

Supporting Information

Title: Methods of analysing chemicals associated with microplastics: A review

Table S1. Sample amount of microplastics used per extraction.

Sample type and amount	No. of publications
Pellet	
5 pellets	10
10 pellets	2
25 or 30 pellets	2
≤ 1 g	7
> 1 g	6
Fragment	
≤ 1 g	2
> 1 g	4
EPS	
30 mg	1
15 mg	2
Macro-sized plastic	
≤ 1 g	1
> 1 g	1

Table 2S Summary of analytical approaches for chemicals associated microplastics collected from the marine environment.

Ref #	Sample type	Sample amount per extraction	Sampling location	Target compounds	Method			
					Extraction	Extraction solvent	Separation	Detection
2	Pellet (PP)	(no information)	Japan (B)	PCBs, DDTs	Soxhlet	Hexane	Silica	
5	Pellet (Colored)	2.5 g	Tokyo, Japan (B)	PCBs	Soxhlet	DCM	Silica	GC-ECD
6	Pellets, Fragment	1–2 g	North Pacific Gyre (B)	PCBs, PAHs	Soxhlet	DCM	–	GC-MS
7	Pellet (yellowing PE)	2–10 pellets	USA, Europe, Asia(B)	PCBs, DDTs, HCHs, PAHs	Soaking	Hexane	Silica	GC-MS, GC-ECD
8	Fragment, Pellet	0.6 g (pellet) 1.0 g (fragment)	Southern Brazil (Seabird digestive tract)	PCBs, OCPs	Soxhlet	HEX/DCM	Alumina	GC-ECD, GC-MS
9	Pellet (Colored, Aged)	2 g	Portugal (B)	PAHs, PCBs, DDTs	PAHs: ASE PCBs, DDTs: Soxhlet	PAHs: HEX/ACE PCBs, DDTs: Hexane	PAHs: Silica/Alumina PCBs, DDTs: Acid Florisil	GC-MS
10	Pellet (yellowing PE)	25 pellets	England(B)	Al, Fe, Mn, Cu, Zn, Pb, Ag, Cd, Co, Cr, Mo, Sb, Sn, U	Acid digestion	HCl/HNO ₃	–	ICP-MS, SEM-EDS
11	Pellet (PE+PP), Fragment	5 pellets	Remote/Urban (B) Open ocean(W)	PCBs, DDTs, PAHs, PBDEs, BAP, NP	Soxhlet	DCM	Silica	GC-IT-MS, GC-MS
12	Pellet (yellowing PE)	5 pellets	Greece(B)	PCBs, DDTs, HCHs, PAHs	Soaking	Hexane	Silica	GC-MS/MS, GC-ECD
13	Pellets, Fragment, PS foam, rubber	5 g	California, USA(B)	PAHs, PCBs, DDTs	Ultrasonication	HEX/ACE	Silica base SPE	GC/MS
14	Plastic litter (PVC float, PE, PP, PET, PVC, EPS)	(no nformation)	Japan (B)	Cr, Cd, Sn, Sb, Pb	–	–	–	X-ray fluorescence analyzer (XRF)
15	Pellet (yellowing PE)	5 pellets	Coasts & Remote island (B)	PCBs, DDTs, HCHs	Soaking	Hexane	Silica	GC-MS
16	Pellet ((PE)	5 pellets	South Africa(B)	PCB, DDTs, HCHs	Soaking	Hexane	Silica	GC-ECD
17	Pellet (PVC,PE, PP, PET, PS; field deployment)	(no nformation)	San Diego Bay (W)	PAHs	Ultrasonication	HEX/ACE	Silica base SPE	GC/MS
18	Pellet (PET, HDPE, PVC, LDPE, PP; field deployment)	2 g	San Diego Bay, USA (W)	PAHs, PCBs, DDTs	Ultrasonication	HEX/ACE	Silica base SPE	GC/MS
19	Pellet (Colored, Aged)	1 g	Portugal (B)	PCBs, DDTs, PAHs	-PAHs: Accelerated solvent extractor -PCB,DDTS: Soxhlet	PAHs: HEX/ACE PCB, DDTS: Hexane	PAHs: Silica/Alumina PCB, DDTS: Florisil	GC-MS, GC-ECD
20	Pellet (yellowing PE)	5 pellets	Portugal (B)	PCBs, DDTs, PAHs, Hopanes	Soaking	Hexane	Silica	GC-MS
21	Fragment	(no nformation)	North Pacific Ocean (Seabird stomach)	PBDEs	Soxhlet	DCM	Silica	GC-IT-MS
22	Pellet	1 g	Brazil (B)	PAHs	Soxhlet	HEX/DCM	Silica/Alumina	GC-MS
23	Pellet	1 g	Brazil (B)	PAHs	Soxhlet	(No description)	Silica/Alumina	GC-MS
24	Styrofoam (EPS)	15 mg	Baltic Sea (B)	Hg	–	–	–	Pyrolysis mercury analyzer AMA 254
25	Pellet (PET, HDPE, PVC, LDPE, PP; field deployment)	30 pellets	San Diego Bay(W)	Cr, Ni, Zn, Fe, Mn, Co, Pb	Acid digestion	HNO ₃ /HCl	–	ICP-MS
26	Fragment	BAP: 1 g APs: 2 g PCB,PBDE: 5 g	South Atlantic Gyre(W)	PBDEs, PCBs, BPA, APs	So aking	DCM	•Bisphenol A: Waters Oasis HLB cartridge •Alkylphenols: SPE •PCB,PBDE: Acid/base silica, Florisil, Alumina	LC/MS/MS,GC/HRMS
27	Pellet (yellowing PE)	5 pellets	Asia (B)	PCBs, PBDEs	Soaking	Hexane	Silica	GC-MS, GC-ECD
28	Pellet (yellowing PE)	5 pellets	Ghana (B)	PCBs, PAHs	Soaking	Hexane	Silica	GC-MS, GC-ECD
29	Pellet	1 g	Greece(B)	PFASs	Ultrasonication	Methanol	–	LC-MS/MS

30	Pellet (yellowing PE)	5 pellets	Australia & New Zealand (B)	PCBs, DDTs, HCHs	Soaking	Hexane	Silica	GC-MS
31	Pellet (yellowing PE)	5 pellets	Mumbai (B)	PCBs, OCPs	Soaking	Hexane	Silica	GC-ECD
32	Plastic debris (Fiber, fragment, bag)	0.15–0.60 g	Belgium (B)	Non-target screening; PCBs, PAHs: quantitation	Soxhlet	HEX/DCM	Silica (fractionation, derivatization)	GC-ITMS
33	Pellet (weathered, transparent) Fragment (PE, PU, PE/PP, PP; less than 1cm)	1 g	North Pacific Gyre (W)	PCB, DDTs, HCHs	Soxhlet	DCM	Silica	GC-MS
34	Plastic debris (PE, PP, PET, PE/PP, acrylic/styrene)	0.3 g	Korea (B)	Non-target screening	Soxhlet	DCM	–	GC-MS
35	Pellet	10 pellets	China (B)	PCBs, OCPs, PAHs	Ultrasonication	Hexane	Silica/Florisil	GC-ECD, GC-MS
36	Fragment	2 g	Norway (Seabird stomach)	PCBs, PBDEs, DDTs	Ultrasonication	HEX/ACE	GPC, Florisil SPE	Quattro micro TM mass spectrometer
37	Pellet (yellowing PE)	5 pellets	Vietnam (B)	PCB, DDTs, HCHs	Soaking	Hexane	Silica	GC-MS, GC-ECD
38	Styrofoam (EPS)	0.03 g	Korea (W)	HBCDs	Soaking	DCM	–	HPLC-MS/MS
39	Pellet (yellowing)	1 g	Brazil (B)	PCBs, DDTs, PAHs,	Soxhlet	DCM/HEX	Alumina	GC-MS, GC-ECD

B: beach, W: water column, HEX: hexane, DCM: dichloromethane, CAN: acetonitrile