nature protocols

https://doi.org/10.1038/s41596-023-00886-9

Protocol

Check for updates

Exposure protocol for ecotoxicity testing of microplastics and nanoplastics

In the format provided by the authors and unedited

Exposure protocol for ecotoxicity testing of microplastics and nanoplastics

Fazel Abdolahpur Monikh[1, 2] *, Anders Baun [3], Nanna B. Hartmann[3], Raine Kortet [2], Jarkko Akkanen[2], Jae-Seong Lee [4], Huahong Shi [5], Elma Lahive [6], Emilia Uurasjärvi [7], Nathalie Tufenkji [8], Korinna Altmann [9], Yosri Wiesner [9], Hans-Peter Grossart [10,11], Willie Peijnenburg [12,13], Jussi V.K. Kukkonen[2]

[1]* Department of Chemical Sciences, University of Padua, via Marzolo 1 – 35131 Padova, Italy

[2] Department of Environmental and Biological Sciences, University of Eastern Finland, Joensuu/Kuopio, Finland

[3] Department of Environmental & Resource Engineering, Technical University of Denmark, Bygningstorvet, Bygning 115, 2800 Kgs. Lyngby, Denmark

[4] Department of Biological Sciences, College of Science, Sungkyunkwan University, Suwon 16419, South Korea

[5] State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai 200241, China

[6] UK Centre for Ecology and Hydrology, Maclean Building, Benson Lane, Crowmarsh Gifford, Oxfordshire OX10 8BB, UK

[7] SIB Labs, University of Eastern Finland, P.O. Box 1627, 70211 Kuopio, Finland

[8] Department of Chemical Engineering, McGill University, Montreal, Quebec, Canada H3A 0C5

[9] Federal Institute of Material Research and Testing (BAM), Unter den Eichen 87, 12205 Berlin, Germany

[10] Department of Plankton and Microbial Ecology, Leibniz Institute for Freshwater Ecology and Inland Fisheries, 16775 Stechlin, Germany

[11] Institute for Biochemistry and Biology, Potsdam University, Maulbeerallee 2, 14469 Potsdam, Germany

[12] Institute of Environmental Sciences (CML), Leiden University, Leiden, The Netherlands

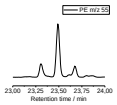
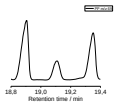
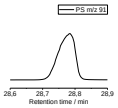
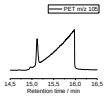
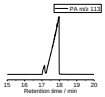
[13] National Institute of Public Health and the Environment (RIVM), Center for Safety of Substances and Products, Bilthoven, The Netherlands

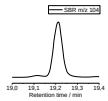
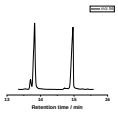
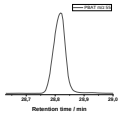
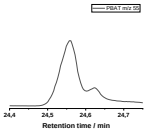
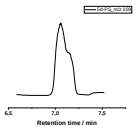
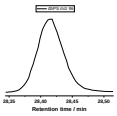
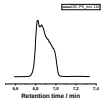
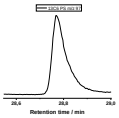
* *Corresponding Author*

Email: Fazel.Monikh@unipd.it, fazel.monikh@unipd.it

ORCID: Fazel A. Monikh 0000-0001-9500-5303

Supplementary Table. Pyrolysis products to identify and quantify the polymers with the TED-GC/MS

Polymer	Mass spectra example	Specific pyrolysis products	Mass traces for identification (m/z)	Mass traces for quantification (m/z)	Limit of detection (µg)	Mass recommended for spiking (µg)
Polyethylene		Tetradecadiene Pentadecadiene Hexadecadiene	55, 81, 95, 109	81	2.2	100-200
Polypropylene		Tetrametylundec-10-ene Tetrametylundec-10-ene Tetrametylundec-10-ene	111, 69, 154, 210	111	0.14	50-150
Polystyrene		Styrene 2,4-Diphenyl-1-butene	51, 78, 104 91, 104, 130, 208	104 91	0.08	5-20
Polyethylene terephthalate		Ethylbenzoate Benzoic acid	77, 105, 122, 150 51, 77, 105, 122	105 and 150 105	0.24	150-300
Polyamide 6		Caprolactam	55, 67, 85, 113	113	0.24	50-150

Styrene-butadiene rubber		Cyclohexenylbenzene	104, 115, 129, 158	104	0.06	5-20
Polylactic acid		PLA: 3,6-Dimethyl-1,4-dioxan-2,5-dione PLA*: 3,6-Dimethyl-1,4-dioxan-2,5-dione	43, 45, 56, 144	56	0.39	150-300
Polybutylene adipate terephthalate	 	PBAT: Adipic acid dibut-3-enyl ester PBAT: 1.6-Dioxacyclododecane-7,12-dione	55, 111, 129, 183 55, 84, 100, 172	55 55	0.07	100-200
Internal standard (d5-Styrene)	 	d5-Styrene 2,4-d10-Diphenyl-1-butene	54, 82, 109 96, 109, 134, 218	109 96		4
Internal standard ($^{13}C_6$-Styrene)	 	($^{13}C_6$)-Styrene 2,4-Di-($^{13}C_6$)-phenyl-1-butene	54, 82, 110 97, 110, 136, 220	110 97		4