleum-derived and biopolymer microplastics affect fast start escape performance and aerobic metabolism in a marine fish. Science of the Total Environment 906. https://doi.org/10.1016/j.scitotenv.2023.167423

Henny, C., Triyanto, Suryono, T., Rohaningsih, D., Yoga, G. P., & Waluyo, A. (2022). Microplastic pollution in lower Cimandiri River, Indonesia: Early detection on the occurrence, abundance and distribution. IOP Conference Series: Earth and Environmental Science 1036(1). https://doi.org/10.1088/1755-1315/1036/1/012114

Hidalgo-Ruz, V., Gutow, L., Thompson, R. C., & Thiel, M. (2012). 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

Hossain, M. A., Sutradhar, L., Sarker, T. R., Saha, S., & Iqbal, M. M. (2022). Toxic effects of chlorpyrifos on the growth, hematology, and different organs histopathology of Nile tilapia, *Oreochromis niloticus*. Saudi Journal of Biological Sciences 29(7). https://doi.org/10.1016/j.sjbs.2022.103316

Huang, J. N., Wen, B., Zhu, J. G., Zhang, Y. S., Gao, J. Z., & Chen, Z. Z. (2020). Exposure to microplastics impairs digestive performance, stimulates immune response and induces microbiota dysbiosis in the gut of juvenile guppy (*Poecilia reticulata*). Science of the Total Environment 733. https://doi.org/10.1016/j.scitotenv.2020.138929

Iannilli, V., Pasquali, V., Setini, A., & Corami, F. (2019). First evidence of microplastics ingestion in benthic amphipods from Svalbard. Environmental Research 179. https://doi.org/10.1016/j.envres.2019.108811

Idris, F., Febrianto, T., Hidayati, J. R., Rajib, & Nugraha, A. H. (2022). Microplastic abundance in sea cucumber at seagrass ecosystem of Bintan Island and surrounding area, Indonesia. IOP Conference Series: Earth and Environmental Science 967(1).

Inayah. (2017). Pengaruh detergent terhadap respon fisiologi, laju pertumbuhan dan tingkat kelangsungan hidup benih ikan nila pada skala laboratorium. Prosiding Seminar Nasional Kemaritiman Dan Sumber daya Pulau-Pulau Kecil 1(1), 44–50.

Indrayani, D., Elvyra (2014). Struktur insang ikan ompok *Hypophthalmus* (bleeker 1846) dari perairan sungai Siak Kota Pekanbaru. JOM FMIPA 1(2).

Jaafar, N., Azfaralariff, A., Musa, S. M., Mohamed, M., Yusoff, A. H., & Lazim, A. M. (2021). Occurrence, distribution and characteristics of microplastics in gastrointestinal tract and gills of commercial marine fish from Malaysia. Science of the Total Environment 799.

Jabeen, K., Li, B., Chen, Q., Su, L., Wu, C., Hollert, H., & Shi, H. (2018). Effects of virgin microplastics on goldfish (*Carassius auratus*). Chemosphere 213, 323–332. https://doi.org/10.1016/j.chemosphere.2018.09.031

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.

Jamin, & Erlangga. (2016). The Effects of organophosphate insecticide on tilapia (*Oreochromis niloticus*, Bleeker): histology analysis of liver and gills 3(2).

Jovanović, B., Gökdağ, K., Güven, O., Emre, Y., Whitley, E. M., & Kideys, A. E. (2018). Virgin microplastics are not causing imminent harm to fish after dietary exposure. Marine Pollution Bulletin 130, 123–131.

Kole, P., Löhr, A. J., Van Belleghem, F. G. A. J., & Ragas, A. M. J. (2017). Wear and tear of tyres: A stealthy source of microplastics in the environment. International Journal of Environmental Research and Public Health 14(10). https://doi.org/10.3390/ijerph14101265

Kama, N. A., Rahim, S. W., dan Yaqin, K. (2021). Microplastic concentration in column seawater compartment in Burau, Luwu Regency, South Sulawesi, Indonesia. IOP Conference Series: Earth and Environmental Science 763(1). https://doi.org/10.1088/1755-1315/763/1/012061

Karami, A., Romano, N., Galloway, T., & Hamzah, H. (2016). Virgin microplastics cause toxicity and modulate the impacts of phenanthrene on biomarker responses in African catfish (*Clarias gariepinus*). Environmental Research 151, 58–70. https://doi.org/10.1016/j.envres.2016.07.024

Karanjkar, D.M., & Deshpande, V. Y. 2020. Zinc induced histopathological alternations in gill, liver, and kidney of freshwater fish *Gonoproktopterus kolus* (Sykes). Advances in Zoology and Botany 8(5), 400–407. https://doi.org/10.13189/azb.2020.080504

Kementrian Kelautan dan Perikanan. (2022). *Rilis Data Kelautan dan Perikanan Triwulan I Tahun 2022*.

Khan, F. R., Shashoua, Y., Crawford, A., Drury, A., Sheppard, K., Stewart, K., & Sculthorp, T. (2020). "The plastic nile": First evidence of microplastic contamination in fish from the nile river (Cairo, Egypt). Toxics 8(2). https://doi.org/10.3390/TOXICS8020022

Killen, S. S., Reid, D., Marras, S., & Domenici, P. (2015). The interplay between aerobic metabolism and antipredator performance: Vigilance is related to recovery rate after exercise. Frontiers in Physiology 6. https://doi.org/10.3389/fphys.2015.00111

Koongolla, J. B., Lin, L., Pan, Y. F., Yang, C. P., Sun, D. R., Liu, S., et al. (2020). Occurrence of microplastics in gastrointestinal tracts and gills of fish from Beibu Gulf, South China Sea. Environmental Pollution 258. https://doi.org/10.1016/j.envpol.2019.113734

Kordi, K. (2009). Budi daya perairan. PT Citra Aditya Bakti. Bandung

Laskar, N., & Kumar, U. (2019). Plastics and microplastics: A threat to environment. Environmental Technology and Innovation 14.

Lécrivain, N.; Clément, B.; Dabrin, A.; Bouffard, D.; Naffrechoux, E. & Frossard, V. (2021). Water-level fluctuation enhances sediment and trace metal mobility in lake littoral. Chemosphere 264, 1-9.

Lesmana, I., Arlia Yusnita, N., & Hendrizal, A. (2021). Isolation and Identification of Disease-Causing Fungi in tilapia (*Oreochromis niloticus*) and Catfish (*Clarias *gariepinus*) Seeds. Berkala Perikanan Terubuk 49, 767–774. https://terubuk.ejournal.unri.ac.id/index.php/JT

Li, J., Liu, H., & Paul Chen, J. (2018). Microplastics in freshwater systems: A review on occurrence, environmental effects, and methods for microplastics detection. Water Research 137, 362–374.

Li, Y., Sun, Y., Li, J., Tang, R., Miu, Y.,& Ma, X. (2021). Research on the influence of microplastics on marine life. IOP Conference Series: Earth and Environmental Science 631(1).

Liang, W., Li, B., Jong, M.C., Ma, C., Zuo, C., Chen Q., & Shi, H. (2023). Process-oriented impacts of microplastic fibers on behavior and histology of fish. J. Hazard. Mater. 448, 130856. DOI: 10.1016/j.jhazmat.2023.130856

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). https://doi.org/10.1038/s41598-019-52292-5

Little, E. E., & Finger, S. E. (1990). Swimming behavior as an indicator of sublethal toxicity in fish. Environmental Toxicology and Chemistry 9.

Lozano, Y. M., Lehnert, T., Linck, L. T., Lehmann, A., & Rillig, M. C. (2021). Microplastic shape, polymer type, and concentration affect soil properties and plant biomass. Frontiers in Plant Science 12.

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. https://doi.org/10.1038/srep14947

Lusher, A., Hollman, P. C. H., Mendoza-Hill, J., dan Food and Agriculture Organization of the United Nations. (2017). *Microplastics in fisheries and aquaculture : status of knowledge on their occurrence and implications for aquatic organisms and food safety*.

Martinez, D. S. T., Alves, O. L., & Barbieri, E. (2013). Carbon nanotubes enhanced the lead toxicity on the freshwater fish. Journal of Physics: Conference Series 429(1). https://doi.org/10.1088/1742-6596/429/1/012043

McNeish, R. E., Kim, L. H., Barrett, H. A., Mason, S. A., Kelly, J. J., & Hoellein, T. J. (2018). Microplastic in riverine fish is connected to species traits. Scientific Reports 8(1). https://doi.org/10.1038/s41598-018-29980-9

Mcquilken, S. A. (2021). The mouth, stomach and intestines. Anaesthesia and Intensive Care Medicine 22(5), 330–335.

Melanie, K., Djamani, R., Zulfahmi, I., Nurlian, R., Sardi, A., Paujiah, E., Muliari, M., Akmal, Y., & Humairani, R. (2021). Toxic effect of lead (Pb) on hatching rate and larvae abnormalities of nile tilapia (*Oreochromis niloticus*). IOP Conference Series: Earth and Environmental Science 674(1). https://doi.org/10.1088/1755-1315/674/1/012096

Mizraji, R., Ahrendt, C., Perez-Venegas, D., Vargas, J., Pulgar, J., Aldana, M., Patricio Ojeda, F., Duarte, C., & Galbán-Malagón, C. (2017). Is the feeding type related with the content of microplastics in intertidal fish gut? Marine Pollution Bulletin 116(1), 498–500.

Mujalifah, Santoso, H., & Laili, S. (2018). Kajian morfologi ikan nila (*Oreochromis niloticus*) dalam habitat air tawar dan air payau. Jurnal Ilmiah Biosaintropis 3.

Muhib, M.I., & Rahman, M.M. (2024). How do fish consume microplastics? An experimental study on accumulation pattern using nile tilapia (*Oreochromis niloticus*). Environ. Sci. Pollut. Res. 31, 39303–39317.

Mujiarto, I. (2023). Sifat dan karakteristik material plastik dan bahan aditif. Traksi. 3(2).

Naidoo, T., & Glassom, D. (2019). Decreased growth and survival in small juvenile fish, after chronic exposure to environmentally relevant concentrations of microplastic. Marine Pollution Bulletin 145, 254–259.

Nugroho, E., Mayadi, L., & Budileksono, S. (2017). Heritabilitas dan Perolehan Genetik pada Bobot Ikan Nila Hasil Seleksi. Jurnal Ilmu- Ilmu Hayati 16(2), 129-135.

Oliveira, M., Almeida, M., & Miguel, I. (2019). A micro(nano)plastic boomerang tale: A never ending story?. Analytical Chemistry 112, 196–200 https://doi.org/10.1016/j.trac.2019.01.005

Oliveira, M., Ribeiro, A., Hylland, K., & Guilhermino, L. (2013). Single and combined effects of microplastics and pyrene on juveniles (0+ group) of the common goby *Pomatoschistus microps* (Teleostei, Gobiidae). Ecological Indicators 34, 641–647. https://doi.org/10.1016/j.ecolind.2013.06.019

Pamungkas, N. A. G., Hartati, R., Redjeki, S., Riniatsih, I., Suprijanto, J., Supriyo, E., & Widianingsih, W. (2022). Karakteristik mikroplastik pada sedimen dan air laut di muara sungai Wulan Demak. Jurnal Kelautan Tropis 25(3), 421–431. https://doi.org/10.14710/jkt.v25i3.14923

Pan, Z., Zhang, C., Wang, S., Sun, D., Zhou, A., Xie, S., Xu, G., & Zou, J. (2021). Occurrence of microplastics in the gastrointestinal tract and gills of fish from Guangdong, South China. Journal of Marine Science and Engineering 9(9). https://doi.org/10.3390/jmse9090981

Pattirane, C. P., Wahyudi, D., Sangkia, F. D., & Hapsari, L. P. (2022). Study feeding different food types to the growth and survival rate of nile fingerlings, *Oreochromis niloticus*. Jurnal Ilmiah PLATAX 10(2), 344. https://doi.org/10.35800/jip.v10i2.43127

Pradiptaadi, B. P. A., & Fallahian, F. (2022). Analisis kelimpahan mikroplastik pada air dan sedimen di kawasan hilir DAS Brantas. Environmental Pollution Journal *2*(1), 344–352. https://ecotonjournal.id/index.php/epj

Prakoso, V. A., & Chang, Y. J. (2018). Effects of hypoxia on oxygen consumption of tilapia fingerlings (*Oreochromis niloticus*). Oseanologi dan Limnologi di Indonesia 3(2), 165. https://doi.org/10.14203/oldi.2018.v3i2.169

Qian, Y., Shang, Y., Zheng, Y., Jia, Y., & Wang, F. (2023). Temporal and spatial variation of microplastics in Baotou section of Yellow River, China. Journal of Environmental Management 338.

Rios-Fuster, B., Alomar, C., Paniagua González, G., Garcinuño Martínez, R. M., Soliz Rojas, D. L., Fernández Hernando, P., & Deudero, S. (2022). Assessing microplastic ingestion and occurrence of bisphenols and phthalates in bivalves, fish and holothurians from a Mediterranean marine protected area. Environmental Research 214. https://doi.org/10.1016/j.envres.2022.114034

Rios-Fuster, B., Arechavala-Lopez, P., García-Marcos, K., Alomar, C., Compa, M., Álvarez, E., Julià, M. M., Solomando Martí, A., Sureda, A., & Deudero, S. (2021). Experimental evidence of physiological and behavioral effects of microplastic ingestion in *Sparus aurata*. Aquatic Toxicology 231. https://doi.org/10.1016/j.aquatox.2020.105737

Rochman, C. M., Hoh, E., Kurobe, T., & Teh, S. J. (2013). Ingested plastic transfers hazardous chemicals to fish and induces hepatic stress. Scientific Reports 3. https://doi.org/10.1038/srep03263

Rochman, C. M., Kurobe, T., Flores, I., & Teh, S. J. (2014). Early warning signs of endocrine disruption in adult fish from the ingestion of polyethylene with and without sorbed chemical pollutants from the marine environment. Science of the Total Environment 493, 656–661.

Ryan, P. G., Moore, C. J., Van Franeker, J. A., & Moloney, C. L. (2009). Monitoring the abundance of plastic debris in the marine environment. Philosophical Transactions of the Royal Society B: Biological Sciences 364(1526), 1999–2012. https://doi.org/10.1098/rstb.2008.0207

Shafiq, M., Qadir, A., & Hussain, C. M. (2019). Microplastics as contaminant in freshwater ecosystem: A modern environmental issue. Handbook of Environmental Materials Management, 355–377.

Lippiatt, S., Sarah O., & Courtney, A. (2013). Marine debris monitoring and assessment: Recommendations for monitoring debris trends in the marine environment. NOAA Marine Debris Program.

Senduk, J. L., Suprijanto, J. & Ridlo, A. (2021). Mikroplastik pada ikan kembung (*Rastrelliger* sp.) dan ikan selar (*Selaroides eptolepis)* di TPI Tambak Lorok Semarang dan TPI Tawang Rowosari Kendal. Buletin Oseanografi Marina 10(3), 251-258.

Shinn, C., Santos, M. M., Lek, S., & Grenouillet, G. (2015). Behavioral response of juvenile rainbow trout exposed to an herbicide mixture. Ecotoxicology and Environmental Safety 112, 15–21.

Sies, H. (2015). Oxidative stress: A concept in redox biology and medicine. Redox Biol. 4, 180-183.

Silva-Cavalcanti, J. S., Silva, J. D. B., França, E. J. de, Araújo, M. C. B. de, & Gusmão, F. (2017). Microplastics ingestion by a common tropical freshwater fishing resource. Environmental Pollution 221, 218–226.

Sloman, K.A.,Baker,D.W.,Ho,C.G.,McDonald,D.G., & Wood,C.M.,2003.The effects of trace metal exposure on agonistic encounters in juvenile rainbow trout, *Oncorhynchus mykiss*. Aquat.Toxicol. 63, 187–196

Sopinka, N. M., Donaldson, M. R., O'Connor, C. M., Suski, C. D., & Cooke, S. J. (2016). Stress indicators in fish. Fish Physiology 35, 405–462. https://doi.org/10.1016/B978-0-12-802728-8.00011-4

Strungaru, S. A., Jijie, R., Nicoara, M., Plavan, G., & Faggio, C. (2019). Micro- (nano) plastics in freshwater ecosystems: Abundance, toxicological impact and quantification methodology. TrAC - Trends in Analytical Chemistry 110, 116–128. https://doi.org/10.1016/j.trac.2018.10.025

Su, L., Deng, H., Li, B., Chen, Q., Pettigrove, V., Wu, C., & Shi, H. (2019). The occurrence of microplastic in specific organs in commercially caught fishes from coast and estuary area of east China. Journal of Hazardous Materials 365, 716–724. https://doi.org/10.1016/j.jhazmat.2018.11.024

Subaramaniyam, U., Allimuthu, R. S., Vappu, S., Ramalingam, D., Balan, R., Paital, B., Panda, N., Rath, P. K., Ramalingam, N., & Sahoo, D. K. (2023). Effects of microplastics, pesticides and nano-materials on fish health, oxidative stress and antioxidant defense mechanism. Frontiers in Physiology 14. https://doi.org/10.3389/fphys.2023.1217666

Sutanhaji, A. T., Rahadi, B., & Firdausi, N. T. (2021). Analisis kelimpahan mikroplastik pada air permukaan di Sungai Metro, Malang. Jurnal Sumberdaya Alam Dan Lingkungan 8(2), 74–84. https://doi.org/10.21776/ub.jsal.2021.008.02.3

Tahir, A., Soeprapto, D. A., Sari, K., Wicaksono, E. A., & Werorilangi, S. (2020). Microplastic assessment in Seagrass ecosystem at Kodingareng Lompo Island of Makassar City. IOP Conference Series: Earth and Environmental Science 564(1). https://doi.org/10.1088/1755-1315/564/1/012032

Tesfahun, A., & Temesgen, M. (2018). Food and feeding habits of nile tilapia *Oreochromis niloticus* in Ethiopian water bodies: A review Agumassie Tesfahun and Mathewos Temesgen. International Journal of Fisheries and Aquatic Studies 6(1), 43–47. www.fisheriesjournal.com

Teuten, E. L., Saquing, J. M., Knappe, D. R. U., Barlaz, M. A., Jonsson, S., Björn, A., et al. (2009). Transport and release of chemicals from plastics to the environment and to wildlife. Philosophical Transactions of the Royal Society B: Biological Sciences 364(1526), 2027–2045.

Thevenon, F., Carroll, C., & Sousa, J. (2015). Plastic debris in the ocean the characterization of marine plastics and their environmental impacts. Situation Analysis Report. www.iucn.org

Thushari, G. G. N., Senevirathna, J. D. M., Yakupitiyage, A., & Chavanich, S. (2017). Effects of microplastics on sessile invertebrates in the eastern coast of Thailand: An approach to coastal zone conservation. Marine Pollution Bulletin 124(1), 349–355. https://doi.org/10.1016/j.marpolbul.2017.06.010

Tongo, I., & Erhunmwunse, N.O. 2022. Effects of ingestion of polyethylene microplastics on survival rate, opercular respiration rate and swimming performance of African catfish (*Clarias gariepinus*). Journal of Hazardous Materials 423, 127237. https://doi.org/10.1016/j.jhazmat.2021.127237

Tosetto, L., Williamson, J. E., & Brown, C. (2017). Trophic transfer of microplastics does not affect fish personality. Animal Behaviour 123, 159–167. https://doi.org/10.1016/j.anbehav.2016.10.035

United Nations Environment Programme. (2018). Single-use plastics, a roadmap for sustainability. (UNEP (ed.); 2nd ed.).

Vandermeersch, G., Van Cauwenberghe, L., Janssen, C. R., Marques, A., Granby, K., Fait, G., et al. (2015). A critical view on microplastic quantification in aquatic organisms. Environmental Research 143, 46–55.

Walkinshaw, C., Lindeque, P. K., Thompson, R., Tolhurst, T., & Cole, M. (2020). Microplastics and seafood: lower trophic organisms at highest risk of contamination. Ecotoxicology and Environmental Safety, 190. https://doi.org/10.1016/j.ecoenv.2019.110066

Wang, W., Gao, H., Jin, S., Li, R., & Na, G. (2019). The ecotoxicological effects of microplastics on aquatic food web, from primary producer to human: A review. Ecotoxicol. Environ. Saf. 173, 110–117.

Watts, A. J. R., Urbina, M. A., Goodhead, R., Moger, J., Lewis, C., & Galloway, T. S. (2016). Effect of Microplastic on the Gills of the Shore Crab Carcinus maenas. Environmental Science and Technology 50(10), 5364–5369. https://doi.org/10.1021/acs.est.6b01187

Wicaksono, E. A. (2021). Kajian cemaran mikroplastik pada sungai-sungai di Kota Makassar serta dampaknya terhadap ikan komersial. Disertasi. Universitas Hasanuddin, Makassar.

Wicaksono, E. A., Tahir, A., & Werorilangi, S. (2020). Preliminary study on microplastic pollution in surface-water at Tallo. AACL Bioflux 13(2). http://www.bioflux.com.ro/aacl

Wilcox, C., Mallos, N. J., Leonard, G. H., Rodriguez, A., & Hardesty, B. D. (2016). Using expert elicitation to estimate the impacts of plastic pollution on marine wildlife. Marine Policy 65, 107–114.

Woods, M. N., Hong, T. J., Baughman, D., Andrews, G., Fields, D. M., & Matrai, P. A. (2020). Accumulation and effects of microplastic fibers in American lobster larvae (*Homarus americanus*). Marine Pollution Bulletin 157. https://doi.org/10.1016/j.marpolbul.2020.111280

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 178, 483–492). https://doi.org/10.1016/j.envpol.2013.02.031

Xiong, X., Tu, Y., Chen, X., Jiang, X., Shi, H., Wu, C., & Elser, J. J. (2019). Ingestion and egestion of polyethylene microplastics by goldfish (*Carassius auratus*): influence of color and morphological features. Heliyon 5(12). https://doi.org/10.1016/j.heliyon.2019.e03063

Yana, T. D., Amin, B., & Ikhwan S, Y. (2021). Identification of the Types and abundance of microplastics in *Telescopium telescopium* in the Coastal Waters of Karimun Island, Riau Islands Province. Journal of Coastal and Ocean Sciences 2(2), 93-97.

Yang, Y., Wang, Z., Wang, J., Lyu, F., Xu, K., & Mu, W. (2021). Histopathological, hematological, and biochemical changes in high-latitude fish *Phoxinus lagowskii* exposed to hypoxia. Fish Physiology and Biochemistry 47(4), 919–938. https://doi.org/10.1007/s10695-021-00947-4

Yatiningsih, R., Boesono, H., & Sardiyatmo. (2018). Analisis perubahan salinitas terhadap tingkat kematian dan tingkah laku ikan nila merah (*Oreochromis niloticus*) sebagai pengganti umpan hidup pada penangkapan cakalang. Journal of Fisheries Resources Utilization Management and Technology 7(1), 01–10.

Yin, L., Chen, B., Xia, B., Shi, X., & Qu, K. (2018). Polystyrene microplastics alter the behavior, energy reserve and nutritional composition of marine jacopever (*Sebastes schlegelii*). *Journal of Hazardous Materials* 360, 97–105. https://doi.org/10.1016/j.jhazmat.2018.07.110

Yin, L., Liu, H., Cui, H., Chen, B., Li, L., & Wu, F. (2019). Impacts of polystyrene microplastics on the behavior and metabolism in a marine demersal teleost, black rockfish (*Sebastes schlegelii*). *Journal of Hazardous Materials*, *380*. https://doi.org/10.1016/j.jhazmat.2019.120861

Yona, D., Maharani, M. D., Cordova, M. R., Elvania, Y., & Dharmawan, I. W. E. (2020). Analisis mikroplastik di insang dan saluran pencernaan ikan karang di tiga pulau kecil dan terluar Papua, Indonesia: kajian awal. Jurnal Ilmu dan Teknologi Kelautan Tropis 12(2), 497–507.

Yusuf, M. A., Tahir, A., Yaqin, K., dan Wicaksono, E. A. (2022). *Abundance and characteristics of microplastics in Sustainable costal management View project Study of Microplastic in fish and local consumers from 5 fish landing ports of South Sulawesi: Potential Health Risks View project*. https://www.researchgate.net/publication/359467281

Zhang, L., Mei, X., Tang, Y., Razlutskij, V., Peterka, J., Taylor, W. D., Naselli-Flores, L., Liu, Z., Tong, C., & Zhang, X. (2022). Effects of nile tilapia (*Oreochromis niloticus*) on phytoplankton community structure and water quality: A short-term mesocosm study. Knowledge and Management of Aquatic Ecosystems 423. https://doi.org/10.1051/kmae/2022009

Zhang, W., Zhang, S., Wang, J., Wang, Y., Mu, J., Wang, P., et al. (2017). Microplastic pollution in the surface waters of the Bohai Sea, China. Environmental Pollution 231, 541–548.

Zhu, J., Zhang, Q., Li, Y., Tan, S., Kang, Z., Yu, X., et al. (2019). Microplastic pollution in the Maowei Sea, a typical mariculture bay of China. Science of the Total Environment 658, 62–68. https://doi.org/10.1016/j.scitotenv.2018.12.192

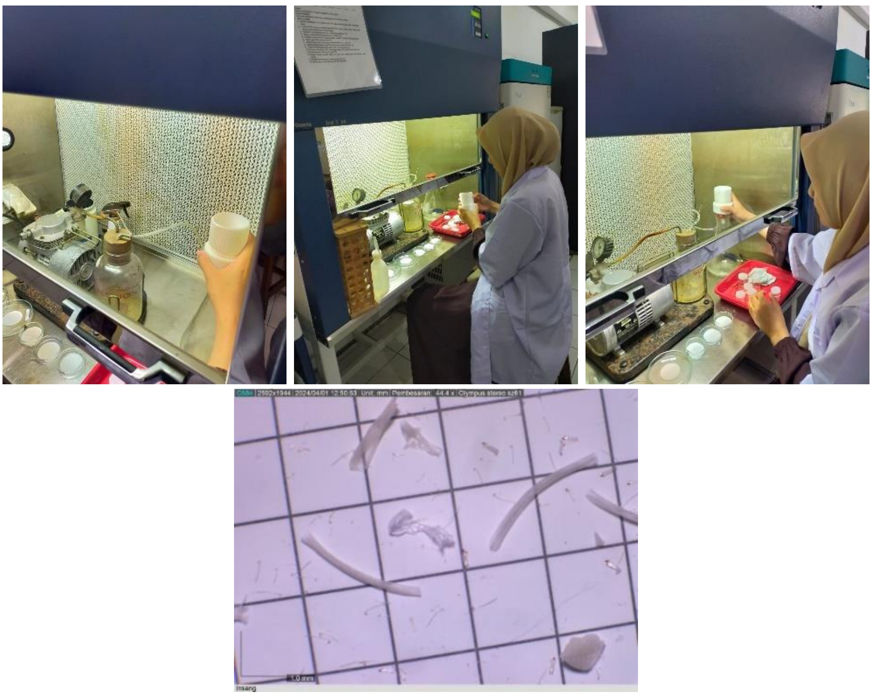
LAMPIRAN - LAMPIRAN

Lampiran 1. Dokumentasi penelitian

Perendaman mikroplastik di Sungai Tallo

Pencacahan plastik menjadi partikel mikroplastik

Pemeliharaan dan Perlakuan



Pengamatan mikroplastik pada organ insang dan usus

Pengukuran konsumsi oksigen dan preparasi sampel untuk analisis histologi

Pengamatan dan analisis histologi

Lampiran 2. Data dan hasil analisis Konsumsi Oksigen

DO awal	DO akhir	W (gr)	t (jam)	V (L)	TKO
5.76	4.8	3.673	0.5	1.5	0.19603
5.16	4.8	4.504	0.5	1.5	0.05995
5.16	4.48	4.26	0.5	1.5	0.11972
5.8	5.12	1.868	0.5	1.5	0.27302
5.8	5.12	2.741	0.5	1.5	0.18606
5.8	5.44	2.386	0.5	1.5	0.11316
4.52	4.48	4.502	0.5	1.5	0.00666
4.52	4.48	3.347	0.5	1.5	0.00896
5.48	4.8	3.975	0.5	1.5	0.12830
5.8	5.12	3.135	0.5	1.5	0.16268
4.52	4.48	5.193	0.5	1.5	0.00578
4.52	4.48	4.77	0.5	1.5	0.00629

Data konsumsi oksigen

Number of families	1							
Number of comparisons per family	3							
Alpha	0.05							
Dunnett's multiple comparisons test	Mean Diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value	A-?		
Kontrol vs. 1 mg/L	-0.1148	-0.2633 to 0.03367	No	ns	0.1315	B	1 mg/L	
Kontrol vs. 10 mg/L	-0.1803	-0.3288 to -0.03184	Yes	*	0.0203	C	10 mg/L	
Kontrol vs. 100 mg/L	-0.03757	-0.1861 to 0.1109	No	ns	0.8101	D	100 mg/L	
Test details	Mean 1	Mean 2	Mean Diff.	SE of diff.	n1	n2	q	DF
Kontrol vs. 1 mg/L	0.0104	0.1252	-0.1148	0.05157	3	3	2.227	8
Kontrol vs. 10 mg/L	0.0104	0.1907	-0.1803	0.05157	3	3	3.497	8
Kontrol vs. 100 mg/L	0.0104	0.04797	-0.03757	0.05157	3	3	0.7286	8

Analisis statistik konsumsi oksigen