

## Supplementary Materials

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**Supplementary Table 1. Main data extracted from all matrices found in Southeast Asia used for this study<sup>[1-285]</sup>**

| Matrices | Country  | Locality                                    | Sample Matrix    | Abundance/ Concentration                           | MPs   | Plastics debris size (mm) | Color  | Polymer Composition  | Instrumentation    | Citation                    |
|----------|----------|---|------------------|--|---|---------------------------|--|--|--------------------|-----------------------------|
| Biota    | Malaysia | Kukup, Johor                                | Sea snails       | 0.444 ± 0.111 – 0.852 ± 0.513 particles/individual | Fiber, Fragments, Films, Pellets, Beads                     | 0.25–5.0 mm               | Black, Red, Blue, Green  | PET, PP, PE,   | ATR–FTIR           | Gonsilou et al., 2023 [76]  |
|          |          | Local wet market                            | Fish             | 29.88 ± 2.34 particles per shark                   | Fiber (84.44 %). Fragment (14.16 %), Foam (1.36 %)          | 0.007 – 4.992 mm          | Black (40.07 %), Blue (31.48 %), Red (7.19 %), White (7.15 %), Yellow, Transparent (6.06 %)                  | Polyester (43.95 %), Polyethylene (23.77 %), Polypropylene (18.39 %), Polyethylene Terephthalate (10.76 %) And Polyurethane (3.14 %) | Raman Spectrometer | Matupang et al., 2023 [141] |
|          |          | Sepanggar Bay                               | Zooplankton      | 302 particles                                      | Fiber, Fragment, Film, Microbead                            | 0.007–4.026 mm            | Translucent (51.0 %), Black (37.7 %), Red (3.3 %), Blue (2.3 %), Others (5.6%)                               | ABS, PA, PE, PET, PMMA, PS, PVC, PP, PU, PVAC  | Micro–FTIR         | Tang et al., 2023 [245]     |
|          |          | Teluk Bahang and Penaga fish market, Penang | Fish             | 432 microplastics                                  | Fragment (49.5%), Fibre (41.9%), Pellet (7.6%), Film (0.9%) | N/A                       | N/A  | N/A  | SEM–EDX            | Foo et al., 2022 [73]       |
|          |          | Tanjong Karang, Selangor and Sebatu, Melaka | Cockles, Mussels | N/A  | Fragment, Film, Pellet, Filament                            | 0.010 – 0.050 µm          | Red, Grey, Black Transparent   | PE, PS, PP   | FTIR               | Karim, 2022 [109]           |
|          |          | Kuala Selangor                              | Shellfish        | 2072 microplastics                                 | Fiber, Fragment   | 0.5 – 2 mm                | Blue (27.36%), Pink (2.8%), Brown (2.56%), Red (2.27%), White/Transparent (0.29%) And Yellow/Orange (0.24%). | PS, PMMA   | FTIR               | Mazlan et al., 2022 [143]   |
|          |          | Setiu wetland, Terengganu                   | Polychaete       | 3277 items   | Filaments (99.79), Fragment (0.21)                          | N/A                       | Transparent (84.71%), Black (4.67%), Blue (3.78%), Green (2.93%), Brown (2.47%), Red (1.43%)                 | PP, PA   | Micro–FTIR         | Hamzah et al., 2021 [80]    |

|  |  |                          |              |  |   |               |  |   |                               |                                   |
|--|--|--------------------------|--------------|--|---|---------------|--|---|-------------------------------|-----------------------------------|
|  |  | Mersing, Pantai Remis    | Fish         | 486–632 pieces                         | Fiber   | 0.063–5.0     | Blue (31.9%), Black (31.1%), Red (19.5%), Grey (12.3%), And Others         | PE, PP, ABS, PET  | FTIR, Raman, FESEM–EDX        | Jaafar et al., 2021 [98]          |
|  |  | Pulau Pangkor, Perak     | Sea cucumber | 1446 particles                         | Filaments (90.87%), Fragments (8.23%), Film (0.9%)            | 0.51 – 2 mm   | Black (59.13%) And Blue (27.04%)   | PE, Poly (Methyl Methacrylate)  | FTIR                          | Muhammad Husin et al., 2021 [147] |
|  |  | Terengganu Estuary       | Zooplankton  | 50.6 – 291.2 individual/m <sup>3</sup> | Fiber   | 0.08–0.2 mm   | N/A  | PA, PE, PP  | ATR=FTIR                      | Taha et al., 2021 [239]           |
|  |  | Klang river              | Gastropod    | 0.5–1.75 items/g                       | Fiber (91%), Fragment (9%)                                    | 0.3–1.85 mm   | Black (50%), Transparent (25%), Red (25%)                                  | PE–PDM  | ATR–FTIR                      | Zaki et al., 2021 [284]           |
|  |  | Local market             | Fish meals   | 216 particles                          | Fragments (78.2%), Filaments (13.4%), Films (8.4%)            | 0.180 mm      | N/A  | PE (63.0%), PP (27.8%), PET (8.8%), NY6 (0.4%)                                | FESEM–EDX, Raman Spectrometer | Karbalaeei et al., 2020 [108]     |
|  |  | Seri Kembangan, Selangor | Fish         | 43 particles                           | Fragments (67.4%), Fibres (16.3%), Films (16.3%)              | 0.2 – 3.49 mm | N/A  | Polyethylene (88.4%), Polypropylene (9.3%), Polyethylene Terephthalate (2.3%) | Raman Spectrometer, FESEM–EDX | Karbalaeei et al., 2019 [107]     |
|  |  | Skudai river, Johor      | Fish         | 1.08 ± 1.77 items per individual       | Film (43.28%), Fragment (28.36%), Fiber (20.9%), Foam (2.99%) | N/A           | Blue (42.19%), White (26.56%), Red (21.88%), Black (7.81%), Yellow (1.56%) | N/A   | N/A                           | Sarijan et al., 2019 [209]        |

|           |  |                                 |                       |                                      |  |                  |   |   |                      |                                |
|-----------|--|---------------------------------|-----------------------|--------------------------------------|--|------------------|---|---|----------------------|--------------------------------|
|           |  | Setiu wetland, Terengganu       | Fish                  | 1260–1961 items                      | Fiber  | 0.0043–0.0157 mm | Black (65.6%), Grey (48.77%)  | PA, PVA   | FTIR                 | Khalik et al., 2018 [113]      |
| Indonesia |  | Bintan Island                   | Sea cucumber          | 225 particles                        | Fiber, Fragment, Film, Foam                                    | N/A              | White, Black, Red, Blue, Brown, Green   | N/A   | N/A                  | Kafabihi et al., 2022 [102]    |
|           |  | Pramuka Island, Seribu Islands, | Fish                  | 1648 particles                       | Fiber (60%), Fragments (35%), Pellets (5%)                     | 0.01 – 5 mm      | N/A   | N/A   | N/A                  | Mardiansyah et al., 2022 [139] |
|           |  | Western and Eastern Indonesia   | Anchovies             | 40–689 particles                     | Fiber (65.45%), Film (68.32%), Fragment (39.39%), Foam (8.57%) | 10 – 500 µm      | N/A   | PP, PS, LDPE, HDPE, PET, PA, CA   | FTIR                 | Ningrum et al., 2022 [165]     |
|           |  | Lampung and Sumbawa             | Sea cucumber          | 2.01 ± 1.59 particles individual– 1. | Fragment (47.88%), Fiber (34.55%)                              | 300 – 5000 µm    | N/A   | Polyethylene And Polypropylene (30.08%), Polyurethane (12.20%), Polyethylene Terephthalate (8.94%), Polyamide (4.07%), Cellophane (4.07%), Polystyrene (4.07%), Cellulose Acetate Group (3.25%), Polyester Group (2.44%), Polybutadiene (0.81%) | ATR FTIR, Micro–FTIR | Riani and Cordova, 2022 [204]  |
|           |  | Pulau Rambut Sanctuary          | Bird                  | 320 particles/bird                   | Film (75%), Fiber (18.75%), Fragments (6.25%)                  | 100–1,000 µm     | Transparent (56.2%), Black (12.5%), Green (6.2%), Brown (6.2%), Red (18.7%)                           | N/A   | N/A                  | Susanti et al., 2022 [223]     |
|           |  | Lombok                          | Edible tissue of fish | 1087.34 particles/ fish              | Fragment, Filament/Fiber, Film, Foam, Pellet                   | N/A              | N/A   | N/A   | N/A                  | Abidin et al., 2021 [1]        |
|           |  | South Sulawesi                  | Fish                  | 3.5±2.87 items/fish                  | Fiber  | 0.01 – 5 mm      | Blue (40%), Transparent (1.71%), Red (6.29%), Yellow (4%), Grey (8.6%), Black (13.7%), Purple(25.7%), | N/A   | N/A                  | Amelinda et al., 2021 [9]      |

|  |  |                                   |   |   |   |                             |  |        |   |                              |
|--|--|-----------------------------------|---|---|---|-----------------------------|--|--------|---|------------------------------|
|  |  | Southern Coast of Java, Indonesia | Fish  | 23 particles/fish   | Filament (84%)<br>Angular (11%),<br>Round (5%)                              | 0.01 – 5 mm                 | N/A  | N/A    | Gas Chromatography –Mass Spectrometry (GC–MS) | Andreas et al., 2021 [12]    |
|  |  | Madura Straits                    | Anchovies   | 7.44±5.16 items/individual  | Fiber, Fragment, Film   | N/A                         | N/A  | N/A    | N/A   | Guntur et al., 2021 [77]     |
|  |  | Surabaya River                    | Fish, Bivalve   | 316.13 ± 274.33;<br>61.14 ± 21.91                                   | Fiber, Film, Foam, Fragment   | N/A                         | Transparent Black, Red, Yellow, Blue, Transparent                                      | N/A    | N/A   | Lestari et al., 2021 [128]   |
|  |  | Ternate island                    | Reef fish   | 594 plastic particles   | Ragment (47.81%), Film (38.22%), Foam (2.69%), Line (7.41%), Pellet (1.52%) | 0.3–5 mm                    | Transparent (53.93%), Black (26.97%), Pink (13.48%), Yellow (3.37%), Blue, Red (1.12%) | N/A    | N/A   | Muhdhar et al., 2021 [148]   |
|  |  | Rambut island                     | Horn snail  | 764.81 particles/individual   | Fiber, Fragment, Film   | N/A                         | N/A  | N/A    | N/A   | Putri and Patria, 2021 [199] |
|  |  | Bengkalis water                   | Fish  |   | Fiber, Film, Fragment   | 0.040–1.000 mm              | White, Black   | N/A    | N/A   | Amin et al., 2020 [10]       |
|  |  | Jakarta                           | Fish  | 1.97 particles/individual   | Fragments (53.31%), Fibers (34.30%), Granules (7.25%), Foam (5.14%)         | 0.3 – 0.5 mm, >1 mm         | N/A  | N/A    | N/A   | Cordova et al., 2020 [46]    |
|  |  | Citarum River,                    | Git (seawater), Tissues (seawater), Git (mixing water pond), Tissues (mixing water) | 2.666 ± 2.233;<br>1.166 ± 0.983;<br>1.333 ± 0.577;<br>1.111 ± 0.838 | Film, Fragment  | 0.3 – 0.5 mm;<br>125–300 µm | Blue, Black  | PE, PP | ATR FTIR                                      | Semiring et al., 2020 [215]  |

|  |  |                    |                              |   |   |         |     |              |      |                               |
|--|--|--------------------|------------------------------|---|---|---------|-----|--------------|------|-------------------------------|
|  |  |                    | pond)                        |   |   |         |     |              |      |                               |
|  |  | Bintan, Kepulauan  | Snails                       | 460–628 pieces/individua  | Fiber (68%),<br>Fragment (23%),<br>Film (9%)                | >1 mm   | N/A | N/A          | N/A  | Al Hamra and Patria, 2019 [6] |
|  |  | Pantai Indah Kapuk | Fish                         | 0–13 pieces/<br>individual;<br>0–16 pieces/<br>individual;<br>4–52 pieces/<br>individual;<br>1–39 pieces/<br>individual;<br>52.65–72.22<br>particles/individuals;<br>2–27 pieces/<br>individual;<br>0–23 pieces/<br>individual;<br>7–33 pieces/<br>individual;<br>7–33 pieces/<br>individual;<br>2–50 pieces/<br>individual | Fibers (89.63%),<br>Films (4.13%),<br>Fragments<br>(6.24%)  | >0.2mm  | N/A | N/A          | N/A  | Hastuti et al., 2019 [82]     |
|  |  | Pangandaran Bay    | Cutlassfish;<br>Croaker fish | 0.75–4.67 pieces/<br>individual;<br>0.21–1.17 pieces/<br>individual   | Fragment (50%),<br>Fiber (23%),<br>Film (27%)               | >300 µm | N/A | N/A          | N/A  | Ismail et al., 2019 [95]      |
|  |  | Tanjung–pinang     | Catfish                      | 20–87 pieces/<br>individual   | Fragment, Fiber   | >50 µm  | N/A | N/A          | N/A  | Lubis et al., 2019 [133]      |
|  |  | Talisayan harbor   | Anchovies                    | 366 pieces/<br>individual;  | Film (50%),<br>Fiber (29%),<br>Fragment (18%),<br>Foam (3%) | >20 µm; | N/A | PP, HDPE, PA | FTIR | Ningrum et al., 2019 [166]    |

|  |          |                                |   |  |  |               |  |   |            |                               |
|--|----------|--------------------------------|---|--|--|---------------|--|---|------------|-------------------------------|
|  |          | Pramuka Island, Seribu Islands | Sea hare, Seagrass                                    | 54.9 particles/g; 2,590 microplastic particles.  | Film, Fiber, Fragments                                     | N/A           | N/A  | N/A   | N/A        | Priscilla et al., 2019 [195]  |
|  |          | Spermonde Archipelago          | Collector urchin, Mussels, Oyster, Tiger cowry        | 0.50 pieces/individual; 0.50 pieces/individual; 0.30 pieces/individual; 0.30 pieces/individual | Fiber (95%)  | >4.5 mm       | Blue And Black   | N/A   | N/A        | Tahir et al., 2019 [240]      |
|  | Thailand | U-Taphao, southern Thailand    | Gastropods  | 21.24 particles/individual   | Fibers (90%), Fragments (7%), Foam (3%)                    | 0.05 – 5 mm   | Blue (48%), Black (27%), Transparent (16%), Red (2%), Other (7%)                         | Poly (Ethylene Terephthalate) (PET) (50%), Polypropylene (PP) (15%), Rayon (15%), Polyethyleneimine (10%), Polyamine With (5%), Poly (Propylene: Ethylene) (5%) | FTIR       | Jitkaew et al., 2023 [100]    |
|  |          | Ubolratana Reservoir           | Fish  | 2.92 ± 1.30 particles per fish   | Fiber (86.9%), Rod (5.8%), Pellets (4.4%), Fragment (2.9%) | 0.03–4.77 mm  | Blue (59.6%), Red (15.3%), Black (10.9%), White (9.5%), Transparent (5.1%), Brown (2.2%) | N/A   | N/A        | Kasamesiri et al., 2023 [112] |
|  |          | Sri Racha Bay                  | Mussels   | 0.07 ± 0.19 items/gram   | Fiber (94%), Pellets (6%)                                  | N/A           | Black (27%), White (25%), And Red (23%)  | PET (45%), PP (40%), Nylon (24%)  | Micro-FTIR | Phaksopa et al., 2023 [180]   |
|  |          | Songkhla Lagoon                | Catfish (stomach), Catfish (tissues), Catfish (gills) | 0.91 ± 0.13 items/g; 0.53 ± 0.09 items/g; 0.30 ± 0.03 items/g                                  | Fragments; N/A; Fiber                                      | 0.3 – 1 mm    | Black, Blue, Red, Green, Transparent, Purple   | Polyethylene Terephthalate, Polypropylene, Cellulosic Fiber   | FTIR       | Pradit et al., 2023 [187]     |
|  |          | Khwaeng Noi Basin              | Shellfish   | 3.0 ± 4.3 pieces/individual  | Film   | 0.01 – 0.4 mm | Blue (64.5%), Green (35.4%)  | PDMS, PA, PES, PVC,   | FTIR       | Sooksawat et al., 2023 [218]  |

|  |  |  |               |  |  |                  |  |  |             |  |
|--|--|--|---------------|--|--|------------------|--|--|-------------|--|
|  |  | Trang River                                | Prawn         | 12.33 ± 2.23 item/individual                                 | Fiber (91.36%), Fragments (44.52%)                             | <100–500 µm      | Blue (61.35%), Black (32.70%), Red (5.68%), And Yellow (0.27%)                                     | Cotton (70.37%), Rayon (25.93%), Polyvinyl Chloride (PVC) (3.70%)                    | FTIR        | Tee-Hor et al., 2023 [246]               |
|  |  | Phuket                                     | Green mussels | 6.6 items/individual   | Filament (87%), Fragment (12%), Sheet (1%)                     | N/A              | Blue (54%), Black (15%), Red (9%), Transparent (7%), Yellow (5%), White (4%), Green (4%), Grey(1%) | PS, PE, PET, RAYON, UF, PA   | Micro-FTIR  | Cherdsukjai et al., 2022 [41]            |
|  |  | Khwaie Noi Watershed                       | Shrimp        | 0.46 ± 1.64 piece/individual                                 | Filaments  | > 50 to 300 µm   | Blue (47.3%), Green (31.9%), Black (20.8%)   | PDMS, PA, PES, PMMA  | FTIR        | Tongnunui et al., 2022 [250]             |
|  |  | Nam Pong River, Khon Kaen,                 | Fish, Snails  | 33.02 ± 44.20 pieces/snail; 37.83 ± 50.1 pieces/snail        | Fragment (74.3%), Filament (11.54%), Sphere (13.74%)           | 0.01 – 5 mm      | Transparent (30.16%), Brown (18.52%), Purple (15.57%)  | LDPE, HDPE, PETE, PS   | SEM, FTIR   | Yasaka et al., 2022 [273]                |
|  |  | Tapi-Phumduang River system and Bandon Bay | Shellfish     | 400 particles  | Fiber (95%), Fragments (5%)                                    | 0.103–4.301 mm   | White, Black, Blue, Red, Green,  | Rayon  | FTIR        | Chinfak et al., 2021 [42]                |
|  |  | Eastern Coast of Thailand                  | Fish          | (0.30 ± 0.48 item/individual), (0.43 ± 0.65 item/individual) | fiber (88.89%), fragments (7.14%), and film (3.57%)            | 0.10 and 5.00 mm | Black (50%), Red (33.33%), Green (16.67%)  | PET (83.33%), PE (8.33%) And PP (8.33%)  | FTIR        | Phaksopa et al., 2021 [181]              |
|  |  | Songkhla lake                              | Fish, Shrimp  | 2.73 ± 0.15 pieces/stomach; 9.12 ± 2.24 pieces/stomach       | Fiber (90%), Fragment (10%)                                    | 150 µm to 5 mm   | Black, Blue, White, Red  | PES, Rayon, VA, PE, Paint  | FTIR, FESEM | Pradit et al., 2021 [186]                |
|  |  | Chi river                                  | Fish          | 1.76 ± 0.97 particles per fish                               | Fiber (86.9%), Rod-shaped (5.8%), Pellet(4.4%), Fragment(2.9%) | 0.03–3.84 mm     | Blue (56.9%), Red(15.3%), Black(10.9%), White(9.5%), Transparent(5.2%), Brown(2.2%)                | N/A  | N/A         | Kasamesiri and Thaimuangphol, 2020 [111] |
|  |  | Gulf of Thailand and the Andaman Sea       | Fish          | 44 particles   | Fiber (82.76%), Fragment (12.24%)                              | N/A              | Red, Black, Blue, Transparent, Green   | PA and H (55.17% and 50.00%, respectively), PE (20.69%), Ad PE (21.43%), PP (21.43%) | FTIR        | Klangnurak and Chunnuyom, 2020 [122]     |
|  |  | Hat Laem Son, Satun Province, and Hat      | Clam          | 15 particles/individual                                      | Fiber  | 1001 –2000 µm    | Black, Blue, Transparent, Red  | PP, PE   | FTIR        | Rangseethampanya et al., 2019 [203]      |



|             |   |                     |  |  |               |   |  |                         |     |                              |
|-------------|---|---------------------|--|--|---------------|---|--|-------------------------|-----|------------------------------|
|             | Pakmeng, Trang Province                       |                     |  |  |               |   |  |                         |     |                              |
|             | Gulf of Thailand                              | Fish                | 10.08 particles/g  | Fiber  | 0.01 – 5.0 mm | Transparent (35%), Black (31%), Green (2%)  | N/A  | N/A                     | N/A | Azad et al., 2018 [21]       |
|             | Chonburi Province, the upper Gulf of Thailand | Shellfish           | 0.17–0.6 particles/g                                       | Fragment, Fiber  | N/A           | Red, Brown, Blue, White, Transparent  | PA (85.71%), PET (38.46%)  | SEM, Raman Spectrometer |     | Thushari et al., 2017 [249]  |
| Singapore   | Singapore market                              | Shrimp              | 13.4 – 7050 items  | Spheres (69.6%), Fragments (21.5%), Film (7.4%) And Fiber (1.5%)       | N/A           | N/A   | N/A  | N/A                     | N/A | Curren et al., 2020 [52]     |
| Philippines | Butuan Bay                                    | Milkfish            | 0.51 ± 0.22 items/g  | Fibrous, Fragment (36%), Filmed (7 %), Granulated (3 %)                | N/A           | Blue (43 %), Brown, Yellow (18 % Each), Transparent (6 %), Violet and White (5 %), Black (4 %), Red (1 %) | (LDPE) (9 %), Polyethylene (PET) (8 %), Polyvinyl Chloride (PVC) (7 %), Polypropylene (PP) (7 %), Polyamide (PA) (7 %) | FTIR                    |     | Similatan et al., 2023 [217] |
|             | Southern Philippine Estuary                   | Edible bivalve      | 1495 microplastic particles                                | Filament/Fiber (65%), Fragments (35%)                                  | N/A           | Black (37%), Blue (14%), Red (9%). Green (5%), Brown (5%), White (1%), Transparent (11%)                  | ABS, CA, PE, PET, PP, PS, PVC, PE  | FTIR                    |     | Bonifacio et al., 2022 [30]  |
|             | Sorsogon Bay                                  | Mussels, Pen shells | 0.31 – 2.50 items/individual; 0.93 – 4.27 items/individual | Fiber, Fragments, Foams, Films, Pellets                                | 0.25–5.0 mm   | Blue (40.4%), Clear (15.6%)   | PE, PET, PS, Thermo Polyurethane   | ATR–FTIR                |     | Malto et al., 2022 [137]     |
|             | Capiz   | Oyster              | 38 MPs particles   | Fiber  | 0.109– 3 mm   | N/A   | Cellophane   | FTIR                    |     | Braña et al., 2021 [31]      |
|             | Eastern Visayas                               | Fish                | 351 particles  | Fiber (42%), Fragment (36%), Foams (9%), Pellets (7%), Microbeads (7%) | N/A           | N/A   | N/A  | N/A                     |     | Cabansag et al., 2021 [35]   |

|  |         |   |   |   |   |                   |   |  |          |                                 |
|--|---------|---|---|---|---|-------------------|---|--|----------|---------------------------------|
|  |         | Liboran River of Barangays Linabo, and Banonong, and Pulauan River of San Pedro | Oyster                                  | 13.3 ± 13.62 particle/oyster  | Microfibers (41%), Fragments (2%), Films (2%), Pellets (1%) | 1.10 to 30.31 µm  | Transparent, Black, Gray, Brown, Blue, White, Yellow, Red, Pink, Orange | N/A  | N/A      | Jambre, 2021 [99]               |
|  |         | Tanon Strait  | Fish                                    | 0.05 items/individual   | Fragments, Fiber  | 300 – 1300 mm     | Black, White, Green   | PUR, Alkyd Varnish, Polymethylacrylate, Polyvinyl  | ATR FTIR | Paler et al., 2021 [174]        |
|  |         | Ayungon; Bais; Dumaguete; Manjuyod  | Rabbitfish                              | 0.033 pieces/individual;<br>0.067 pieces/individual;<br>0.67 pieces/individual;<br>1.47 pieces/individual | N/A   | >8 µm             |   | PA (100%); PE (50%), PA (50%); PS (5%), PE (53%), PET (25%), PA (12%), PP (5%); PE (3%), PA (3%), PP (94%) | FTIR     | Bucol et al., 2020 [32]         |
|  |         | Bombong Estuary and the Coastal Waters of Ticalan in San Juan, Batangas         | Oyster, Fish                            | 40 MPs particles;<br>51 MPs particles   | Filaments, Fragments, Pellet; Filaments, Fragments          | N/A               | N/A   | N/A  | N/A      | Ateneo et al., 2019 [20]        |
|  |         | Bacoor Bay  | Asian green mussel <i>Perna viridis</i> | NA  | N/A   | >11 µm            | N/A   | N/A  | N/A      | Argamino and Janairo, 2016 [16] |
|  | Vietnam | Ho Chi Minh City  | Clams                                   | 2.7 ± 2.4 fibres/g  | Fiber   | 300–5000 µm       | Blue, Red, Transparent, Grey, Green                                     | N/A  | N/A      | Kieu-Li et al., 2022 [119]      |
|  |         | Hue City, Tuy Ho  | Fish                                    | 0.9 ± 0.4 and 1.1 ± 0.5 items/g   | Fiber, Fragments  | 0.01 – 5 mm       | White–Transparent, Black–Grey, Yellow–Orange, Red–Pink, Blue–Green      | N/A  | N/A      | My et al., 2023 [149]           |
|  |         | Phu Yen   | Bivalve                                 | 1.4 – 3.0 items/individua   | Fiber (69 % – 92 %), Fragment (8 % – 31 %)                  | N/A               | Black, White, Red, Blue, And Transparent                                | PET, PP, Rayon PEI, Polyamine, Poly (Propylene: Ethylene)  | FTIR     | My et al., 2023 [150]           |
|  |         | Central Vietnam   | Clams                                   | 2.17 ± 0.43 = 2.38 ± 1.28 items/g   | Fiber (52.9%), Fragment (46.6%), Film                       | 300 µm to 1500 µm | White (58.1%), Blue (35.1%)   | PES, PE, PP, LDPE, PVC, HDPE   | FTIR     | Tran–Nguyen et al., 2023 [251]  |

|          |           |                              |  |   |  |                |  |  |                          |                                 |
|----------|-----------|------------------------------|--|---|--|----------------|--|--|--------------------------|---------------------------------|
|          |           |                              |  |   | (0.99%)  |                |  |  |                          |                                 |
|          |           | Cau Hai Lagoon               | Shrimp   | 0.2, 1.1 ± 0.4 – 0.7 ± 0.3 items/g  | Fiber, Fragment, Pellets   | 0.01 – 5 mm    | White–Transparent, Black–Grey, Yellow–Orange, Red–Pink, Blue–Green     | Rayon (61.9%) Polyamide (10.5%), PET (6.7%), Polyethylene (5.7%), Polystyrene (3.8%), Polyacrylic (5.8%)                       | ATR=FTIR                 | My et al., 2022 [151]           |
|          |           | Tinh Gia, Thanh Hoa          | Bivalve  | 0.29 ± 0.14 particle/g  | Fiber, Fragment  | 0.015 – 0.4 mm | N/A  | PP (31%), PES (23%), PE (15%), PS (7%), PA (8%), PVA (8%), Rubber (8%)   | Raman spectrometer, FTIR | Nam et al., 2019 [154]          |
|          | Sri Lanka | Southern coasts of Sri Lanka | Coral reef   | 546.7 ± 170.3 items/kg  | Fiber (97.4%), Fragment, Film, Foam  | 0.5 – 5 mm     | Blue, Red, Green, Black, Purple, Ash, White, Transparent               | LDPE (74.8 %), Polyamide (25.2 %), PET (20 %)  | FTIR                     | Hansani et al., 2023 [81]       |
|          |           | Negombo fishing harbour      | <i>S. serrata</i> (seafood);<br><i>P. monodon</i> (seafood);<br><i>K. pelamis</i> (seafood);<br><i>P. perna</i> (seafood);<br><i>H. archipelagicus</i> (seafood);<br><i>S. commersonii</i> (seafood);<br><i>S. ealand</i> (seafood);<br><i>Sepia</i> sp. (seafood) | 1.8 ± 0.21 MP/g;<br>1.7 ± 0.29 MP/g;<br>1.42 ± 0.29 MP/g;<br>1.4 ± 0.06 MP/g;<br>1.17 ± 0.14;<br>0.83 ± 0.10 MP/g;<br>0.82 ± 0.30 MP/g;<br>0.04 ± 0.02 MP/g | Fibre (52%)<br>Fragment (19%),<br>Sphere (17%),<br>Film (5%), Pellet (5%), Foams (2%). | N/A            | Blue In Colour (69%).<br>Transparent (1%),<br>Orange (1%), Yellow (1%) | PE, PP, PS, Nylon–6,6  | FTIR                     | Kandeyaya et al., 2023 [105]    |
|          |           | local fishery markets        | Commercial dried fish  | 0.27 ± 0.04 items/g   | Fiber (79.8%),<br>Fragment (11.4%), Film (8.8%)  | N/A            | Transparent (70.2%),<br>Blue (15.8%), Black (8.6%), Red (5.5%)         | Polyethylene (35%),<br>Polyethylene Terephthalate (26%),<br>Polystyrene (18%),<br>Polyvinyl Chloride (12%), Polypropylene (9%) | ATR–FTIR                 | Piyawardhana et al., 2022 [185] |
| Sediment | Malaysia  | Kerteh estuary               | Freshwater sediment  | 7.08 to 57.83 particles/g   | fiber, fragment, film, others  | >1–5 mm        | Transparent, Blue, Green, Yellow, Violet, Brown, Pink, And Red         | Nylon, Polyethylene (PE), Polypropylene (PP), Polystyrene (PS)   | FTIR, SEM                | Hossain et al., 2023 [90]       |

|  |  |   |                               |   |   |  |   |  |                    |                                    |
|--|--|---|-------------------------------|---|---|--|---|--|--------------------|------------------------------------|
|  |  | Kemena River;<br>Niah River   | Soil sediment                 | 21 to 40 items/kg<br>(mean 28±10.44);<br>45 to 125 items/kg<br>(mean 76.67±42.52)           | fiber, fragment,<br>film, foam  | 0.1 to 5 mm  | Transparent, Black,<br>Blue, Yellow, Pink | Polyethylene (PE),<br>Polystyrene (PS),<br>Polycarbonate (PC), And<br>Polyethylene<br>Terephthalate (PET)  | ATR–FTIR           | Karing et al., 2023<br>[110]       |
|  |  | Kuala Gula<br>Mangrove,<br>Malaysia   | Mangrove<br>sediment          | 1016 pieces   | Fiber, Fragment,<br>Others  | <500 µm, 500<br>µm <sup>-1</sup> mm,<br>and >1 mm              |   | Rayon, Polyethylene<br>Terephthalate (PET),<br>Azlon, Cotton   | FTIR               | Mohamed et al.,<br>2023 [144]      |
|  |  | Seberang<br>Perai,<br>Penang;<br>Kuala Muda,<br>Penang;<br>Penaga,<br>Penang;<br>Balik Pulau,<br>Penang | Coastal<br>bottom<br>sediment | 350 ± 25.892 pcs/kg;<br>290 ± 24.505 pcs/kg;<br>270 ± 18.070 pcs/kg;<br>255 ± 22.368 pcs/kg | Fragment, Fiber;<br>Fiber, Fragment,<br>Pellet, Foam;<br>Fragment, Fiber,<br>Foam;<br>Fiber, Fragment | N/A  | N/A                                       | Polyethylene (PE),<br>Polystyrene (PS),<br>Polypropylene (PP),<br>Polybutadiene,<br>Polychloroprene,<br>Polyformaldehyde,<br>Polyvinyl Chloride<br>(PVC), Polyamide–6,<br>Polyethylene Oxide | FESEM–EDX,<br>FTIR | Tan and Mohd<br>Zanuri, 2023 [243] |
|  |  | Seberang<br>Perai,<br>Penang;<br>Kuala Muda,<br>Penang;<br>Penaga,<br>Penang                            | Estuarine<br>sediment         | 4000 ± 29.174<br>pcs/kg;<br>940 ± 15.773 pcs/kg;<br>430 ± 7.234 pcs/kg                      | Fragment, Fiber,<br>Foam;<br>Fiber, Fragment,<br>Foam;<br>Fragment, Fiber,<br>Foam                    | N/A  | N/A                                       | Polyethylene (PE),<br>Polystyrene (PS),<br>Polypropylene (PP),<br>Polybutadiene,<br>Polychloroprene,<br>Polyformaldehyde,<br>Polyvinyl Chloride<br>(PVC), Polyamide–6,<br>Polyethylene Oxide | FESEM–EDX,<br>FTIR | Tan and Mohd<br>Zanuri, 2023 [243] |
|  |  | Tanjung Aru,<br>Kota<br>Kinabalu,<br>Sabah;<br>UMS<br>ODEC,<br>Sabah                                    | Beach<br>sediment             | 857 MPs/kg;<br>160 MPs/kg   | Fragment, Film,<br>Fiber/Line,<br>Foam, Pellet;<br>Fragment, Film,<br>Fiber/Line,<br>Pellet, Foam     | 5mm – 1mm,<br><1mm   |   | Polypropylene (PP),<br>Polyethylene (PE),<br>Polyethylene<br>Terephthalate (PET),<br>Polystyrene (PS)  | FTIR               | Zahari et al., 2023<br>[281]       |
|  |  | Sungai<br>Tuang<br>Melaka   | Sediment                      | 12.74 particles/L   | N/A   | 10–100 µm,<br>101–300 µm,<br>301–500 µm,<br>and 501–1000<br>µm | N/A                                       | N/A  | N/A                | Anoam et al., 2022<br>[13]         |

|  |  |  |                     |   |   |  |  |   |                   |                           |
|--|--|--|---------------------|---|---|--|--|---|-------------------|---------------------------|
|  |  | Batu 1 Fish Market;<br>Lutong beach;<br>Parkcity Everly beach;<br>Tanjong Lobang Beach;<br>Esplanade beach;<br>Tusan Beach;<br>Bungai beach;<br>Peliau Beach | Beach sediment      | 152 particles/90g;<br>327 particles/90g;<br>322 particles/90g;<br>260 particles/90g;<br>90 particles/90g;<br>209 particles/90g;<br>110 particles/90g;<br>83 particles/90g | Fragment, Fiber;<br>Fragment, Fiber, Foams, Pellet;<br>Fiber, Fragment, Foam, Pellet;<br>Fragment, Fiber, Foam, Pellet;<br>Fragment, Fiber, Fiber, Fragment, Foam;<br>Fragment, Fiber, Foam, Pellet;<br>Fragment, Fiber | <1 mm, 1–2 mm, 2–3 mm, 3–4 mm and 4–5 mm   | Transparent, Black, White, Blue, Brown, Gray, Yellow, Green, Red, Purple, Pink | Polyethylene (PE), Polyester (PET), Polystyrene (PS), Polypropylene (PP).   | Atr–Ftir, SEM–EDX | Viswanathan, 2022 [263]   |
|  |  | ODEC, UMS Public Beach, Kota Kinabalu;<br>Kebagu Public Beach, Kota Kinabalu   | Beach sediment      | 66 item/m <sup>2</sup> ;<br>131 items/m <sup>2</sup>  | N/A   | Macro (>20mm), Meso (5–10mm), Micro (<5mm) | N/A  | Polypropylene (PP), Polyethylene (PE), Polyethylene Terephthalate (PET), Polystyrene (PS)   | FTIR, SEM         | Zahari et al., 2022 [280] |
|  |  | Baram River, Sarawak   | Freshwater sediment | 2727 particles  | Fragment, Pellet, Foam, Fiber, Film   | 0.3–1mm, 1–2mm, 2–3mm, 3–4mm, 4–5mm        |  | Polyethylene (PE), Polyester (PET) Fiber, Silicon Polymer, Nitrile, Polystyrene (PS)  | ATR–FTIR          | Choong et al., 2021 [43]  |
|  |  | Setiu Wetlands/ Seawater   | Sediment            | 0.750 ± 3.838 to 14.25 ± 4.343 items/g  | Filament, Film  |  | Transparent, Red, Black  | Polypropylene   | ATR–FTIR, SEM     | Ibrahim et al., 2021 [93] |
|  |  | Miri river Estuary   | Estuarine sediment  | 284–456 particles/kg  | Fragment (57%), fibre (36%), foam (4%), pellet (3%)   | <1 mm–4 mm                                 | Black (22.7–35.9%), Blue (23.6–24.1%), And Transparent (11.9–14.8%)            | (PE), Polyurethane (PU), Polypropylene (PP), Ethylene Propylene Diene Monomer (EPDM), Butyl Branham, And Ethylene Vinyl Acetate (EVA) | FTIR              | Liong et al., 2021 [131]  |
|  |  | ealand bay   | Beach sediment      | 34 pieces particles of microplastics  | fragment, fiber   | 1000 to 5000 µm                            | Blue, Red, Transparent, Black  | Low–Density Polyethylene (LDPE), Polyethylene, Polyamide  | FTIR              | Bitlus et al., 2020 [29]  |

|  |           |   |                     |  |  |  |  |   |                    |                                |
|--|-----------|---|---------------------|--|--|--|--|---|--------------------|--------------------------------|
|  |           | Sri Tujuh Beach, Tumpat, Kelantan   | Marine sediment     | N/A  | Fragment, Fiber, Film  | 100 – 5000 $\mu\text{m}$   |  | Polyethylene (PE), Polyethylene Terephthalate (PETE Or PET), High-Density Polyethylene (HDPE), Low-Density Polyethylene (LDPE), Polyamide (PA)                                | ATR-FTIR           | Saipolbahri et al., 2020 [206] |
|  |           | Pantai Penarik, Setiu; Pantai Pengkalan Atap; Pantai Rantau Abang; Pantai Ma Daerah, Kerteh | Beach sediment      | 41.27% of 2489 items;<br>35.11% of 2489 items;<br>14.62% of 2489 items;<br>8.99% of 2489 items   | Fiber, Fragment; Fiber, Fragment, Foam, Film; Fiber, Fragment; Fiber, Fragment | > 125, 250, 600 $\mu\text{m}$  | Black, Transparent, Red, Yellow, Brown | N/A   | N/A                | Nurul Nadia, 2019 [168]        |
|  |           | Skudai River, Johor; Tebrau River, Johor  | Freshwater sediment | 120–280 particles/kg;<br>140–820 particles/kg  | Film, Fragment, Fibre; Film, Fragment, Fibre                                   | 1000 to 5000 $\mu\text{m}$   | Yellow And White; Blue                 | N/A   | N/A                | Sarijan et al., 2018 [210]     |
|  |           | Kapar, Selangor Malaysia  | Mangrove sediment   | 418 items  | Line< Pellet< Film<Foam<Fragments  |  |  | N/A   | N/A                | Barasarathi et al., 2014 [27]  |
|  | Indonesia | Way Belau River, Lampung  | Freshwater sediment | 21.03±11.92 particles/100 g of dry sediment  | Fragment   | N/A  | Red                                    | Polyethylene  | Raman Spectroscopy | Alam et al., 2023 [7]          |
|  |           | Jakarta; Surabaya; Cilacap; Berau   | Mangrove sediment   | 69.86 ± 27.53 and 78.52 ± 29.48 pieces/kg-dry sediment;<br>103.17 ± 30.80 and 103.00 ± 30.38 pieces/kg-dry sediment;<br>10.51 ± 5.06 and 9.62 ± 7.56 pieces/kg-dry sediment;<br>19.69 ± 10.93 and 16.78 ± 12.83 pieces/kg-dry sediment | Fragment, Fiber, Foam Particles, Granules                                      | 200–500 $\mu\text{m}$ , 500 and 1000 $\mu\text{m}$ , 1000–2000 $\mu\text{m}$ , and 2000–5000 $\mu\text{m}$ | N/A                                    | Low-Density Polyethylene (32.08 %), Polypropylene (25.00 %), Polystyrene (10.42 %), High-Density Polyethylene (7.92 %), Polyurethane (4.58 %) And Polyvinyl Chloride (3.75 %) | FTIR               | Cordova et al., 2023 [47]      |

|  |  |   |                     |  |   |  |  |  |          |                                  |
|--|--|---|---------------------|--|---|--|--|--|----------|----------------------------------|
|  |  | Lombok  | Beach sediment      | 80,896.97 ± 143.09 items/m <sup>3</sup>  | N/A                                     | 0.5–4.75 mm  | N/A  | N/A  | N/A      | Fitrianti and Ghafari, 2023 [72] |
|  |  | Pekalongan River  | Freshwater sediment | 0.77 ± 0.07 to 1.5 ± 0.05 particles/g,   | Fiber, Pellets, Fragments, Films, Foams | 1 mm, 1–2 mm, 2–3 mm, 3–4 mm, and 4–5 mm                           | Yellow, Green, Red, Blue, Black, And Clear.                    | Polystyrene, Polyester, Polyamide  | ATR–FTIR | Ismanto et al., 2023 [96]        |
|  |  | Surakarta city  | Freshwater sediment | 0.55 ± 0.03 to 1.10 ± 0.04 particles/kg  | Fragment, Fiber, Pellet, Film, Foam     | 1 mm, 1–2 mm, 2–3 mm, 3–4 mm, 4–5 mm                               | White, Green, Red, Blue, Black, Transparent                    | Polystyrene (PS), Silicone Polymer, Polyester (PES), Polyamide (PA)              | ATR–FTIR | Ismanto et al., 2023 [97]        |
|  |  | Blanakan Ponds, Subag, Jawa Barat; Blanakan River, Subang, Jawa Barat   | Freshwater sediment | 8120 particles/kg; 1720 particles/kg   | N/A                                     | <500 m, 500–1000 m, >1500 m, >1500 m                               | N/A  | N/A  | N/A      | Takarina et al., 2023 [242]      |
|  |  | Lake Beratan, Tabanan Regency, Bali Province                            | Freshwater sediment | 68.93%   | Fragment, Fiber                         | <50 µm, 50–100 µm, 100–200 µm, 200–300 µm, 300–500 µm, and >500 µm | N/A  | Polyethylene (PE), Polypropylene (PP), Polystyrene (PS), Polyvinylchloride (PVC) | FTIR     | Watiniasih et al., 2023 [264]    |
|  |  | Situbondo, east java  | Coastal sediment    | 204.52±127.73 – 492.50±143.26 (particles kg <sup>-1</sup> dry weight of sediment   | Fiber, Fragment, Film, Microbeads       | 300 µm   | Blue, Red, White, Brown, Yellow, Green, Black, And Transparent | N/A  | N/A      | Yona et al., 2023 [274]          |
|  |  | Krukut River  | Freshwater sediment | downstream sediment (150 ± 5.0 particle/kg dry weight), middle (125 ± 6.0 particle/kg dry weight), upstream (112 ± 3.5 particle/kg dry weight) | Fiber, Film, Fragment, Pellet           | N/A  | N/A  | N/A  | N/A      | Azizi et al., 2022 [22]          |
|  |  | Andai Beach, manokwari, West Papua; Aipiri Beach, Manokwari, West Papua | Beach sediment      |  | Fragment, Fiber, Film, Foam             |  |  | N/A  | N/A      | Embulaba et al., 2022 [65]       |

|  |  |   |                                     |   |  |  |  |  |          |                               |
|--|--|---|-------------------------------------|---|--|--|--|--|----------|-------------------------------|
|  |  | east Surabaya                                 | Mangrove sediment; coastal sediment | ND (not detected) to 598 items/kg   | Fragments (30%), Foam (28%), Granules (22%), Fibers (20%)                          | <100 µm, 100–500 µm, 500–1000 µm, and 1000–5000 µm.                      | N/A  | Polypropylene, High-Density Polyethylene, Polyethylene   | ATR-FTIR | Ni'am et al., 2022 [164]      |
|  |  | Lampung and Sumbawa                           | Marine sediment                     | 58.42 ± 24.33 particles kg <sup>-1</sup>  | Fragment, Fiber  | 300–1000 µm  | N/A  | Polyethylene (30.08%), Polypropylene (30.08%), Polyurethane (12.20%), And Polyethylene Terephthalate (8.94%)   | FTIR     | Riani and Cordova, 2022 [204] |
|  |  | dumping sites                                 | Landfill sediment                   | 20,608 ± 23,633 pieces/kg dry weight  | Fragments, Films/Sheets, Lines/Fiber   | <500, 500–1000, 1000–1500, 1500–2000, 2000–2500, 2500–3000 and > 3000 µm | White Or Transparent Was Dominant (56% To Total Number Of MP; N = 626), Followed by Yellow (10%), Green (8%) And Blue (8%) | Polyethylene (PE), Polypropylene (PP), Polyethylene Terephthalate (PET), Polystyrene (PS), Polyvinyl Chloride (PVC), Polymethyl Methacrylate (PMMA), Poly (diallyl phthalate) (PDAP), Polyurethane (PU), Epoxy Resin (EPO) | FTIR     | Tun et al., 2022 [256]        |
|  |  | Pluit, Jakarta Bay; Ancol, Jakarta Bay        | Coastal sediment                    | 37440–38592 pieces/kg; 18405–27284 pieces/kg  | Fiber (1%), Fragment (98%), Granule (1%); Fiber (1%), Fragment (97%), Granule (2%) | >20 µm   | N/A  | P, PET, PE   | FT-IR    | Azizi et al., 2021 [23]       |
|  |  | Sunda Kelapa Port; Tanjung Priok; Ancol Beach | Marine sediment                     | 45066.67 ± 5205.13 particle/kg dry weight; 40533.33 ± 2444.04 particle/kg dry weight; 34666.67 ± 2444.04 particle/kg dry weight | Fiber, Film, Pellet, Fragment  | N/A  | N/A  | Polyethylene (PE), Polypropylene (PP), Polystyrene (PS), Polyamide (PA)  | FTIR     | Azizi et al., 2021 [24]       |
|  |  | Brantas River, East Java                      |                                     | 133 – 5467 particles/m <sup>3</sup>   | Fragments, Film, Pellets, Fiber  | NA   | Na   | PE, PVC, PC  | NA       | Buwono et al., 2021 [33]      |
|  |  | Muara Angke Wildlife Reserve                  | Mangrove sediment                   | 8.09 ± 10.28 particles per kg of dry sediment   | Foams, Fiber, Fragments, Granules  | <1000 µm   | N/A  | Polystyrene (44.62%), Polypropylene (29.23%), Polyethylene (15.38%), Other Polymers (10.77%)   | FTIR     | Cordova et al., 2021 [48]     |



|  |  |                            |                     |  |   |                        |  |   |             |                               |
|--|--|----------------------------|---------------------|--|---|------------------------|--|---|-------------|-------------------------------|
|  |  | Untung Jawa; Tidung        | Marine sediment     | 110,737.77 ± 4,197.61 particles Kg <sup>-1</sup> ; 87,626.66 ± 4,957.00 particles Kg <sup>-1</sup> | Fiber, Films, Fragment, And Granules              | N/A                    | N/A  | N/A   | N/A         | Huseini et al., 2021 [91]     |
|  |  | Rambut Island, Jakarta Bay |                     | 0.00001546 particles/m <sup>3</sup>  | Film, Fragment, Fiber                             | NA                     |  | Na  | NA          | Putri and Patria, 2021 [199]  |
|  |  | Barranglomp o Island       | Seabed sediment     | 195±66.98 MPs/kg DW  | Line, Fragment                                    | N/A                    | Transparent, Blue, Grey, Red, Black, Green, Orange, Brown, Purple, Yellow, White | N/A   | N/A         | Sawalman et al., 2021 [212]   |
|  |  | Java Sea                   | Marine sediment     | 132 microplastic   | Fibres (98%), While Fragments (2%) And Film (<1%) | N/A                    | Blue (44%) Or Black (36%), Red (15%), White (4%) And Transparent (1%)            | Dibutyl Phthalate Signal, Polyethylene Terephthalate (PET)  | ATR-μ-FT-IR | Utami et al., 2021 [257]      |
|  |  | Yogyakarta City            | Freshwater sediment | 279.31–1,026.93 particles kg <sup>-1</sup>   | Fiber, Film, Fragments, And Pellets               | 1 to 5,000             | Transparent, Grey, Blue, Brown, Green, Black, Red                                | High-Density Polyethylene (HDPE): commonly used for plastic bottles, Polypropylene (PP), Polystyrene (PS), Polyethylene Terephthalate (PET) | FTIR        | Utami et al., 2021 [258]      |
|  |  | Tallo River, Makassar      | Freshwater sediment | 6.67 ± 20.82 to 150 ± 36.06 item/kg  | Fragment, Lines, Films, Pellets                   |                        | Blue, Transparent, White, Red, Green   | Polyethylene, Polypropylene, Synthetic Rayon, Polyester   | FTIR        | Wicaksono et al., 2021 [267]  |
|  |  | Rambut Island              | Marine sediment     | N/A  | Fiber, Film, Pellet, Fragment, Foam               |                        | N/A  | N/A   | N//A        | Wicaksono et al., 2021 [268]  |
|  |  | Palu Bay, Central Sulawesi | Coastal sediment    | N/A  | Film, Fragments, Fiber                            | N/A                    | N/A  | N/A   | N/A         | Widiastuti et al., 2021 [270] |
|  |  | Citanduy River             | Freshwater sediment | 18,190–70,405 particles/kg of dry sediment   | Fragments, Films, Fiber                           | 20–40 μm, 500–1,000 μm | Blue, Yellow, Green, Black, Red, Brown, And Transparent                          | N/A   | N/A         | Widigdo et al., 2021 [271]    |

|  |  |  |                     |   |   |                 |  |   |        |                              |
|--|--|--|---------------------|---|---|-----------------|--|---|--------|------------------------------|
|  |  | Banten Bay                             | Coastal sediment    | 267 ± 98 particles/kg dry weight  | Foam, Fragments, Granules, Fiber  | 500 and 1000 µm |  | Polyester Terephthalate, Polypropylene, Polyethylene, Polystyrene | µ-FTIR | Falahudin et al., 2020 [68]  |
|  |  | Surabaya River                         | Freshwater sediment | 760–43110 particles/kg  | Film (63.4–88.7%), Fragments (4.7–35.6%), Foam (0.8–20.7%), Pellets (0.5–2.6%), Fiber (0.8–12.4%) | 1–5 mm          | Transparent (33.1–79.9%), White (7–56.5%), Blue (4.7–27.2%), Red (1.7–10.6%), Black (6.9–13%), Yellow (0.3–8.2%) | LDPE (39–73%)   | FTIR   | Firdaus et al., 2020 [71]    |
|  |  | Tidung Besar Island; Bira Besar Island | Sediment            | N/A   | Fiber, Fragments, Films, And Pellets  | N/A             | N/A  | N/A   | N/A    | Sayogo et al., 2020 [214]    |
|  |  | West Java                              | Marine sediment     | 16.666 ± 0.577 particles/100 g  | N/A   | N/A             | N/A  | Polyethylene (PE) And Polypropylene (PP)                          | N/A    | Sembiring et al., 2020 [215] |
|  |  | Ciwalengke River, Majalaya             | Freshwater sediment | 3.03 ± 1.59 particles per 100 g   | Fiber, Fragment   | 50 mm – 2000mm  | N/A  | Polyester (PES), Polyamide  | N/A    | Alam et al., 2019 [8]        |
|  |  | Lamongan                               | Coastal sediment    | 206 items kg–1 dry weight   | Foams, nurdles, and other forms   | 0.3 to 5 mm     | N/A  | N/A   | N/A    | Asadi et al., 2019 [17]      |
|  |  | Bama Resort, Baluran National Park     | Coastal sediment    | 116.41 ± 80.78 particles kg–1 DW.   | 183 Fiber (37.8%), 159 Films (32.9%), 141 Fragments (29.1%)                                       | N/A             | Clear or Transparent, White, Blue, Red   | N/A   | N/A    | Asadi et al., 2019 [18]      |
|  |  | Bintan Island                          | Coastal sediment    | Madong Village (956 ± 171.18 particles/kg), Pengudang Village (928 ± 118.58 particles/kg), Busung Village (604 ± 119.26 particles/kg) and Kawal Village (1,136 ± 154.75 Particles/kg) | Fiber, Fragment, Film   | N/A             | N/A  | N/A   | N/A    | Hamra and Patria, 2019 [79]  |

|  |          |                               |                     |   |   |                                 |   |  |            |                                  |
|--|----------|-------------------------------|---------------------|---|---|---------------------------------|---|--|------------|----------------------------------|
|  |          | Makassar Strait               | Seabed sediment     | 27.16%  | Line  | N/A                             | Blue  | N/A  | N/A        | Tahir et al., 2019 [240]         |
|  |          | eastern water of Java Sea     | Surface sediment    | 206.04–896.96 particle/kg   | Fragments, Plastic Fiber, Plastic Films               | N/A                             | N/A   | N/A  | N/A        | Yona et al., 2019 [275]          |
|  |          | Kupang and Rote               | Mangrove sediment   | 849 particles   | Fiber, Fragment, Film, Pellets                        | <5 mm                           | N/A   | N/A  | N/A        | Zandhi et al., 2019 [285]        |
|  |          | Sekotong, Lombok Island       |                     | 35–77 pieces/kg   | Foam (41%), Fragment (33%), Granule (22%), Fiber (4%) | >200 µm                         | N/A   | PS, PP, PE   | ATR–FTIR   | Cordova and Hernawan, 2018 [44]  |
|  | Thailand | Mae Klong River               | Freshwater river    | 1102.1 items per kilogram for the CP1, 426.9 items per kilogram for the S1 site | Fiber, Fragment, Stick, And Plate                     | 1.0–5.0 mm                      | Black, Colourless, Green, Red, White, And Brown | Rayon, Polyester (PES), Polyamide (PA), Polyethylene (PE), Polybutylene Terephthalate (PBT), Polypropylene (PP), Polycarbonate (PC)  | µ–FTIR     | Chaisanguansuk et al., 2023 [37] |
|  |          | Phetchaburi Province          | Beach sediment      | 4–3,516 pcs/ m2   | NA  | 5–1 mm., 1–0.3 mm., 0.3–0.02 mm | N/A   | Polyethylene Terephthalate (PET), Polyethylene (PE), Polypropylene (PP), Polyester (PES), Acrylonitrile–Butadiene–Styrene (ABS), Polyvinylchloride (PVC), Chloroprene Rubber (CR), Polystyrene (PS), Styrene–Butadiene Rubber (SBR), Polyurethane (PU) | FTIR       | Pardit, 2023 [176]               |
|  |          | Chao Phraya River in Thailand | Freshwater sediment | 3 ± 1 (items/kg)  | Fragments PE, PP                                      | 0.05 to 0.3 mm                  | N/A   | PP, PE, PVC  | Micro–FTIR | Ta and Babel, 2023 [235]         |
|  |          | Mai Khao Coastline, Phuket    | Beach sediment      | 793 items   | fiber, fragment, film, and sphere                     | >300 µm and 20 to 300 µm        | White, Black, Yellow, Blue, Red, And Green      | Polyethylene Terephthalate (PET), Polyamide (PA), And Polyether Urethane (PU)  | µFTIR      | Akkajit and Khongsang, 2022 [4]  |

|  |  |   |                     |   |   |   |  |   |        |                                     |
|--|--|---|---------------------|---|---|---|--|---|--------|-------------------------------------|
|  |  | Aquaculture ponds in Hanoi city (Ponds 1) |                     | 2657–3009 particles/kg                          | Fiber (62%) And Fragment (38%)  | N/A   | Green, White, Black, Red, White, Yellow, Blue  | PE (40%) And PP (50%)   |        | Da Le et al., 2022 [53]             |
|  |  | Songkhla lagoon; Pattani lagoon           | Mangrove sediment   | 106–413 items/kg (SK);<br>108–180 items/kg (PN) | Fiber, Fragment   | <5.0 mm   | White, Yellow, Pink, Silver, Purple, Red, Green, Black, Dark Blue, Light Blue, And Transparent | PE, Rayon, Rubber, Styrene, Paint, And Poly (Vinyl Acetate)   | FTIR   | Pradit et al., 2022 [188]           |
|  |  | Phuket coastline                          | Beach sediment      | 188.3 ± 34.48 items kg <sup>-1</sup>            | Fiber (85.6%), Other (8.2%), And Film (3.3%), Fragment (1.1%), Sphere | 0–300 µm fiber, >300 µm fiber, >300 µm film, 20–300 µm fragment, 20–300 µm sphere, >300 µm sphere | White/Transparent, Black, Yellow/Red, Blue   | Polyethylene Terephthalate (PET), Polystyrene (PS), Polypropylene (PP), Poly vinyl Chloride (PVC), Polyurethane (PU), Epoxy, And Other  | µFT–IR | Akkajit et al., 2021 [5]            |
|  |  | Tapi–Phumduang River                      | Freshwater sediment | 55–160 particles/kg                             | Fiber (93.9%), Fragments (6%)   | 0.424–1.356 mm  | Blue (44%), White (25%), Black (20%), Green (9%) And Red (2%)                                  | PP, PE, PET, Nylon, Rayon   | FTIR   | Chinfak et al., 2021 [42]           |
|  |  | Bang Yai canal                            | Estuary sediment    | dry season (450 ± 196 items/kg dry weight)      | Fiber, Films, Fragments, And Granules                                 | N/A   | Blue, Black, Red, Green, Purple, And Transparent   | Polypropylene, Polyethylene, And Polyethylene Terephthalate, Polytetrahydrofuran, Low–Density Polyethylene, Polystyrene, Polyamide, Polymethyl Methacrylate, And Polyvinyl Chloride | FT–IR  | Jiwarungreangkul et al., 2021 [101] |
|  |  | Talo Kapo Beach, Pattani Bay              | Beach sediment      | 18 pieces particles of microplastics            | Fiber, Fragment, And Film   | 1000 to 5000 µm   | Transparent, Blue, Black   | Polyethylene (PE), Polyethylene Terephthalate (PETE Or PET), High–Density Polyethylene (HDPE), Low–Density Polyethylene (LDPE), And Polyamide (PA)                                  | FTIR   | Bitlus et al., 2020 [29]            |

|  |             |   |                                  |   |  |   |  |   |                  |  |
|--|-------------|---|----------------------------------|---|--|---|--|---|------------------|--|
|  |             | libong, ealand sea                            | Beach sediment, Mudflat sediment | 25 pieces/m2;<br>4 pieces/m2                        | Fiber (50%),<br>Fragment (41%)   | >5mm, 1–5mm, 1mm  | White (43%), Red (12%), Blue (9%);<br>White (41%), Blue (35%), Red (6%)        | Polyvinyl Chloride (PVC), Polypropylene (PP), Nylon, Polyethylene (PE), Polyester, Polyacrylate (PA) And Polymer with a structure similar to EPDM rubber. | FTIR             | Pradit et al., 2020 [190]                |
|  |             | Chao Phraya River                             | Freshwater sediment              | 1 ± 13 items/kg and<br>4.9 ± 3.4 mg/kg              | N/A  | 0.05–0.3 mm   | N/A  | PP, PE, PS  | micro-FTIR       | Ta and Babel, 2020 [233]                 |
|  |             | Chao Phraya River, Bangkok                    | Freshwater sediment              | 2290 particles/kg                                   | Fragments  | 0.053–0.5 mm  | N/A  | PS (42.86%), PP (28.57%), PE (14.29%), PES (7.14%)  | Micro-FTIR, Ftir | Ta and Babel, 2020 [233]                 |
|  |             | Chao Phraya River                             | Freshwater sediment              | 2290 particles/m3                                   | fragments  | 0.053 to 0.5 mm   | Black  | PE, PP, PS  | FTIR             | Ta et al., 2020 [236]                    |
|  |             | Rayong; Chanthaburi; Trat                     | N/A                              | N/A   | N/A  | Fractions of a millimetre with few particles and Fiber reaching > 1 mm. | Blue, Green, Red, Yellow/Orange, Transparent/White, Black/Brown, Uncoloured    | N/A   | N/A              | Bissen and Chawchai, 2019 [28]           |
|  |             | Gulf of Thailand                              | Landfill foil                    | 457.99±489.71 Items/1Kg.dryweigh                    | Fiber, Films, Sphere, Granules, Irregular  | N/A   | N/A  | Polyethylene (PE), Polypropylene (PP), Polyethylene Terephthalate (PET)   | FTIR             | Puthcharoen and Leungprasert, 2019 [198] |
|  | Singapore   | Sembawang beach; Changi beach; Lazarus Island | Beach sediment                   | 31.1 pieces/kg;<br>599 pieces/kg;<br>9.16 pieces/kg | Fragment (33%), Fiber (4%), Foam (57%), Granule (4%), Film (4%);<br>Fragment (62%), Foam (28%), Film (10%);<br>Fragment (33%), Fiber (8%), Foam (33%), Granule (26%) | >1 mm   | N/A  | N/A   | N/A              | Curren and Leong, 2019 [50]              |
|  | Phillipines | Baroy; Tangub; Kapatagan; Cabgan              |                                  | 2258 microplastic particles                         | Filament/Fiber, Fragments, Foam  |   | Black, Blue, Brown, Green, Orange, Red, Transparent, Violet, White, And Yellow | Acrylonitrile Butadiene Styrene (ABS), Cellulose Acetate (CA), Polyethylene (PE), Polyethylene Terephthalate (PET), Polypropylene (PP),                   | FTIR             | Bonifacio et al., 2022 [30]              |

|  |  |   |                     |  |  |  |  |  |          |                            |
|--|--|---|---------------------|--|--|--|--|--|----------|----------------------------|
|  |  |   |                     |  |  |  | Polystyrene (PS), And Polyvinyl Chloride (PVC) (Fig. S2). The Top Three Polymers Are PP (23), PVC (12), And PE (10)        |  |          |                            |
|  |  | Cabadbaran; Buenavista; Nasipit   | N/A                 | Cabadbaran (40.0/kg); Buenavista (48.9/kg); Nasipit (71.1/kg)  | Fiber, Fragments, Films  | N/A  | Blue, Transparent, White, Brown, Black, Gray, And Red  | High-Density Polyethylene (HDPE) And Low-Density Polyethylene (LDPE), Polyethylene Terephthalate (PET), Ethylene-Vinyl Acetate (EVA), Polyamide (PA), Polypropylene (PP)   | ATR-FTIR | Navarro et al., 2022 [156] |
|  |  | Puerto Princesa   | Beach sediment      | N/A  | Fiber, Fragment, Film, Filament                                    | N/A  | Blue, Transparent, White, Red, Green, And Yellow   | Polyethylene Terephthalate (PET), Polypropylene (PP)   | FTIR     | Sajorne et al., 2022 [207] |
|  |  | Dumping sites   | Landfill sediment   | 20,608 ± 23,633 pieces/kg dry weight   | Fragment, Film/Sheet, Line/Fiber                                   | <500, 500–1000, 1000–1500, 1500–2000, 2000–2500, 2500–3000 and > 3000 μm | White Or Transparent Was Dominant (56% to total number of MP; N = 626), followed by Yellow (10%), Green (8%) and Blue (8%) | Polyethylene (PE), Polypropylene (PP), Polyethylene Terephthalate (PET), Polystyrene (PS), Polyvinyl Chloride (PVC), Polymethyl Methacrylate (PMMA), Poly (diallyl phthalate) (PDAP), Polyurethane (PU), Epoxy Resin (EPO) | FTIR     | Tun et al., 2022 [256]     |
|  |  | Baseco Port area, Manila Bay  | Marine sediment     | N/A  | Fragments, Foam, Fiber, Film, Pellet, Filament                     | 1.6±1.4 mm   | N/A  | N/A  | N/A      | Castro et al., 2021 [36]   |
|  |  | Cañas River; Pasig River; Tullahan River; Parañaque River; Meycauayan River | Freshwater sediment | 386–557 particles/kg; 386–771 particles/kg; 386–771 particles/kg; 386–1033 particles/kg; 386–1052 particles/kg | Fragment, Films; Fragments; Fragments; Fragments, Fiber; Fragments | 0.075–5 mm   | Transparent And Blue   | PP (45%), LDPE (24%), HDPE (23%), PS (9%); PP (59%), HDPE (22%), LDPE (19%); PP (44%), PS (29%), HDPE (18%), LDPE (9%); PP (63%), HDPE (20%), LDPE (17%); PP (47%), HDPE (33%), LDPE (10%), PS (10%)                       | ATR-FTIR | Osorio et al., 2021 [172]  |

|  |         |   |                     |   |  |   |   |   |          |                            |
|--|---------|---|---------------------|---|--|---|---|---|----------|----------------------------|
|  |         | Negros Oriental   |                     | 0.025 items/g                           | N/A  | <2000 µm  | N/A   | Polystyrene (GPPS), Polyethylene (PE), Polyethylene Terephthalate (PET), Polyamide (PA), Polypropylene (PP), Polyvinyl Chloride (PVC), Rayon (RY), Phenoxy resin (PR), And Acrylic Fiber (AF) | FTIR     | Bucol et al., 2020 [32]    |
|  |         | Pasig River   | Freshwater sediment | NA                                      | Fragment                                   | small (1.16 ± 0.42 mm) and large (4.13 ± 0.37 mm) | Brown, Red, Orange, Green, Blue, Violet, And Gray   | Polymethyl pentene, Polypropylene, Low-Density Polyethylene; High Density Polyethylene, And Polystyrene   | N/A      | Deocarís et al., 2019 [58] |
|  |         | Bombong Estuary and the Coastal Waters of Ticalan in San Juan, Batangas |                     | 22 particles                            | Filaments, Fragments, Films, Pellets, Foam |   |   | Polypropylene, High-Density Polyethylene, Low-Density Polyethylene, Polystyrene, Polyvinyl Chloride, And Polyethylene Terephthalate   | ATR-FTIR | Espiritu et al., 2019 [66] |
|  |         | Lawaye River  | Freshwater sediment | 4–11 particles/kg                       | Filaments (10 MPs), Fragments (7 MPs)      | N/A   | N/A   | PE (HDPE or LDPE) with Silica   | ATR-FTIR | Espiritu et al., 2019 [66] |
|  |         | Opol; El Salvador City; Alubijid  | Beach sediment      | N/A                                     | Filament, Angular, Fiber, Broken           |   | Black, Blue-black, Blue, Brown, Ale White, Light Orane  | N/A   | N/A      | Kalnasa et al., 2019 [103] |
|  |         | Talim Bay, Luzon  | Sediment            | 260 pieces/kg                           | Fragment (52%), Film (29%), Granules (19%) | >0.7 µm   | Red (30%), White (26%), Yellow/Pale Brown (24%), Blue/Violet (12%), Green (8%) And Orange (<1%) | N/A   | NA       | Paler et al., 2019 [175]   |
|  | Vietnam | red river estuary   | Surface sediment    | 2,188 ± 1,499 items.kg <sup>-1</sup> dw | Fiber, Fragment                            | < 500 µm  | Blue (36%), White (21%), And Red (11%).   | Polypropylene (PP), Polyethylene (PE), Polyurethane (PU), Polyamide (PA), And Polystyrene (PS)  | FTIR     | Da Le et al., 2023 [54]    |

|  |  |  |                      |  |   |                                  |  |   |            |                             |
|--|--|--|----------------------|--|---|----------------------------------|--|---|------------|-----------------------------|
|  |  | Le Thuy beach area, Quangngai province | Beach sediment       | 1582 ± 660 MPs/kg  | Fiber, Fragment                                     | < 50 µm                          |  | Polythylene Terephthalate   | Micro-FTIR | Le et al., 2023 [126]       |
|  |  | Cha Va River                           | Estuarine sediment   | 3,300 items kg <sup>-1</sup> to 8,000 items kg <sup>-1</sup>       | Fiber, Fragment                                     | 308 µm to 4,815 µm               | Green, White, Blue, And Red                          | Acrylate, Alkyd, Polypropylene, Polyester, Polyethylene, Polyethylene Terephthalate   | FTIR-ATR   | Dao et al., 2023 [56]       |
|  |  | N/A                                    | Agriculture sediment | 11,716 ±10,726 items/kg  | Fiber   | <1,000 µm and 1,000–2,000 µm     | Black, White, Purple, Red, And Blue                  | N/A   | N/A        | Doan et al., 2023 [60]      |
|  |  | Lach Huyen area, Hai Phong city        | Mangrove sediment    | 1309.1±124.8 particles/kg  | Micro fiber, Micro foam, Micro fragment, Micro film | 0.3–5 mm                         | White, Black, Blue, Red, And Yellow                  | Polyethylene (PE), Polypropylene (PP), Polyethylene Terephthalates (PET), And Polyamides (PA)   | FTIR       | Duong et al., 2023 [61]     |
|  |  | to lich, bhue river; day river         | Freshwater river     | 1600 items kg <sup>-1</sup> dw to 94,300 items kg <sup>-1</sup> dw | Fiber, Fragment                                     | NA                               | Purple, Black, Green, Red, Blue, Grey, White, Yellow | Polyethylene (PE), Polypropylene (PP), Polyester, Polystyrene (P S), Polyvinyl Chloride (PVC), Polyurethane (PU)  | micro-FTIR | Duong et al., 2023 [63]     |
|  |  | Mekong River                           | Freshwater sediment  | 6.0 ± 2.0 items g <sup>-1</sup>                                    | Fiber, Fragment                                     | 1060 µm, 179,672 µm <sup>2</sup> | Blue, Red, White, Green, Yellow, Grey, And Black     | 33.3 % Polyester, 33.3 % PE, PP, And PE-PP, 16.7 % Rayon, 16.8 % Other Polymers   | FTIR-ATR   | Kieu-Le et al., 2023 [118]  |
|  |  | Phu Ly, Ha Nam                         | Freshwater sediment  | 3.74 to 31.23 mg kg <sup>-1</sup>                                  | Fiber, Fragment                                     | N/A                              | Black, Red, Blue, Clear White                        | N/A   | N/A        | Le Thanh et al., 2023 [123] |
|  |  | Le Thuy beach                          | Beach sediment       | 1582 ± 660 MPs/kg  | Fiber, Fragment                                     | 83.1 ± 74.3 µm                   | N/A  | Polyethylene Terephthalate (PET) (46.43 %), Polyethyleneimine (PEI) (14.51%), Melamine-Urea Formaldehyde Resin (MUF) (10.20 %), Polytetrafluoroethylene (PTFE -9.18 %), Polyvinyl Alcohol (PVA -8.16 %), Phenol Resin (PF -3.57 %), Nylon (PA-3.06 %), Ethylene Vinyl Alcohol (EVOH - | micro-FTIR | Le et al., 2023 [125]       |



|  |  |                                |   |  |  |   |   |                    |                           |
|--|--|--------------------------------|---|--|--|---|---|--------------------|---------------------------|
|  |  |                                |   |  |  |   | 2.04 %), Cellophane (CP-1.53 %), Polyurethane (PU-0.8 %), Polyacrylamide (PAM-0.51 %) |                    |                           |
|  | Ma River   | Freshwater sediment            | 1328.3 ± 1925.5 items/kg dry weight                       | N/A  | N/A  | N/A   | N/A   | N/A                | Nguyen et al., 2023 [162] |
|  | Tonkin bay,  | Marine sediment                | 63 to 955 MP.kg-1 dry weight                              | Fiber  | <300 µm, >1 mm                                     | Purple, Red   | PE (22%), PP (52%), PS (6%), Polyester (10%) And PA (10%)                             | FTIR               | Phuong et al., 2023 [184] |
|  | Aquaculture ponds in Hanoi city (Ponds 1); Aquaculture ponds in Hanoi city (Ponds 2) |                                | 2657-3009 particles/kg; 2527-3007 particles/kg            | Fiber (62%) And Fragment (38%); Fiber (81%) And Fragment (19%)   | N/A  | Green, White, Black, Red, White, Yellow, Blue                                     | PE (40%) And PP (50%)   | Raman Spectroscopy | Da Le et al., 2022 [53]   |
|  | To Lich River  |                                | 956 – 66 061 particle/kg                                  | Fragments, Films, Foams, Fibre, Pellets                          | 300-500 µm   | N/A   | PS, PVC, PET, PP And HDPE   |                    | Duong et al., 2022 [62]   |
|  | Bac Ninh Province  | Canal sediment, River sediment | 6640 items.kg-1 dry weight; 13,330 items.kg-1 dry weight  | N/A  | N/A  | N/A   | PET, PE, PP, Nylon  | µFTIR              | Mai et al., 2022 [136]    |
|  | Peatland area, Mekong Delta  | Sediment                       | 92.3 ± 261.3 items kg-1.                                  | Fragments (67.0 %), Films (24.6 %), Fiber (7.6 %), Foams (0.9 %) | 300-1000 µm  | Aqua (26.6 %), White (25.6 %), Blue (25.4 %), Green (12.7 %)                      | Polyvinyl Chloride (46.2 %), Polyethylene (20.9 %), And Polypropylene (9.2 %)         | FTIR               | Nguyen et al., 2022 [160] |
|  | Dong Hoa Market; Phuong Nam Pearl Resort; 30 April                                   | Sediment                       | 4.49 Pieces/kg dry weight; 6.58 Pieces/kg dry weight; ND; | Fragment (35.7%), Fiber (21.4%), Granule (42.9%)                 | 0.5 mm to 1 mm; 1 mm to 2.8 mm; and 2.8 mm to 5 mm | White And Blue Microplastic (40.5%), Green (11.9%), Orange, Gray, And Red At 7.1% | Polypropylene (PP), Polyethylene (PE), And Polystyrene (PS)                           | FTIR-ATR           | Nhon et al., 2022 [163]   |

|  |                                       |                     |   |   |  |  |   |                          |                                |
|--|---------------------------------------|---------------------|---|---|--|--|---|--------------------------|--------------------------------|
|  | Beach; Aquaculture area; Can Gio Park |                     | 2.37 Pieces/kg dry weight;<br>0.68 Pieces/kg dry weight   |   |  |  |   |                          |                                |
|  | Da Nang Bay                           | Sediment            | 6120.0 ± 2145.7 items kg <sup>-1</sup>  | Fiber, Fragments  | 300 to 1000 μm   | Blue, Whitw, Red   | Polyethylene, Polypropylene, Polyethylene Terephthalate   | Micro-Raman              | Tran-Nguyen et al., 2022 [252] |
|  | Inh Chanh                             | Landfill sediment   | 20,608 ± 23,633 pieces/kg dry weight  | Fragment, Film/Sheet, Line/Fiber  | <500, 500–1000, 1000–1500, 1500–2000, 2000–2500, 2500–3000 and > 3000 μm | White or Transparent was dominant (56% to total number of MP; N = 626), followed by Yellow (10%), Green (8%) and Blue (8%) | (PE), Polypropylene (PP), Polyethylene Terephthalate (PET), Polystyrene (PS), Polyvinyl Chloride (PVC), Polymethyl Methacrylate (PMMA), Poly (diallyl phthalate) (PDAP), Polyurethane (PU), Epoxy Resin (EPO) | FTIR                     | Tun et al., 2022 [256]         |
|  | Can Gio Beach                         | Beach sediment      | 523 MP pieces   | Fiber, Fragment   |  | White, Pink, Brown, Black, Grey, Blue  | Polyethylene (PE), Polyethylene Terephthalate (PET), Poly (Vinyl Chloride) (PVC), Polypropylene (PP), And Polystyrene (PS), Poly (Methyl Methacrylate) (PMMA)   | micro-Raman spectroscopy | Khuyen et al., 2021 [115]      |
|  | Doc Let; Bach Dang; Cam Lam           | Beach sediment      | 2,548 ± 190 items.m <sup>-3</sup> ;<br>1,741 ± 156 items.m <sup>-3</sup> ;<br>1,614 ± 108 items.m <sup>-3</sup>           | Fiber, Fragment, Film   | N/A  | N/A  | N/A   | N/A                      | Le et al., 2021 [125]          |
|  | Saigon River                          | Freshwater sediment | 350 items (0.0485 g) of plastic debris;<br>11 items (0.0130 g) of macroplastics;<br>339 items (0.0355 g) of microplastics | Fragments were the major shape with 300 items while other shapes of Sheets, Fiber and Beads | < 0.3 mm   | N/A  | Polyethylene (PE), Polypropylene (PP), PE–PP Mixture, Polystyrene (PS), Polyurethane (PU), Silicon, Rubber, And Nylon   | FTIR                     | Trinh et al., 2021 [254]       |
|  | Red river Delta; Tien yen bay         | Mangrove sediment   | 0 to 4941 particles/kg;<br>0 to 815 particles/kg  | Microfiber, Microfoam, Microfragment, Microfilm   | N/A  | N/A  | Polyethylene (PE), Polypropylene (PP), Polystyrene (PS), Polyethylene Terephthalates (PET), Polyamide (PA), And Polyester (PLE)   | FTIR                     | Viet Dung et al, 2021 [262]    |

|          |  |   |                   |  |  |  |  |   |          |                            |
|----------|--|---|-------------------|--|--|--|--|---|----------|----------------------------|
|          |  | Vung Tau City   | Beach sediment    | 71.4% particles  | Fragments, Fiber, Granules   | 0.5 to 1 mm, 1 to 2.8 mm, and 2.8 to 5 mm                                    | White, Green, And Blue   | Polyethylene (PE), Polypropylene (PP), Polystyrene (PS), And Polyvinyl Chloride (PVC)   | FTIR     | Hien et al., 2020 [87]     |
|          |  | Da Nang beach   | Beach sediment    | 745 items  | Fiber, Fragment  | 300–2600 µm,   | Blue, White, Red, Yellow, Purple, Green  | N/A   | N/A      | Nguyen et al., 2020 [161]  |
| Myanmar  |  | Yangon; Mandalay; Patheingyi; Patheingyi–Yangon–Way; Chaung Thar; Wundwin | Coast sediment    | 3,289 ± 3,466 2 piece/kg dry weight; 2,052 ± 3,501 piece/kg dry weight; 3,239 ± 4,911 piece/kg dry weight; 432 ± 390 piece/kg dry weight; 418 ± 794 piece/kg dry weight; 177 ± 182 piece/kg dry weight | Fragments, 278 Films/Sheets, Lines/Fiber, Foams, And Granule/Particles | <500, 500–1000, 304 1000–1500, 1500–2000, 2000–2500, 2500–3000, and >3000 µm | Green, Blue, Red, Yellow, Grey, Black, Purple, Brown, Mix  | PE (42) > PET (26) > PP (7) = PS(7); PP (57) > PET (21) > PE (19); PE (46) > PET (20) > PP (17); PE (32) = PP (32) > PET (14); PE (41) > PET (36) > PDAP (9) > PP (5); PET (47) > PE( 20) > PP (7) = PU (7)   | FTIR     | Tun et al., 2023 [255]     |
|          |  | Mergui Archipelago  | Coast sediment    | 96 micro debris  | N/A  | N/A  | N/A  | N/A   | ATR–FTIR | Littman et al., 2020 [132] |
| Cambodia |  | Garbage incineration spaces   | Landfill sediment | 20,608 ± 23,633 pieces/kg dry weight   | Fragment, Films/Sheet, Lines/Fiber                                     | <500, 500–1000, 1000–1500, 1500–2000, 2000–2500, 2500–3000 and > 3000 µm     | White Or Transparent was dominant (56% to total number of MP; N = 626), followed by Yellow (10%), Green (8%) And Blue (8%) | (PE), Polypropylene (PP), Polyethylene Terephthalate (PET), Polystyrene (PS), Polyvinyl Chloride (PVC), Polymethyl Methacrylate (PMMA), Poly (diallyl phthalate) (PDAP), Polyurethane (PU), Epoxy Resin (EPO) | FTIR     | Tun et al., 2022 [256]     |
| Laos     |  | Dumping sites   | Landfill sediment | 20,608 ± 23,633 pieces/kg dry weight   | Fragment, Films/Sheets, Lines/Fiber                                    | <500, 500–1000, 1000–1500, 1500–2000, 2000–2500, 2500–3000 and > 3000 µm     | White Or Transparent Was Dominant (56% To Total Number Of MP; N = 626), Followed By Yellow (10%), Green (8%) And Blue (8%) | (PE), Polypropylene (PP), Polyethylene Terephthalate (PET), Polystyrene (PS), Polyvinyl Chloride (PVC), Polymethyl Methacrylate (PMMA), Poly (diallyl phthalate) (PDAP), Polyurethane (PU), Epoxy Resin (EPO) | FTIR     | Tun et al., 2022 [256]     |

|       |          |   |                  |  |                                     |                          |  |  |  |                                 |
|-------|----------|---|------------------|--|-------------------------------------|--------------------------|--|--|--|---------------------------------|
|       | Brunei   | Maura beach; Tungku beach; Lumut beach; Seri Kenangan beach; Meragang beach; Tanjung Batu | Coastal sediment | 2958 items with a weight of 73.03 kg   | N/A                                 | N/A                      | Transparent, White, Coloured, Black  | Polypropylene (PP), Polyethylene (PE), High Density Polyethylene (HDPE), Low Density Polyethylene (LDPE) | FTIR   | Qaisrani et al., 2020 [200]     |
| Water | Malaysia | Langat and Kelantan River   |                  | Kelantan: 179.6 items/L and Langat: 1464.8 items/L   | Fiber, Fragment, Pellet, Foam, Film | 0 – 5000 $\mu\text{m}$   | Transparent, Blue, Black, White, Pink, Brown, Green, Orange, Red, Yellow, Purple | PP, PE, PA, PMMA, PS, PET, ABS, PVC, PTFE, PU, PVA   | micro-FTIR and Pyrolysis-GCMS  | Anuar et al., 2023 [14]         |
|       |          | Tropical river  |                  | 3.12 $\pm$ 2.49 particles/L  |                                     |                          | N/A  |  |  | Chen et al., 2023 [40]          |
|       |          | Kemena and Niah River   |                  | 60 to 128 items particles/L  | Fiber, Film, Fragment, Foam         | 100 – 1000 $\mu\text{m}$ | Pink, Yellow, Black, Blue, Transparent   | Polyethylene (PE), Polystyrene (PS), Polycarbonate (PC), And Polyethylene Terephthalate (PET)            | ATR-FTIR   | Karing et al., 2023 [110]       |
|       |          | Tropical estuarine mangrove   |                  | 201 $\pm$ 21.214 – 1407 $\pm$ 124.265 pcs/L  | N/A                                 | N/A                      | N/A  | (PE), (PS), Polyacetal (PP), Polybutadiene, Polychloroprene, Polyformaldehyde, (PVC), Pa, (PEO) (2%)     | FTIR   | Tan and Mohd Zanuri, 2023 [243] |
|       |          | Marine Park Island  |                  | Pulau perhentian: 588.33 $\pm$ 111.77 items/L Pulau Redang: 314.67 $\pm$ 58.08 items/L Pulau Kapas: 359.8 $\pm$ 87.70 items/L Pulau Tenggol: 294.33 $\pm$ 101.64 items/L | Fiber, Fragment, Film, Pellet       | N/A                      |  | Black, Transparent, Blue, Red, Brown, Purple, Green, Yellow, Orange                                      | Polyethylene, Polypropylene, Polyvinyl Methyl Ether, Polyamide, Phenoxy-Resins and Polyurethane-Acrylic. | micro-FTIR                      |

|  |  |                                       |  |   |                                     |  |   |   |            |                              |
|--|--|---------------------------------------|--|---|-------------------------------------|--|---|---|------------|------------------------------|
|  |  | Sungai Tuang                          |  | 487.38 particles/L  |                                     |  |   |   |            | Anoam et al., 2022 [13]      |
|  |  | Melayu river, Johor                   |  | Mar-20 ( $2.89 \pm 1.36$ particles/L) > Feb-20 ( $1.33 \pm 1.00$ particle/L) and Jan-20 ( $1.00 \pm 0.87$ particle/L) | Film, Fiber                         | 0 $\mu\text{m}$ – 0.50 $\mu\text{m}$ . | Blue, Red, Black, Transparent, Green        | PET, PE   | ATR-FTIR   | Primus and Azman, 2022 [194] |
|  |  |                                       |  | 2.10 to 6.80 particles/L  | Fragment, Fiber, Pellet,            | N/A                                    | N/A   | Cellophane, PES, PE   | FTIR       | Zainuddin et al., 2022 [282] |
|  |  | Tropical river                        |  | $4.39 \pm 5.11$ particles/L   | N/A                                 | N/A                                    | N/A   | n/a   | n/a        | Chen et al., 2021 [39]       |
|  |  | Baram river                           |  | $9.3 \pm 1.27$ to $18 \pm 1.41$ particles/L   | Fiber, Pellet, Film, Fragment, Foam | 300 – 1000 $\mu\text{m}$               | Blue, Black, Transparent, Green, Yellow     | Polyethylene (PE), Polyester (PET) Fiber, Silicon Polymer, Nitrile, and Polystyrene (PS)                                    | ATR-FTIR   | Choong et al., 2021 [43]     |
|  |  | Miri River estuary                    |  | 10.7 to 14.3 particle /L  | Fragment, Fiber, Pellet, Foam       | <1000 $\mu\text{m}$                    | Blue, Black, Red, Green, White, Transparent | Polyethylene (PE), Polypropylene, Polyurethane, Ethylene Propylene Diene Monomer, Butyl-Branham, And Ethylene Vinyl Acetate | FTIR       | Liong et al., 2021 [131]     |
|  |  | Terengganu estuary and Offshore water |  | 1687 particles m <sup>-3</sup> in seawater; 1900 particles m <sup>-3</sup> in Offshore                                | Fibres, Fragments, Pellets          | N/A                                    |   | PA, PE, PP  | micro-FTIR | Taha et al., 2021 [239]      |
|  |  | Setiu Wetland                         |  | 0.36 items/L  | Fragment, Film, Fiber               | N/A                                    | Green, Blue, Black, Transparent, Brown, Red | PP,   | FTIR       | Yusof et al., 2023 [279]     |

|  |           |                                 |  |   |   |                |   |                     |                    |                                |
|--|-----------|---------------------------------|--|---|---|----------------|---|---------------------|--------------------|--------------------------------|
|  |           | Klang river estuary             |  | 0.5 to 4.5 particles L <sup>-1</sup>    | Fibres, Fragments, and Pellet                         | 300–1000 Mm    | Black, Red, Blue, Transparent   | PA, PP              | ATR–FTIR           | Zaki et al., 2021 [283]        |
|  |           | Sungai Dungun                   |  | 22.8 to 300.8 items/m <sup>3</sup>      | Fiber, Fragment                                       | N/A            | Black, Blue, Brown, Green, Red, Purple, White, And Transparent  | PP, PAN, Rayon      | ATR–FTIR           | Hwi et al, 2020 [92]           |
|  |           | Peninsular Malaysia             |  | 8 to 73 particles/L                     | Fragment, Fiber, Film, Foam                           | 1000 – 3000 μm | Black, Blue, Grey, Red, Yellow, Green, And White  | N/A                 | N/A                | Najihah et al., 2020 [152]     |
|  |           | Cherating River                 |  | 0.0042 ± 0.0033 particle/m <sup>3</sup> | Fiber, Fragment, Film, Foam, Pellet                   | 0 – 5000μm     | Transparent, Blue, Black, Red, White, Yellow, Others  | N/A                 | N/A                | Pariatamby et al., 2020 [177]  |
|  |           | Kelantan Bay                    |  | N/A                                     | Fiber, Fragment, Film                                 | 100 – 5000 μm  | Blue, Transparent, Red  | PE, PETE or PET, PA | FTIR               | Saipolbahri et al., 2020 [206] |
|  |           | Bangi, Selangor                 |  |   | Fragment, Film, Foam                                  | 200–500 μm     | Red, Blue Green White Grey  | PE                  | ATR–FTIR technique | Suardy et al., 2020 [220]      |
|  | Indonesia | Way Belau River, Lampung,       |  | 36.76 ± 21,81 particles/500 ml          | N/A   | N/A            | N/A   | PE, PP              | N/A                | Alam et al., 2023 [7]          |
|  |           | Banger River of Pekalongan City |  | 252 particles                           | Foam, Beads, Fiber, Granule, Film, Fragment, Filament | 100–5000 μm    | Brown, White, Blue, Orange, Black, Pink, Transparent, Yellow, Maron, Red, Blue Sky, Black Transparent, Purple | PET, PE, PP         | FTIR               | Despasari et al., 2023 [59]    |
|  |           | Urban lakes                     |  | 30,000 particles/m <sup>3</sup>         | Sheet, Fragment, Fiber, Foam                          | 300–3000 μm    | Green, Orange, Yellow, Black, Grey, Blue, Red, White  | n/a                 | n/a                | Henny et al., 2023 [86]        |



|  |                                     |   |  |                  |  |   |          |                                  |
|--|-------------------------------------|---|--|------------------|--|---|----------|----------------------------------|
|  | Krukut River, Jakarta               | downstream: $265 \pm 5.0$ particle/100 ml; middle: $221 \pm 3.0$ particle/100 ml; upstream: $215 \pm 1.5$ particle/100 ml | Fiber, Film, Fragment, Pellet            | N/A              | N/A  | N/A   | N/A      | Azizi et al., 2022 [22]          |
|  | Greater Jakarta area to Jakarta Bay | $9.02 \pm 4.68$ particles $m^{-3}$  | Fragment, Foam, Fiber, Granule           | 300–1000 $\mu m$ | N/A  | PA, PVC, PBT, PE, PP, PS, PU, PET                                     | FTIR     | Cordova et al., 2022 [49]        |
|  | Lake Singkarak                      | 27.91 items/m <sup>3</sup>  | Fragment, Foam, Pellet, Fiber            | 300–5000 $\mu m$ | White, Red, Blue, Black, Orange, Yellow, Green | N/A   | N/A      | Henny et al., 2022 [84]          |
|  | lower Cimandiri River               | 96 – 325 particles/m <sup>3</sup>   | Fiber, Fragment, Sheet, Bead, Foam, Film | 100–500 $\mu m$  | Green, Red, Blue, Black, White, Yellow         | N/A   | N/A      | Henny et al., 2022 [85]          |
|  | Jakarta Bay                         | $347.778 \pm 83.110$ particle   | Granules, Fragments, Fibers, And Foams   | 300–1000 $\mu m$ | N/A  | PP, PE, PS  | FTIR     | Purwiyanto et al., 2022 [196]    |
|  | Metro River, East Java              | 0.8 – 1.61 particle mL <sup>-1</sup>  | Fiber, Bead, Film                        | N/A              | N/A  | N/A   | N/A      | Sari et al., 2022 [208]          |
|  | Cisadane River                      | $13.33 \pm 113.33$ particles $m^{-3}$   | Fiber, Fragment, Granule, Foam           | 300–1000 $\mu m$ | N/A  | PU, PS, PP, PET, PE, PS, PBT, PA, Cellulose Acetate Group, Cellophane | ATR–FTIR | Sulistiyowati et al., 2022 [222] |
|  | coastal area                        | 1532 particles  | Fibers, Films, Fragments, And Pellets    | N/A              | N/A  | Polyethylene, Polypropylene, Polystyrene                              | FTIR     | Takarina et al., 2022 [241]      |



|  |  |                                    |  |   |                                     |             |  |  |      |                                   |
|--|--|------------------------------------|--|---|-------------------------------------|-------------|--|--|------|-----------------------------------|
|  |  | Brantas Rive                       |  | 4066.67 particles/m <sup>3</sup>  | Pellet, Fragment, Fiber, Films      | 100–1000 µm | Transparent, Red, Blue, Black, Grey, Purple, Other | N/A  | N/A  | Buwono et al., 2021 [34]          |
|  |  | Brantas River, East Java           |  | 133 ± 5467 particles/m  | Fragment, Fiber, Pellet, Film       | N/A         | N/A  | N/A  | N/A  | Buwono et al., 2021 [34]          |
|  |  | Burau, Luwu Regency, South Sulawes |  | 56.2 items/m <sup>3</sup>   | Fragment, Granule, Fiber, Film      | 10–1000 µm  | Transparent, Blue, Black, White, Red, Green, Brown | PS   | FTIR | Kama et al., 2021 [104]           |
|  |  | Labuan marine water                |  | N/A   | Fragment, Fiber,                    | N/A         | N/A  | N/A  | N/A  | Kisnarti et al., 2021 [120]       |
|  |  | Surabaya river water               |  | 9.66 ± 8.87 to 21.16 ± 19.35 particles/m <sup>3</sup>   | Foam, Fiber, Fragment, Pellet, Film | 0–5000 µm   | Red, White, Transparent, Yellow, Blue, Black       | N/A  | N/A  | Lestari et al., 2021 [128]        |
|  |  | Surabaya City (WWTP)               |  | SDWTPs I and II were 26.8–35 and 8.5–12.3 particles/L   | Fiber, Fragment, Film, Pellet       | 1–5000 µm   | Black, Blue, Red, Yellow, Transparent              | PP, PE, LDPE, PA 6, PA 6.6, Polytrimelithicamide | FTIR | Radityaningrum et al., 2021 [201] |
|  |  | Barranglomp o Island               |  | inner zone: 6920 ± 3411 MP/m <sup>3</sup> outer zone: 7713 ± 3821 MP/m <sup>3</sup>           | Foam, Fragment, Line                | 100–5000 µm | Green, Red, Transparent, White, Blue, Black, Other | Polyester, Polypropylene, Rayon.                 | FTIR | Sawalman et al., 2021 [212]       |
|  |  | Benoa Bay                          |  | Mac 2018 (0.36 particles/m <sup>3</sup> ) and October 2018 (0.15 particles/m <sup>3</sup> ) w | Fibers, Fragments, Granules, Foam   | 300–1000 µm | N/A  | PA, PP, PE, PS, Other                            | FTIR | Suteja et al., 2021 [225]         |

|  |  |                                 |  |   |                                     |                          |  |   |          |                                   |
|--|--|---------------------------------|--|---|-------------------------------------|--------------------------|--|---|----------|-----------------------------------|
|  |  | Tallo river, makassar           |  | $0.74 \pm 0.46$ to $2.15 \pm 0.68$ items/m <sup>3</sup> in the wet season; $1.48 \pm 0.26$ to $3.41 \pm 0.13$ items/m <sup>3</sup> dry season | Line, Fragment, Pellet, Film        | 1–5000 $\mu\text{m}$     | Transparent, Blue, Red, Black, White, Green, Other           | PP, PE, Poly(styrene–butadiene) PSB, PES, Rayon | FTIR     | Wicaksono et al., 2021 [268]      |
|  |  | Dumai waters, Province of Riau  |  | 61.80 – 102 particles/m <sup>3</sup> a  | Fiber, Filament, Fragment           | N/A                      | N/A  | N/A   | N/A      | Yoswaty et al., 2021 [277]        |
|  |  | Citarum River Downstream        |  | $0.0574 \pm 0.025$ particles/m <sup>3</sup>   | Fragment, Film                      | 500–5000 $\mu\text{m}$   | Blue, Black  | N/A   | N/A      | Fareza and Sembiring, 2020 [69]   |
|  |  | Surabaya river                  |  | 1.47 to 43.11 particles/m <sup>3</sup>  | Film, Fragment, Fiber, Foam, Pellet | 0–5000 $\mu\text{m}$     | Red, White, Yellow, Transparent, Black, Blue                 | PET, PE, PS, PP, LDPE                           | FTIR     | Lestari et al., 2020 [129]        |
|  |  | Southern Caspian Sea coasts     |  | $34,491 \pm 18,827$ particles/km <sup>2</sup>   | Fragment, Styrofoam, Film, Lines    | 333 – 4750 $\mu\text{m}$ | White, Red, Yellow, Pink, Blue                               | PS, PP, PE                                      | ATR–FTIR | Mataji et al., 2020 [140]         |
|  |  | Jatiluhur Reservoir             |  | $0.71 \times 10^4$ – $4.59 \times 10^5$ particles/km  | Fragment                            | 100–5000 $\mu\text{m}$   | N/A  | PP, PE  | FTIR     | Ramadan and Sembiring, 2020 [202] |
|  |  | Downstream Area of Citarum Rive |  | $0.0574 \pm 0.025$ particles/m <sup>3</sup>   | Fragment, Fiber, Film, Foam         | 125–5000 $\mu\text{m}$   | Blue, Red, Green, White, Black, Brown, Transparent           | PE, PP  | FTIR     | Sembiring et al., 2020 [215]      |
|  |  | Tallo and Jeneberang Estuary    |  | Tallo: $1.84 \pm 0.17$ Jeneberang: $1.78 \pm 0.25$ particles/m <sup>3</sup>   | Line, Fragment, Foam, Film          | N/A                      | Transparent, Blue, Red, Black, Other                         | N/A   | N/A      | Wicaksono et al., 2020 [266]      |
|  |  | Coastal water of Makassar City  |  | N/A   | N/A                                 | 500–5000 $\mu\text{m}$   | White, Transparent, Black, Blue, Purple, Brown, Orange, Red, | N/A   | N/A      | Afdal et al., 2019 [3]            |
|  |  | Slum and industrial area        |  | $5.85 \pm 3.28$ particles per liter   | Fiber, Fragment, Foam               | 50–5000 $\mu\text{m}$    | Red, Green   | PA, PES   | FTIR     | Alam et al., 2019 [8]             |

|  |          |                                     |                            |   |   |             |  |  |            |                                 |
|--|----------|-------------------------------------|----------------------------|---|---|-------------|--|--|------------|---------------------------------|
|  |          | Northern coastal waters of Surabaya |                            | 0.49 N/L  | Fiber, Fragment, Foam, Granule            | 300–1000 µm | N/A  | PS, PE, PP, PET, PES, PU, PB   | FTIR       | Cordova et al., 2019 [45]       |
|  |          | Sumba waters                        |                            | 44 ± 24.59 n/m3   | Fiber, Granule, Other                     | 300–1000 µm | N/A  | PE, PS, PA, PP   | FTIR       | Cordova and Hernawan, 2018 [44] |
|  |          | Small Islands of Bintan water       |                            | 0.46 ± 0.25 pieces/m  | Fragment, Fiber, Film, Granule            | 300–5000 µm | Red, Green, White, Blue, Yellow, Black, Purple, Brown                                  | PP, PE, LDPE, PS   | ATR–FTIR   | Syakti et al., 2018 [231]       |
|  |          | Marine environment                  |                            | N/A   | N/A                                       | N/A         | N/A  | PP, PE, PS   | MICRO–FTIR | Syakti, 2017 [229]              |
|  |          | Coastal area                        |                            | 2313 items  | N/A                                       | 250–5000 µm | Pink, Yellow, Black, Violet, Red, White, Green, Blue                                   | PC, PS, PP, LDPE, PVC, PET, HDPE                                       | ATR–FTIR   | Syakti et al., 2017 [230]       |
|  | Thailand | Ubolratana Reservoir, Thailand      |                            | 25–3363 particles/m3  | Fiber, Pellet, Styrofoam, Sheet, Fragment | 150–5000 µm | Blue, Red, White, Black, Transparent, Brown, Pink, Gray, Green, Yellow, Purple, Orange | PP, PE, PES, PS, PA, PET, others                                       | micro–FTIR | Kasamesiri et al., 2023 [112]   |
|  |          | Bangkok                             | Wastewater                 |   | Sphere, Fiber, Fragment, Sheet,           | >500 µm     |  | Polymer  | FTIR       | Hongprasith et al., 2020 [88]   |
|  |          |                                     | Wastewater treatment plant | 26.6 ± 11.8 MPs/L   | Fibres                                    |             |  | Polyester, Polypropylene, Polyethylene, Silicone polymer, Polyesterene | FTIR       | Tadsuwan et al., 2021 [238]     |
|  |          | Chao Phraya River estuary           |                            | wet: 4.0 ± 2.8 × 10 <sup>5</sup> particles/km <sup>2</sup> dry: 3.3 × 10 <sup>5</sup> particles/km <sup>2</sup> |   |             |  | PP, PE   |            | Oo et al., 2023 [170]           |

|  |                                  |  |  |   |                        |  |   |          |                                       |
|--|----------------------------------|--|--|---|------------------------|--|---|----------|---------------------------------------|
|  | river water in southern Thailand |  | February, April, June, and August were $0.41 \pm 0.08$ , $0.25 \pm 0.06$ , $0.24 \pm 0.11$ , and $0.26 \pm 0.06$ particles/L | Fiber, Fragment                               | 63–1000 $\mu\text{m}$  | Blue, Transparent, Red, Other  | PE, PA, PP, PET, RAYON, PDMS            | FTIR     | Pradit et al., 2023 [189]             |
|  | Tropical river                   |  | $80 \pm 38$ items/m  | Fragment, Film, Fiber, Pellet                 | 300–5000 $\mu\text{m}$ | Transparent, Green, Blue, Red, Yellow, White, Other                    | PP, PE, COPOLYMER, PVC, OTHER           | FTIR     | Ta and Babel, 2023 [235]              |
|  | Ping River, Chiang Mai Province  |  | $3,880 \pm 1,150$ , $3,810 \pm 1,355$ and $3,320 \pm 628$ pieces/m <sup>3</sup> (per station)                                | N/A   | N/A                    | N/A  | PES, PU, PA, PE, PET, and PP            | FTIR     | Teeratitayangkul et al., 2023 [247]   |
|  | Urban canal                      |  | $370 \pm 140$ particle(p)/m <sup>3</sup>   | Pellet, Fragment, Fiber, Films                | 300–1000 $\mu\text{m}$ | Transparent, Green, White, Black, Blue, Red, Reflection                | PP, PE, PVS, PS, PET, PA, Other         | FTIR     | Eamrat et al., 2022 [64]              |
|  | Wastewater treatment plant       |  | DRY:76 and 192 particles L– WET: 36–68 particles L– 1  | Sheet, Fiber, Fragment, Unspecified           | N/A                    | White, Grey, Black, Brown, Yellow, Blue, Red, Pink, Green, Transparent | PE, PP, PET, PU, Polyacrylate, PES, PS, | FTIR     | Kittipongvises et al., 2022 [121]     |
|  | Khlong Tho                       |  | 2,916.67 pieces per lite   | Film, Fragment, Fiber, Pellet                 | N/A                    | Yellow, Transparent, Red, Pink, Green, Gray, White, Brown, Blue, Black | n/a                                     | n/a      | Ong–oard and Tantipanapip, 2022 [169] |
|  | Chao Phraya River                |  | 21+16 particles/m <sup>3</sup>   | Fragments, Sheets/Films, Foams, Fibers, Beads | 515–5150 $\mu\text{m}$ | N/A  | PP, PE, LDPE, PP/PE, PS, Other          | FTIR     | Ounjai et al., 2022 [173]             |
|  | shore of Rayong province         |  | $1781.48 \pm 1598.36$ particles/m  | Fiber, Fragment, Pellet, Foam, Film           | 0–5000 $\mu\text{m}$   | Transparent, Red, Blue, Yellow, Black, White                           | PP, PE, PS                              | ATR–FTIR | Prarat and Hongsawat, 2022 [191]      |
|  | Bandon Bay, Gulf                 |  | 0.33 particles/m   | Fibre, Fragment, Granule, Film and Foam       | 300–5000 $\mu\text{m}$ | Red, Blue, White, Yellow, Transparent, Green                           | PU, PS, PVC, PE, PP                     | ATR–FTIR | Ruangpanupan et al., 2022 [205]       |

|  |  |   |  |   |  |             |   |  |            |  |
|--|--|---|--|---|--|-------------|---|--|------------|--|
|  |  | Bueng Boraphet Wetland                            |  | 1.44 ± 3.4 particles/m <sup>3</sup>   |  |             |   | PES, PP, PET   | FTIR       | Sarin and Klomjek, 2022 [211]                |
|  |  | Tha Dee Sub-River basin                           |  | 0.5 ± 0.4 Items/L   |  |             |   |  |            | Suttiviriya and Kongpran, 2022 [226]         |
|  |  | chao phraya river in ang thong area               |  | 41.77 particles/m <sup>3</sup>  | N/A  | 53–5000 µm  | N/A   | PE, PP, PA, PES, PS, OTHER   | FTIR       | Ta and Babel, 2019 [237]                     |
|  |  | the inner Gulf                                    |  | 9.97 ± 18.55 pieces/L   | Fiber, Fragment, Film, Foam, Pellet            | 125–5000 µm | N/A   | PE, PP, EPDM, Rubber, PA, styrene–ethylene–butylene–styrene (SEBS) | FTIR       | Vibhatabandhu and Srithongouthai, 2022 [260] |
|  |  | Inner Gulf of Thailand                            |  | 21.29 ± 36.21 pieces/L  | Fiber, Fiber, Fragment, Pellet, Foam           | 100–5000 µm | Transparent, Brown, Black, Others                   | PE, PP, PTFE, Rayon, PEPP, Other                                   | micro–FTIR | Vibhatabandhu and Srithongouthai, 2022 [261] |
|  |  | Freshwater Bangkok                                |  | 0.40–2.40 particles/L   |  |             |   |  |            | Chanpiwat and Damrongsiri, 2021 [38]         |
|  |  | Tapi–Phumduang River system and Bandon Ba         |  | 0 to 2.81 items/L   | Fiber, Fragment                                | 124–4763 µm | Blue, Black, White, Green, Red                      | PP, PE, PET, nylon (PA), Rayon                                     | FTIR       | Chinfak et al., 2021 [42]                    |
|  |  | Chao Phraya River Estuary                         |  | flood tide was 5.16 × 10 <sup>5</sup> particles/km <sup>2</sup> and Ebb tide was 3.11 × 10 <sup>5</sup> particles/km <sup>2</sup> | Fragment, Foam, Film, Pellet, Fiber, Microbead | 335–5000 µm | Red, Blue, Brown, Black, Transparent, White         | PP, PE, PS, LDPE   | FTIR       | Oo et al., 2021 [171]                        |
|  |  | Sea–surface waters around Chao Phraya River mouth |  |   | Fiber, Sphere, Film, Rod, Other                | 0–2000 µm   | N/A   | PE, PP, PE+PP, PET, Rubber, nylon                                  | FTIR       | Sukhsangchan et al, 2020 [221]               |
|  |  | lower Chao Phraya                                 |  | 80 ± 65 items/m <sup>3</sup>  | Fragments, Pellets, Films, And Fibers          | 50–5000 µm  | Transparent, Green, Blue, Red, Yellow, White, Other | PP, PE, PES, PS, COPOLYMER, OTHER                                  | FTIR       | Ta and Babel, 2020 [234]                     |

|  |             |                                 |  |  |   |              |   |  |          |                             |
|--|-------------|---------------------------------|--|--|---|--------------|---|--|----------|-----------------------------|
|  |             | Chao Phraya River Estuary       |  | 48 ± 8 items/m <sup>3</sup>              | Fragment, Pellet, Film, Fiber             | 300–5000 µm  | Transparent, Green, Blue, Red, Yellow, White, Other                       | PP, PE, PS, COPOLYMER, other   | FTIR     | Ta and Babel, 2020 [234]    |
|  |             | Chao Phraya River               |  | 104 particles/m <sup>3</sup>             | N/A                                       | 500–5000 µm  | N/A   | PP, PE, PS, PA, PES, OTHER   | FTIR     | Ta et al., 2020 [236]       |
|  | Singapore   | coastal regions of Singapore    |  | 106 to 238 particles/mL                  | Film, Fragment, Fiber                     | 0 – 5000µm   | Black, Blue, Purple, Transparent, Pink                                    | PP, TPC, PE  | FTIR     | Curren and Leong, 2023 [51] |
|  |             | N/A                             |  | N/A                                      | Fragments, Fibres, Foam, Pellets, Film    | N/A          | N/A   | N/A  | N/A      | Curren and Leong, 2019 [50] |
|  | Philippines | Laguna de Bay                   |  | 14.29 items/m <sup>3</sup>               | Fiber, Fragments, Film, Granule, Filament | N/A          | Black, White, Transparent, Brown, Blue, Red                               | (LDPE), (PP),(PET), (GPPS), (PA), (HDPE), (PMMA), (PVC), (ABS), (EVA), (PBT) | FTIR     | Arcadio et al., 2023 [15]   |
|  |             | Cagayan de Oro River            |  | 300 items/m <sup>3</sup>                 | Fiber, Filament, Fragment                 | 0.3 – 5000µm | Blue, Red, White, Transparent, Brown, Black                               | Polyacetylene, PES, PU, PET, PA  | FTIR     | Gabriel et al., 2023 [74]   |
|  |             | Sitio Pulo, Navotas, Metro      |  | N/A                                      | Fiber, Film, Foam, Fragment, Pellet       | N/A          | N/A   | PE, PP, Polyisoprene, poly (styrene-allyl alcohol), PU                       | ATR-FTIR | Galicia et al., 2023 [75]   |
|  |             | Coastal Surface Waters in Roxas |  | 3,487.18 particles/m <sup>3</sup>        | Fiber, Film, Fragment                     | 0 – 4000µm   | Green, Grey, Black, Blue, Red, Transparent                                | N/A  | N/A      | De Castro, 2021 [57]        |
|  |             | Manila Bay                      |  | 1,580 to 57,665 particles/m <sup>3</sup> | Fragment, Film, Pellet, Line, Sheet, Foam | 75 – 5000µm  | White, Black, Red, Green, Blue, Yellow, Orange, Transparent, Other Colour | PP, PE and PET   | FTIR     | Osorio et al., 2021 [172]   |

|  |   |  |                                       |  |              |   |                                  |          |                                   |
|--|---|--|---------------------------------------|--|--------------|---|----------------------------------|----------|-----------------------------------|
|  |   |  | 5.83 Particles/ m <sup>3</sup>        | Fragment, Fiber                            | 160 – 1570µm | Transparent, White, Green, Grey, Black, Orange, Yellow, Red, Blue | PP, PE, PEST, PA                 | ATR–FTIR | Yong et al., 2021 [276]           |
|  | Macajalar Bay                                   |  | n/a                                   | Fiber                                      | N/A          | Yellow, Red, Blue, Transparent, Black, Purple, Orange, Brown      | PE, HDPE, LDPE, PP, PET, PVC, PS | FTIR     | Esquinas et al., 2020 [67]        |
|  | metro Manila Rivers                             |  | 800 – 60,000 particles/m <sup>3</sup> | Fragment, Film, Line, Pellet, Sheet, Foam  | N/A          | N/A   | PET, PP, PE, PS, HDPE, LDPE, PU  | FTIR     | Tanchuling and Osorio, 2020 [244] |
|  | Coastal Waters of Ticalan in San Juan, Batangas |  | 16 particles                          | Filaments, Fragments, Films, Pellets, Foam | N/A          | N/A   | HDPE, LDPE, EVA, nitrile, and PP | FTIR     | Espiritu et al., 2019 [66]        |
|  | Vietnam   |  |                                       |  |              |   |                                  |          |                                   |
|  | Thanh Hoa                                       |  | 44.1 items/m <sup>3</sup>             | Fragment, Fiber                            | 0 – 5000 µm  | N/A   | PS, PP, PE                       | FTIR     | Dao et al., 2023 [55]             |
|  | Mekong River Delta, Vietnam                     |  | 53.8 ± 140.7 items m <sup>-3</sup>    | Fiber, Fragment                            | 0 – 5000 µm  | Green, Yellow, White, Grey, Blue, Red                             | PE, PP, PES, PS                  | FTIR     | Kieu–Le et al., 2023 [118]        |
|  | Ho Chi Minh City                                |  | 2,695 particles/L                     | N/A  | 150–5000 µm  | N/A   | N/A                              | N/A      | Le Tran et al., 2023 [124]        |

|  |  |   |  |   |                                     |                   |   |  |                    |                                |
|--|--|---|--|---|-------------------------------------|-------------------|---|--|--------------------|--------------------------------|
|  |  | Ha Noi, Vietnam   |  | 884.24 items m <sup>-3</sup>  | Fiber, Fragment                     | 45 – 5000 μm      | Red, Blue, White, Black, Yellow, Green, Pink, Purple, Orange, Brown | Rayon, PA, PE, PP, PES, PVC, PEVC,             | Micro-FTIR         | Mai et al., 2023 [135]         |
|  |  | Nhue-Day River Basin  |  | dry season (49–2,827 items/m <sup>3</sup> ); rainy season (400–1,133 items/m <sup>3</sup> ) | Fiber, Fragment                     | 300 – 5000 μm     | Red, Blue, Grey, White, Black, Yellow, Green                        | N/A  | N/A                | Nguyen et al., 2023 [159]      |
|  |  | Saigon–Dong Nai rivers  |  | 228,120–715,124 items. m <sup>-3</sup>  | Fiber, Fragment, Film, Pellet       | 100–5000 μm       | Yellow, Blue, White,  | PE, PP, PVC, OTHERS                            | Raman spectrometry | Phu et al., 2023 [183]         |
|  |  | Seawater Northern of Vietnam                                    |  | 4.26 ± 3.53 to 136.16 ± 96.03 items.m <sup>-3</sup>   | Fiber, Fragment                     | 100–1000 μm       | Red, Blue, Purple, White, Other                                     | PP, PE, PES, PS                                | FTIR               | Phuong et al., 2023 [184]      |
|  |  | Saigon Urban Canals via Can Gio Mangrove Reserve to East Sea by |  | N/A   | Fiber, Fragment                     | 15 Mm to 197.5 Mm | White, Grey, Brown, Green, Pink, Black                              | PE, PET, PA, PP, PVC, PS, PMMA                 | FTIR               | Khuyen et al., 2022 [117]      |
|  |  | coastal water in Nam Dinh                                       |  | 6.7– 9.2 microplastics/m <sup>3</sup>   | Fiber, Fragment                     | 20–1000 μm        | Red, White, Blue, Violet, Other                                     | PE, PP, PS, PES                                | micro-FTIR         | Nam et al., 2022 [153]         |
|  |  | Saigon–Dong Nai river basin                                     |  | 228.120 microfibers/m <sup>3</sup>  | Fiber, Granular                     | 100–5000 μm       | N/A   | N/A  | N/A                | Phu et al., 2022 [182]         |
|  |  | Da Nang, Vietnam  |  | 1482.0 ± 1060.4 items m <sup>-3</sup>   | Fragment, Film, Foam, Fiber, Pellet | 1000–5000 μm      | Black, Blue, Green, Orange, Purple, Red, White, Yellow              | PET, PA, PE, PP, PS, HDPE, LDPE, PVC, PDMS, CB | Raman spectrometry | Tran–Nguyen et al., 2022 [252] |



|        |          |   |                        |  |   |                               |  |   |  |                           |                             |
|--------|----------|---|------------------------|--|---|-------------------------------|--|---|--|---------------------------|-----------------------------|
|        |          | wastewater treatment plants   |                        | 138–340 particles/L  | Fragment, Fiber, Granule, Pellet, Foam, | 1.6 – 5000 µm                 | Black, White, Yellow   | PE, PET, PVC, Nylon, ABS > PS, PP, PES  | FTIR   | Van Do et al., 2022 [259] |                             |
|        |          | seawater  |                        | Ly Nhon (LN; 13.14 MPs/L); Vung Tau (VT; 14.54 MPs/L); Ly Nhon (LN; 13.14 MPs/L)   | Fragment, Bead, Fiber, Bar, Film        | N/A                           | White, Gray, Brown, Yellow, Blue, Pink, Transparent, Translucent | PMMA, PA, PS, PVC, PET, PP, PE, UNDIFFIED   | Micro-FTIR   | Khuyen et al., 2021 [114] |                             |
|        |          | Cua Luc bay   |                        |  |   | 250 – 5000 µm                 |  |   |  | Nghi et al., 2020 [158]   |                             |
| Others | Malaysia | Kuala Nerus, Chagar Hutang, Bangi   | Atmospheric deposition | MP deposition fluxes in Kuala Nerus, Bangi and Chagar Hutang ranging 114 to 689 (368 ± 154), 280–394 (340 ± 30) and 172–476 (274 ± 95) MP/m <sup>2</sup> /day respectively | Fragment, Fiber                         | 50–5000 µm                    |  | Polyacrylamide (PA), High Density Polyethylene (HDPE), Polyester (PES), Polypropylene (PP), Colour Pigment (CP), Polyvinylchloride (PVC), Copolymer, Nylon. | Nile Red method, micro-FTIR and air mass back trajectories using a Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) | Hee et al., 2023 [83]     |                             |
|        |          | Not mentioned   | Colectomy              | 331 MPs per colectomy  | Not Mentioned                           | 0.8 – 1.6 mm                  |  | Polycarbonate, Polyamide, Polypropylene   | Not mentioned  | Lee et al., 2023 [127]    |                             |
|        |          | Kuala Lumpur  | Sewage treatment plant | Not mentioned  |   | Fiber, Pellet, Film, Fragment | 151 – 2040 µm  |   | PE, PP, PA, Polyvinylene, PP, PS, PVC, PET   | FTIR                      | Liew et al., 2023 [130]     |
|        |          | Pasar Seri Kembangan, Selangor. Pasar Kajang, Selangor. Pasar Mersing, Johor. Tok Bali Fisheries Port LKIM, Kelantan. | Shark                  | 2211 particle were found in gastrointestinal tract (GIT) and gills, 29.88 ± 2.34 particles per shark   | Fiber, Fragment, Foam, Pellet           | 0.007 – 4.992 mm              |  |   | Polyester, Polyethylene, Polypropylene, Polyethylene Terephthalate, Polyurethane   | Raman                     | Matupang et al., 2023 [141] |

|  |           |   |                          |  |                                    |                 |  |   |                           |                                   |
|--|-----------|---|--------------------------|--|------------------------------------|-----------------|--|---|---------------------------|-----------------------------------|
|  |           | Pulau Langkawi                                | Sea cucumber             | Fibre: 99.4%,<br>Fragments: 0.6%   | Fragment, Fiber                    | 0.5–2.0 µm      |  | PE, PMMA                                      | FTIR                      | Mazlan et al., 2023 [142]         |
|  |           | Serdang and Sri Kembangan                     | Drinking water           | 8 to 22 particles/L  | Fragment, Fiber                    | 100–300 µm      |  | PET, PP                                       | FTIR                      | Praveena et al, 2022 [192]        |
|  |           | Pulau Pangkor, Perak                          | Sea cucumber             | Fiber: 90.87%,<br>Fragment: 8.23%,<br>Film: 0.9%   | Fiber, Fragment,<br>Film           | 0.2–7.0 µm      |  | PE, PMMA, LDPE,<br>HDPE,                      | FTIR                      | Muhammad Husin et al., 2021 [147] |
|  |           | Residents of Northeastern Peninsular Malaysia | Human colectomy specimen | 28.1 ± 15.4 particles/g tissue   | Fiber, Filament                    | 0.8 – 1.6 mm    |  | Polycarbonate,<br>Polyamide,<br>Polypropylene | micro-FTIR spectroscopy   | Ibrahim et al., 2021 [94]         |
|  |           | Klang   | Grey water               | Fiber: 71%,<br>Fragment: 20%,<br>Pellet: 9%  | Fiber, Fragment,<br>Pellet         | 73.89 – 8096 µm |  | Not Mentioned                                 | Quantifying and measuring | Asmawi, 2020 [19]                 |
|  | Indonesia | Terengganu                                    | Zooplankton              | 983 microplastic particles, 3.3 particles/L;<br>Fish larvae: 0.014 particles/individual,<br>Cyclopoid: 0.013 particles/individual,<br>Shrimps: 0.01 particles/individual,<br>Polychaate: 0.007 particles/individual,<br>Calanoid: 0.005 particles/individual,<br>Chaetognath: 0.003 particles/individual | Fragment, Fiber                    | 0.02–1.68 mm    |  | PA  | FT-IR                     | Amin et al., 2020 [11]            |
|  |           | Bangi, Selangor                               | Cosmetic surface water   | Sungai Langat: 12 pieces, Tasik Cempaka: 5 pieces  | Pellet,<br>Fragments, Film<br>Foam | 200–500 µm      |  | PE  | ATR-FTIR                  | Suardy et al., 2020 [220]         |

|  |  |  |  |  |                                |  |  |  |                          |                               |
|--|--|--|--|--|--------------------------------|--|--|--|--------------------------|-------------------------------|
|  |  | Not mentioned  | Cosmetic product                               | Facial cleanser: 120095 particles/g, Toothpaste: 104335 particles/g  | Pellet                         | Facial cleanser: 10–178 µm, Toothpaste: 3 – 145 µm |  | LDPE, PP   | FTIR                     | Praveena et al, 2018 [193]    |
|  |  | Malaysia, Australia, France, Iran, Japan, New ealand, Portugal, South Africa | Salt   | 30 particles (41.6%) were confirmed as plastic polymers, 17 particles (23.6%) were pigments, 21 particles (29.1%) were not identified, and 4 particles (5.50%) were non-plastic items  | Not Mentioned                  | 160 – 980 µm                                       |  | PE, PET, Polyisoprene/Polystyrene, Polyacrylonitrile, Polyamide-6    | micro-RAMAN spectroscopy | Karami et al, 2017 [106]      |
|  |  | Padang and Jambi City  | Table salts                                    | 33–313 particles/kilogram  | Fragments, Fiber, Film, Pellet | 100–300 mm   |  | Polyethylene, Polypropylene, Polyethylen Terephthalate and Polyester | ATR-FTIR                 | Syamsu et al., 2023 [232]     |
|  |  | Jakarta  | Macroalgae sea grapes <i>Caulerpa racemosa</i> | The average number of microplastics and their identification showed that the washed, stirred, and NaOH-treated macroalgae samples contained an average abundance of 3.28±0.31 particles/g, 5.06±0.59 particles/g, and 2.0±0.81 particles/g, respectively.  | Fragment, Fiber                | Not Mentioned                                      |  | Not Mentioned  | Not mentioned            | Patria et al., 2023 [178]     |
|  |  | Jakarta  | Atmospheric deposition                         | Microplastics deposition rate ranged from 3 to 40 particles m <sup>-2</sup> d <sup>-1</sup> , with an average of 15 particles m <sup>-2</sup> d <sup>-1</sup> . The rainy season's deposition rate (23.422 particles m <sup>-2</sup> d <sup>-1</sup> ) was higher than the dry season (5.745 particles m <sup>-2</sup> d <sup>-1</sup> ) | Foam, Fragments Fiber          | 300 – 1000 µm                                      |  | Polyester, Polystyrene, Polybutadiene Polyethylene                   | FT-IR                    | Purwiyanto et al., 2022 [197] |

|  |  |                            |   |  |                  |                  |  |   |   |                                 |
|--|--|----------------------------|---|--|------------------|------------------|--|---|---|---------------------------------|
|  |  | Kenjeran, Pacet, Mojokerto | Human stool   | Not mentioned  | Not Mentioned    | Not Mentioned    |  | HDPE, PP, PS  | Raman Spectroscopy  | Nugrahapraja et al., 2022 [167] |
|  |  | Bandung metropolitan area  | Atmospheric environment   | Comercial area: 0.3–0.6 particles/m <sup>3</sup> ; Residential area: 0.1–0.3 particles/m <sup>3</sup>  | Fibre            | 1000 to 1400 µm  |  | Not Mentioned   | Quantify and measuring  | Syafina et al., 2022 [228]      |
|  |  | Kenjeran, Surabaya         | Drinking water  | Drinking water: 7.585 µg/g   | Not Mentioned    | Not mentioned    |  | Drinking Water: LDPE And PET  | Raman Spectroscopy (off-resonance) with excitation wavelength 785nm | Luqman et al., 2021 [134]       |
|  |  | Kenjeran, Surabaya         | Human stool, Drinking water, Staples foods, Table salts, Toothpaste | Human stool: 3.33 – 13.99 µg/g; Drinking water: 7.585 µg/g; Salted fish: 11.61 µg/g, Seawater catfish: 5.15 µg/g; Tempeh: 4.07 µg/g; Rice: 15.36 µg/g; Tablesalt brand 1: 8.69 µg/g, Tablesalt brand 2: 26.27 µg/g; Toothpaste brand 1: 23.47 µg/g, Toothpaste brand 2: 14.79 µg/g | Not Mentioned    | Not mentioned    |  | Human Stool: HDPE, LDPE, LLDPE. PP, PS And PET; Drinking Water: LDPE And PET; Salted Fish: PP; Seawater Catfish: LDPE; Tempeh; PP Rice: PP; Tablesalt Brand 1: PP, Tablesalt Brand 2: LLDPE; Toothpaste Brand 1: PP, Toothpaste Brand 2: HDPE | Raman Spectroscopy (off-resonance) with excitation wavelength 785nm | Luqman et al., 2021 [134]       |
|  |  | Makassar City              | Dug wells water   | Highest 0.95 particles/L, Lowest: 0.25 particles/L   | Fiber, Fragments | 0.069 – 4.459 mm |  | Not Mentioned   | Only quantifying process  | Natsir et al., 2021 [155]       |
|  |  | Makassar                   | Sea urchins   | <i>D. setosum</i> : 23.70±2.99 MPs/individual,   | Fiber, Fragment  | 118 – 15.797 µm  |  | Not Mentioned   | Quantify and measuring  | Sawalman et al., 2021 [213]     |

|  |  |                                 |   |  |                            |                                    |  |   |   |                            |
|--|--|---------------------------------|---|--|----------------------------|------------------------------------|--|---|---|----------------------------|
|  |  | Cities in Central Java Province | Duck husbandry  | Not mentioned  | Filament, Fragment, Pellet | Pellet: 250 – 5000 $\mu\text{m}^2$ |  | Poly (N-Butyl Methacrylate) (PBM), Polyester (PE), Polyvinyl Chloride (PVC), Polyethylene Terephthalate (PET), Nylon (NY)   | Not mentioned   | Susanti et al., 2021 [224] |
|  |  | Indonesian rural area           | Human stool, Drinking water, Staples foods, Table salts, Toothpaste | Human stool: 6.94 – 16.55 $\mu\text{g/g}$ ;<br>Tempoh: 11.08 $\mu\text{g/g}$ ;<br>Tablesalt brand 1: 2.06 $\mu\text{g/g}$ ;<br>Tablesalt brand 2: 5.55 $\mu\text{g/g}$ ;<br>Toothpaste brand 1: 15.42 $\mu\text{g/g}$ ;<br>Toothpaste brand 2: 17.80 $\mu\text{g/g}$   | Not Mentioned              |                                    |  | Human Stool: PET, PS, PP,PE,HDPE; Tempoh: LDPE;<br>Rice: PP;<br>Tablesalt Brand 1: PP, Tablesalt Brand 2: PE;<br>Toothpaste Brand 1: PP, Toothpaste Brand 2: HDPE | Raman Spectroscopy (off-resonance) with excitation wavelength 785nm | Wibowo et al., 2021 [265]  |
|  |  | Surabaya                        | Airbone   | Office 1: 576 particles,<br>Office 2: 603 particles;<br>School 1: 529,<br>School2: 578 particles;<br>Apartment 1: 260 particles,<br>Apartment 2: 203 particles   | Fiber, Fragments, Films    | 3000–3500 $\mu\text{m}$            |  | Not Mentioned   | Only quantify using digital microscope (Dino-Lite AM3113T)          | Bahrina et al., 2020 [26]  |
|  |  | Surabaya                        | Airbone   | Urip Sumoharjo street (225,087 units/day) as many as 174.97 particles/m <sup>3</sup> and 130.50 particles/m <sup>3</sup> ;<br><br>Mayjend Sungkono street (132,066 units/day) as many as 131.75 particles/m <sup>3</sup> and 68.36 particles/m <sup>3</sup> ;<br><br>Embong Malang Street (98,017 units/day) as much 94.69 particles/m <sup>3</sup> and 55.93 particles/m <sup>3</sup> . | Fiber, Fragment, Film      | 1000–1500 $\mu\text{m}$            |  | PET, Polyester, Cellophane  | FTIR  | Syafei et al., 2019 [227]  |

|  |           |  |   |  |   |   |   |               |   |                                |
|--|-----------|--|---|--|---|---|---|---------------|---|--------------------------------|
|  |           | Makassar   | Seagrass beds (sediment and benthic animal) | Echinoderm:23.53%; Bivalve 1: 16.67%, Bivalve 2: 25%; Gastropod 1: 20%, Gastropod 2: 0%  | Not Mentioned   | Not Mentioned   |   | Not Mentioned | Not mentioned   | Tahir et al., 2019 [240]       |
|  | Singapore | Around Tonle Sap Basin (Melong River and Tonle Sap Basin)                        | Water, Atmosphere                           | Small: 88.42 per m <sup>2</sup> d <sup>-1</sup> , Medium: 39.30 per m <sup>2</sup> d <sup>-1</sup> , Large: 28.87 per m <sup>2</sup> d <sup>-1</sup>   | Fiber, Pellet, Foam, Film   | >50 µm  |   | Not Mentioned | FT-IR   | Finnegan, 2022 [70]            |
|  |           | Singapore (tropical rainforest climate) and Lahti, Finland (continental climate) | Wheat                                       | Not mentioned  | Fragment  | Not Mentioned   |   | Not Mentioned | Not mentioned   | Pflugmacher et al., 2021 [179] |
|  |           | Singapore  | Seagrass and macroalgae                     | Seagrass 1: 0.051 cm <sup>-2</sup> , Seagrass 2: 0.060 cm <sup>-2</sup> , Seagrass3: 0.036 cm <sup>-2</sup> ; Macroalgae 1: 0.012 cm <sup>-2</sup> , Macroalgae 2: 0.007 cm <sup>-2</sup> ; All taxa: 0.029 cm <sup>-2</sup> | Microfiber, Microfragment   | Seagrass 1: 1443 µm, seagrass 2: 1724 µm, Seagrass3: 2097 µm; Macroalgae 1: 1474 µm, Macroalgae 2: 2632 µm; All taxa: 1843 µm |   | Not Mentioned |   | Seng et al., 2020 [216]        |
|  |           | Supermarket in Singapore   | Shrimp                                      | 13.4 to 7050 items.  | Fiber, Pellet, Film Fragments   | Not Mentioned   |   | Not Mentioned | Quantifying   | Curren et al., 2020 [52]       |
|  |           | Philippines  | Oslob, Cebu                                 | Whale shark scat, Surface water  | Shark: 39; Surface Water: 321, thus yielding MP concentration 5.83 MP M <sup>-3</sup> | Shark: Fragments, Fiber; Surface Water: Fragments, Fiber  | Shark: >300 µm, Surface water: 0.16 – 1.57 mm |               | Shark: Polypropylene (PP), Polyethylene (PE), Polyester (PEST), Polystyrene (PS), Nitrile Rubber (NR);<br>Surface Water: Polypropylene (PP) | FTIR                           |

|         |  |   |   |                                       |   |  |  |                          |                                |
|---------|--|---|---|---------------------------------------|---|--|--|--------------------------|--------------------------------|
| Vietnam | Ho Chi Minh  | Wastewater, Sludge                      | Wastewater: 2,695 particles/l, Sludge: 287,600 particles/kg   | Not Mentioned                         | 0.15–5 mm                                       |  | Not Mentioned  | Not mentioned            | Le Tran et al., 2023 [124]     |
|         | Da Nang  | Drainage channels (water and sediments) | Water: 1482.0 ± 1060.4 items m <sup>-3</sup> , Sediment: 6120.0 ± 2145.7 items kg <sup>-1</sup>   | Fiber, Fragments                      | Water: 1000 to 5000 µm, Sediment: 00 to 1000 µm |  | Polyethylene, Polypropylene, Polyethylene Terephthalate.   | Not mentioned            | Tran–Nguyen et al., 2022 [252] |
|         | Danang coastal city  | Wastewater treatment plants             | 183 to 443 particles/L  | Fiber, Granular, Pellet, Foam, Other  | 1.6 µm – 5000 µm                                |  | PE, PET, PVC, Nylon, ABS, PS, PP, PES  | FTIR analysis            | Van Do et al., 2022 [259]      |
|         | Long Dien  | Seawater, Salt                          | Vung Tau (14.54 MPs/L seawater and 114.67 MPs/kg salt), Ly Nhon (13.14 MPs/L seawater and 63.59 MPs/kg salt), and Can Thanh (9.42 MPs/L seawater and 93.69 MPs/kg salt) | Fiber, Fragments, Films, Pellet, Foam | Not Mentioned                                   |  | Water: PM, MA, PA, PS, PVC, PET, PP, PE, Unidentified;<br>Salt: PE, PP, PET, PVC, PS, PA, PMMA, Unidentified | micro–RAMAN spectroscopy | Khuyen et al., 2021 [114]      |
|         | Ho Chi Minh city   | Dry and wet atmospheric fallout         | 71– 917 items m <sup>-2</sup> d <sup>-1</sup>   | Fiber, Fragment                       | 300–5000 µm                                     |  | Not Mentioned  | Not mentioned            | Strady et al., 2021 [219]      |
|         | Ho Chi Minh City   | Sea salt                                | Fairly similar –133.62 items/kg, corresponding to 487.71 items  | Fiber, non–Fiber                      | Not Mentioned                                   |  | PE, PP, PVC, PET, PS, PA–6, PMMA, Unidentified Polymer   | Raman and FTIR           | Khuyen et al., 2021 [116]      |
|         | Thai Binh, Thanh Hoa, Quang Binh, Quang Ngai, Binh Dinh, Ninh Thuan, Ba Ria – Vung Tau, Ben Tre and Bac Lieu | Sea salt                                | Between 723 ± 196 items/kg and 1057 ± 174 items/kg  | Fragment, Fiber                       | 63 µm – 5000 µm                                 |  | PE, PS, PP   | FTIR                     | Ha, 2021 [78]                  |

|          |  |                                 |   |  |                                    |                |  |   |       |                           |
|----------|--|---------------------------------|---|--|------------------------------------|----------------|--|---|-------|---------------------------|
|          |  | provinces                       |   |  |                                    |                |  |   |       |                           |
|          |  | Ho Chi Minh city                | Atmospheric fallout   | 1801 items m <sup>-2</sup> d <sup>-1</sup> and 913 items m <sup>-2</sup> d <sup>-1</sup> in the dry and rainy seasons, respectively. | Fiber, Fragment                    | 200 mm to 5 mm |  | Not Mentioned   | FTIR  | Thinh et al., 2020 [248]  |
| Cambodia | Around Tonle Sap Basin (Melong River and Tonle Sap Basin)  | Water, Atmosphere               | Small: 88.42 per m <sup>2</sup> d <sup>-1</sup> , Medium: 39.30 per m <sup>2</sup> d <sup>-1</sup> , Large: 28.87 per m <sup>2</sup> d <sup>-1</sup>  | Fiber, Pellet, Foam, Film  | >50 μm                             |                |  | Not Mentioned   | FT-IR | Finnegan, 2022 [70]       |
|          | Phnom Penh   | Drinking water treatment plants | WTP1: 1180.5 ± 158 p/L in the inlet and 521 ± 61 p/L in the distribution tank, WTP2: 1463 ± 126 p/L in the inlet and 617 ± 147 p/L in the distribution tank   | Film, Fragment, Bead (Pellet), Fibre   | 6.5–20, 20–53, 53–500, and >500 μm |                |  | PET, PE, PP, PA, PES, Cellophane  | FT-IR | Babel and Dork, 2021 [25] |
| Brunei   | Not mentioned  | Drinking water                  | 14 ± 6.8 particles/L to 56 ± 23 particles/L   | Fiber, Fragments, Film, Pellet   | 0.5 – 1.00 mm                      |                |  | LDPE, HDPE, Polyethylene Terephthalate (PETE), Ethylene Vinyl Acetate (EVA) | FT-IR | Hossain et al., 2023 [89] |
| Myanmar  | Myanmar (Patheingyi, Chaungthar, Wundwin, Bagan, Myingyang, Yangon, Yangon-Patheingyi, Mandalay, Madaya-Nay Pyi Taw, Nay Pyi Taw; Taiwan (Tainan)) | Road dust                       | Patheingyi: 17 pieces/kg dry weight, Chaungthar: 10 pieces/kg dry weight, Wundwin: 0, Bagan: 0, Myingyang: 14 pieces/kg dry weight, Yangon: 63 pieces/kg dry weight, Yangon-Patheingyi: 84 pieces/kg dry weight, Mandalay: 79 pieces/kg dry weight, Madaya-Nay Pyi Taw: 285 pieces/kg | Not mentioned  | 250 – 1000 μm                      | Not Mentioned  |  | PE, PS, PET, PVC, PES, PP, Unidentified                                     | FT-IR | Mon et al., 2022 [146]    |



|        |   |  |  |   |               |               |               |  |                            |                            |
|--------|---|--|--|---|---------------|---------------|---------------|--|----------------------------|----------------------------|
|        |   |  |  | dry weight,<br>Nay Pyi Taw;<br>Taiwan (Tainan): 555<br>pieces/kg dry weight   |               |               |               |  |                            |                            |
|        | Not mentioned   | Cosmetic (facial cleanser, toothpaste) |  | Facial: 16 % (20 - 1000 µm), 52 % (63-250 µm) and 52% (20-63 µm);<br><br>Toothpaste: 43% (63-250 µm) and 57% (63-250 µm)  | Pellet        | 63-20 µm      | Pellet        | PE, Polyethylene Oxidized, Calcium Carbonate (Caco3), Silica Gel.  | FT-IR                      | Mon and Nakata, 2020 [145] |
| Taiwan | Myanmar (Pathein, Chaungthar, Wundwin, Bagan, Myingyang, Yangon, Yangon-Pathein, Mandalay, Madalay-Nay Pyi Taw, Nay Pyi Taw; Taiwan (Tainan)) | Road dust                              |  | Pathein: 17 pieces/kg dry weight, Chaungthar: 10 pieces/kg dry weight, Wundwin: 0, Bagan: 0, Myingyang: 14 pieces/kg dry weight, Yangon: 63 pieces/kg dry weight, Yangon-Pathein: 84 pieces/kg dry weight, Mandalay: 79 pieces/kg dry weight, Madalay-Nay Pyi Taw: 285 pieces/kg dry weight, Nay Pyi Taw; Taiwan (Tainan): 555 pieces/kg dry weight | Not mentioned | 250 – 1000 µm | Not Mentioned | PE, PS, PET, PVC, PES, PP, Unidentified  | FT-IR                      | Mon et al., 2022 [146]     |
| SEA    | SEA   | Drinking water                         |  | Bangkok= 0.43 to 1.52 particles/L, Malaysia=8–22 particles/L,   | Not Mentioned | 0–5 mm        |               | Polyethelene Terephthalate (PET), LDPE, Polypropylene (PP), Polyethelene (PE), Polyethylene Succinate (PEST) | FTIR and Raan spectroscopy | New et al., 2023 [157]     |

**Supplementary Table 2. Category engaged in microplastics contamination factors<sup>[286,287]</sup>**

| <i>PRI</i> | Risk category | <i>PERI</i> | Risk level     | <i>PLI</i> | Risk category |
|------------|---------------|-------------|----------------|------------|---------------|
| 0-10       | I             | <150        | Minor          | <10        | I             |
| 1-10       | II            | 150-300     | Moderate       | -          | -             |
| 11-100     | III           | 300-600     | High           | 10 – 20    | II            |
| 101-1000   | IV            | 600-1200    | Danger         | 20 – 30    | III           |
| >1000      | V             | >1200       | Extreme danger | >30        | IV            |

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**Supplementary Figure 1.** Number of polymer compositions in biota, sediment, water and other matrices recorded in Southeast Asia studies.