# Supporting Information

## Data quality assessment for studies investigating microplastics and nanoplastics in food products: Are current data reliable?

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**Glossary of acronyms**

AFM, atomic force microscopy; ATR-FT-IR, attenuated total reflection Fourier transform infrared spectroscopy; ABS, acrylonitrile butadiene styrene; CPE, chlorinated polyethylene; EDX, energy-dispersive X-ray spectroscopy; EVA, ethylene vinyl acetate copolymer; EDTA, ethylene diamine tetraacetic acid; FT-IR, Fourier transform infrared spectroscopy; $HNO_3$, nitric acid; $H_2O_2$, hydrogen peroxide; KOH, potassium hydroxide; MPs, microplastics; MP/NPs, microplastics and nanoplastics; NPs, nanoplastics; NaOH, sodium hydroxide; NaClO, sodium hypochlorite; NaI, sodium iodide; NaCl, sodium chloride; PA, polyamide; PAAM, polyacrylamide; PAN, polyacrylonitrile; PAR, polyarylester; PE, polyethylene; HDPE, high-density polyethylene; LDPE, low-density polyethylene; PES, polyester; PET, poly(ethylene terephthalate); PEVA, polyethylene/ethylene vinyl acetate; PP, polypropylene; PS, polystyrene; PTFE, polytetrafluoroetylene; PU, polyurethane; PVA, poly(vinyl alcohol); PVC, poly(vinyl chloride); PVDF, polyvinylidene fluoride; Py-GC/MS, pyrolysis gas chromatography-mass spectrometry; Raman, Raman spectroscopy; SEM, scanning electron microscopy; SEM-EDX, scanning electron microscopy and energy dispersive X-ray spectroscopy. TD-GC/MS, thermal desorption-gas chromatography/mass spectrometry; TMAH, tetramethylammonium hydroxide.

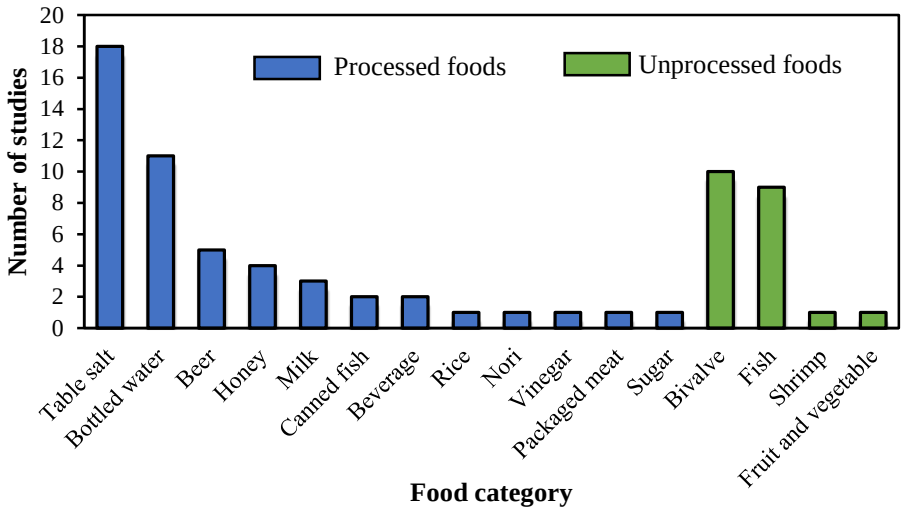


**Fig. S1.** Number of studies analyzing MP/NPs in processed foods and unprocessed foods by May 2022. A total of 71 data records from 63 publications on MP/NPs occurrence in 16 kinds of food products were reviewed, including 12 kinds of processed foods and 4 kinds of unprocessed foods.

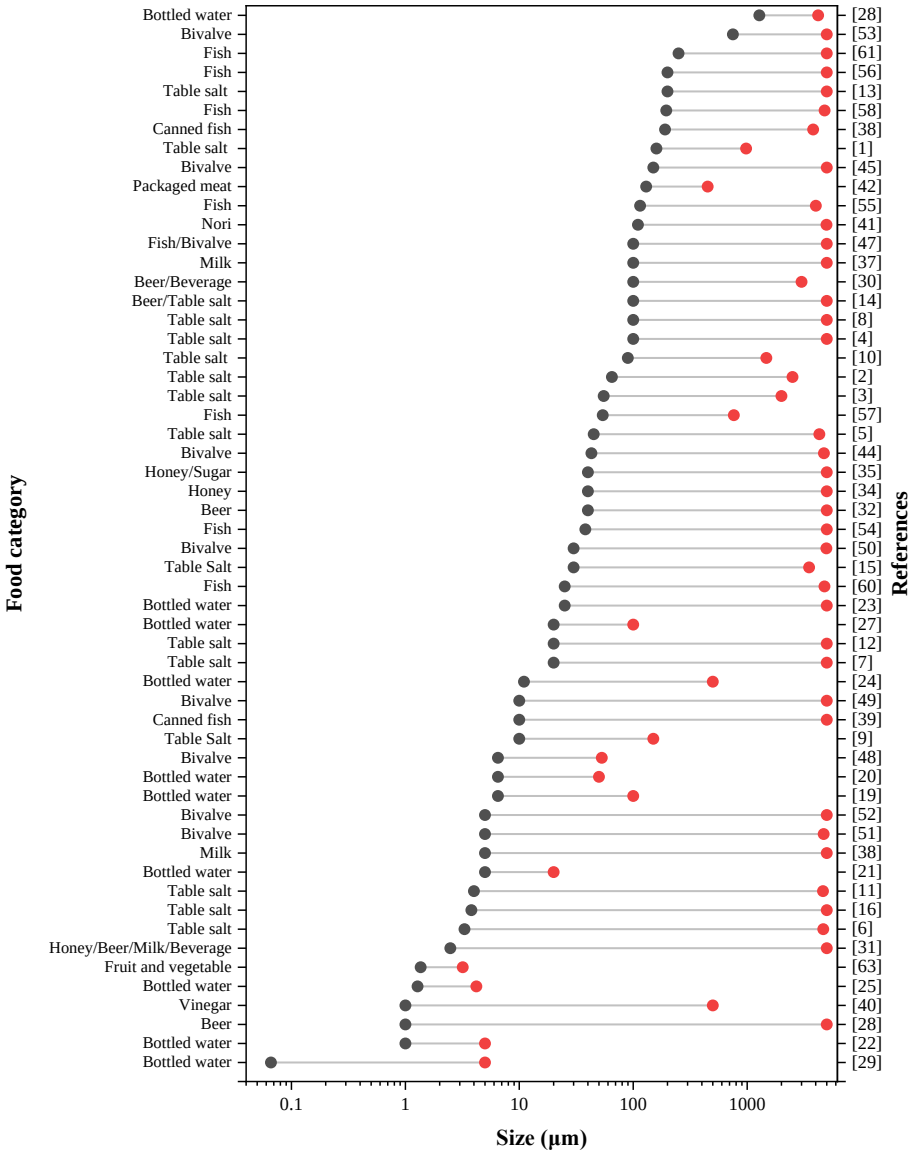


**Fig. S2.** Size range of MP/NPs in food products. For the studies reporting the size of MP/NPs, the maximum limit was 5000 µm. Black dots represent the minimum particle size and red dots represent the maximum particle size.

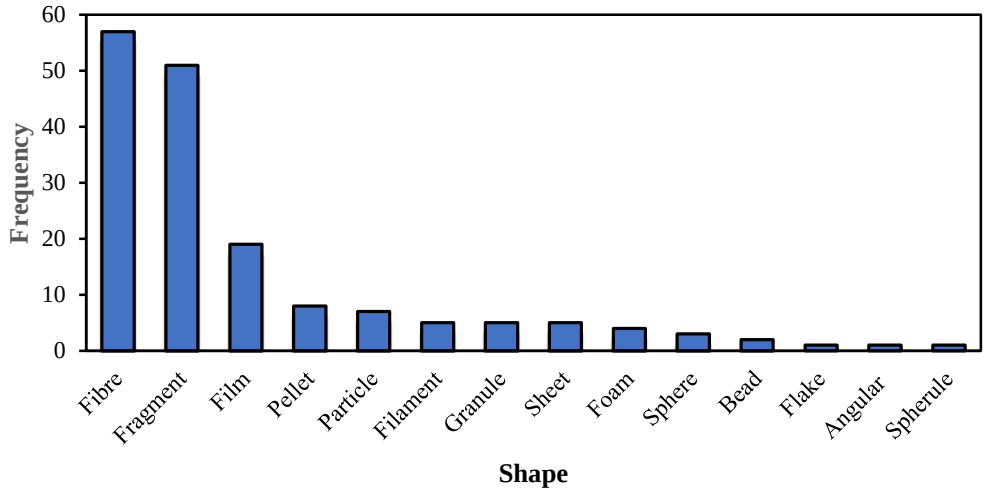

**Fig. S3.** Number of data records reporting a particular shape of MP/NPs in food products (from 66 out of 71 data records).

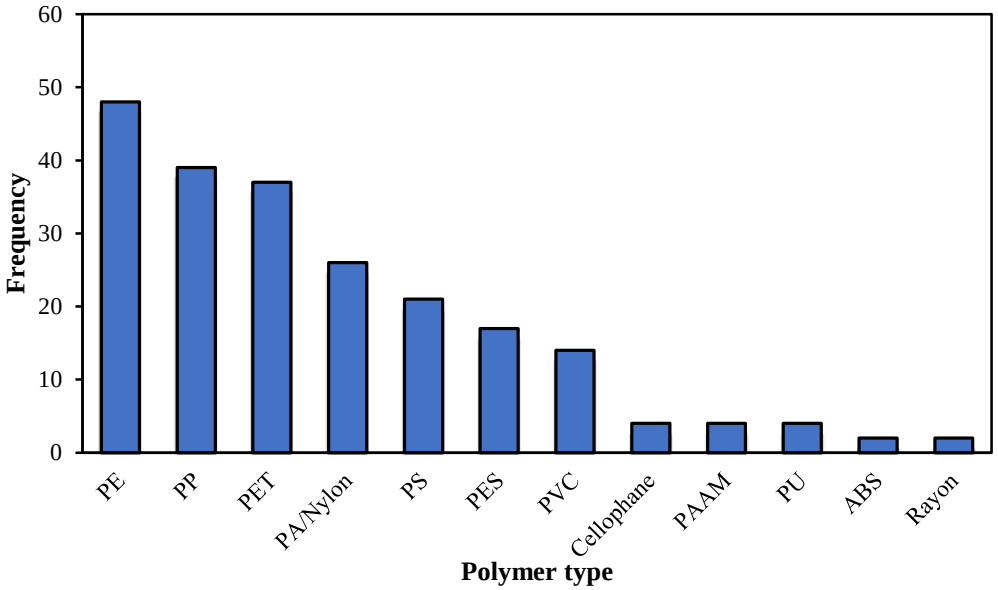


**Fig. S4.** Number of data records reporting a particular polymer type of MP/NPs in food products (from 59 out of 71 data records).

**Table S1** Explanation of criteria used for data quality assessment of studies analyzing MP/NPs in food products.

| Criteria | | Explanation |
|---|---|---|
| Sampling | 1 Sampling strategy | Comprehensive information should be recorded: this includes the purchase location, place of origin, and package materials (only required for packaged foods). Furthermore, sample characteristics need to be recorded (e.g., salts: sea/lake/well/rock salts; milk: whole/skim milk; seafood: species).<br>This will be helpful in identifying potential sources of contamination in the raw materials and during manufacturing process of food products. This information also enables the replication of the sampling and provides insight in comparability with other studies. |
| | 2 Sample size | The sufficient sample size for different types of food products should be met to ensure representative sampling. The required sample size for each type of food is as follows: liquid foods: >10 L per research unit or n >10 bottles/bags; seafood: >50 individuals per research unit; packaged foods: >10 kg per research unit or n >10 bottles/bags per research unit. A research unit can be species, type, and other characteristics. |
| | 3 Sample storage | This criterion is set to avoid possible contamination of samples before analysis. For packaged foods, samples should meet the required storage conditions and remain unopened before the experiments. For seafood, samples should be frozen or stored on ice shortly after purchasing, and any sample handling should be avoided before being in the laboratory.<br>Biota samples can also be stored in a fixative, and the effects of the fixative on different polymers should be tested before application. |
| Contamination mitigation | 4 Laboratory preparation | Precautions regarding the materials, equipment, laboratory surfaces, and the clothes of researcher should be met. All materials, equipment, and laboratory surfaces need to be thoroughly washed and rinsed. After rinsing, all materials should be kept in clean air conditions. Researchers should wear cotton lab coats and gloves. |
| | 5 Clean air conditions | The handling of samples should be performed in clean air facilities to avoid airborne contamination. Samples should not be taken out of the clean air facilities without being sealed off. Negative controls become an even higher necessity. |
| | 6 Negative controls | Negative controls (in triplicate) should be included to quantify the background contamination and be treated alongside the actual samples. The controls should be conducted using filtered water, biota tissue or other food matrices that is free of plastic. Only then a contamination deriving through air, clothes, added chemicals or used equipment can be discovered. |
| Sample purification/handling | 7 Sample treatment | A digestion step or other extraction methods should be justified. The effect on polymers should be tested in the current or previous studies before applying any protocol. |
| | 8 Positive controls | Positive controls (in triplicate) should be included to determine the efficiency of MP/NPs extraction and separation.<br>This is a necessary quality assurance, providing information on the effectiveness of the purification and analysis methods |

| Criteria | | Explanation |
|---|---|---|
| | | applied. Positive controls should be performed in parallel to the actual samples with an added number of MP/NPs of known polymer identity. Then, the amounts of retrieved MP/NPs particles are tallied to the amounts added. |
| Particle characterization | 9 Polymer identification | Polymer identification is required to avoid miscounting of MP/NPs. The choice of the analytical method depends on the targeted sizes of plastics.<br>For microplastic studies:<br>The accepted matching rate between the polymer and the reference spectra should be 70% or higher.<br>The following information should be provided: the number of total particles and analyzed particles, the number of confirmed particles, and the proportion of different polymer types.<br>All particles should be analyzed when the number of presorted particles <100. For particle numbers >100, 50% of them should be identified, with a minimum of 100 particles.<br>For nanoplastic studies: Analytical methods should be reported. |
| | 10 Abundance, size, and shape | Detailed information on detected MP/NPs should be provided, which is necessary for the health risk assessment. The reportage should include the abundance/concentration of MP/NPs (minimum, maximum, mean ± standard deviation) per research unit, the size range of MP/NPs (minimum, maximum, mean ± standard deviation), and the proportion of different shapes of MPs. |

**Table S2** A summary of reviewed studies on MP/NPs in processed foods and unprocessed foods, including information on polymer identification methods and characteristics of MP/NPs (polymer type, abundance, size, and shape).

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| | **Processed foods** | | | | | |
| **[1]** | Table salt | Stereomicroscope, Raman spectrometer | PP (40.0%), PE (33.3%), polyacrylonitrile (10.0%), PET (6.66%), polyisoprene/PS (6.66%), and PA-6 (3.33%) | 1–10 n/kg | 160–980 μm; (Average: 515 ± 171 μm) | Fragment (63.8%), filament (25.6%), and film (10.6%) |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[2]** | Table salt | Stereomicroscope, FT-IR | LDPE (n = 334), resin (n = 287), HDPE (n = 239), polyvinyl formal (n = 143), PP (n = 119), rubber (n = 96), ABS (n = 72), PVC (n = 48), thermoplastic elastomere (n = 45), ethylene propylene (n = 41), PU (n = 39), PET (n = 24), poly4-methyl-1-pentene (n = 23), polyvinyl butyral (n = 21), polychloroprene (n = 19), polyvinyl acetate (n = 16), PES (n = 12), and polyactide (n = 10) | 17.0 ± 5.9–122.5 ± 64.2 n/kg in sea salt, 64 n/kg in rock salt | 65–2500 μm | Fiber, fragment, sheet, and spherule. |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[3]** | Table salt | Stereomicroscope, FT-IR, SEM | PE (51.6%), PP (25%), PES (21.8%), and PA (1.6%) | Sea salt: 35 ± 15–72 ± 40 n/kg; Well salt: 2 ± 1–29 ± 11 n/kg | 55 µm–2 mm | Fiber (83%) and fragment (17%) |
| **[4]** | Table salt | Stereomicroscope, FT-IR | Sea salt: PE (35%), PP (30%), and PET (30%); Rock salt: PET (41%), PE (26%), and PP (23%); Lake salt: PP (47%), PE (28%), teflon (11%), and PET (10%) | Sea salt :0–1674 n/kg (excluding one outlier of 13629 n/kg); Rock salt: 0–148 n/kg； Lake salt:28–462 n/kg | 0.1–5 mm | Fragment (63% in sea salt, 54% in rock salt, 88% in lake salt), fiber (31%, 45%, and 11% respectively), and sheet (6%, 1%, and 1% respectively) |
| **[5]** | Table salt | Stereomicroscope, FT-IR | PET, PE, PES, and cellophane | Sea salt: 550–681 n/kg; Lake salt: 43–364 n/kg; Rock/well salt: 7–204 n/kg | 45–4300 µm | Fragment, fiber, pellet, sheet, film, and granule |
| **[6]** | Table salt | SEM-EDX, FT-IR | PVA, PP, and PE | 0.67 ± 1.15 n/kg–3.42 ± 4.94 n/kg; (Average: 1.68 ± 1.83 n/kg) | 3.3–4660 µm | Fiber (37%), particle (63%) |
| **[7]** | Table salt | Microscope, µ-Raman | PE (22.9%), PP (19.2%), PU (17.5%), and PET (14.5%) | Sea salt: 16–84 n/kg; Lake salt: 8–102 n/kg; Rock salt: 9–16 n/kg | 20 µm–5 mm | Fiber (>70% in each salt type), fragment, and film |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[8]** | Table salt | Microscope, FT-IR, SEM | PE (78%), PES (19%), and PVC (3%) | 115–575 n/kg | >1 mm (15%), 500–1000 µm (16.2%), 200–500 µm (31.2%), 100–200 µm (37.7%) | Fiber (88.5%), film (4.9%), irregular shape (3.7%), and pellet (2.9%), |
| **[9]** | Table Salt | FT-IR, SEM-EDX | PET, PVC, PE, PS, PA, PP, and nylon | 70–320 n/kg | 10–150 µm | Fiber |
| **[10]** | Table salt | Stereomicroscope, FT-IR | PP (39.5%), PE (34.9%), PS (14.0%), PES (4.7%), polyetherimide (2.3%), PET (2.3%), and polyoxymethylene (2.3%) | 2.5–20 n/kg | 89.7–1474.9 µm | Fragment (93%) and fiber (7%) |
| **[11]** | Table salt | Microscope, FT-IR | PP | 1.57–31.68 n/g | 4–4628 µm | Fragment, fiber, film, foam, and granule |
| **[12]** | Table salt | Raman spectroscopy, SEM-EDX, ion chromatography | PE, PP, PET, nylon, and PS | Sea salt: 1400–2300 n/kg Rock salt: 200–400 n/kg | 20 µm–5 mm | Fragment (44%), fiber (39%), sheet (13%), and pellet (4%) |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[13]** | Table salt | Microscope, FT-IR | PES, PET, PA, PE, and PS | 103 ± 39–56 ± 49 n/kg | 0.2–5 mm | Fiber and fragment |
| **[14]** | Beer, sea salt | Microscope, FT-IR | Not reported | Beer: 0–14.3 n/L (Average: 4.05 n/L); Salt: 46.7–806 n/kg (Average: 212 n/kg) | 0.1–5 mm | Fiber and fragment |
| **[15]** | Table Salt | Stereomicroscopy, FT-IR | PET (83.3%), PP (6.7%), and PE (3.3%) | 50–280 n/kg | 30 µm–3.5 mm | Fiber |
| **[16]** | Table salt | Microscope, FT-IR | Cellophane, PS, PA, and PAR | 600–700 n/kg | 3.8 µm–5.02 mm | Fragment, fiber, and pellet |
| **[17]** | Table salt | Microscope, FT-IR | Nylon (53%), LDPE (27%), PP (15%), and PET (5%) | 0.37–2.13 n/g | Not reported | Fiber |
| **[18]** | Table salt | FT-IR, AFM | PE (41.5%), PP (22.7%), cellulose (11.2%), and nylon (8.7%) | Not reported | < 2 mm | Fragment (55%), fiber (42%), and sheet (3%) |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[19]** | Bottled water | Optical microscopy, FT-IR | PP (54%), nylon (16%), PE (10%), PS (11%), PES (6%), and others (3%) | >100 μm: 10.4 n/L; 6.5–100 μm: 325 n/L | 6.5–100 μm (95%) | Particle (66%), fiber (13%), film (12%), foam (5%), and pellet (3%) |
| **[20]** | Bottled water | Optical microscopy, FT-IR, Raman spectroscopy | PET (28.4%) PE (24.2%), PP (18.1%), PA (7.2%), PVC (4.4%), cellophane (3.5), polyvinyl fluoride (2.4%), PMMA (2.1%), PTFE (1.8%), polysilicate (1.8%), poly (1.3 oxathiolane) (1.4%), and other copolymers (1.2%) | 140 ± 19 n/L | 6.5–50 μm (90.5%) | Fiber (62.8%), fragment (37.2%) |
| **[21]** | Bottled water | Raman spectroscopy | PET (49.75%), PE (21.75%), PES (4.25%), PP (10.50%), PA (4%), and others (10%) | Returnable bottle: 118 ± 88 n/L in, but only; Single-use plastic bottles: 14 ± 14 n/L; Carton box: 11 ± 8 n/L Glass bottle: 50 ± 52 n/L | 5–20 μm (80%) | Not reported |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[22]** | Bottled water | Raman spectroscopy | PET (29.05%), styrene butadiene copolymer (4.67%), PE (17.37%), PP (14.33%), and others (5.53%) | Single-use PET bottles: 2649 ± 2857 n/L; Reusable PET bottles: 4889 ± 5432 n/L; Glass bottles: 3074 ± 2531 n/L | 1–5 μm (90%) | Not reported |
| **[23]** | Bottled water | FT-IR, SEM | PET (7%), PE (6%), PS (5%), and PA (4%) | 2–23 n/bottle | 25–5000 μm | Film, flower, foam, rod, and irregular shape |
| **[24]** | Bottled water | FT-IR | PVC (18, 6.1%), PES (1, 0.3%), PA (4, 1.4%), PE (240, 81.4%), and PS (32, 10.8%) | 317 ± 257 n/L | 11–500 μm | Fragment |
| **[25]** | Bottled water | SEM-EDX | Not reported | $5.42 \times 10^7 \pm 1.95 \times 10^7$ n/L | 1.28–4.2 μm | Not reported |
| **[26]** | Bottled water | Stereomicroscope, FT-IR, Raman spectroscopy | PE, PET, and PP | 8.5 ± 10.2 n/L | 1.28–4.2 mm | Fragment (93 %) and fiber (7%) |
| **[27]** | Bottled water | Stereomicroscope, SEM-EDX | PET (45.08%), PE (24.79%), polydimethyl siloxane (17.90%), and PVC (12.23%) | 2.20 ± 1.85 n/0.75L | Generally between 20 and 100 μm | Fragment (77.94%), granule/pellet (19.92%), and film (2.14%). |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[28]** | Beer, Bottled water | Stereomicroscope, Raman | Beer: PE and PS, Bottled water: PET | Beer:10–19 fibers/0.33L; Bottled water: Not reported | Beer:1 μm–5 mm; Bottled water: Not reported | Fiber |
| **[29]** | Bottled water | Optical microscopy, FT-IR, TD-GC/MS, | PET | Not reported | 66 nm–5 μm | Sphere |
| **[30]** | Beer, beverage | Fluorescence microscope, SEM, Raman spectroscopy | PA, poly (ester amide), ABS, and PET | 0–28 ± 5.29 n/L | 0.1–3 mm | Fiber and fragment |
| **[31]** | Honey, beer, milk, refreshment | FT-IR, microscope | PAAM (30%), PP (26%), HDPE and LDPE (44%) | Honey: 22–114 n/L; Beer: 8–117 n/L; Milk: 16–53 n/L; Refreshment:8–59 n/L | Fiber: 13.45–6742.48 μm ; Fragment: 2.48–247.54 μm | Fiber and fragment |
| **[32]** | Beer | Dissecting microscope | Not reported | Fiber: 2–79 n/L; Fragment: 12–109 n/L; Granule: 2–66 n/L | >40 μm | Fiber, fragments, and granular |
| **[33]** | Honey | Microscopy, Raman spectroscopy | PET | 60–8680 n/kg | Not reported | Fiber and particle |
| **[34]** | Honey | Dissecting microscope | Not reported | Fiber: 10–336 n/kg; Fragment: 2–82 n/kg | >40 μm | Fiber and fragment |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[35]** | Honey, sugar | Dissecting microscope | Not reported | Fiber: 166 ± 147 n/kg of honey, 217 ± 123 n/kg of sugar; Fragment: 9 ± 9 n/kg of honey, 32 ± 7 n/kg of sugar | >40 μm | Fiber and fragment |
| **[36]** | Milk | Micro-Raman spectroscopy, SEM-EDX | PE, PES, PP, PTFE, PS | 1720–10040 n/L | ⩾5 μm | Fiber, particle, bead |
| **[37]** | Milk | Electron microscopy, SEM-EDS, Raman | Polyethersulfone and polysulfone | 1–14 n/L | 0.1–5 mm | Fiber (97.5%) and fragment (2.5%) |
| **[38]** | Canned fish | Stereomicroscope, Raman spectroscopy, EDX | PP (33.3%), PET (33.3%), PE (16.6%), and PVC (16.5%) | 0–3 n/brand | 190–3800 μm (Average: 1149 ± 936 μm) | Fragment (46.6%), film (26.6%), and filament (26.6%) |
| **[39]** | Canned fish | Fluorescence microscope, Raman, SEM-EDX | PET (36.6%), PS (17.6%), PP (13.5%), PS-PP (10.2%), PS-PET (7.9%), nylon (7.1%), PVC (3.9%), and LDPE (3.2%) | 128 n/kg | Fragment: 10–1100 μm; film: 70–1000 μm; fiber:100–8000 μm | Fiber (58%), fragment (38%), and film (8%) |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[40]** | Rice | Py-GC/MS | PE (95%), PP (4%), and PET (1%) | 52 ± 5.0–283 ± 50 μg/g dry weight | Not reported | Not reported |
| **[41]** | Nori | Stereomicroscope, FT-IR | PES (18.9%), rayon (6.6%), PP (4.0%), PA (1.8%), and cellophane (1.8%) | 0.9–3 n/g (dry–wet) | 0.11–4.97 mm | Fiber (64.8%), fragment, film, and pellet |
| **[42]** | Vinegar | Stereomicroscope, FT-IR, SEM-EDX | PE and HDPE | 24.5 ± 7.77–82 ± 36.59 n/L (Average: 51.35 ± 20.73 n/L) | 1–500 μm (84%) | Fragment (94 %) and fiber (6%) |
| **[43]** | Packaged meat | Dissection microscope, FT-IR | PS | Particle: 4.0 ± 4.5–18.7 ± 8.3 n/kg; Fiber: 18–160 n/kg | 130–450 μm | Particle, fiber |
| | **Unprocessed foods** | | | | | |
| **[44]** | Bivalve (oyster, mussel, clam, scallop) | Optical microscope, μ-FT-IR | Fragment: PE (24%), PP (23%), PS (22%), silicon (6%), PEVA (4%), PET (2%), PU (2%), acrylic (2%) and others (11%); Fiber: PES (82%), PP (6%), acrylic (6%) and nylon (3%) | 0.15 ± 0.20 n/g, 0.97 ± 0.74 n/individual | 43–4720 μm; < 300 μm (65%) | Fragment (76%), fiber (24%), and film (0.3%) |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[45]** | Bivalve | Stereomicroscope, FT-IR | PE, PP, PET, PS, and PVC | Fresh mussels：0.20 ± 0.24 n/g wet weight; Processed mussels：0.9 ± 0.10 n/g wet weight | 150–6000 μm | Line (69.67%), fragment (17.13%), and fiber (13.66%) |
| **[46]** | Bivalve | Stereomicroscope, FT-IR | EVA, HDPE, nylon, PET, PVC, and PES | 3.83 ± 0.2 n/individual; 0.04 ± 0.003 n/g soft tissue | <2000 μm | Filament (30%) and fragment (70%) |
| **[47]** | Fish, bivalve | Stereomicroscope, Raman spectroscopy | PP, PA, PE, PS, PET, PVC, PAN, and others | Fish: 1.69 ± 0.39–4.71 ± 1.24 n/individual; Bivalve: 0.28 ± 0.07–1.56 ± 0.33 n/individual | 0.1–5 mm | Fiber, fragment, film, and particle |
| **[48]** | Bivalve | Fluorescence microscope, FT-IR | Ethylene/propylene copolymer (67%), LDPE (17%), PP (8%), and PET (8%) | 7.32 ± 8.33 n/mussel and 1.53 ± 2.04 n/g (wet weight) | 6.5–53 μm | Fragment (75.4%) and fiber (24.6%) |
| **[49]** | Bivalve | Stereomicroscope, FT-IR | Rayon, PET, CPE, PVC, and PVDF | 1.2–6.0 n/individual (0.8–4.4 n/g) | 10–5000 μm | Fiber, fragment, granule, and film |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[50]** | Bivalve | Microscope, Raman | PE (35%), PP (15%), nylon-6 (7.5%), and PET/PES (7.5%) | Average: 0.6 ± 0.1 n/mussel | 30–4960 µm; Average size: 1.7 ± 0.1 mm | Fiber (62.7%) and fragment (37.3%) |
| **[51]** | Bivalve | Stereomicroscope, FT-IR | PES, PP, and PET | 0.7–2.9 n/g of tissue; 1.1–6.4 n/individual | 5 µm–4.7 mm | Fiber, fragment, sphere, and flake |
| **[52]** | Bivalve | Stereomicroscope, FT-IR | PE, PET, and PA | 2.1–10.5 n/g | 5 µm–5 mm | Fiber, fragment, and pellet |
| **[53]** | Bivalve | Stereomicroscopy | Not reported | 6.2–7.2 n/g of tissue | 750–6000 µm | Filament |
| **[54]** | Fish | Stereomicroscope, FT-IR | PE, PP, PES, and nylon | 0–17 n/individual; (Average: 0.96 ± 0.08 n/individual) | 38 µm–1 mm (34%); >1 mm (66%) | Fiber (81.8%), fragment (12.7%), and film (5.5%) |
| **[55]** | Fish | Stereomicroscope, FT-IR | PE, PP, and PS | 0.07 ± 0.26 n/fish in inedible tissues; 0.53 ± 0.77 n/fish in inedible tissues | 115–4010 µm | Fragment, fiber, and foam |
| **[56]** | Fish | Stereomicroscope, Raman spectroscopy, SEM-EDX | PET (88.4%), PP (9.3%), and PET (2.3%) | 0–10 n/species | 0.2–34.9 mm | Fragment (67.4%), fiber (16.3%), and film (16.3%) |

| Reference | Food category | Identification method of polymer | Polymer type | Abundance | Size | Shape |
|---|---|---|---|---|---|---|
| **[57]** | Fish | Stereomicroscope, Raman | PE (57%), PP (32.9%), PET (6.3%), and PS (1.3%) | 1.75 ± 0.71–4.11 ± 2.85 n/individual | 54–765 μm | Fragment (91.4%) and fiber (8.6%) |
| **[58]** | Fish | Stereomicroscope, Raman spectroscopy | PE (35%), PET (26%), PS (18%), PVC (12%), and PP (9%) | 0–1.92 ± 0.12 n/individual | 195–4780 μm | Fiber (79.8%), fragment (11.4%), and film (8.8%) |
| **[59]** | Fish | FT-IR | Nylon, acrylic, modacrylic, PE, PU, and PS | 0.13 n/individual | Not reported | Fiber (89.5%) and fragment (10.5%). |
| **[60]** | Fish | Optical microscopy, fluorescent microscopy, SEM-EDX | Not reported | 11.4 n/fish (0.015 n/g wet weight) | 25–4770 μm | Fiber and thread (76%) irregular fragment (12%), and microbead (12%). |
| **[61]** | Fish | Stereomicroscope | Not reported | 0.38 n/individual | 0.25–5 mm | Filament (84%), angular (11%), and round (5%) |
| **[62]** | Shrimp | Microscope | Not reported | 13 ± 1–7050 ± 418 n/g | Not reported | Film, fragment, fiber, and sphere |
| **[63]** | Fruit and vegetable | SEM-EDX | Not reported | 26375–307750 n/g | 1.36–3.19 μm | Not reported |

**Table S3** Characteristics of MP/NPs (polymer type, size, and shape) used in toxicological studies on mice and human cells.

| Reference | Subject | Polymer type | Size (μm) | Shape |
|---|---|---|---|---|
| **[64]** | Mice | PS | 0.5 | Sphere |
| **[65]** | Peripheral blood mononuclear cells; human mast cell-1; human dermal fibroblast; cervical cancer cells; basophilic leukemia cells; red blood cell | PE | 1–10, 45–53, 90–106 | Fragment, bead, and pellet |
| **[66]** | Human peripheral blood lymphocyte | PE | 10–45 | Bead |
| **[67]** | Mice | PS | 5, 20 | Sphere |
| **[68]** | Human lung epithelial BEAS-2B cell | PS | 1.72 | Sphere |
| **[69]** | Human lung cell | PS | 1, 10 | Sphere |
| **[70]** | Peripheral blood mononuclear cells, human mast cells, red blood cells, normal cells, cancer cells | PVC, ABS | 25–75, 75–200 | Particle |
| **[71]** | Caco-2 and HT29-MTX-E12 (human colon epithelial cell) co-culture bewo b30 (human placental trophoblast cell) | COOH-modified PS | 0.05, 0.5 | Sphere |
| **[72]** | Mice | PS | 5 | Sphere |
| **[73]** | Mice | PS | 0.5 | Sphere |
| **[74]** | Human dermal fibroblasts, peripheral blood mononuclear cells (pbmcs), HMC-1 (human mast cell line 1), RBL-2H3 (human basophilic leukemia cell line), RAW 264.7 (mouse macrophage cell line) | PP | <20, 25–200 | Particle |
| **[75]** | Human dermal fibroblasts, human peripheral blood mononuclear cells, human mast cell line | PS | 0.46, 1, 3, 10, 40, 100 | Sphere |
| **[76]** | Mice | $^{64}$Cu-labeled PS | 0.2–0.3 | Not reported |
| **[77]** | Mice | PS | 5 | Sphere |
| **[78]** | Mice | PS | 5 | Sphere |
| **[79]** | Mice | PS | 0.5, 4, 10 | Sphere |
| **[80]** | Human umbilical vein endothelial cell | PS | 0.5, 1, 5 | Not reported |
| **[81]** | Mice | PE | 10–150 | Not reported |
| **[82]** | Mice | PS | 0.5 | Sphere |
| **[83]** | Mice liver and hepatocyte | Fluorescent PS | 4.98 ± 0.32 | Sphere |
| **[84]** | Human intestinal epithelial cell line Caco-2 | PS | 0.1, 5 | Sphere |

| Reference | Subject | Polymer type | Size (μm) | Shape |
|---|---|---|---|---|
| **[85]** | Rat basophilic leukemia (RBL-2H3) cell | PS | 0.05, 0.5, 5 | Sphere |
| **[86]** | Mice | PS | 0.5, 50 | Sphere |
| **[87]** | Mice | PS | 5 | Sphere |
| **[88]** | Mice | PS | 0.5, 5 | Sphere |
| **[89]** | Human intestinal epithelial cell line Caco-2 | Laser ablated PET | 0.1 | Not reported |
| **[90]** | Madin–Darby canine kidney (MDCK) epithelial and L929 mouse fibroblast cell line | PS, PE | PE: 1–4, PS: 9.5–11.5 | Sphere |
| **[91]** | Mice | PE | 16.9 ± 1.9 | Particle |
| **[92]** | Human fibroblast hs27 cell line | PS | 0.1 | Particle |
| **[93]** | THP-1 human acute monocytic leukaemia cells, DMBM-2 murine macrophages and U937 human histiocytic lymphoma cells | PS-COOH | 0.02, 0.1, 0.2, 0.5, 1 | Bead |
| **[94]** | Mice | PS | 0.025, 0.05 | Not reported |
| **[95]** | Human glioblastoma multiforme T98G cell and human cervical carcinoma hela cell | PE, PS | PE: 3–16, 0.1–0.6; PS: 10, 0.04–0.25 | Sphere and particle |
| **[96]** | Caco-2-based models of the human gastrointestinal epithelium, mice | PS | 1, 4, 10 | Sphere |
| **[97]** | Human intestinal epithelial cell line Caco-2 | PE, PP, PET, and PVC | 1–4, 10–20 | Sphere and particle |
| **[98]** | Mice | PE | 1–10 | Sphere |
| **[99]** | Bone marrow cells of mice | PS | 5 | Sphere |
| **[100]** | Human intestinal cells ht-29 | PS | 3, 10 | Not reported |
| **[101]** | Hepatocarcinoma cell line | Chemically transformed PS by simulated gastric fluid | 0.5, 50 | Sphere |
| **[102]** | Human kidney proximal tubular epithelial cells HK-2 and male C57BL/6 mice | PS | 2 | Not reported |
| **[103]** | Human intestinal epithelial cell line Caco-2 | PS | 0.1, 5 | Sphere |
| **[104]** | Mice | PS | 5–5.9 | Not reported |

| Reference | Subject | Polymer type | Size (μm) | Shape |
|---|---|---|---|---|
| **[105]** | Human alveolar type II epithelial cell line | PS | 0.025, 0.07 | Particle |
| **[106]** | Mice, human intestinal epithelial cell line Caco-2 | PS | 0.1 | Sphere |
| **[107]** | Mice | PS | 5 | Sphere |

**Table S4** Score of each criterion and accumulated scores for individual studies. The number of each table corresponds to the number of references in Table S2.

| **[1]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, place of origin, and packaging material were reported. The sample characteristics (i.e., sea/lake/well salt) were not mentioned. | 1 |
| 2 | Sample size | 3–5 packages per brand. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Cotton lab coats and nitrile gloves were worn during all procedures. The glassware was washed, and the work surface was cleaned. | 2 |
| 5 | Clean air conditions | Procedures were carried out in a horizontal laminar flow cabinet. | 2 |
| 6 | Negative controls | One procedural blank containing only filtered deionized water was tested simultaneously during the extraction procedure and another procedural blank containing only the NaI solution was tested simultaneously during the density separation process. | 1 |
| 7 | Sample treatment | Samples were digested with KOH at 48℃, followed by flotation with NaI. | 2 |
| 8 | Positive controls | Positive controls in triplicate for HDPE, LDPE, PP, PS, PET, PVC, NY6, and NY66 were conducted. The recovery rates of all polymers were >95%. | 2 |
| 9 | Polymer identification | All particles were identified by a Raman spectrometer. A high-quality index >700 was accepted. The proportion of different polymer types and unidentified or non-plastic particles was reported. | 2 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 15 | | |

| **[2]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, sample characteristics and place of origin were included. The package material was not mentioned. | 1 |

| | | | |
|---|---|---|---|
| 2 | Sample size | >10 kg for each salt type | 2 |
| 3 | Sample storage | Not reported. | 0 |
| 4 | Laboratory preparation | Tap and distilled water and digestive reagents were filtered before use. Glassware and laboratory equipment were washed and rinsed with filtered water. 100% cotton lab coats were worn. The working surface was cleaned with ethanol before the experiments. | 2 |
| 5 | Clean air conditions | Sample processing was done inside a laminar flow cabinet. The samples were immediately covered with aluminum foil when not in use. | 2 |
| 6 | Negative controls | One blank extraction group with filtered distilled water and without salt was tested simultaneously for each batch (n = 10). The number of MPs in blanks was not reported. | 1 |
| 7 | Sample treatment | Samples were digested with Fe (II) solution and 30% $H_2O_2$ at 75°C. NaCl flotation. | 1 |
| 8 | Positive controls | Recovery experiments were carried out with LDPE sheets, PVC, and PET fragments. Recovery rates for LDPE sheets and PET were 100%, and for PVC was 30%. | 1 |
| 9 | Polymer identification | Half of the suspected particles were identified using ATR-FT-IR. The number of non-plastic/unidentified particles and different polymers was reported. The minimum accepted match rate was not mentioned. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 13 | | |

| **[3]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, origins, sample characteristics (i.e., sea/lake/rock/well salts), and package material was included. | 2 |
| 2 | Sample size | 750 g for each type, total m = 10.5 kg | 1 |
| 3 | Sample storage | Samples were stored under hygienic conditions. | 2 |
| 4 | Laboratory preparation | All glassware was cleaned with ultrapure water. Cotton coats were worn. The cleaning of the work surface and the usage of gloves were not mentioned. | 1 |
| 5 | Clean air conditions | The lab windows were closed throughout the experiment. Samples were covered with a lid. | 1 |
| 6 | Negative controls | Blank experiments were performed following the same procedure without samples. The value was subtracted from the value of the samples. The number of MPs on blanks was not reported. | 1 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65°C. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was | 0 |

| | | | |
|---|---|---|---|
| | | given. | |
| 9 | Polymer identification | 75 suspected MP particles were analyzed by ATR-FT-IR. The accepted matching rate was 80% or higher. The proportion of different polymers and non-plastics/unidentified particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 12 | | |

| **[4]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, place of origin, and sample characteristics (sea/lake/rock/well) were reported. No information on packing materials. | 1 |
| 2 | Sample size | 500 g per brand. Total m = 19.5 kg | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Nitrile gloves and cotton lab coats were worn during experiments. All liquids were filtered before use. All experimental apparatus was rinsed, and work surfaces were cleaned. | 2 |
| 5 | Clean air conditions | Laboratory air was ventilated, and air particles were kept below 1000/$m^3$. | 1 |
| 6 | Negative controls | Two procedural blanks and one air blank were processed together with ten samples for every analysis batch. The number of MPs on blanks was negligible. | 2 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 60℃. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Each MP-like particle was examined by FT-IR. Matching rates higher than 70% were accepted. The proportion of different polymer types and unidentified or non-plastic particles was reported. | 2 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 13 | | |

| **[5]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics, package material, and place of origin was included. | 2 |
| 2 | Sample size | About 1 kg for each brand, total m = 15 kg. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All containers and beakers were rinsed three times with filtered | 1 |

| | | | |
|---|---|---|---|
| | | water. | |
| 5 | Clean air conditions | Samples were immediately covered when they are not in use. Negative controls were included. | 1 |
| 6 | Negative controls | Procedure blanks were conducted while the number of blanks was not clear. The number of particles on blanks was reported but whether the value was used to correct for the sample was not mentioned. | 1 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65℃. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | A total of 152 particles were randomly selected for verification using μ-FT-IR. Matches with a quality index ⩾0.7 were accepted. The proportion of different polymers and non-plastic/unidentified particles was reported. | 2 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 11 | | |

| **[6]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, country of origin, and sample characteristics (i.e., production date, expiry date, batch no, coloration, and weight per package) were reported. The type of salts (sea/lake/rock/well) was not mentioned. | 1 |
| 2 | Sample size | Three sachets for each brand, total n = 69. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | A cotton laboratory coat was worn during all steps of analysis. All equipment was rinsed with filtered Millipore water before being used. All laboratory working benches and working spaces were cleaned with 70% ethanol throughout the experiment. | 2 |
| 5 | Clean air conditions | All the experiments were carried out inside a laminar flow chamber. Samples were covered with aluminum foil as possible. | 2 |
| 6 | Negative controls | Two controls (procedural blank and air blank) were set up. The number of MPs in blanks was reported. Not clear if samples were corrected for blanks. | 1 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65℃. | 1 |
| 8 | Positive controls | No positive controls were conducted or no information was given. | 0 |
| 9 | Polymer identification | Particles identified by FT-IR. The accepted spectra matching rate was not mentioned. About 10.9% of the 82 isolated MPs were analyzed. The proportion of different polymer types and unidentified particles was not reported. | 1 |
| 10 | Abundance, size, and shape | The abundance of microfibers and MPs in different brands was reported. Insufficient information on the size distribution and | 1 |

| | | | |
|---|---|---|---|
| | | shape. | |
| Total | 10 | | |

| **[7]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, sample characteristics (i.e., sea/lake/rock salt), and place of origin were reported. The package materials were not mentioned. | 1 |
| 2 | Sample size | Three packs per brand and at least five different brands per salt type. Total n = 48 packs. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All equipment and work surfaces were cleaned with pure ethanol 70%. No information on the use of gloves and cotton lab coats. | 1 |
| 5 | Clean air conditions | All operations were performed under a closed fume hood. When operations were not ongoing, the bottles were kept capped and all other equipment was kept in lidded glass containers. | 2 |
| 6 | Negative controls | For each salt type, an empty petri dish was kept uncovered near the working area. | 1 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65℃. NaI was used for floatation. | 1 |
| 8 | Positive controls | No positive controls were conducted or no information was given. | 0 |
| 9 | Polymer identification | Particles identified by μ-Raman. The accepted Raman spectra matching rate was not mentioned. No information on the number of analyzed particles. The proportion of different polymer types was reported while the unidentified particles were not mentioned. | 1 |
| 10 | Abundance, size, and shape | Comprehensive information on the abundance, size, and shape distribution of MPs. | 2 |
| Total | 10 | | |

| **[8]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics and place of origin was included. The package material was not reported. | 1 |
| 2 | Sample size | 400 g for each sample. A total of 3.2 kg. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All the glassware was precleaned with double-distilled water. Cotton lab coats and laboratory rubber gloves were used during the investigation. | 2 |
| 5 | Clean air conditions | MPs count and identification were made under a laminar flow | 1 |

| | | | |
|---|---|---|---|
| | | bench. | |
| 6 | Negative controls | The number of procedure blanks was not reported. The blank measurement showed the absence of MPs contamination. | 1 |
| 7 | Sample treatment | Samples were digested with 30% $H_2O_2$. The temperature and time were not reported. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | MPs were analyzed using micro-FTIR. The number of analyzed particles and the proportion of different polymers were not reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 9 | | |

| **[9]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, origins, sample characteristics (i.e., sea salts), and package material was included. | 2 |
| 2 | Sample size | 120 g for each type, total m = 1320 g. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | The equipment was pre-rinsed. Plastic materials were avoided and substituted with glassware or metals. Synthetic textiles were not allowed during sample handling and cotton clothes and 100% cotton coats were worn. Laboratory surfaces were cleaned. | 2 |
| 5 | Clean air conditions | Samples were kept covered as much as possible, treatments were performed in a vertical air laminar flow fume hood. | 2 |
| 6 | Negative controls | Blanks were performed and kept for a long interval like that of the salt samples. No MPs were recorded in blanks. | 1 |
| 7 | Sample treatment | No digestion. | 0 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | All particles were analyzed by FT-IR. The accepted matching rate was 65%. The proportion of different polymers and non-synthetic particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was not detailed. | 1 |
| Total | 9 | | |

| **[10]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, place of origin and sample characteristics (salt type), and package materials were reported. | 2 |

| | | | |
|---|---|---|---|
| 2 | Sample size | 400 g of each product. 4.4 kg in total. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Laboratory suits which do not shed fibers were worn. All equipment was cleaned. | 1 |
| 5 | Clean air conditions | Samples were covered as possible. Air control was included. | 1 |
| 6 | Negative controls | Blank controls were only placed directly next to the laboratory equipment. | 1 |
| 7 | Sample treatment | No digestion. | 0 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | A total of 667 potential MP particles with FT-IR spectroscopy. The proportion of different polymer types and unidentified or non-plastic particles were sorted. The accepted matching rate was not mentioned. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 8 | | |

| **[11]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, origins, sample characteristics (i.e., sea salts), and package material were reported. | 2 |
| 2 | Sample size | 360 g for each replicate; a total of 11brands. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Not mentioned. | 0 |
| 5 | Clean air conditions | Not mentioned. | 0 |
| 6 | Negative controls | Blanks were performed. Filters (n = 3) were left overnight exposed to the laboratory air. | 1 |
| 7 | Sample treatment | No digestion (total suspended solids was determined). | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Particles were analyzed by μ-FT-IR. The accepted matching rate was not mentioned. The number of analyzed particles and the proportion of different polymers were not reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 8 | | |

| **[12]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics, and place of origin was included. Package materials were not reported. | 1 |

| | | | |
|---|---|---|---|
| 2 | Sample size | 200 g per sample, total m = 7.2 kg. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Throughout the experiment, no plasticware was used, and special care was taken to prevent contamination during the whole analysis. | 1 |
| 5 | Clean air conditions | Experiments were conducted in laminar flow. | 2 |
| 6 | Negative controls | No negative controls were conducted, or no information was given. | 0 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65°C. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | A total of 1800 particles were identified by the micro-Raman spectroscope. The accepted matching rate was not reported. The proportion of different polymers and non-plastic/unidentified particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 8 | | |

| **[13]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics (i.e., sea salt), and package materials was included. The place of origin was not mentioned. | 1 |
| 2 | Sample size | 600 g for each brand, total m = 4.8 kg. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | No plasticware was used during any of the extraction steps, while cotton lab coats and nitrile gloves were worn. The cleaning and rinsing of work surfaces and equipment were not mentioned. | 1 |
| 5 | Clean air conditions | Not mentioned. | 0 |
| 6 | Negative controls | A procedural blank was conducted by taking only 80 mL of filtered $H_2O_2$ in a glass bottle and following all the extraction steps. Sample values were corrected for procedural contamination. The procedural contamination was not reported. | 1 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65°C. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Some particles were selected for further characterization using μ-FT-IR. Only information on the proportion of different polymers was included. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |

| | |
|---|---|
| Total | 7 |

| **[14]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, place of origin and sample characteristics, and package materials were reported. | 2 |
| 2 | Sample size | Beer: 1 L/brand, Total v = 12 L;<br>Sea salt: 150 g/brand, Total m = 1.8 kg. | Sea salt: 0<br>Beer: 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | A cotton lab coat and sterling nitrile powder-free exam gloves were worn throughout the experimental procedure. The work surface was wiped. The washing and rinsing of experimental equipment were not mentioned. | 1 |
| 5 | Clean air conditions | Experiments were conducted in a laminar airflow cabinet. All glassware was covered as possible. | 2 |
| 6 | Negative controls | One blank was processed for each brand (n = 12 for each; n = 24 total). The number of MPs in blanks was reported and subtracted from samples. | 2 |
| 7 | Sample treatment | No digestion. | 0 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | No polymer identification was conducted. | 0 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | Sea salt: 9<br>Beer: 10 | | |

| **[15]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, sample characteristics (i.e., sea/lake/well salt), and place of origin were reported. The package material was not mentioned. | 1 |
| 2 | Sample size | 200 g of each type, repeated in triplicate. Total m = 10.8 kg. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Not mentioned. | 0 |
| 5 | Clean air conditions | Not mentioned. | 0 |
| 6 | Negative controls | During the sample handling process, a blank measurement was performed. Whether the blank was triplicated was not clear. The number of MPs per filter was reported. Not clear if samples were corrected for blanks. | 1 |
| 7 | Sample treatment | No digestion. Salt samples were dissolved, followed by centrifuge. | 0 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |

| | | | |
|---|---|---|---|
| 9 | Polymer identification | Fibers found on the filters were randomly selected for analysis using FT-IR. The number of analyzed particles was not clear. The proportion of different polymer types and unidentified particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 6 | | |

| **[16]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics, and place of origin was included. The package material was not included. | 1 |
| 2 | Sample size | 750 g for each brand, total m = 7.5 kg. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All the vessels and beakers used in the study were rinsed and cleaned before use. | 1 |
| 5 | Clean air conditions | Not mentioned. | 0 |
| 6 | Negative controls | No negative controls were conducted, or no information was given. | 0 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65℃. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Selected fragments of MPs were analyzed by FT-IR. A matching rate higher than 70% was accepted. The proportion of different polymers and non-plastic/unidentified particles was not reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 6 | | |

| **[17]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, origins, and sample characteristics (i.e. salt types) were reported. The package material was not mentioned. | 1 |
| 2 | Sample size | For each type, 30 g was analyzed. Total m = 360 g. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All equipment and containers were rinsed. Cotton clothes were worn during all analyses. The usage of gloves and the cleaning of work surfaces were not mentioned. | 1 |
| 5 | Clean air conditions | Samples remained closed until use. | 0 |
| 6 | Negative controls | Not mentioned. | 0 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65℃. | 1 |

| | | | |
|---|---|---|---|
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Particles were analyzed by FT-IR. Matches with a quality index ⩾0.7 were accepted. The number of analyzed particles was not reported, only the proportion of different polymers was provided. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape of MPs was included. Information on the size distribution of MPs was not included. | 1 |
| Total | 5 | | |

| **[18]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, origins, and sample characteristics (i.e., sea/lake/rock/well salts) was included. Package materials were not mentioned. | 1 |
| 2 | Sample size | 250 g for each sample, total m = 6.25 kg. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Not mentioned. | 0 |
| 5 | Clean air conditions | Not mentioned. | 0 |
| 6 | Negative controls | Not mentioned. | 0 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65℃. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Particles were analyzed by μ-FT-IR. The accepted matching rate and the number of analyzed particles were not reported. The proportion of different polymer types and unidentified particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 5 | | |

| **[19]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Production lots, types of water, and containers were mentioned. | 2 |
| 2 | Sample size | 5–8 L per sample; 6–10 bottles of water. | 2 |
| 3 | Sample storage | Storage time and method were not mentioned. | 0 |
| 4 | Laboratory preparation | The workspace was wiped down every week. All glassware was covered with a watch glass when not in use and washed thoroughly between trials. Filters were inspected under a microscope prior to use, and a cotton lab coat and sterling nitrile powder-free exam gloves were worn. | 2 |
| 5 | Clean air conditions | Work occurred in a laminar airflow cabinet. | 2 |

| | | | |
|---|---|---|---|
| 6 | Negative controls | Thirteen lab blanks using laboratory deionized water or acetone were processed. The number of MPs in blanks was reported. | 2 |
| 7 | Sample treatment | No digestion. | 2 |
| 8 | Positive controls | To verify the accuracy of MPs counting, four solutions were created using DI water containing 0, 20, 50, or 100 polyethylene microspheres. | 2 |
| 9 | Polymer identification | Nearly 1,000 (~50%) being further analyzed by FT-IR. A match of 70% or greater was required. The percentage of different polymers was reported. | 2 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 18 | | |

| **[20]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Production batch and package material were mentioned, and 4 samples were randomly collected from each batch. However, only one batch was considered for this study. | 1 |
| 2 | Sample size | 65 single-use plastic and 30 glass bottles including still water and sparkling water were analyzed. The volume of water used for MPs analysis ranged between 2.4–6.0 L (1–12 bottles). | 2 |
| 3 | Sample storage | Samples were stored in a refrigerator at 4 °C and analyzed within 12–24 h of storage. | 2 |
| 4 | Laboratory preparation | Cotton laboratory coats were worn. Ligand free-wipes and powder free-examination gloves were used. Glassware and tools were rinsed thrice with Ethanol (50%) and de-ionized water. The outer surface of all sample bottles was also washed similarly to avoid any plastic contamination. | 2 |
| 5 | Clean air conditions | Samples were processed inside a fume hood with laminar air-flow. | 2 |
| 6 | Negative controls | Three replicates of lab banks. The number of MPs in blanks was reported. | 2 |
| 7 | Sample treatment | No digestion. | 2 |
| 8 | Positive controls | No positive controls. | 0 |
| 9 | Polymer identification | Particles ⩾50 μm were enumerated according to morphology (fibers and fragments). Plastic particles in the 53–⩾500 μm range were tested by ATR-FT-IR spectroscope. A match factor ⩾0.60 was accepted. Totally, 100 spots were analyzed. The proportion of different particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 16 | | |

| **[21]** |
|---|

| Criteria | | Explanation | Score |
|---|---|---|---|
| 1 | Sampling strategy | Bottle materials, type of water, water brand, and batch number were considered for sampling. | 1 |
| 2 | Sample size | Water volume 0.7–1.5 L which was inadequate for large particle analysis (size >100 μm). | 1 |
| 3 | Sample storage | The outside of water bottles or beverage cartons was rinsed with Milli-Q water and placed on a cleaned bench. The storage time for chemical analysis was not mentioned. | 1 |
| 4 | Laboratory preparation | A laboratory coat made of 100% cotton, particle-free nitrile gloves, and arm sleeves were worn. Before every work step, gloved hands were washed with detergent and thoroughly rinsed with Milli-Q water. | 2 |
| 5 | Clean air conditions | All steps of the filtration process were conducted using a laminar flow workbench. | 2 |
| 6 | Negative controls | Blank reported. | 2 |
| 7 | Sample treatment | No digestion. | 2 |
| 8 | Positive controls | No positive controls. | 0 |
| 9 | Polymer identification | Whenever possible, either all particles present or at least around 1000 particles of the smallest size range (5–10 μm) were analyzed. Library matches with a ranking greater than 700 were accepted. The proportion of different polymers was reported. | 2 |
| 10 | Abundance, size, and shape | Information on the abundance and size range of MPs was included. | 1 |
| Total | 14 | | |

| **[22]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Bottle materials, age of containers, and water type were reported but brand and production lots were not identified. | 1 |
| 2 | Sample size | 0.5 to 1.5 L of water volume was inadequate for large particle analysis. | 1 |
| 3 | Sample storage | Clean the outside of the bottles and allow them to dry in a laminar flow box before opening the cap. | 1 |
| 4 | Laboratory preparation | All persons wore lab coats made of cotton. For analytical procedures, only ultrapure water was used. All added solutions were filtered through a syringe membrane filter. Hardware made of plastics was avoided to be used. Glassware was treated for 15 min with sodium dodecyl sulphate solution in an ultrasonic bath. Afterwards, the glassware was rinsed once with Ethanol and three times with ultrapure water. | 2 |
| 5 | Clean air conditions | All steps of sample preparation were performed in a laminar flow box. | 2 |
| 6 | Negative controls | Seven blanks were evaluated. The number of MPs in blanks was reported. | 2 |

| | | | |
|---|---|---|---|
| 7 | Sample treatment | EDTA solution was added to each sample, and the sample was left to stay for 15 min. | 2 |
| 8 | Positive controls | No positive controls. | 0 |
| 9 | Polymer identification | An analyzed sample area of 4.4% by Raman spectroscopy. The proportion of different polymers was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance and size range of MPs was included. | 1 |
| Total | 13 | | |

| **[23]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Clearly indicated brand, packaging materials, type of water, and source. | 2 |
| 2 | Sample size | Three different bundles for each brand of bottled water (0.4–0.6 L/bottle) were analyzed. | 2 |
| 3 | Sample storage | Not reported. | 0 |
| 4 | Laboratory preparation | Clean lab cotton coats and nitrile gloves were worn. The washing and rinsing of materials were not mentioned. | 1 |
| 5 | Clean air conditions | All samples are processed on a laminar flow meter. | 2 |
| 6 | Negative controls | Three blank reagents were analyzed as controls. The number of MPs in blanks was not reported. | 1 |
| 7 | Sample treatment | No digestion. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | The chemical composition of the particles was identified by μ-FT-IR. At least 70 % of matching quality indicators were considered acceptable. The number of non-plastic/unidentified particles and different polymers was reported. | 2 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 14 | | |

| **[24]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on sample characteristics and package material was included. The purchase location was not mentioned. | 0 |
| 2 | Sample size | Three bottles for each brand were analyzed. | 1 |
| 3 | Sample storage | Not reported. | 0 |
| 4 | Laboratory preparation | All personnel wore purple cotton lab coats and green PP hairnets. Powder-free nitrile gloves were used only when required for safety reasons. The equipment was cleaned manually and in an ultrasonic bath. Filters were checked for contamination under a stereomicroscope before usage. | 2 |

| | | | |
|---|---|---|---|
| | | Reagents were filtered before usage. The use of plastic materials was avoided. | |
| 5 | Clean air conditions | Work was done under the laminar flow cabinet, whenever possible. Samples and glassware were covered with watch glasses when not in use. | 2 |
| 6 | Negative controls | Procedural blanks (n = 14) were prepared for each set of samples. The number of MPs in blanks was reported. | 2 |
| 7 | Sample treatment | No digestion. | 2 |
| 8 | Positive controls | Recovery rates in triplicates for all sample handling steps were determined. The recovery rate of each step was between 58%–86%. | 1 |
| 9 | Polymer identification | The chemical composition of the particles was identified by FT-IR. The number of different polymers was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 13 | | |

| **[25]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on sample characteristics and purchase location and package material was reported. | 2 |
| 2 | Sample size | Three different bottles for each brand were analyzed. | 1 |
| 3 | Sample storage | Not reported. | 0 |
| 4 | Laboratory preparation | Nitrile gloves were used. During all phases of sample treatment, no plastic material was used. All laboratory equipment used was preventively washed with water-grade, and subsequently with organic solvents. | 2 |
| 5 | Clean air conditions | Laminar flow hoods were used. | 2 |
| 6 | Negative controls | Three reagents blank were analyzed as controls. The number of MPs in blanks was reported. | 2 |
| 7 | Sample treatment | No digestion. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | SEM-EDX was used for polymer identification. The number of different polymers was not reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance and size range of MPs was included. | 1 |
| Total | 13 | | |

| **[26]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Only one batch number was collected. | 1 |
| 2 | Sample size | 3 bottles (0.5 L/bottle) were analyzed. | 1 |

| | | | |
|---|---|---|---|
| 3 | Sample storage | Storage conditions were not mentioned. | 0 |
| 4 | Laboratory preparation | Lab personnel wore cotton coats and nitrile gloves. Plastic materials were not used during any of the stages of the experiment. | 2 |
| 5 | Clean air conditions | A fume hood was used. | 2 |
| 6 | Negative controls | Insufficient form of control, filters placed in petri dish & closed. | 1 |
| 7 | Sample treatment | No digestion. | 2 |
| 8 | Positive controls | No positive controls. | 0 |
| 9 | Polymer identification | ATR-FT-IR and Raman microscopy were used for polymer identification. The number of different polymers was not reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 12 | | |

| **[27]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on sample characteristics and purchase location was reported. The package material was not mentioned. | 1 |
| 2 | Sample size | A total of 100 samples were obtained and analyzed (750 mL/sample). | 2 |
| 3 | Sample storage | Not reported. | 0 |
| 4 | Laboratory preparation | A laboratory coat of 100% cotton and particle-free gloves were worn. All glass vessels were checked for cracks, cleaned with detergent, and rinsed with deionized water. Before the filtration of water samples, the plastic bottles were also cleaned. | 2 |
| 5 | Clean air conditions | Not reported. | 0 |
| 6 | Negative controls | Deionized water was filtered and used as a blank sample to account for background or laboratory contamination. The number of MPs in blanks was not reported. | 1 |
| 7 | Sample treatment | No digestion. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | MPs were visually identified using an optic microscope. All particles were counted, sorted, photographed, and then analyzed with SEM-EDX. The number of different polymer types was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 11 | | |

| (Bottled water) **[28]** | | |
|---|---|---|
| Criteria | Explanation | Score |

| | | | |
|---|---|---|---|
| 1 | Sampling strategy | No basic information on the water sample. | 0 |
| 2 | Sample size | 3 L water were analyzed. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All glassware was cleaned and covered before use. | 1 |
| 5 | Clean air conditions | The whole filtration was performed in a laminar flow box. | 2 |
| 6 | Negative controls | An additional moistened filter was placed during the filtration step in the laminar flow box. The number of fibers in blanks was reported. | 1 |
| 7 | Sample treatment | No digestion. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | All fibers were analyzed by Raman micro spectroscopy. The accepted matching rate was not reported. The proportion of different polymers and non-plastic fibers was not reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance of MPs was not included. | 0 |
| Total | 8 | | |

| (Beer) **[28]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics, and place of origin was included. The package material was not included. | 1 |
| 2 | Sample size | Total volume = 3.99 L. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All glassware was cleaned and covered before use. | 1 |
| 5 | Clean air conditions | The whole filtration was performed in a laminar flow box. | 2 |
| 6 | Negative controls | An additional moistened filter was placed during the filtration step in the laminar flow box. The number of fibers in blanks was reported. | 1 |
| 7 | Sample treatment | No digestion. | 0 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | All fibers were analyzed by Raman micro spectroscopy. The accepted matching rate was not reported. The proportion of different polymers and non-plastic fibers was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 8 | | |

| **[29]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on sample characteristics and package material was included. The purchase location was not mentioned. | 0 |

| | | | |
|---|---|---|---|
| 2 | Sample size | 16 L for each brand. | 2 |
| 3 | Sample storage | Not reported. | 0 |
| 4 | Laboratory preparation | Not reported. | 0 |
| 5 | Clean air conditions | During the isolation procedure, all open vessels were covered with aluminum foil. | 1 |
| 6 | Negative controls | Not reported. | 0 |
| 7 | Sample treatment | No digestion. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Decomposed segments from PET were identified by FT-IR and TD-GC-MS. | 1 |
| 10 | Abundance, size, and shape | Information on the shape and size of nanoplastics was included. The abundance of NPs was not reported. | 0 |
| Total | 6 | | |

| **[30]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics, and package materials was included. Production plant regions were reported. | 2 |
| 2 | Sample size | 3 L for each sample, total v = 1881 L. | 2 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All glass equipment was rinsed with filtered deionized water before use. Nitrile gloves and a laboratory coat made of 100% cotton were worn throughout the experiments. The working space was cleaned. | 2 |
| 5 | Clean air conditions | MPs extraction was carried out in turned-off laminar air flow fume hood and closed filtering units. | 2 |
| 6 | Negative controls | Blanks (n = 4) with filtered Milli-Q water were run, and no MPs on the filter of the blank samples were found. | 2 |
| 7 | Sample treatment | No digestion. | 0 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Particles were identified using micro-Raman spectroscopy. 80% of total MPs were analyzed. Confidence levels of 70% or greater were accepted. The proportion of different polymers and non-plastic particles was reported. | 2 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 14 | | |

| **[31]** | | |
|---|---|---|
| Criteria | Explanation | Score |

| | | | |
|---|---|---|---|
| 1 | Sampling strategy | Purchase location, sample characteristics, and package material were mentioned. The place of origin was not mentioned. | 2 |
| 2 | Sample size | 2950 mL in total. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Not mentioned. | 0 |
| 5 | Clean air conditions | The laboratory air was previously cleaned with an air purifier. All processes were performed within a horizontal laminar flow. | 2 |
| 6 | Negative controls | Blanks were performed by following the same procedure with actual samples while the number of blank controls was not clear. The number of fibers in blanks was reported. | 1 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ (the temperature was not mentioned), vacuum filtrated, and sonicated at 55℃. | 1 |
| 8 | Positive controls | No positive controls were conducted or no information was given. | 0 |
| 9 | Polymer identification | The chemical composition of the particles was defined using FT-IR. A random sample of 10 particles was taken from each filter. The ratio of plastic vs non-plastic particles was reported, while the proportion of different polymer types in each research unit was not clearly reported. | 1 |
| 10 | Abundance, size, and shape | Reporting includes the abundance, size, and shape range of the MPs. Insufficient information on the size distribution of the MPs. | 1 |
| Total | 8 | | |

| **[32]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, origins and sample characteristics were reported. The package material was not mentioned. | 1 |
| 2 | Sample size | Volumes filtered were 0.33 and 0.5 L per type. The total volume was not clear. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Not mentioned. | 0 |
| 5 | Clean air conditions | The filtration unit and all other glassware used were covered. | 1 |
| 6 | Negative controls | Procedure blanks were carried out. The number of blanks was not clear. Fibers on blanks were negligible. | 1 |
| 7 | Sample treatment | No digestion. | 0 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | No polymer identification. | 0 |
| 10 | Abundance, size, and shape | Information on the abundance and shape of MPs was included. | 1 |
| Total | 4 | | |

| **[33]** |
|---|

| Criteria | | Explanation | Score |
|---|---|---|---|
| 1 | Sampling strategy | Purchase location, origins and sample characteristics were reported. The package material was not mentioned. | 1 |
| 2 | Sample size | Five types of honey samples were analyzed. 125 g or 250 g for each type. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All material was cleaned and rinsed. All inner surfaces of the laminar flow box were cleaned. Cleanroom-grade gloves and sleeves were used. | 2 |
| 5 | Clean air conditions | Honey handling, dilution, and filtration were performed in a laminar flow box. | 2 |
| 6 | Negative controls | One procedure blank was carried out. Fibers and particles on blanks were reported. | 1 |
| 7 | Sample treatment | Samples were filtered at 70℃, followed by $H_2O_2$ treatment. | 1 |
| 8 | Positive controls | Positive controls for polymethacrylate particles were conducted. The recovery rate was not reported. | 1 |
| 9 | Polymer identification | Particles were analyzed by Raman spectroscopy and ATR-FT-IR. The accepted matching rate was not reported. The number of analyzed particles and chemical composition were reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance and shape of particles was included. Information on the size distribution of particles was not included. | 1 |
| Total | 10 | | |

| **[34]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, origins and sample characteristics were reported. The package material was not mentioned. | 1 |
| 2 | Sample size | A total of 47 honey samples were analyzed, but the volume was not mentioned. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Not mentioned. | 0 |
| 5 | Clean air conditions | The filtration unit and all other glassware used were covered. | 1 |
| 6 | Negative controls | Procedure blanks were carried out. The number of blanks was not clear. Fibers on blanks were negligible. | 1 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at room temperature. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | No polymer identification. | 0 |
| 10 | Abundance, size, and shape | Information on the abundance and shape of MPs was included. | 1 |
| Total | 6 | | |

| **[35]** |
|---|

| Criteria | | Explanation | Score |
|---|---|---|---|
| 1 | Sampling strategy | Purchase location, origins and sample characteristics were reported. The package material was not mentioned. | 1 |
| 2 | Sample size | Honey: one pack for each type; Sugar: 250 g for each type. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Not mentioned. | 0 |
| 5 | Clean air conditions | Care was taken not to leave samples exposed to the atmosphere longer than necessary. | 1 |
| 6 | Negative controls | No negative controls. | 0 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at room temperature. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | No polymer identification. | 0 |
| 10 | Abundance, size, and shape | Information on the abundance and shape of MPs was included. | 1 |
| Total | 5 | | |

| **[36]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, sample characteristics (i.e., whole/skim/powdered milk), and the place of origin were reported. | 2 |
| 2 | Sample size | From each sample, 25 mL was analyzed. | 0 |
| 3 | Sample storage | Samples were stored in the laboratory at 6°C. | 2 |
| 4 | Laboratory preparation | Cotton lab coats and powder-free disposable gloves were used. All reagents used for milk preparation were filtered. | 2 |
| 5 | Clean air conditions | Class 2 biosafety cabinets with certified ‘low pressure-drop’ filters, filtration unit, dedicated glassware, and spectroscopy equipment were installed in clean laboratory rooms (ISO class 5). | 2 |
| 6 | Negative controls | Method blanks were systematically analyzed for each series of analyses. The MPs contamination value was reported and subtracted. | 2 |
| 7 | Sample treatment | Samples were digested with multi-enzymatic detergent for 2 min at 40°C and EDTA for 3 min at 40°C. Then, samples were digested with alkaline solution tetramethyl ammonium hydroxide in a microwave for a maximum of 1 min, with the final temperature below 80°C. | 1 |
| 8 | Positive controls | Samples spiked with 5 types of MPs were prepared to determine the recovery rate. The recovery rate ranged from 78 to 141%. | 1 |
| 9 | Polymer identification | Particles were identified using μ-Raman. The number of analyzed particles was not reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |

| | |
|---|---|
| Total | 15 |

| **[37]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, place of origin, and sample characteristics (whole milk, lactose-free, half fat, light, and lactose-free light) and package materials were reported. | 2 |
| 2 | Sample size | Three liters per type. Total volume = 230 L. | 1 |
| 3 | Sample storage | Milk samples were stored in a laminar flow box until they were processed for MPs extraction. | 2 |
| 4 | Laboratory preparation | Nitrile gloves and a laboratory coat made of 100% cotton were worn. The working space was cleaned. The containers, beakers, and filtering units were rinsed. | 2 |
| 5 | Clean air conditions | All doors and windows remained closed during MPs extraction. The MPs extraction for all samples was performed in a turned-off fume hood and foot traffic was limited. | 2 |
| 6 | Negative controls | One blank was conducted. | 1 |
| 7 | Sample treatment | No digestion. | 0 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Particles were examined by micro-Raman. The number of analyzed particles, the proportion of different polymer types, and unidentified or non-plastic particles were not reported. Only the common types of detected MPs were reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 13 | | |

| **[38]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, place of origin, and the sample characteristics were reported. | 2 |
| 2 | Sample size | Four cans per brand. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Cotton lab coats and nitrile gloves were worn during the experiment. All the glassware and forceps were washed. The horizontal laminar flow cabinet was cleaned. | 2 |
| 5 | Clean air conditions | Procedures were carried out in a horizontal laminar flow cabinet. | 2 |
| 6 | Negative controls | Procedural blanks were run in parallel with the samples. The number of blanks was not mentioned. No plastic particles on the blanks. | 1 |
| 7 | Sample treatment | Samples were digested with KOH at 40℃, followed by flotation | 2 |

| | | | |
|---|---|---|---|
| | | with NaI. | |
| 8 | Positive controls | No information on positive control for canned fish. Positive controls for steamed were conducted. | 1 |
| 9 | Polymer identification | All particles were identified by micro-Raman spectroscopy. The accepted matching rate was not reported. The proportion of different polymer types and unidentified or non-plastic particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 14 | | |

| **[39]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location and sample characteristics (i.e., the oil types, fish species, and salt concentration) were reported. No information on the origin of the fish and package materials. | 1 |
| 2 | Sample size | N = 50 in total, 20 g fish flesh from each can was analyzed. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Nitrile gloves and a cotton laboratory coat were worn throughout the analytical procedures. All work surfaces were cleaned. All cans were washed and rinsed. The washing and rinsing of equipment were not mentioned. | 1 |
| 5 | Clean air conditions | Part of the sampling was conducted in opened clean cabinet. The laboratory didn't have any windows and the door was closed during all the steps. The samples were immediately covered. Negative controls were included. | 1 |
| 6 | Negative controls | Five blanks were included in each batch, number of fibers was negligible. | 2 |
| 7 | Sample treatment | Samples were digested with KOH. Sample treatments were carried out below 40°C. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Visual methods (microscope) and micro-Raman analysis were applied. All the sorted particles (n = 165) were examined. Out of 131 possible MPs, 70 particles were chosen randomly for analysis. MPs were identified with a certainty level >85%. The presence of polymer types and the ratio of MPs vs non-plastic particles were reported. | 2 |
| 10 | Abundance, size, and shape | Comprehensive information on abundance, size, and shape distribution of MPs. | 2 |
| Total | 12 | | |

| **[40]** | | |
|---|---|---|
| Criteria | Explanation | Score |

| | | | |
|---|---|---|---|
| 1 | Sampling strategy | Information on purchase location, sample characteristics, package material, and place of origin was included. | 2 |
| 2 | Sample size | A total of 4 g for each bag of rice. | 0 |
| 3 | Sample storage | Once in the laboratory, all samples were stored at room temperature, and sealed in their original packaging. | 2 |
| 4 | Laboratory preparation | All containers, steel mesh sieves, steel tweezers, and equipment used were rinsed thoroughly three times with ultrapure water (Milli-Q water), liquid chromatography grade acetone followed by liquid chromatography grade dichloromethane prior to use. All materials and samples were covered with aluminum foil until use. 100% cotton laboratory coats were worn during all steps of analysis. Pressurized liquid extraction cells were sonicated with acetone and dichloromethane prior to use. | 2 |
| 5 | Clean air conditions | The work was performed in a laminar flow cabinet when possible. | 2 |
| 6 | Negative controls | Blank pyrolysis cups were analyzed. Procedural blanks (n = 10) were treated in the same way as the rice samples. Instrumental blanks (n = 10) were included and analyzed in each batch of samples. In all blanks, plastic was either not detected or lower than the method quantification limits. | 2 |
| 7 | Sample treatment | Samples were extracted with dichloromethane at 180°C and 1500 psi. | 2 |
| 8 | Positive controls | A 7-point external calibration was performed for quantifying 7 plastics. The regression coefficients of the calibration curve were greater than 0.95. | 2 |
| 9 | Polymer identification | Three types of polymers were identified using Py-GC/MS. | 2 |
| 10 | Abundance, size, and shape | Information on the concentration of plastics was included. | 1 |
| Total | 17 | | |

| **[41]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location and place of origin were reported. The package material was not mentioned. | 1 |
| 2 | Sample size | 9 g dry weight for each brand. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All laboratory glassware and tools were cleaned and rinsed. Non-latex nitrile gloves and cotton laboratory coats were worn during the whole experimental process. The cleaning of work surface was not mentioned. | 1 |
| 5 | Clean air conditions | Samples were immediately covered if they were not in use. Negative controls were included. | 1 |
| 6 | Negative controls | Blank controls without samples were simultaneously performed to assess air contamination. The number of MPs on blanks was negligible. | 2 |

| | | | |
|---|---|---|---|
| 7 | Sample treatment | Enzymatic hydrolysis at 55℃, followed by $H_2O_2$ treatment at 65℃ and flotation with NaCl. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Particles were analyzed by micro-FTIR spectroscopy. The spectrum matching with a similarity index no less than 0.7 was accepted. Of all 693 visually identified particles, 328 particles (47.3%) were instrumental verified. The proportion of different polymer types and non-plastic particles was reported. | 2 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 10 | | |

| **[42]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location and sample characteristics were reported. The package material was not mentioned. | 1 |
| 2 | Sample size | Total volume = 12 L. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Cotton lab coats were worn. Wiping of the lab surfaces and rinsing of the equipment were reported. The use of plastic hardware was avoided. | 2 |
| 5 | Clean air conditions | Sample preparation was conducted in a clean room under the fume hood; samples were covered as possible. | 2 |
| 6 | Negative controls | No negative controls were conducted, or no information was given. | 0 |
| 7 | Sample treatment | Samples were filtered without digestion. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Particles that were selected from the filter paper using tweezers were analyzed by ATR-FT-IR. The number of analyzed particles and the proportion of different polymer types were not reported. | 0 |
| 10 | Abundance, size, and shape | Information on the abundance, size, shape distribution, and color of particles was included. | 2 |
| Total | 9 | | |

| **[43]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics and package materials was included. The place of origin was not mentioned. | 1 |
| 2 | Sample size | About 3 kg of packaged meat in total. | 0 |
| 3 | Sample storage | Not reported. | 0 |

| | | | |
|---|---|---|---|
| 4 | Laboratory preparation | Cotton gowns and nitrile gloves were worn. The glassware used was rinsed at least three times with distilled water and ethanol. | 1 |
| 5 | Clean air conditions | Samples were processed under a funnel hood. | 1 |
| 6 | Negative controls | No negative controls were conducted, or no information was given. | 0 |
| 7 | Sample treatment | No digestion. | 0 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | All particles were identified using ATR-FT-IR. The number of non-plastic/unidentified particles and different polymers were not reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 6 | | |

| **[44]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, sample characteristics (i.e., the bivalve species), and the place of origin were reported. | 2 |
| 2 | Sample size | 75 individuals for each specie. | 2 |
| 3 | Sample storage | Samples were immediately frozen after removing external materials and stored at –20°C until analysis. | 2 |
| 4 | Laboratory preparation | All solutions were filtered before use. All experimental equipment was rinsed with commercial ultrapure water. Cotton laboratory coats and latex gloves were worn during all processes. The cleaning of work surfaces was not mentioned. | 1 |
| 5 | Clean air conditions | The procedure was carried out in a clean fume hood. The samples were immediately covered. | 2 |
| 6 | Negative controls | Three procedural blank samples were run with every set of samples. (Total n = 12). The number of MPs in blank samples was reported. | 2 |
| 7 | Sample treatment | Samples were digested with KOH. Sample treatments were carried out below 60°C. | 2 |
| 8 | Positive controls | Positive controls for PP, PE, EPS, nylon, and PES were conducted. Recovery rate >90%. | 2 |
| 9 | Polymer identification | A micro-Fourier transform infrared microscope was used for visual identification and chemical verification. Spectral matching with a hit index ⩾70% was accepted. The proportion of different polymer types was reported. Only the ratio of fiber MPs vs non-plastic particles was reported. | 1 |
| 10 | Abundance, size, and shape | Comprehensive information on the abundance, size, and shape distribution of MPs. | 2 |
| Total | 18 | | |

| [45] | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, place of origin, and sample species was included. | 2 |
| 2 | Sample size | 120–500 individuals per research unit, total n = 1500. | 2 |
| 3 | Sample storage | Fresh mussels were wrapped in aluminum foils and then frozen at –30°C until processing. Processed mussels were frozen inside their original packaging. | 2 |
| 4 | Laboratory preparation | Facilities and surfaces used for sampling and analysis were cleaned with filtered deionized water. The wearing of non-synthetic clothing was not mentioned. | 1 |
| 5 | Clean air conditions | Processing steps were performed under a fume cupboard | 2 |
| 6 | Negative controls | Negative controls were conducted, 0.09 ± 0.10 fibers /filter. | 2 |
| 7 | Sample treatment | Samples were digested with 30% $H_2O_2$ at 65°C. | 1 |
| 8 | Positive controls | Positive controls (n = 9) were conducted. Spiking with LDPE. Recovery rate >80%. | 2 |
| 9 | Polymer identification | A total of 59 particles (13.6% of visually identified particles) were analyzed by FT-IR spectroscope. The accepted matching rate was 70%. The proportion of different polymers and non-plastic/unidentified particles was reported. | 1 |
| 10 | Abundance, size, and shape | Comprehensive information on the Abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 17 | | |

| [46] | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics and place of origin was included. | 2 |
| 2 | Sample size | 120 mussels from supermarkets and 90 mussels from wholesalers. | 2 |
| 3 | Sample storage | Samples were frozen until analysis. | 2 |
| 4 | Laboratory preparation | Cotton lab coats were worn, bench surfaces were cleaned prior to use with ethanol, and equipment was rinsed with filtered RO water. | 2 |
| 5 | Clean air conditions | Windows and air vents of the laboratory remained closed during sample processing. All containers were covered with foil whilst samples were being processed. | 1 |
| 6 | Negative controls | Empty Petri dishes were placed next to workbenches and assessed for air-borne contamination daily (at most, three fibers were recorded on a given day and accounted for in the final MP calculations). | 1 |
| 7 | Sample treatment | Samples were digested with 10% KOH for 48 h at 60°C. | 2 |
| 8 | Positive controls | Reported recovery rates for fibers were 90–85%. | 1 |

| | | | |
|---|---|---|---|
| 9 | Polymer identification | A total of 31 (5%) MPs were scanned for polymer identification using ATR-FT-IR. The proportion of different polymers and non-plastic/unidentified particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 16 | | |

| **[47]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location and sample characteristics (i.e., fish and bivalve species) were reported. | 2 |
| 2 | Sample size | At least 10 individuals for each species, total n = 100. | 2 |
| 3 | Sample storage | Samples were wrapped with aluminum foil and stored at –20°C refrigerator until further analysis. | 2 |
| 4 | Laboratory preparation | All reagents were filtered, and all the tools were rinsed with Milli-Q water. Disposable latex gloves, 100% cotton lab coats, and clothing were worn during all procedures. The cleaning of the work surface was not mentioned. | 1 |
| 5 | Clean air conditions | Not mentioned. | 0 |
| 6 | Negative controls | Procedural blanks without samples were processed synchronously during the whole course of the experiment. The MPs found in the blanks were reported and subtracted from the observed MPs in the samples. | 2 |
| 7 | Sample treatment | The whole gastrointestinal tracts (GIT) and approximately 20 g flesh without skin of fish, as well as the entire soft tissues of bivalves were digested with KOH at 60°C, followed by floatation with saturated sodium chloride solution. | 2 |
| 8 | Positive controls | Four positive controls of PS and PP were set up. Recovery rates ranged from 84% to 100%. | 2 |
| 9 | Polymer identification | Particles identified by micro-Raman spectroscopy. The Raman spectra matching with a hit index >70% was considered acceptable. A total of 637 suspected MPs were picked out for further verification by micro-Raman spectroscopy. The proportion of different polymer types was reported while the unidentified particles were not mentioned. | 1 |
| 10 | Abundance, size, and shape | Comprehensive information on the abundance, size, and shape distribution of MPs. | 2 |
| Total | 16 | | |

| **[48]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, place of origin, and sample characteristics (i.e., size and weight of green mussels) were reported. | 2 |
| 2 | Sample size | A total of 90 green mussels from 3 markets. | 1 |

| | | | |
|---|---|---|---|
| 3 | Sample storage | Samples were transported to the laboratory in an ice compartment and immediately frozen at –20°C until further analysis. | 2 |
| 4 | Laboratory preparation | Powder free-examination gloves were used, and pure cotton laboratory coats were always worn. All of the glassware was rinsed with ethanol and deionized water prior to use. Steel or glass devices were always used. | 2 |
| 5 | Clean air conditions | Experiments were conducted inside a clean fume hood. The glassware was covered with aluminum foil when not in use. | 2 |
| 6 | Negative controls | Three replicates of blank samples were conducted in parallel with the sample analysis. Control samples were contaminated with polyethylene and polypropylene, while the number of MPs was not reported. MPs in samples were calculated by deducting the MPs contamination values found in blank controls. | 1 |
| 7 | Sample treatment | Mussel soft tissue was digested with 30% $H_2O_2$ along with the Fe (II) catalyst at 60°C for 24 h. | 2 |
| 8 | Positive controls | No positive controls were conducted or no information was given. | 0 |
| 9 | Polymer identification | Samples were tested for the polymer composition using micro-FT-IR. A minimum of three spots on each filter paper were randomly selected and checked for the polymer composition. A hit index with a minimum of 80% similarity was considered acceptable. | 1 |
| 10 | Abundance, size, and shape | Comprehensive information on the abundance, size, and shape distribution of MPs was reported. | 2 |
| Total | 15 | | |

| **[49]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location and sample characteristics (i.e., shellfish species) were reported. | 2 |
| 2 | Sample size | 10 individuals for each species, total n = 70. | 1 |
| 3 | Sample storage | Samples were wrapped in aluminum foil and transferred to the laboratory and stored at –20°C. | 2 |
| 4 | Laboratory preparation | A cotton laboratory coat and nitrile gloves were worn during the entire procedure. Glass containers were washed with Milli-Q water. The cleaning of work surfaces was not mentioned. | 1 |
| 5 | Clean air conditions | Samples were sealed with aluminum foil as possible. Negative controls were included. | 1 |
| 6 | Negative controls | Blanks were performed by following the same procedure with actual samples while the number of blank controls was not mentioned. The number of MPs in the blanks was negligible. | 1 |
| 7 | Sample treatment | Samples were digested with KOH at 60°C. | 2 |
| 8 | Positive controls | No positive controls were conducted or no information was | 0 |

| | | | |
|---|---|---|---|
| | | given. | |
| 9 | Polymer identification | Particles identified by μ-FT-IR. The spectra matching ⩾70% were accepted. A total of 373 items were confirmed as MPs by spectral analysis. The proportion of different polymer types in each species was reported, while the number of non-plastic particles was not reported. | 1 |
| 10 | Abundance, size, and shape | Comprehensive information on the abundance, size, and shape distribution of MPs. | 2 |
| Total | 13 | | |

| **[50]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, sample characteristics (i.e., type of mussel, weight), and place of origin were reported. The species of mussels were not mentioned. | 1 |
| 2 | Sample size | >50 individuals of mussels from each city. Total n = 317. | 2 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Shells were cleaned with Milli-Q water before the examination. All equipment used was cleaned using Milli-Q water, followed by acetone. No information on the use of gloves and cotton lab coats. | 1 |
| 5 | Clean air conditions | All work was carried out in the laminar closed cabinet. | 2 |
| 6 | Negative controls | A control group with three replications was used for the digestion and density separation. A Petri dish was left open for the same duration as the microscopic examination of each sample. MPs in control groups were negligible. | 2 |
| 7 | Sample treatment | Samples were digested with KOH and NaClO. The treatment was proved no effect on MPs. | 2 |
| 8 | Positive controls | No positive controls were conducted or no information was given. | 0 |
| 9 | Polymer identification | Particles identified by μ-Raman. The accepted Raman spectra matching rate of 70% or higher was accepted. 204 MP-like particles were counted, and 40 randomly selected particles were examined. The proportion of different polymer types and unidentified particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 13 | | |

| **[51]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, place of origin, sample characteristics (length and weight) and package materials were reported. | 2 |

| | | | |
|---|---|---|---|
| 2 | Sample size | 48–240 individuals in total. | 1 |
| 3 | Sample storage | Samples were stored at –20℃. | 2 |
| 4 | Laboratory preparation | All of the apparatus used was rinsed three times with filtered tap water. | 1 |
| 5 | Clean air conditions | Not mentioned. | 0 |
| 6 | Negative controls | Procedure blanks (n = 6) were conducted. MPs on blanks were negligible. | 2 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65℃, followed by floatation with NaCl. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | 138 particles were analyzed by micro-FT-IR spectroscopy. A hit index of at least 70% match was considered acceptable. The proportion of different polymer types and unidentified or non-plastic particles was reported. | 2 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 13 | | |

| **[52]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, place of origin and sample characteristics (species, length and weight) were reported. | 2 |
| 2 | Sample size | 6–30 individuals for each species, 144 individuals in total. | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | All of the containers and beakers were rinsed three times with filtered water. | 1 |
| 5 | Clean air conditions | Samples were immediately covered if they were not in use. Negative controls were included. | 1 |
| 6 | Negative controls | One blank group was performed simultaneously to correct for the potential procedural contamination. The number of MPs on blanks was negligible. | 2 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 65℃, followed by floatation with NaCl. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | Particles were analyzed by micro-FTIR spectroscopy. The accepted matching rate was not mentioned. The number of analyzed particles and the proportion of different polymer types and unidentified or non-plastic particles were not reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 11 | | |

| **[53]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, origins and sample characteristics (i.e., mussel species) were reported. | 2 |
| 2 | Sample size | 10 individuals per research unit. Total n = 80 | 1 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Glassware was accurately rinsed. Only glass materials and cotton dresses were used. | 1 |
| 5 | Clean air conditions | Samples remained closed until use. Negative controls were included. | 1 |
| 6 | Negative controls | All blanks analyzed resulted free from MPs. The number of procedure blanks was not clear. | 1 |
| 7 | Sample treatment | Samples were digested with $H_2O_2$ at 50°C. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | No polymer identification. | 0 |
| 10 | Abundance, size, and shape | Information on the abundance and size distribution of MPs was included. Information on the shapes of MPs was not included. | 1 |
| Total | 9 | | |

| **[54]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, fish species, and place of origin was included. | 2 |
| 2 | Sample size | 702 individuals in total. | 2 |
| 3 | Sample storage | Samples were stored in the freezer at –20°C. | 2 |
| 4 | Laboratory preparation | The working area was cleaned methodically, and all equipment was rinsed. | 1 |
| 5 | Clean air conditions | All processing of fish occurred in a laminar flow cabinet. | 2 |
| 6 | Negative controls | Procedural blanks were carried out (total blank = 105) and no contamination was found. | 2 |
| 7 | Sample treatment | Samples were digested with 10% KOH solution at 60°C. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | 135 of 674 pieces of all MP pieces were tested by μ-FTIR. A matching rate >50% was accepted. Proportions of polymer types and non-plastic particles were reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 16 | | |

| **[55]** | | |
|---|---|---|
| Criteria | Explanation | Score |

| | | | |
|---|---|---|---|
| 1 | Sampling strategy | Purchase location, sample characteristics (i.e., species, weight and length), and the place of origin were reported. | 2 |
| 2 | Sample size | From each species, 30 fishes were randomly collected (a total of 270 fishes). | 1 |
| 3 | Sample storage | Samples were wrapped in aluminum foil and were transported to the laboratory in ice boxes. One batch of samples was stored at 4°C for immediate analysis, and the rest were stored at –20°C until further processing. | 2 |
| 4 | Laboratory preparation | Filter papers were examined under a stereomicroscope prior to the experiment. All reagents were filtered before use. All equipment was rinsed at least three times with pre-filtered water. Clean cotton lab coats, nitrile gloves, and cotton clothing were worn during all stages of the experiment. | 2 |
| 5 | Clean air conditions | The samples were analyzed in a laboratory with minimized air circulation and restricted access. | 1 |
| 6 | Negative controls | Control blanks were run along with each batch of sample processing. The blanks contained three white fibers. The data was corrected by the subtraction of blanks. | 2 |
| 7 | Sample treatment | Samples were digested with 10% KOH. The edible tissue samples were incubated at 60°C for 24 h and the inedible tissues were incubated at 40°C for 72 h. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | A total of 90 particles (appx 50%) were randomly selected for FT-IR analysis. The proportion of polymers and unidentified particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 15 | | |

| **[56]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location and sample characteristics (species, habitat, weight, and length) were reported. | 2 |
| 2 | Sample size | Ten individuals per species were examined. Total n = 110. | 1 |
| 3 | Sample storage | Samples were maintained at –20°C. | 2 |
| 4 | Laboratory preparation | Nitrile gloves and cotton lab coats were worn during experiments. All liquids were filtered before use. Glassware and instruments were washed and rinsed. The cleaning of the work surface was not mentioned. | 1 |
| 5 | Clean air conditions | Experiments were conducted in a horizontal laminar flow cabinet. | 2 |
| 6 | Negative controls | Procedural blanks were run simultaneously while the number of MPs on blanks was not mentioned. | 1 |

| | | | |
|---|---|---|---|
| 7 | Sample treatment | Excised organs and gills of fish were digested with KOH at 40°C, followed by flotation with NaI. | 2 |
| 8 | Positive controls | No positive controls were conducted or no information was given. | 0 |
| 9 | Polymer identification | A total of 56 particles >149 μm were identified using a micro-Raman spectrometer. The accepted matching rate was not reported. The proportion of different polymer types and unidentified or non-plastic particles was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 14 | | |

| **[57]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics (i.e., species, length, and weight), and place of origin was included. | 2 |
| 2 | Sample size | 30 individual fish per species (total n = 180). | 1 |
| 3 | Sample storage | Samples were stored in the laboratory at –20°C. | 2 |
| 4 | Laboratory preparation | Cotton lab coats and nitrile gloves were worn in the laboratory; all solutions were filtered; all the glassware was accurately rinsed at least two times. | 2 |
| 5 | Clean air conditions | Samples were capped with aluminum foil and glass caps during the identification and analysis. | 1 |
| 6 | Negative controls | Quality control blanks were conducted during the extraction process (a clean filter left out during dissection and filtering processes), and the visual sorting (a clean filter left out for the duration of visual inspection at the microscope). An average of 0.40 ± 0.54 colored fibers per blank was found. | 1 |
| 7 | Sample treatment | Samples were digested with KOH at 50°C for 48 h. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | 79 particles (about 34% of all particles) were subjected to analysis by μ-Raman spectroscopy. A minimum library match of 70% was accepted. The percentage of different polymers was reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 14 | | |

| **[58]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics (i.e., species and weight), and place of origin was included. | 2 |

| | | | |
|---|---|---|---|
| 2 | Sample size | < 50 fish in some of the research units (Total n >50). | 1 |
| 3 | Sample storage | Not reported. | 0 |
| 4 | Laboratory preparation | All the equipment used was rinsed with deionized water. Potassium hydroxide and sodium iodide solutions were filtered prior to use. Nitrile gloves were worn during the experimental process. The wearing of a cotton lab coat was not mentioned. | 1 |
| 5 | Clean air conditions | Samples and solutions were kept covered as much as possible. | 1 |
| 6 | Negative controls | Procedural blanks without fish were carried out along with sample preparation. No MPs were observed in procedural blanks. The number of blanks was unclear. | 1 |
| 7 | Sample treatment | Samples were digested with KOH at 40°C for 48 h, followed by NaI floatation. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | About 30% of visually selected plastic particles were chosen for the verification (a total of 61 items).by micro-Raman spectroscopy. The number of non-plastic/unidentified particles and different polymers were reported. The minimum accepted hit quality index was not reported. | 1 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 11 | | |

| **[59]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location and sample characteristics (i.e., fish species, weight, length, and habitat) were reported. | 2 |
| 2 | Sample size | A total of 140 fishes from 4 species. | 1 |
| 3 | Sample storage | After purchase, fishes were immediately transported in a cooler box to the laboratory. | 1 |
| 4 | Laboratory preparation | Neoprene gloves and cotton lab coats were worn. Glassware used was washed and rinsed with distilled water. Pre-filtered tap water was used for rinsing the fish. | 2 |
| 5 | Clean air conditions | Not mentioned. | 0 |
| 6 | Negative controls | During the dissection, six references (Petri dishes) were placed around the dissection area to account for any airborne MPs. Single red nylon fiber was found in the reference Petri dishes. | 1 |
| 7 | Sample treatment | Samples were digested using 10 M NaOH at 60°C for 48 h. | 1 |
| 5 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 8 | Polymer identification | Suspected MPs were analyzed with FT-IR. A match rate >70% was accepted. The proportion of different polymers was not reported. | 1 |

| | | | |
|---|---|---|---|
| 10 | Abundance, size, and shape | Information on the abundance and shape of MPs was included. The size range of MPs was not reported. | 1 |
| Total | 10 | | |

| **[60]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location, sample characteristics (species, weight, length and sex) and place of origin was included. | 2 |
| 2 | Sample size | A total of 44 fishes. | 0 |
| 3 | Sample storage | Each sample was kept in a plastic Ziploc bag in a -20°C freezer before the examination. | 2 |
| 4 | Laboratory preparation | Only glass or metal instruments were used, and all surfaces were cleaned with alcohol and natural white fiber tissue. Instruments were washed with distilled water. A cotton laboratory coat was worn during working. | 2 |
| 5 | Clean air conditions | Samples were covered by aluminum foil when they were not in use. All analyses were done in a clean laboratory. | 1 |
| 6 | Negative controls | No negative controls were conducted, or no information was given. | 0 |
| 7 | Sample treatment | Samples were digested with 10% KOH for 48 h at 60°C. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | No polymer identification. | 0 |
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape distribution of MPs was included. | 2 |
| Total | 11 | | |

| **[61]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location and sample characteristics (i.e., fish species, habitat, and weight) were reported. | 2 |
| 2 | Sample size | A total of 50 fishes from 5 fish markets. | 1 |
| 3 | Sample storage | The samples were stored in the freezer at –10°C prior to analysis. | 2 |
| 4 | Laboratory preparation | Non-plastic apparatus was used throughout the handling and analysis of samples. | 1 |
| 5 | Clean air conditions | Not mentioned. | 0 |
| 6 | Negative controls | Not mentioned. | 0 |
| 7 | Sample treatment | Samples were digested using 15% KOH at 65°C for 24 h. | 1 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | No polymer identification. | 0 |

| | | | |
|---|---|---|---|
| 10 | Abundance, size, and shape | Information on the abundance, size, and shape range of MPs was included. | 2 |
| Total | 9 | | |

| **[62]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Purchase location, sample characteristics (i.e., the shrimp species), and the place of origin were reported. | 2 |
| 2 | Sample size | 93 individuals in total. | 1 |
| 3 | Sample storage | Samples were obtained in frozen form or were thawed before purchase. Samples were thawed at room temperature for 1 h before the experiment. No detailed information on sample storage after purchase. | 1 |
| 4 | Laboratory preparation | Cotton clothing, lab coats, and nitrile gloves were worn during the study. Work surfaces and tools were cleaned (70% ethanol) and rinsed (Milli-Q water).<br>As far as possible, glass and metal wares were used to reduce the introduction of plastic from the surrounding. | 2 |
| 5 | Clean air conditions | Samples were processed in a clean-air cabinet. | 2 |
| 6 | Negative controls | The sole examination of controls was placed inside the clean-air cabinet while experimental procedures were carried out. | 1 |
| 7 | Sample treatment | Samples were digested with NaClO at 25℃. Protocol proved no impact on the integrity of the plastic polymers in the previous study. | 2 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | No polymer identification. | 0 |
| 10 | Abundance, size, and shape | Reporting includes the abundance and shape of the MPs. Insufficient information on the size of MPs. | 1 |
| Total | 12 | | |

| **[63]** | | | |
|---|---|---|---|
| Criteria | | Explanation | Score |
| 1 | Sampling strategy | Information on purchase location and sample characteristics was included. The place of origin was not reported. | 1 |
| 2 | Sample size | Dry weight of 0.1 g for each type of vegetables and fruits. | 0 |
| 3 | Sample storage | Not mentioned. | 0 |
| 4 | Laboratory preparation | Only glass equipment and containers were used. All containers and equipment were first washed with UPLC-MS Grade water and subsequently with acetone. | 1 |
| 5 | Clean air conditions | Experiments were conducted in laminar flow. | 2 |
| 6 | Negative controls | No negative controls were conducted, or no information was given. | 0 |

| | | | |
|---|---|---|---|
| 7 | Sample treatment | All samples were mineralized by adding 1 mL of 65% nitric acid at 80°C for 90 min. | 0 |
| 8 | Positive controls | No positive controls were conducted, or no information was given. | 0 |
| 9 | Polymer identification | No polymer identification. | 0 |
| 10 | Abundance, size, and shape | Information on the abundance and size of MPs was included. No information on the shape of MPs. | 1 |
| Total | 5 | | |

**References**


[1] Karami A, Golieskardi A, Choo C K, Larat V, Galloway T S, Salamatinia B (2017). The presence of microplastics in commercial salts from different countries. Scientific Reports, 7(1): 46173

[2] Kapukotuwa R W M G K, Jayasena N, Weerakoon K C, Abayasekara C L, Rajakaruna R S (2022). High levels of microplastics in commercial salt and industrial salterns in Sri Lanka. Marine Pollution Bulletin, 174: 113239

[3] Sathish M N, Jeyasanta I, Patterson J (2020). Microplastics in Salt of Tuticorin, Southeast Coast of India. Archives of Environmental Contamination and Toxicology, 79: 111-121

[4] Kim J-S, Lee H-J, Kim S-K, Kim H-J (2018). Global Pattern of Microplastics (MPs) in Commercial Food-Grade Salts: Sea Salt as an Indicator of Seawater MP Pollution. Environmental Science & Technology, 52(21): 12819-12828

[5] Yang D, Shi H, Li L, Li J, Jabeen K, Kolandhasamy P (2015). Microplastic Pollution in Table Salts from China. Environmental Science & Technology, 49(22): 13622-13627

[6] Fadare O O, Okoffo E D, Olasehinde E F (2021). Microparticles and microplastics contamination in African table salts. Marine Pollution Bulletin, 164: 112006

[7] Gündoğdu S (2018). Contamination of table salts from Turkey with microplastics. Food Additives & Contaminants: Part A, 35(5): 1006-1014

[8] Vidyasakar A, Krishnakumar S, Kumar K S, Neelavannan K, Anbalagan S, Kasilingam K, Srinivasalu S, Saravanan P, Kamaraj S, Magesh N S (2021). Microplastic contamination in edible sea salt from the largest salt-producing states of India. Marine Pollution Bulletin, 171: 112728

[9] Renzi M, Grazioli E, Bertacchini E, Blašković A (2019). Microparticles in Table Salt: Levels and Chemical Composition of the Smallest Dimensional Fraction. Journal of Marine Science and Engineering, 7(9): 310

[10] Lee H, Kunz A, Shim W J, Walther B A (2019). Microplastic contamination of table salts, including a global review. Scientific Reports, 9: 10145

[11] Renzi M, Blašković A (2018). Litter & microplastics features in table salts from marine origin: Italian versus Croatian brands. Marine Pollution Bulletin, 135: 62-68

[12] Yaranal N A, Subbiah S, Mohanty K (2021). Identification, extraction of microplastics from edible salts and its removal from contaminated seawater. Environmental Technology & Innovation, 21: 101253

[13] Seth C K, Shriwastav A (2018). Contamination of Indian sea salts with microplastics and a potential prevention strategy. Environmental Science and Pollution Research, 25(30): 30122-30131

[14] Kosuth M, Mason S A, Wattenberg E V (2018). Anthropogenic contamination of tap water, beer, and sea salt. PLoS ONE, 13(4): e0194970

[15] Iñiguez M E, Conesa J A, Fullana A (2017). Microplastics in Spanish Table Salt. Scientific Reports, 7(1): 8620

[16] Sivagami M, Selvambigai M, Devan U, Velangani A A J, Karmegam N, Biruntha M, Arun A, Kim W, Govarthanan M, Kumar P (2021). Extraction of microplastics from commonly used sea salts in India and their toxicological evaluation. Chemosphere, 263: 128181

[17] Nithin A, Sundaramanickam A, Surya P, Sathish M, Soundharapandiyan B, Balachandar K (2021). Microplastic contamination in salt pans and commercial salts – A baseline study on the salt pans of Marakkanam and Parangipettai, Tamil Nadu, India. Marine Pollution Bulletin, 165: 112101

[18] Selvam S, Manisha A, Venkatramanan S, Chung S Y, Paramasivam C R, Singaraja C (2020). Microplastic presence in commercial marine sea salts: A baseline study along Tuticorin Coastal salt pan stations, Gulf of Mannar, South India. Marine Pollution Bulletin, 150: 110675

[19] Mason S A, Welch V G, Neratko J (2018). Synthetic Polymer Contamination in Bottled Water. Frontiers in Chemistry, 6: 407

[20] Kankanige D, Babel S (2020). Smaller-sized micro-plastics (MPs) contamination in single-use PET-bottled water in Thailand. Science of the Total Environment, 717: 137232

[21] Schymanski D, Goldbeck C, Humpf H-U, Fürst P (2018). Analysis of microplastics in water by micro-Raman spectroscopy: Release of plastic particles from different packaging into mineral water. Water Research, 129: 154-162

[22] Oßmann B E, Sarau G, Holtmannspötter H, Pischetsrieder M, Christiansen S H, Dicke W (2018). Small-sized microplastics and pigmented particles in bottled mineral water. Water Research, 141: 307-316

[23] Zhou X-J, Wang J, Li H-Y, Zhang H-M, Jiang H, Zhang D L (2021). Microplastic pollution of bottled water in China. Journal of Water Process Engineering, 40: 101884

[24] Weisser J, Beer I, Hufnagl B, Hofmann T, Lohninger H, Ivleva N P, Glas K (2021). From the Well to the Bottle: Identifying Sources of Microplastics in Mineral Water. Water, 13(6): 841

[25] Zuccarello P, Ferrante M, Cristaldi A, Copat C, Grasso A, Sangregorio D, Fiore M, Oliveri Conti G (2019). Exposure to microplastics (<10 μm) associated to plastic bottles mineral water consumption: The first quantitative study. Water Research, 157: 365-371

[26] Makhdoumi P, Amin A A, Karimi H, Pirsaheb M, Kim H, Hossini H (2021). Occurrence of microplastic particles in the most popular Iranian bottled mineral water brands and an assessment of human exposure. Journal of Water Process Engineering, 39: 101708

[27] Ibeto C N, Enyoh C E, Ofomatah A C, Oguejiofor L A, Okafocha T, Okanya V (2021). Microplastics pollution

indices of bottled water from South Eastern Nigeria. International Journal of Environmental Analytical Chemistry, 1-20

[28] Wiesheu A C, Anger P M, Baumann T, Niessner R, Ivleva N P (2016). Raman microspectroscopic analysis of fibers in beverages. Analytical Methods, 8(28): 5722-5725

[29] Huang Y, Wong K K, Li W, Zhao H, Wang T, Stanescu S, Boult S, Van Dongen B, Mativenga P, Li L (2022). Characteristics of nano-plastics in bottled drinking water. Journal of Hazardous Materials, 424: 127404

[30] Shruti V C, Pérez-Guevara F, Elizalde-Martínez I, Kutralam-Muniasamy G (2020). First study of its kind on the microplastic contamination of soft drinks, cold tea and energy drinks - Future research and environmental considerations. Science of the Total Environment, 726: 138580

[31] Diaz-Basantes M F, Conesa J A, Fullana A (2020). Microplastics in Honey, Beer, Milk and Refreshments in Ecuador as Emerging Contaminants. Sustainability, 12(14): 5514

[32] Liebezeit G, Liebezeit E (2014). Synthetic particles as contaminants in German beers. Food Additives & Contaminants: Part A, 31(9): 1574-1578

[33] Mühlschlegel P, Hauk A, Walter U, Sieber R (2017). Lack of evidence for microplastic contamination in honey. Food Additives & Contaminants: Part A, 34(11): 1982-1989

[34] Liebezeit G, Liebezeit E (2015). Origin of Synthetic Particles in Honeys. Polish Journal of Food and Nutrition Sciences, 65(2): 143-147

[35] Liebezeit G, Liebezeit E (2013). Non-pollen particulates in honey and sugar. Food Additives & Contaminants: Part A, 30(12): 2136-2140

[36] Da Costa Filho P A, Andrey D, Eriksen B, Peixoto R P, Carreres B M, Ambühl M E, Descarrega J B, Dubascoux S, Zbinden P, Panchaud A, Poitevin E (2021). Detection and characterization of small-sized microplastics (≥ 5 μm) in milk products. Scientific Reports, 11(1): 24046

[37] Kutralam-Muniasamy G, Pérez-Guevara F, Elizalde-Martínez I, Shruti V C (2020). Branded milks – Are they immune from microplastics contamination? Science of the Total Environment, 714: 136823

[38] Karami A, Golieskardi A, Choo C K, Larat V, Karbalaei S, Salamatinia B (2018). Microplastic and mesoplastic contamination in canned sardines and sprats. Science of the Total Environment, 612: 1380-1386

[39] Akhbarizadeh R, Dobaradaran S, Nabipour I, Tajbakhsh S, Darabi A H, Spitz J (2020). Abundance, composition, and potential intake of microplastics in canned fish. Marine Pollution Bulletin, 160: 111633

[40] Dessì C, Okoffo E D, O'Brien J W, Gallen M, Samanipour S, Kaserzon S, Rauert C, Wang X, Thomas K V (2021). Plastics contamination of store-bought rice. Journal of Hazardous Materials, 416: 125778

[41] Li Q, Feng Z, Zhang T, Ma C, Shi H (2020). Microplastics in the commercial seaweed nori. Journal of Hazardous Materials, 388: 122060

[42] Makhdoumi P, Naghshbandi M, Ghaderzadeh K, Mirzabeigi M, Yazdanbakhsh A, Hossini H (2021). Micro-plastic occurrence in bottled vinegar: Qualification, quantification and human risk exposure. Process Safety

and Environmental Protection, 152: 404-413

[43] Kedzierski M, Lechat B, Sire O, Maguer G L, Le Tilly V, Bruzaud S (2020). Microplastic contamination of packaged meat: Occurrence and associated risks. Food Packaging and Shelf Life, 24: 100489

[44] Cho Y, Shim W J, Jang M, Han G M, Hong S H (2019). Abundance and characteristics of microplastics in market bivalves from South Korea. Environmental Pollution, 245: 1107-1116

[45] Nalbone L, Cincotta F, Giarratana F, Ziino G, Panebianco A (2021). Microplastics in fresh and processed mussels sampled from fish shops and large retail chains in Italy. Food Control, 125: 108003

[46] Sparks C, Awe A, Maneveld J (2021). Abundance and characteristics of microplastics in retail mussels from Cape Town, South Africa. Marine Pollution Bulletin, 166: 112186

[47] Fang C, Zheng R, Chen H, Hong F, Lin L, Lin H, Guo H, Bailey C, Segner H, Mu J, Bo J (2019). Comparison of microplastic contamination in fish and bivalves from two major cities in Fujian province, China and the implications for human health. Aquaculture, 512: 734322

[48] Imasha H U E, Babel S (2021). Microplastics Contamination in Commercial Green Mussels from Selected Wet Markets in Thailand. Archives of Environmental Contamination and Toxicology, 81(3): 449-459

[49] Ding J, Li J, Sun C, Jiang F, He C, Zhang M, Ju P, Ding N X (2020). An examination of the occurrence and potential risks of microplastics across various shellfish. Science of the Total Environment, 739: 139887

[50] Gündoğdu S, Çevik C, Ataş N T (2020). Stuffed with microplastics: Microplastic occurrence in traditional stuffed mussels sold in the Turkish market. Food Bioscience, 37: 100715

[51] Li J, Green C, Reynolds A, Shi H, Rotchell J M (2018). Microplastics in mussels sampled from coastal waters and supermarkets in the United Kingdom. Environmental Pollution, 241: 35-44

[52] Li J, Yang D, Li L, Jabeen K, Shi H (2015). Microplastics in commercial bivalves from China. Environmental Pollution, 207: 190-195

[53] Renzi M, Guerranti C, Blašković A (2018). Microplastic contents from maricultured and natural mussels. Marine Pollution Bulletin, 131: 248-251

[54] Wootton N, Reis-Santos P, Dowsett N, Turnbull A, Gillanders B M (2021). Low abundance of microplastics in commercially caught fish across southern Australia. Environmental Pollution, 290: 118030

[55] Daniel D B, Ashraf P M, Thomas S N (2020). Microplastics in the edible and inedible tissues of pelagic fishes sold for human consumption in Kerala, India. Environmental Pollution, 266: 115365

[56] Karbalaei S, Golieskardi A, Hamzah H B, Abdulwahid S, Hanachi P, Walker T R, Karami A (2019). Abundance and characteristics of microplastics in commercial marine fish from Malaysia. Marine Pollution Bulletin, 148: 5-15

[57] Mistri M, Sfriso A A, Casoni E, Nicoli M, Vaccaro C, Munari C (2022). Microplastic accumulation in commercial fish from the Adriatic Sea. Marine Pollution Bulletin, 174: 113279

[58] Piyawardhana N, Weerathunga V, Chen H-S, Guo L, Huang P-J, Ranatunga R R M K P, Hung C-C (2022).

Occurrence of microplastics in commercial marine dried fish in Asian countries. Journal of Hazardous Materials, 423: 127093

[59] Calderon E A, Hansen P, Rodríguez A, Blettler M C M, Syberg K, Khan F R (2019). Microplastics in the Digestive Tracts of Four Fish Species from the Ciénaga Grande de Santa Marta Estuary in Colombia. Water, Air, and Soil Pollution, 230(11): 257

[60] Taghizadeh Rahmat Abadi Z, Abtahi B, Grossart H P, Khodabandeh S (2021). Microplastic content of Kutum fish, Rutilus frisii kutum in the southern Caspian Sea. Science of the Total Environment, 752: 141542

[61] Andreas, Hadibarata T, Sathishkumar P, Prasetia H, Hikmat, Pusfitasari E D, Tasfiyati A N, Muzdalifah D, Waluyo J, Randy A, Ramadhaningtyas D P, Zuas O, Sari A A (2021). Microplastic contamination in the Skipjack Tuna (Euthynnus affinis) collected from Southern Coast of Java, Indonesia. Chemosphere, 276: 130185

[62] Curren E, Leaw C P, Lim P T, Leong S C Y (2020). Evidence of Marine Microplastics in Commercially Harvested Seafood. Frontiers in Bioengineering and Biotechnology, 8: 562760

[63] Oliveri Conti G, Ferrante M, Banni M, Favara C, Nicolosi I, Cristaldi A, Fiore M, Zuccarello P (2020). Micro- and nano-plastics in edible fruit and vegetables. The first diet risks assessment for the general population. Environmental Research, 187: 109677

[64] An R, Wang X, Yang L, Zhang J, Wang N, Xu F, Hou Y, Zhang H, Zhang L (2021). Polystyrene microplastics cause granulosa cells apoptosis and fibrosis in ovary through oxidative stress in rats. Toxicology, 449: 152665

[65] Choi D, Hwang J, Bang J, Han S, Kim T, Oh Y, Hwang Y, Choi J, Hong J (2021). In vitro toxicity from a physical perspective of polyethylene microplastics based on statistical curvature change analysis. Science of the Total Environment, 752: 142242

[66] Çobanoğlu H, Belivermiş M, Sıkdokur E, Kılıç Ö, Çayır A (2021). Genotoxic and cytotoxic effects of polyethylene microplastics on human peripheral blood lymphocytes. Chemosphere, 272: 129805

[67] Deng Y, Zhang Y, Lemos B, Ren H (2017). Tissue accumulation of microplastics in mice and biomarker responses suggest widespread health risks of exposure. Scientific Reports, 7(1): 46687

[68] Dong C-D, Chen C-W, Chen Y-C, Chen H-H, Lee J-S, Lin C-H (2020). Polystyrene microplastic particles: In vitro pulmonary toxicity assessment. Journal of Hazardous Materials, 385: 121575

[69] Goodman K E, Hare J T, Khamis Z I, Hua T, Sang Q-X A (2021). Exposure of Human Lung Cells to Polystyrene Microplastics Significantly Retards Cell Proliferation and Triggers Morphological Changes. Chemical Research in Toxicology, 34(4): 1069-1081

[70] Han S, Bang J, Choi D, Hwang J, Kim T, Oh Y, Hwang Y, Choi J, Hong J (2020). Surface Pattern Analysis of Microplastics and Their Impact on Human-Derived Cells. ACS Applied Polymer Materials, 2(11): 4541-4550

[71] Hesler M, Aengenheister L, Ellinger B, Drexel R, Straskraba S, Jost C, Wagner S, Meier F, von Briesen H, Büchel C, Wick P, Buerki-Thurnherr T, Kohl Y (2019). Multi-endpoint toxicological assessment of polystyrene

nano- and microparticles in different biological models in vitro. Toxicology In Vitro, 61: 104610

[72] Hou J, Lei Z, Cui L, Hou Y, Yang L, An R, Wang Q, Li S, Zhang H, Zhang L (2021). Polystyrene microplastics lead to pyroptosis and apoptosis of ovarian granulosa cells via NLRP3/Caspase-1 signaling pathway in rats. Ecotoxicology and Environmental Safety, 212: 112012

[73] Hou B, Wang F, Liu T, Wang Z (2021). Reproductive toxicity of polystyrene microplastics: In vivo experimental study on testicular toxicity in mice. Journal of Hazardous Materials, 405: 124028

[74] Hwang J, Choi D, Han S, Choi J, Hong J (2019). An assessment of the toxicity of polypropylene microplastics in human derived cells. Science of the Total Environment, 684: 657-669

[75] Hwang J, Choi D, Han S, Jung S Y, Choi J, Hong J (2020). Potential toxicity of polystyrene microplastic particles. Scientific Reports, 10(1): 7391

[76] Im C, Kim H, Zaheer J, Kim J Y, Lee Y-J, Kang C M, Kim J S (2022). PET Tracing of Biodistribution for Orally Administered 64Cu-Labeled Polystyrene in Mice. Journal of Nuclear Medicine, 63(3): 461-467

[77] Jiang P, Yuan G-H, Jiang B-R, Zhang J-Y, Wang Y-Q, Lv H-J, Zhang Z, Wu J-L, Wu Q, Li L (2021). Effects of microplastics (MPs) and tributyltin (TBT) alone and in combination on bile acids and gut microbiota crosstalk in mice. Ecotoxicology and Environmental Safety, 220: 112345

[78] Jin Y, Lu L, Tu W, Luo T, Fu Z (2019). Impacts of polystyrene microplastic on the gut barrier, microbiota and metabolism of mice. Science of the Total Environment, 649: 308-317

[79] Jin H, Ma T, Sha X, Liu Z, Zhou Y, Meng X, Chen Y, Han X, Ding J (2021). Polystyrene microplastics induced male reproductive toxicity in mice. Journal of Hazardous Materials, 401: 123430

[80] Lee H-S, Amarakoon D, Wei C-I, Choi K Y, Smolensky D, Lee S-H (2021). Adverse effect of polystyrene microplastics (PS-MPs) on tube formation and viability of human umbilical vein endothelial cells. Food and Chemical Toxicology, 154: 112356

[81] Li B, Ding Y, Cheng X, Sheng D, Xu Z, Rong Q, Wu Y, Zhao H, Ji X, Zhang Y (2020). Polyethylene microplastics affect the distribution of gut microbiota and inflammation development in mice. Chemosphere, 244: 125492

[82] Li Z, Zhu S, Liu Q, Wei J, Jin Y, Wang X, Zhang L (2020). Polystyrene microplastics cause cardiac fibrosis by activating Wnt/β-catenin signaling pathway and promoting cardiomyocyte apoptosis in rats. Environmental Pollution, 265: 115025

[83] Li S, Ma Y, Ye S, Tang S, Liang N, Liang Y, Xiao F (2021). Polystyrene microplastics trigger hepatocyte apoptosis and abnormal glycolytic flux via ROS-driven calcium overload. Journal of Hazardous Materials, 417: 126025

[84] Liu S, Wu X, Gu W, Yu J, Wu B (2020). Influence of the digestive process on intestinal toxicity of polystyrene microplastics as determined by in vitro Caco-2 models. Chemosphere, 256: 127204

[85] Liu L, Xu K, Zhang B, Ye Y, Zhang Q, Jiang W (2021). Cellular internalization and release of polystyrene

microplastics and nanoplastics. Science of the Total Environment, 779: 146523

[86] Lu L, Wan Z, Luo T, Fu Z, Jin Y (2018). Polystyrene microplastics induce gut microbiota dysbiosis and hepatic lipid metabolism disorder in mice. Science of the Total Environment, 631-632: 449-458

[87] Luo T, Wang C, Pan Z, Jin C, Fu Z, Jin Y (2019). Maternal Polystyrene Microplastic Exposure during Gestation and Lactation Altered Metabolic Homeostasis in the Dams and Their F1 and F2 Offspring. Environmental Science & Technology, 53(18): 10978-10992

[88] Luo T, Zhang Y, Wang C, Wang X, Zhou J, Shen M, Zhao Y, Fu Z, Jin Y (2019). Maternal exposure to different sizes of polystyrene microplastics during gestation causes metabolic disorders in their offspring. Environmental Pollution, 255: 113122

[89] Magrì D, Sánchez-Moreno P, Caputo G, Gatto F, Veronesi M, Bardi G, Catelani T, Guarnieri D, Athanassiou A, Pompa P P, Fragouli D (2018). Laser Ablation as a Versatile Tool To Mimic Polyethylene Terephthalate Nanoplastic Pollutants: Characterization and Toxicology Assessment. ACS Nano, 12(8): 7690-7700

[90] Palaniappan S, Sadacharan C M, Rostama B (2022). Polystyrene and Polyethylene Microplastics Decrease Cell Viability and Dysregulate Inflammatory and Oxidative Stress Markers of MDCK and L929 Cells In Vitro. Exposure and Health, 14(1): 75-85

[91] Park E-J, Han J-S, Park E-J, Seong E, Lee G-H, Kim D-W, Son H-Y, Han H-Y, Lee B-S (2020). Repeated-oral dose toxicity of polyethylene microplastics and the possible implications on reproduction and development of the next generation. Toxicology Letters, 324: 75-85

[92] Poma A, Vecchiotti G, Colafarina S, Zarivi O, Aloisi M, Arrizza L, Chichiriccò G, Di Carlo P (2019). In Vitro Genotoxicity of Polystyrene Nanoparticles on the Human Fibroblast Hs27 Cell Line. Nanomaterials, 9(9): 1299

[93] Prietl B, Meindl C, Roblegg E, Pieber T R, Lanzer G, Fröhlich E (2014). Nano-sized and micro-sized polystyrene particles affect phagocyte function. Cell Biology and Toxicology, 30(1): 1-16

[94] Rafiee M, Dargahi L, Eslami A, Beirami E, Jahangiri-Rad M, Sabour S, Amereh F (2018). Neurobehavioral assessment of rats exposed to pristine polystyrene nanoplastics upon oral exposure. Chemosphere, 193: 745-753

[95] Schirinzi G F, Pérez-Pomeda I, Sanchís J, Rossini C, Farré M, Barceló D (2017). Cytotoxic effects of commonly used nanomaterials and microplastics on cerebral and epithelial human cells. Environmental Research, 159: 579-587

[96] Stock V, Böhmert L, Lisicki E, Block R, Cara-Carmona J, Pack L K, Selb R, Lichtenstein D, Voss L, Henderson C J, Zabinsky E, Sieg H, Braeuning A, Lampen A (2019). Uptake and effects of orally ingested polystyrene microplastic particles in vitro and in vivo. Archives of Toxicology, 93: 1817-1833

[97] Stock V, Laurisch C, Franke J, Dönmez M H, Voss L, Böhmert L, Braeuning A, Sieg H (2021). Uptake and cellular effects of PE, PP, PET and PVC microplastic particles. Toxicology In Vitro, 70: 105021

[98] Sun H, Chen N, Yang X, Xia Y, Wu D (2021). Effects induced by polyethylene microplastics oral exposure on colon mucin release, inflammation, gut microflora composition and metabolism in mice. Ecotoxicology and Environmental Safety, 220: 112340

[99] Sun R, Xu K, Yu L, Pu Y, Xiong F, He Y, Huang Q, Tang M, Chen M, Yin L, Zhang J, Pu Y (2021). Preliminary study on impacts of polystyrene microplastics on the hematological system and gene expression in bone marrow cells of mice. Ecotoxicology and Environmental Safety, 218: 112296

[100] Visalli G, Facciolà A, Ciarello M P, De Marco G, Maisano M, Di Pietro A (2021). Acute and Sub-Chronic Effects of Microplastics (3 and 10 μm) on the Human Intestinal Cells HT-29. International Journal of Environmental Research and Public Health, 18(11): 5833

[101] Wang Y-L, Lee Y-H, Hsu Y-H, Chiu I-J, Huang C C-Y, Huang C-C, Chia Z-C, Lee C-P, Lin Y-F, Chiu H-W (2021). The Kidney-Related Effects of Polystyrene Microplastics on Human Kidney Proximal Tubular Epithelial Cells HK-2 and Male C57BL/6 Mice. Environmental Health Perspectives, 129(5): 057003

[102] Wang L, Wang Y, Xu M, Ma J, Zhang S, Liu S, Wang K, Tian H, Cui J (2021). Enhanced hepatic cytotoxicity of chemically transformed polystyrene microplastics by simulated gastric fluid. Journal of Hazardous Materials, 410: 124536

[103] Wu B, Wu X, Liu S, Wang Z, Chen L (2019). Size-dependent effects of polystyrene microplastics on cytotoxicity and efflux pump inhibition in human Caco-2 cells. Chemosphere, 221: 333-341

[104] Xie X, Deng T, Duan J, Xie J, Yuan J, Chen M (2020). Exposure to polystyrene microplastics causes reproductive toxicity through oxidative stress and activation of the p38 MAPK signaling pathway. Ecotoxicology and Environmental Safety, 190: 110133

[105] Xu M, Halimu G, Zhang Q, Song Y, Fu X, Li Y, Li Y, Zhang H (2019). Internalization and toxicity: A preliminary study of effects of nanoplastic particles on human lung epithelial cell. Science of the Total Environment, 694: 133794

[106] Xu D, Ma Y, Han X, Chen Y (2021). Systematic toxicity evaluation of polystyrene nanoplastics on mice and molecular mechanism investigation about their internalization into Caco-2 cells. Journal of Hazardous Materials, 417: 126092

[107] Zheng H, Wang J, Wei X, Chang L, Liu S (2021). Proinflammatory properties and lipid disturbance of polystyrene microplastics in the livers of mice with acute colitis. Science of the Total Environment, 750: 143085