

APPENDIX IV – PLASTIC CONTAMINANTS (POLYMER TYPES, ASSOCIATED AND SORBED CONTAMINANTS)

Table 1. Complete table of all organic contaminants identified as the most commonly researched polymer types and corresponding number of publications in ASEAN+3 and regulation status under international law. An expansion of Table 1.2.14.8 in the report. Legend: Red = not regulated under any of the three conventions (London Convention/London Protocol, Basel Convention and the Stockholm Convention); Green = under the regulation of at least 1 of the mentioned conventions.

Organic contaminants (plastic polymer types)			
Regulated	No. of papers	Unregulated	No. of papers
Polyethylene (PE)	125	Polyvinyl chloride (PVC)	56
Polypropylene (PP)	107	Expanded polystyrene (EPS)	31
Polystyrene (PS)	95	Styrene-acrylonitrile (SAN)	23
Polyethylene terephthalate (PET or PETE or or PETP or PET-P)	64	Low-density polyethylene (LDPE)	19
Polyamides (PA)	39	Nylon	19
Polyurethane (PU or PUR)	12	Cellophane (CP)	15
Acrylic polymers	11	Polyester	15
Polycarbonate (PC)	10	Rayon/viscose	11
Alkyd	7	High-density polyethylene (HDPE)	10
Polyvinyl alcohol (PVA)	5	Ethylene-vinyl acetate (EVA) or Polyethylene-vinyl acetate (PEVA)	7
Polymethyl methacrylate (PMMA)	4	Polyethylene-polypropylene copolymer (PEP or PE/PP)	7
Acrylonitrile butadiene styrene (ABS)	3	Polyethersulfone (PES)	6
Polybutylene terephthalate (PBT)	3	Polyethyl acrylate	6
Styrene	3	Polytetrafluoroethylene (PTFE)/teflon	6
Synthetic cellulose	2	Resin	6
Acrylonitrile (AN)	1	Polycaprolactone (PCL)	3
Epoxy resins	1	Polyoxymethylene (POM)	3
Polycarbonate/acrylonitrile butadiene styrene (PC/ABS)	1	Vinyl	3
Polyphenylene sulphides (PPS)	1	Polyacrylate/styrene	2
Polysiloxanes/silicones	1	Polyethylene propylene diene (PEPD)	2
Polyvinyl acetate (PVAC)	1	Polypropylene/ethylene-propylene rubber (PP/EPR)	2

Urethane alkyd	1	Styrene-acrylate	2
Melamine formaldehyde resins	0	Wax	2
Phenol formaldehyde resins	0	Acrylonitrile styrene acrylate (ASA)	1
Polyacetals	0	Cellulose (CL)	1
Polyvinyl butyral	0	Dipar	1
Urea formaldehyde resins	0	Epoxy	1
Alkanes C10-C13	Too generic?	Ethylene propylene diene monomer (EDPM)	1
Butadiene	Too generic?	Extruded polyester (XPS)	1
Ethers	Too generic?	Foamed polystyrene (FPS)	1
Ethylene	Too generic?	General purpose polystyrene (GPPS)	1
Mixed PE, PP and PET	Too generic?	Linear low-density polyethylene (LLDPE)	1
Polyether	Too generic?	Medium-density polyethylene (MDPE)	1
		Paraffin	1
		Phenoxy resin	1
		Poly(1-butene) (PB)	1
		Poly(1-octene)	1
		Polyacrylonitrile (PAN)	1
		Polyarylamide (PAA/PARA)	1
		Polyarylether (PAE)	1
		Polybutadiene (PBD)	1
		Polybutyl methacrylate (PBMA)	1
		Polybutylene adipate terephthalate (PBAT)	1
		Polychlorinated biphenyl (PCB)	1
		Polyester alkyd (PAK)	1
		Polyethyl acrylate styrene	1
		Polyethylene/ethylacrylate copolymer	1
		Polyisoprene/polystyrene	1

	Polyphenylene	1
	Polypropylene/ethylene-propylene-diene terpolymer (PP/EPDM)	1
	Polystyrene-(ethylene-butylene)-styrene	1
	Polysulfone (PSUL)	1
	Polyvinyl sulfite	1
	Polyvinylidene dichloride (PVDC)	1

Table 2. All plastic-associated organic contaminants with indication of research effort in ASEAN+3 and international regulations. An expansion of Table 1.2.14.9 in the report. Legend: Red = not regulated under any of the three conventions (London Convention/Protocol, Basel Convention and the Stockholm Convention); Green = under the regulation of at least 1 of these conventions.

Organic contaminants (plastic-associated)			
Regulated	No. of papers	Unregulated	No. of papers
Hexabromocyclododecane (HBCDD)	9	Polycyclic aromatic hydrocarbon (PAHs)	10
Polychlorinated biphenyls (PCB)	9	Hexachlorocyclohexane (HCH): Gamma hexachlorocyclohexane	6
Hexachlorocyclohexane (HCH): Alpha hexachlorocyclohexane	6	Hexachlorobenzene (HCBs)	5
Hexachlorocyclohexane (HCH): Beta hexachlorocyclohexane	6	Hexachlorocyclohexane (HCH): Delta hexachlorocyclohexane	5
Dichlorodiphenyltrichloroethanes (DDTs)	4	UV326/Tinuvin 326	4
Polybrominated diphenyl ethers (PBDEs)	4	Bisphenol-A (BPA) and its analogues	3
Pentachlorobenzene (PeCB)	3	Irgafos168 and its 2 degradation products: 2,4-di-tert-butylphenol (2,4-DTBP) and tris(2,4-di-tert-butylphenyl)phosphate2)	3
Organic phosphorus compounds	2	UV327	3
Aldrin	1	Dichlorodiphenyldichloroethylenes (DDEs)	2
Chlordane	1	Irganox 1076	2
Dieldrin	1	Nonylphenol (NPs) and its antioxidants, plasticisers, and degradation products	2
Endrin	1	UV320	2
Heptachlor	1	UV328	2
Perfluorooctane sulfonic acid (PFSO), its salts and perfluorooctane sulfonyl fluoride	1	Benzophone-3 (BP-3)	1

Organic cyanides	0	Butylated hydroxytoluene (BHT)	1
Organohalogen compounds	0	Hexanoic acid, 2-ethyl-, hexadecylester (HEHA)	1
Organosilicon compounds	0	Irganox 1010	1
Perfluorohexane sulphonic acid (PHSxS), its salts and PHFxS-related compounds	0	Nonachlor	1
Phenols; phenol compounds including chlorophenols	0	Perfluorooctane sulfonamide (PFOSA)	1
Polychlorinated dibenzo-furan (Any congener of)	0	Phthalates esters/phthalic acid esters (PAEs)	1
Polychlorinated dibenzo-p-dioxin (Any congener of)	0	Polyhalogenated carbazole (PHCs)	1
Short-chain chlorinated paraffins (SCCPs)	0	Tris-(2,3-dibromopropyl) isocyanurate (TBC)	1
Technical endosulfan and its related isomers	0	UvinualMC80	1
		UV531/BP-12	1
		4-methylbenzylidene camphor (4-MBC)	1
		Pharmaceutical drugs	
		Tetracycline (TC)	4
		Sulfamethoxazole (SMX)	3
		Ciprofloxacin (CIP)	2
		Sulfamethazine (SMT)	2
		Amoxicillin (AMX)	1
		Cephalosporin (CEP)	1
		Propranolol (PRP)	1
		Sertraline (SER)	1
		Sulfadiazine (SDZ)	1
		Trimethoprim (TMP)	1
		Tylosin (TYL)	1
		Antimicrobial agents	
		Triclosan (TCS)	2
		PPCPs (pharmaceuticals and personal care products)	

	Synthetic musks (SMs)	1
	Others	
	Lubrication oil	1
	17b-Estradiol, E2	1

Table 3. All plastic-associated inorganic contaminants (mostly heavy metal or its compound) with indication of research effort in ASEAN+3 and in international regulations. An expansion of Table 1.2.14.10 in the report. Legend: Red = not regulated under any of the three conventions (London Convention/Protocol, Basel Convention and the Stockholm Convention); Green = under the regulation of at least 1 of these conventions.

Inorganic contaminants (heavy metals and/or its compounds)			
Regulated	No. of papers	Unregulated	No. of papers
Lead (Pb) and lead compounds	6	Manganese (Mn)	1
Cadmium (Cd) and cadmium compounds	5	Strontium (Sr)	1
Copper (Cu)	5	Tin (Sn)	1
Zinc (Zn)	3	Aluminium (Al)	0
Arsenic (As)	2	Astatine (At)	0
Chromium (Cr) and Hexavalent chromium compounds	2	Barium (Ba)	0
Nickel (Ni)	2	Cesium (Cs)	0
Antimony (Sb); antimony compounds	1	Cobalt (Co)	0
Mercury (Hg) and mercury compounds	1	Molybdenum (Mo)	0
Asbestos (silicate dust and fibres)	0	Silver (Ag)	0
Beryllium (Be)	0	Titanium (Ti)	0
Cyanides - Inorganic cyanides	0	Uranium (U)	0
Fluorides - Inorganic fluorine compounds excluding calcium fluoride	0		
Iron (Fe)	0		
Selenium (Se) and selenium compounds	0		
Tellurium (Te) and tellurium compounds	0		
Vanadium (V)	0		