

DAFTAR PUSTAKA

- Arlofa, N. dan Herutom H. 2017. Perbandingan analisis gugus ataktik pada polimer polipropilena dengan metode gravimetric dan fourier transform infra red (FTIR). Seminar Nasional Riset Terapan.
- Aliabad, M.K., M. Nassiri, K. Kor. 2019. Microplastics in the surface sea water of Chahbahar Bay, Gulf of Oman (Makrancoast). Marine Pollution Bulletin. No. 143: 125-133.
- Andrady, A.L. 2011. Microplastics in the marine environment. Marine Pollution Bulletin. No. 62 (3011): 1596-1605.
- Ayuningtyas, W. C., D. Yona, S. H. Julianda, F. Iranawati. 2019. Kelimpahan mikroplastik pada perairan di Banyuurip, Gresik, Jawa Timur. Journal of Fisheries and Marine Research. Vol. 3, No. 1: 41-45.
- Bakir,A., S. J. Rowland, R. C. Thompson. 2012. Competitive sorption of persistent organic pollutants on to microplastics in the marine environment. Marine Pollution Bulletin. No. 64: 2782–2789.
- Barasarathi, J., P. Agamuthu, C. U. Emenike, and S. H. Fauziah. 2014. Microplastic abundance in selected mangrove forest in Malaysia. Proceeding of The ASEAN Conference on Science and Technology. ISBN. XX (20XX) XX-XX :1–5.
- Bhattachary and Chaudhari. 2014. Study On Structural, Mechanical and Functional Properties of Polyester Silica Nanocomposite Fabric. India. Internasional Journal Or Pure and Appllied Sciences and Technology. Vol. 21, No. 1.
- Beaman, J., C. Bergeron, R. Benson, A-M. Cook, K. Gallagher, K. Ho, D. Hoff, S. Laessig. 2016. State of the science white paper. United States Environmental Protection Agency. EPA-822-R-16-009 : 1-30.
- Browne, M. A., T. Galloway, R. Thompson. 2007. Microplastic – an emerging contaminant of potential concern? Integrated Environmental Assesment and Management. Vol. 3: 559-561.
- Castillo,A.B., I. Al-Maslamani, J. P. Obbard. 2016. Prevalence of microplastics in the marine waters of Qatar. Marine Pollution Bulletin. No. 111: 260–267.
- Cincinelli, A., C. Scopetani, D. Chelazzi, E. Lombardini, T. Martellini, A. Katsoyiannis, M. C. Fossi, S. Corsolini. 2017. Micrplastics in the surface waters of the Ros Sea (Antarctica): Occurrence, distribution and characterization by FTIR. Chemosphere. No. 175 : 391-400.
- Citrasari, N., N.I. Oktavitri, A. Nuril, Aniwindira. 2012. Analisis laju timbunan dan komposisi sampah di permukiman pesisir Kenjeran Surabaya. Journal of Biological Research, No. 18: 83–85.
- Claessens, M., L. Van Cauwenbergh, M. B. Vandegehuchte, and C. R. Janssen. 2013. New techniques for the detection of microplastics in sediments and field collected organisms. Marine Pollution Bulletin. Vol. 70, No. 1–2: 227– 233.

- Cole, Matthew, P. Lindeque, C. Halsband, T. S. Galloway. 2011. Microplastics as contaminants in the marine environment: A review. *Marine Pollution Bulletin*. No. 62, 2588-2597
- Collignon, A., J-H. Hecq, F. Glagani, P. Voisin, F. Collard, A. Goffart. 2012. Neustonic microplastics and zooplankton in the North Western Mediterranean Sea. *Marine Pollution Bulletin*, No. 64 : 861-864.
- Dewi IS, A.A. Budiarsa., I. R. Ritonga . 2015. Distribusi mikroplastik pada sedimen di Muara Badak, Kabupaten Kutai Kartanegara. *Depik* 4 (3): 121-131.
- Eriksen, M., S. Mason, S. Wilson, C. Box, A. Zellers, W. Edwards, H. Farley and S. Amato. 2013. Microplastic pollution in the surface waters of the Laurentian Great Lakes. *Marine Pollution Bulletin* Vol. 77, No. 1-2: 177-182
- Fachruddin, L., K. Yaqin, R. Iin. Perbandingan dua metode analisis konsentrasi mikroplastik pada kerang hijau, *Perna viridis* dan penerapannya dalam kajian ekotoksikologi. *Jurnal Pengelolaan Perairan*. Vol. 3 (1): 1-13.
- Fendall, L.S. dan M.A. Sewell. 2009. Contributing to marine pollution by washing your face: microplastics in facial cleansers. *Marine Pollution Bulletin* 58: 1225-1228.
- Galgani, F., J.P. Leaute, P. Moguedet, A. Souplet, Y. Verin, A. Carpentier, H. Goraguer, D. Latrouite, B. Andral, Y. Cadiou, J.C. Mahe, J.C. Poulard and P. Nerisson. 2000. Litter on the sea floor along European coasts. *Marine Pollution Bulletin*, Vol.40, No.6: 516-527.
- Gwertz, Berit., A. Barth, M. Ogonowski, M. Macleod. 2017. Abundance and composition of near surface microplastics and plastic debris in the Stockholm Archipelago, Baltic Sea. *Marine Pollution Bulletin*. Xxx (xxxx) xxx-xxx.
- Gregory, M.R. 2009. Environmental implications of plastic debris in marine settings—entanglement, ingestion, smothering, hangers-on, hitch-hiking and alien invasions. *Philosophical Transactions of the Royal Society B* 364(1526): 2013-2025.
- Gupta, V. B., & Z. Bashir. 2005. PET fibers, films, and bottles: Sections 5-7. *Handbook of Thermoplastic Polyesters*, 362– 388.
- Hastuti, A.R. 2014. Distribusi Spasial sampah laut di ekosistem mangrove Pantai Indah Kapuk Jakarta. Departemen Manajemen Sumber Daya Perairan Fakultas Perikanan dan Ilmu Kelautan Institut Pertanian Bogor. 29 hal.
- Hidalgo-Ruz, V., L. Gutow, R.C. Thompson, M.Thiel. 2012. Microplastics in the marine environment: a review of the methods used for identification and quantification. *Environ. Sci. Technol.* Vol. 46, No. 6, 3060-3075.
- Hinojosa, I. A. and M. Thiel. 2009. Floating marine debris in fjords, gulfs and channels of southern Chile. *Marine pollution bulletin*. Vol. 58: 341-350.
- Hiwari, H., N.P. Purba, Y.N. Ihsan, L. P. S. Yuliadi, P. G. Mulyani. 2018. Kondisi sampah mikroplastik di permukaan air laut sekitar Kupang dan Rote, Provinsi Nusa Tenggara Timur. Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia. Vol. 5, No. 2 : 165-171, ISSN 2407-8050.

- Horvat, Pieter, M. Kunaver, A. Krzan. 2015. Techniques usefull for characterization of microplastics. Proceedings of the micro2015
- Indirawati, S. M. 2017. Pencemaran Logam Berat Pb dan Cd Dan Keluhan Kesehatan pada Masyarakat di Kawasan Pesisir Belawan. *Jurnal Jumantik*, Vol. 2(2): 54-55.
- Isobe, A., K. Kubo, Y. Tamura, S. Kako, E. Nakashima. 2014. Selective transport of microplastics and mesoplastics by drifting in coastal waters. *Marine Pollution Bulletin*. No. 89: 324 –330.
- Jambeck, Jenna R., R. Geyer, C. Wilcox. 2015. *Plastic waste inputs from land into the ocean*. *Science*. Vol. 347, 768-770.
- Lusher, A. L., G. Hernandez-Milian, J. O'Brien, S. Berrow, I. O'Connor, R. Officer. 2015. Microplastic and macroplastic ingestion by a deep diving, oceanic cetacean: The True's beaked whale Mesoplodon mirus. *Environmental Pollution*. No. 199: 185-191.
- Manalu, Anggresia A. 2017. Kelimpahan mikroplastik di Teluk Jakarta. Tesis. Institut Pertanian Bogor. 45 hal.
- Mawaddah, R., Firdaus, A. Tahir. 2020. Studies of Micro Plastics contamination on mussels, sea water and sediment at Sanrobengi Island of South Sulawesi. *Advance in Environmental Biology*. Vol. 4 (2): 12-17.
- McMahon, Clive R. 1999. The diet of itinerant male Hooker's sea lions, *Phocarctos hookeri*, at sub-Antarctic Macquarie Island. *Wildlife Research*. No. 26: 839-846.
- Moore, C.J. and M.J. Allen. 2000. Distribution of anthropogenic and natural debris on the mainland shelf of the southern California bight. *Marine Pollution Bulletin* Vol. 40, No.1: 83-88.
- NOAA National Ocean and Atmosphere Administration. 2016. Marine debris impact on coastal and benthic habitats. *NOAA Marine Debris Habitat Report*.
- Nor M, Obbard JP. 2014. Microplastics in Singapore's coastal mangrove ecosystems. *Marine Pollution Bulletin* No.79: 278-283.
- Nuelle, M-T., J. H. Dekiff, D. Remy, E. Fries. 2014. A new analytical approach for monitoring microplastics in marine sediment. *Environment Pollution*, No. 184 : 161-169.
- Padang, Anita. 2014. Pertumbuhan fitoplankton *Coccolithophore* sp di wadah terkontrol dengan kepadatan inokulum yang berbeda. *Jurnal Ilmiah Agribisnis dan Perikanan*. Vol. 6. No. 3: 33-38.
- Rochman, C.M., E. Hoh, B.T. Hentschel, S. Kaye, 2013. Longterm field measurements of sorption of organic contaminants to five types of plastic pellets: implications for plastic marine debris. *Environment Science Technology*. No. 47, ISSN 1646-1654.
- Rosadi, F., R. Saptati, D. Setyowati. 2019. Bumi dalam kantong plastik. *Media Keuangan*. Vol. XIV, No. 144, ISSN 1907- 6320.

- Saeed, T., N. A- Jandal, A. A- Mutairi, H. Taqi. 2020. Microplastics in Kuwait marine environment. *Marine Pollution Bulletin*. No. 152 : 1-6.
- Schmidt, N., D. Thibault, F. Galgani, A. Paluselli, R. Sempere. 2018. Occurrence of microplastics in surface waters of the Gulf of Lion (NW Mediterranean Sea). *Progress in Oceanography*. No. 163: 214-220.
- Tanjung, A. R., I. Ayuningrum, R. Manurung. 2013. Pengaruh waktu polimerisasi pada proses pembuatan polyester dari asam lemak sawit distilat (ALSD). *Jurnal Teknik Kimia USU*. Vol. 2, No. 4.
- Tankovic, M.S. Perusco, V. S., J. Godrijan, D., & M. Pfannkuchen. (2015). Marine plastic debris in the northeastern Adriatic. *Micro 2015. Book of abstract*. National Oceanic and Atmospheric Administration. 2013. Programmatic environmental assessment (PEA) for the NOAA Marine Debris Program. Maryland (US): NOAA. 168 p.
- Thompson, R. C. Y. Olsen, R. P. Mitchell, A. Davis, S. J. Rowland, A. W. G. John, D. McGonigle, A. E. Rusell. 2004. Lost at Sea: Where Is All the Plastic?. *Science*. Vol. 304. 838.
- Veronica, Agnes . 2016. Kontaminasi mikroplastik di perairan tawar. *Teknik kimia, Institut Teknologi Bandung*. Bandung.
- Virsek, M.K., A. Palatinus, S. Koren, M. Peterlin, P. Horvat, A. Krzan. 2016. Protocol for microplastics sampling on the sea surface and sample analysis. *Journal of Visualized Experiments*. No. 118: 1-9.
- Wahyudi, Jatmiko, H.T. Prayitno, A. D. Astuti. 2018. Pemanfaatan limbah plastik sebagai bahan baku pembuatan bahan bakar alternatif. *Jurnal Litbang*. Vol. XIV, No. 1: 58-67.
- Wang, W., A. W. Ndungu, Z. Li, J. Wang. 2017. Mikroplastics pollution in inland freshwaters of China : a case study in urban surface waters of Wuhan, China. *Science of the Total Environment*. No. 575 : 1369-1374.
- Wicaksono E. A., A. Tahir, S. Werorilangi. 2020. Preliminary study on microplastic pollution in surface water at Tallo and Jeneberang Estuary, Makassar, Indonesia. Vo. 13. No.2.
- Wright, S.L., Thompson, R.C., Galloway, T.S., 2013. The physical impacts of microplasticson marine organisms: a review. *Environment Pollution*. No. 178, 483–492.
- Zbyszewski, M., Corcoran, P.L. 2011. Distribution and degradation of fresh water plastic particles along the beaches of Lake Huron, Canada. *Water Air Soil Pollution*. 220, 365-372.
- Zhang, W., S. Zhang, J. Wang, Y. Wang, J. Mu, P. Wang, X. Lin, D. Ma. 2017. Microplastic pollution in the surface waters of the Bohai Sea, China. *Environmental Pollution*. No. 231: 541-548.
- Zhao, S., L. Zhu, T. Wang, D. Li. 2014. Suspended microplastics in the surface water of the Yangtze Estuary System, China: First observation on occurrence, distribution. *Marine pollution Bulletin*. Vol. 86: 562-568.

Zubris, K.A.V. dan B.K. Richards. 2005. Synthetic fibers as an indicator of land application of sludge. Environment Pollution. No. 138: 201-211.

LAMPIRAN

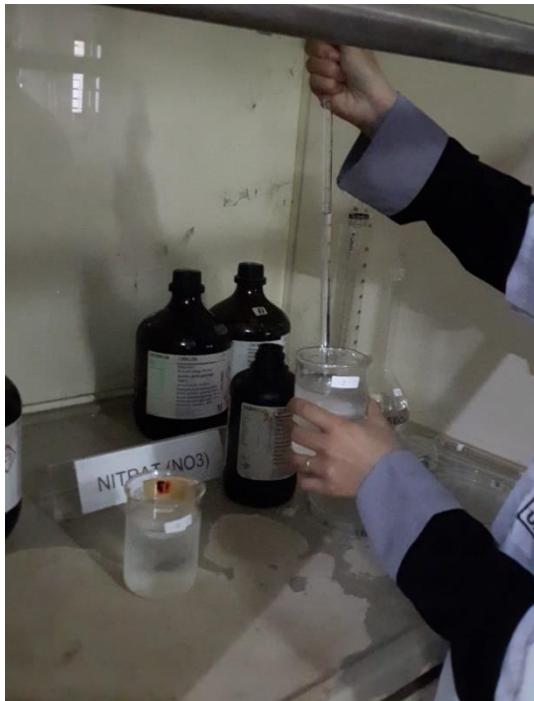
Lampiran 1. Dokumentasi penelitian



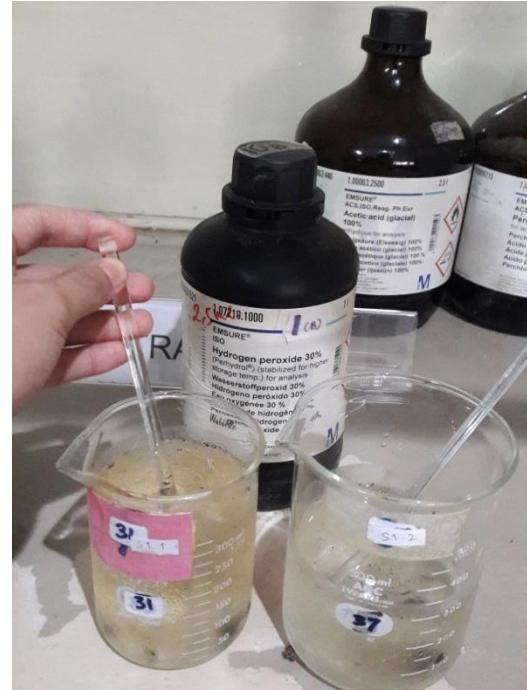
Gambar 14. Pengambilan sampel air



Gambar 15. Penyimpanan sampel di dalam freezer (suhu 4°)



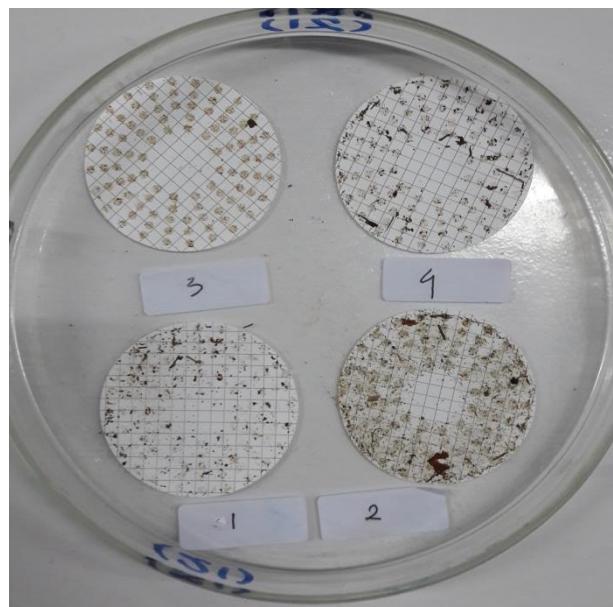
Gambar 16. Digesti sampel air menggunakan H_2O_2



Gambar 17. Sampel yang telah diberi H_2O_2 di diamkan selama 24 jam



Gambar 18. Sampel disaring menggunakan kertas saring *whatmann* dibawah *vacum pump*



Gambar 19. Sampel yang telah disaring



Gambar 20. Pengamatan menggunakan mikroskop

Lampiran 2. Data mikroplastik yang ditemukan pada perairan di Kecamatan Burau,
Kabupaten Luwu Timur

1. Stasiun I

Substasiun	Komposisi mikroplastik			
	Microplastik	Warna	Bentuk	Ukuran (mm)
1	Mp1	Biru	Fragmen	2.25
	Mp2	Biru	Fiber	1.09
	Mp3	Biru	Fiber	3.89
	Mp4	Biru	Fiber	0.35
	Mp5	Biru	Fiber	1.90
	Mp6	Biru	Fiber	1.04
	Mp7	Biru	Fiber	3.15
	Mp8	Biru	Fiber	1.04
	Mp9	Biru	Fiber	0.57
	Mp10	Biru	Fiber	0.25
	Mp11	Biru	Fiber	0.10
	Mp12	Biru	Fiber	1.52
	Mp13	Biru	Fiber	0.97
	Mp14	biru	Fiber	1.70
	Mp15	Biru	Fiber	1.30
	Mp16	biru	Fiber	1.80
	Mp17	Biru	Fiber	1.48
	Mp18	Biru	Fiber	1.62
	Mp19	Biru	film	0.64
	Mp20	biru	Fiber	1.94
	Mp21	Biru	Fiber	6.16
	Mp22	Biru	Fiber	0.72
	Mp23	Biru	Fiber	3.62
	Mp24	Biru	Fiber	1.53
	Mp25	biru	Fiber	1.82
	Mp26	Biru	Fiber	0.51
2	Mp27	Coklat	Fragmen	0.34
	Mp28	Coklat	Fragmen	0.66
	Mp29	Coklat	Fragmen	0.17
	Mp30	Coklat	Fragmen	0.39
	Mp31	Coklat	Fragmen	0.35
	Mp32	Coklat	Fragmen	0.12
	Mp33	Hijau	Fiber	1.34
	Mp34	Hijau	Fiber	3.60
	Mp35	Hijau	Fiber	0.52
	Mp36	Hijau	Fiber	3.58
	Mp37	Hijau	Fiber	3.82
	Mp38	hijau	Fragmen	0.66

	Mp39	Hijau	Fragmen	0.36
	Mp40	Hitam	Fiber	0.39
	Mp41	Hitam	Fiber	1.23
	Mp42	Hitam	film	1.46
	Mp43	Hitam	Fiber	0.94
	Mp44	Hitam	Fiber	4.80
	Mp45	Hitam	Fiber	5.07
	Mp46	Hitam	Fiber	1.48
	Mp47	hitam	Fragmen	0.37
	Mp48	Hitam	Fiber	1.53
	Mp49	Hitam	Fiber	0.64
	Mp50	Hitam	Fiber	1.83
	Mp51	Hitam	Fiber	0.64
	Mp52	Hitam	Fragmen	0.34
	Mp53	Hitam	Fragmen	0.59
	Mp54	Hitam	Fiber	0.47
	Mp55	Hitam	Fiber	0.87
	Mp56	Merah	Fiber	1.48
	Mp57	Merah	Fiber	0.96
	Mp58	Merah	Fiber	0.63
	Mp59	Merah	Fiber	0.24
	Mp60	Merah	Fiber	0.90
	Mp61	Merah	Fiber	0.54
	Mp62	Merah	Fiber	0.48
	Mp63	Merah	Fiber	1.29
	Mp64	Merah	Fiber	0.44
	Mp65	Putih	Fragmen	0.63
	Mp66	Putih	Butiran	0.16
	Mp67	Putih	Butiran	0.17
	Mp68	Putih	Butiran	0.12
	Mp69	Putih	Butiran	0.17
	Mp70	Putih	Butiran	0.11
	Mp71	Putih	Fragmen	0.06
3	Mp72	Putih	Fragmen	0.55
	Mp73	Putih	Fragmen	0.16
	Mp74	Putih	pellet	0.16
	Mp75	putih	pellet	0.16
	Mp76	Putih	pellet	0.15
	Mp77	Putih	Pellet	0.16
	Mp78	Putih	Fragmen	0.83
	Mp79	Putih	Fragmen	0.25
	Mp80	Putih	Fragmen	0.31
	Mp81	Putih	Fragmen	0.24
	Mp82	Putih	Fragmen	0.17

	Mp83	Putih	Fragmen	0.08
	Mp84	Putih	Fiber	2.61
	Mp85	Putih	Fragmen	0.23
	Mp86	Transparan	Fragmen	0.09
	Mp87	Transparan	Film	2.81
	Mp88	Transparan	Film	1.40
	Mp89	Transparan	Film	2.94
	Mp90	Transparan	Film	2.01
	Mp91	Transparan	Film	1.31
	Mp92	Transparan	Fragmen	0.86
	Mp93	Transparan	Film	2.45
	Mp94	Transparan	Film	1.00
	Mp95	Transparan	Fragmen	0.05
4	Mp96	Transparan	Fiber	2.21
	Mp97	Transparan	film	2.27
	Mp98	Transparan	film	4.27
	Mp99	Transparan	film	2.46
	Mp100	Transparan	Fragmen	0.79
	Mp101	Transparan	Fragmen	0.45
	Mp102	Transparan	Fragmen	0.54
	Mp103	Transparan	Fragmen	0.48
	Mp104	Transparan	Fragmen	0.62
	Mp105	Transparan	film	0.72
	Mp106	Transparan	film	0.64
	Mp107	Transparan	film	0.67
	Mp108	Transparan	film	0.48
	Mp109	Transparan	Fragmen	0.38
	Mp110	Transparan	film	1.25
	Mp111	Transparan	film	0.54
	Mp112	Transparan	Fragmen	0.31
	Mp113	Transparan	film	0.51
	Mp114	Transparan	Fragmen	0.53
	Mp115	Transparan	film	4.25
	Mp116	Transparan	Fiber	1.53
	Mp117	Transparan	Fragmen	0.29
	Mp118	Transparan	Fragmen	0.16
	Mp119	Transparan	Fragmen	0.15
	Mp120	Transparan	Fragmen	0.32
	Mp121	Transparan	Fragmen	0.13
	Mp122	Transparan	Fragmen	0.23
	Mp123	Transparan	Fragmen	0.07
	Mp124	Transparan	film	0.56
	Mp125	Transparan	Fragmen	0.30

Lampiran 3. Uji statistik

Analisis of varians (Komposisi)

1. Bentuk

Table Analyzed

Stasiun 1

One-way analysis of variance

P value	0.2631
P value summary	ns
Are means signif. different? (P < 0.05)	No
Number of groups	4
F	1.506
R square	0.2735

ANOVA Table

	SS	df	MS
Treatment (between columns)	3.669	3	1.223
Residual (within columns)	9.744	12	0.8120
Total	13.41	15	

Tukey's Multiple Comparison Test

	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
Fiber vs Fragmen	0.3056	0.6782	No	ns	-1.586 to 2.197
Fiber vs Film	0.8889	1.973	No	ns	-1.003 to 2.781
Fiber vs Butiran	1.222	2.713	No	ns	-0.6696 to 3.114
Fragmen vs Film	0.5833	1.295	No	ns	-1.309 to 2.475
Fragmen vs Butiran	0.9167	2.035	No	ns	-0.9752 to 2.809
Film vs Butiran	0.3333	0.7398	No	ns	-1.559 to 2.225

Table Analyzed

Transform of Stasiun 2

One-way analysis of variance

P value	0.2602
P value summary	Ns
Are means signif. different? (P < 0.05)	No
Number of groups	3
F	1.601
R square	0.2858

ANOVA Table

	SS	df	MS
Treatment (between columns)	0.4292	2	0.2146
Residual (within columns)	1.073	8	0.1341
Total	1.502	10	

Tukey's Multiple

	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
Fiber vs Fragmen	-0.09455	0.5165	No	ns	-0.8344 to 0.6452
Fiber vs Film	0.3869	1.957	No	ns	-0.4122 to 1.186
Fragmen vs Film	0.4815	2.435	No	ns	-0.3176 to 1.281

Table Analyzed

Transform of All Data

One-way analysis of variance

P value	< 0.0001
P value summary	***
Are means signif. different? (P < 0.05)	Yes
Number of groups	4
F	22.90
R square	0.8620

ANOVA Table

	SS	df	MS
Treatment (between columns)	5.378	3	1.793
Residual (within columns)	0.8610	11	0.07827
Total	6.239	14	

Tukey's Multiple Comparison Test

	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
Fiber vs Fragmen	-0.1510	1.080	No	ns	-0.7464 to 0.4443
Fiber vs Film	0.7178	5.131	Yes	*	0.1224 to 1.313
Fiber vs Butiran	1.423	9.417	Yes	***	0.7798 to 2.066
Fragmen vs Film	0.8688	6.211	Yes	**	0.2735 to 1.464
Fragmen vs Butiran	1.574	10.42	Yes	***	0.9308 to 2.217
Film vs Butiran	0.7051	4.666	Yes	*	0.06199 to 1.348

2. Warna

Table Analyzed Stasiun 1

One-way analysis of variance					
P value	0.0091				
P value summary	**				
Are means signif. different? (P < 0.05)	Yes				
Number of groups	7				
F	3.885				
R square	0.5261				
ANOVA Table					
Treatment (between columns)	SS	df	MS		
Transparan vs Biru	2.799	6	0.4665		
Residual (within columns)	2.522	21	0.1201		
Total	5.321	27			
Tukey's Multiple Comparison Test					
	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
Transparan vs Biru	0.3889	2.245	No	ns	-0.4082 to 1.186
Transparan vs Putih	0.5278	3.046	No	ns	-0.2693 to 1.325
Transparan vs Merah	0.8611	4.970	Yes	*	0.06407 to 1.658
Transparan vs Hijau	0.9167	5.291	Yes	*	0.1196 to 1.714
Transparan vs Coklat	0.9444	5.451	Yes	*	0.1474 to 1.741
Transparan vs Hitam	0.6667	3.848	No	ns	-0.1304 to 1.464
Biru vs Putih	0.1389	0.8016	No	ns	-0.6582 to 0.9359
Biru vs Merah	0.4722	2.726	No	ns	-0.3248 to 1.269
Biru vs Hijau	0.5278	3.046	No	ns	-0.2693 to 1.325
Biru vs Coklat	0.5556	3.206	No	ns	-0.2415 to 1.353
Biru vs Hitam	0.2778	1.603	No	ns	-0.5193 to 1.075
Putih vs Merah	0.3333	1.924	No	ns	-0.4637 to 1.130
Putih vs Hijau	0.3889	2.245	No	ns	-0.4082 to 1.186
Putih vs Coklat	0.4167	2.405	No	ns	-0.3804 to 1.214
Putih vs Hitam	0.1389	0.8016	No	ns	-0.6582 to 0.9359
Merah vs Hijau	0.05556	0.3206	No	ns	-0.7415 to 0.8526
Merah vs Coklat	0.08333	0.4810	No	ns	-0.7137 to 0.8804
Merah vs Hitam	-0.1944	1.122	No	ns	-0.9915 to 0.6026
Hijau vs Coklat	0.02778	0.1603	No	ns	-0.7693 to 0.8248
Hijau vs Hitam	-0.2500	1.443	No	ns	-1.047 to 0.5470
Coklat vs Hitam	-0.2778	1.603	No	ns	-1.075 to 0.5193

Table Analyzed	Transform Of Stasiun 2
One-way analysis of variance	
P value	< 0.0001
P value summary	***
Are means signif. different? (P < 0.05)	Yes
Number of groups	7
F	14.70
R square	0.8077
ANOVA Table	
Treatment (between columns)	SS 16.17
	df 6
	MS 2.694
Residual (within columns)	3.849
	df 21
	MS 0.1833
Total	20.02 27
Tukey's Multiple Comparison Test	
Transparan vs Biru	Mean Diff. 1.611
	q 7.527
	Significant? P < 0.05? Yes
	Summary ***
	95% CI of diff 0.6264 to 2.596
Transparan vs Putih	2.167
	10.12
	Yes

	1.182 to 3.151
Transparan vs Merah	2.167
	10.12
	Yes

	1.182 to 3.151
Transparan vs Hijau	2.250
	10.51
	Yes

	1.265 to 3.235
Transparan vs Coklat	2.333
	10.90
	Yes

	1.349 to 3.318
Transparan vs Hitam	1.917
	8.954
	Yes

	0.9320 to 2.901
Biru vs Putih	0.5556
	2.595
	No
	ns
	-0.4291 to 1.540
Biru vs Merah	0.5556
	2.595
	No
	ns
	-0.4291 to 1.540
Biru vs Hijau	0.6389
	2.985
	No
	ns
	-0.3458 to 1.624
Biru vs Coklat	0.7222
	3.374
	No
	ns
	-0.2625 to 1.707
Biru vs Hitam	0.3056
	1.427
	No
	ns
	-0.6791 to 1.290
Putih vs Merah	2.533e-007
	1.183e-006
	No
	ns
	-0.9847 to 0.9847
Putih vs Hijau	0.08333
	0.3893
	No
	ns
	-0.9014 to 1.068
Putih vs Coklat	0.1667
	0.7786
	No
	ns
	-0.8180 to 1.151
Putih vs Hitam	-0.2500
	1.168
	No
	ns
	-1.235 to 0.7347
Merah vs Hijau	0.08333
	0.3893
	No
	ns
	-0.9014 to 1.068
Merah vs Coklat	0.1667
	0.7786
	No
	ns
	-0.8180 to 1.151
Merah vs Hitam	-0.2500
	1.168
	No
	ns
	-1.235 to 0.7347
Hijau vs Coklat	0.08333
	0.3893
	No
	ns
	-0.9014 to 1.068
Hijau vs Hitam	-0.3333
	1.557
	No
	ns
	-1.318 to 0.6514
Coklat vs Hitam	-0.4167
	1.947
	No
	ns
	-1.401 to 0.5680

Transform of
Stasiun 3

Table Analyzed

One-way analysis of variance

P value < 0.0001

P value summary ***

Are means signif. different? (P < 0.05) Yes

Number of groups 7

F 24.90

R square 0.8768

ANOVA Table

	SS	df	MS
Treatment (between columns)	33.71	6	5.618
Residual (within columns)	4.738	21	0.2256
Total	38.45	27	

Tukey's Multiple Comparison Test

	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
Transparan vs Biru	2.667	11.23	Yes	***	1.574 to 3.759
Transparan vs Putih	3.278	13.80	Yes	***	2.185 to 4.370
Transparan vs Merah	3.000	12.63	Yes	***	1.907 to 4.093
Transparan vs Hijau	3.361	14.15	Yes	***	2.269 to 4.454
Transparan vs Coklat	3.222	13.57	Yes	***	2.130 to 4.315
Transparan vs Hitam	2.889	12.16	Yes	***	1.796 to 3.981
Biru vs Putih	0.6111	2.573	No	ns	-0.4814 to 1.704
Biru vs Merah	0.3333	1.404	No	ns	-0.7592 to 1.426
Biru vs Hijau	0.6944	2.924	No	ns	-0.3981 to 1.787
Biru vs Coklat	0.5556	2.339	No	ns	-0.5369 to 1.648
Biru vs Hitam	0.2222	0.9357	No	ns	-0.8703 to 1.315
Putih vs Merah	-0.2778	1.170	No	ns	-1.370 to 0.8147
Putih vs Hijau	0.08333	0.3509	No	ns	-1.009 to 1.176
Putih vs Coklat	-0.05556	0.2339	No	ns	-1.148 to 1.037
Putih vs Hitam	-0.3889	1.638	No	ns	-1.481 to 0.7036
Merah vs Hijau	0.3611	1.521	No	ns	-0.7314 to 1.454
Merah vs Coklat	0.2222	0.9357	No	ns	-0.8703 to 1.315
Merah vs Hitam	-0.1111	0.4679	No	ns	-1.204 to 0.9814
Hijau vs Coklat	-0.1389	0.5848	No	ns	-1.231 to 0.9536
Hijau vs Hitam	-0.4722	1.988	No	ns	-1.565 to 0.6203
Coklat vs Hitam	-0.3333	1.404	No	ns	-1.426 to 0.7592

Transform of
Stasium 4

Table Analyzed

One-way analysis of variance

P value	< 0.0001
P value summary	***
Are means signif. different? (P < 0.05)	Yes
Number of groups	7
F	13.98
R square	0.7997

ANOVA Table

	SS	df	MS
Treatment (between columns)	174.4	6	29.07
Residual (within columns)	43.67	21	2.080
Total	218.1	27	

Tukey's Multiple Comparison Test

	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
Transparan vs Biru	6.889	9.554	Yes	***	3.572 to 10.21
Transparan vs Putih	7.000	9.708	Yes	***	3.683 to 10.32
Transparan vs Merah	7.194	9.978	Yes	***	3.877 to 10.51
Transparan vs Hijau	7.389	10.25	Yes	***	4.072 to 10.71
Transparan vs Coklat	7.111	9.862	Yes	***	3.794 to 10.43
Transparan vs Hitam	7.139	9.901	Yes	***	3.822 to 10.46
Biru vs Putih	0.1111	0.1541	No	ns	-3.206 to 3.428
Biru vs Merah	0.3056	0.4238	No	ns	-3.011 to 3.623
Biru vs Hijau	0.5000	0.6934	No	ns	-2.817 to 3.817
Biru vs Coklat	0.2222	0.3082	No	ns	-3.095 to 3.539
Biru vs Hitam	0.2500	0.3467	No	ns	-3.067 to 3.567
Putih vs Merah	0.1944	0.2697	No	ns	-3.123 to 3.511
Putih vs Hijau	0.3889	0.5393	No	ns	-2.928 to 3.706
Putih vs Coklat	0.1111	0.1541	No	ns	-3.206 to 3.428
Putih vs Hitam	0.1389	0.1926	No	ns	-3.178 to 3.456
Merah vs Hijau	0.1944	0.2697	No	ns	-3.123 to 3.511
Merah vs Coklat	-0.08333	0.1156	No	ns	-3.400 to 3.234
Merah vs Hitam	-0.05556	0.07705	No	ns	-3.373 to 3.261
Hijau vs Coklat	-0.2778	0.3852	No	ns	-3.595 to 3.039
Hijau vs Hitam	-0.2500	0.3467	No	ns	-3.567 to 3.067
Coklat vs Hitam	0.02778	0.03852	No	ns	-3.289 to 3.345

Table Analyzed	Transform of All Data
One-way analysis of variance	
P value	< 0.0001
P value summary	***
Are means signif. different? (P < 0.05)	Yes
Number of groups	7
F	16.31
R square	0.8303
ANOVA Table	
	SS df MS
Treatment (between columns)	4.486 6 0.7477
Residual (within columns)	0.9170 20 0.04585
Total	5.403 26
Tukey's Multiple Comparison Test	
	Mean Diff. q Significant? P < 0.05? Summary 95% CI of diff
Transparan vs Biru	0.6200 5.791 Yes ** 0.1254 to 1.115
Transparan vs Putih	0.9648 9.011 Yes *** 0.4702 to 1.459
Transparan vs Merah	1.026 9.579 Yes *** 0.5309 to 1.520
Transparan vs Hijau	1.315 11.37 Yes *** 0.7806 to 1.849
Transparan vs Coklat	1.225 11.45 Yes *** 0.7308 to 1.720
Transparan vs Hitam	0.8363 7.811 Yes *** 0.3417 to 1.331
Biru vs Putih	0.3448 3.220 No ns -0.1499 to 0.8394
Biru vs Merah	0.4055 3.788 No ns -0.08910 to 0.9002
Biru vs Hijau	0.6948 6.009 Yes ** 0.1606 to 1.229
Biru vs Coklat	0.6054 5.654 Yes * 0.1107 to 1.100
Biru vs Hitam	0.2163 2.020 No ns -0.2783 to 0.7109
Putih vs Merah	0.06076 0.5675 No ns -0.4339 to 0.5554
Putih vs Hijau	0.3501 3.027 No ns -0.1842 to 0.8843
Putih vs Coklat	0.2606 2.434 No ns -0.2340 to 0.7552
Putih vs Hitam	-0.1285 1.200 No ns -0.6231 to 0.3661
Merah vs Hijau	0.2893 2.502 No ns -0.2450 to 0.8236
Merah vs Coklat	0.1998 1.867 No ns -0.2948 to 0.6945
Merah vs Hitam	-0.1892 1.768 No ns -0.6839 to 0.3054
Hijau vs Coklat	-0.08947 0.7737 No ns -0.6237 to 0.4448
Hijau vs Hitam	-0.4785 4.138 No ns -1.013 to 0.05572
Coklat vs Hitam	-0.3891 3.634 No ns -0.8837 to 0.1056

3. Ukuran

Table Analyzed	Transform of Ukuran
One-way analysis of variance	
P value	< 0.0001
P value summary	***
Are means signif. different? (P < 0.05)	Yes
Number of groups	7
F	35.66
R square	0.9145
ANOVA Table	SS df MS
Treatment (between columns)	10.55 6 1.759
Residual (within columns)	0.9866 20 0.04933
Total	11.54 26
Tukey's Multiple Comparison Test	Mean Diff. q Significant? P < 0.05? Summary 95% CI of diff
0.01-0.1 vs 0.01-0.1	0.0 0.0 No ns -0.5131 to 0.5131
0.01-0.1 vs 0.1-1	-1.478 13.31 Yes *** -1.991 to -0.9650
0.01-0.1 vs 1.1-2	-0.7756 6.984 Yes ** -1.289 to -0.2625
0.01-0.1 vs 2.1-3	-0.1477 1.330 No ns -0.6608 to 0.3653
0.01-0.1 vs 3.1-4	0.3250 2.926 No ns -0.1881 to 0.8380
0.01-0.1 vs 4.1-5	0.4694 3.913 No ns -0.08475 to 1.024
0.01-0.1 vs 0.1-1	-1.478 13.31 Yes *** -1.991 to -0.9650
0.01-0.1 vs 1.1-2	-0.7756 6.984 Yes ** -1.289 to -0.2625
0.01-0.1 vs 2.1-3	-0.1477 1.330 No ns -0.6608 to 0.3653
0.01-0.1 vs 3.1-4	0.3250 2.926 No ns -0.1881 to 0.8380
0.01-0.1 vs 4.1-5	0.4694 3.913 No ns -0.08475 to 1.024
0.1-1 vs 1.1-2	0.7024 6.325 Yes ** 0.1894 to 1.215
0.1-1 vs 2.1-3	1.330 11.98 Yes *** 0.8172 to 1.843
0.1-1 vs 3.1-4	1.803 16.24 Yes *** 1.290 to 2.316
0.1-1 vs 4.1-5	1.947 16.24 Yes *** 1.393 to 2.502
1.1-2 vs 2.1-3	0.6279 5.654 Yes * 0.1148 to 1.141
1.1-2 vs 3.1-4	1.101 9.911 Yes *** 0.5875 to 1.614
1.1-2 vs 4.1-5	1.245 10.38 Yes *** 0.6909 to 1.799
2.1-3 vs 3.1-4	0.4727 4.257 No ns -0.04035 to 0.9858
2.1-3 vs 4.1-5	0.6171 5.145 Yes * 0.06297 to 1.171

3.1-4 vs 4.1-5	0.1444	1.204	No	ns	-0.4097 to 0.6986
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Uji statistic (Konsentrasi)

1. Normalitas

Mean	5.624
Std. Deviation	3.356
Std. Error	0.8389
Lower 95% CI of mean	3.836
Upper 95% CI of mean	7.413
KS normality test	
KS distance	0.2424
P value	0.0127
Passed normality test (alpha=0.05)?	No
P value summary	*
D'Agostino & Pearson omnibus normality test	
K2	2.946
P value	0.2292
Passed normality test (alpha=0.05)?	Yes
P value summary	ns
Shapiro-Wilk normality test	
W	0.8515
P value	0.1144
Passed normality test (alpha=0.05)?	Yes
P value summary	*
Sum	89.99

2. Homogenitas

Test of Homogeneity of Variances

konsentrasi

Levene Statistic	df1	df2	Sig.
1.803	3	12	.200

3. Uji anova parametric

ANOVA Table	SS	df	MS
Treatment (between columns)	69.43	3	23.14
Individual (between rows)	31.18	3	10.39
Residual (random)	68.31	9	7.590
Total	168.9	15	

Tukey's Multiple Comparison Test	Mean Diff.	q	Significant?	P < 0.05?	Summary	95% CI of diff
St.1 vs St. 2	-0.9975	0.7241	No	ns	-7.079 to 5.084	
St.1 vs St. 3	-2.193	1.592	No	ns	-8.274 to 3.889	
St.1 vs St.4	-5.528	4.013	No	ns	-11.61 to 0.5541	

St. 2 vs St. 3	-1.195	0.8675	No	ns -7.277 to 4.887
St. 2 vs St.4	-4.530	3.289	No	ns -10.61 to 1.552
St. 3 vs St.4	-3.335	2.421	No	ns -9.417 to 2.747