***Supplementary Information for***

Quantification of Microplastics in North-Western Mediterranean Harbours: Seasonality and Biofilm-related Metallic Contaminants

Javier A. Tesán Onrubia1\*, Kahina Djaoudi1,2, Franco Borgogno3, Susana Canuto3, Bernard Angeletti4, Giovanni Besio5, Marco Capello6, Laura Cutroneo6, Alessandro Stocchino7, Stéphane Mounier1, Véronique Lenoble1\*

1Aix-Marseille Univ., Université de Toulon, CNRS, IRD, MIO UM 110, 13288, Marseille, France

2Department of Molecular and Cellular Biology, the University of Arizona, Tucson, Arizona, 85721, USA.

3European Research Institute, via Pinelli 24/d, 10144 Torino, Italy

4Aix Marseille Univ, CNRS, IRD, INRA, Coll France, CEREGE, Aix-en-Provence, France

5Dipartimento di Ingegneria Civile, Chimica e Ambientale, Università degli Studi di Genova, 1 Via Montallegro, 16145 Genoa, Italy

6Dipartimento di Scienze della Terra dell'Ambiente e della Vita, Università degli Studi di Genova, Corso Europa 26, 16132 Genova, Italy

7Department of Civil and Environmental Engineering, The Hong Kong Polytechnic, University, Hung Hom, Kowloon, Hong Kong

\* Correspondence: JTO: javier.tesan@mio.osupytheas.fr, VL: lenoble@univ-tln.fr

**This file includes:**

Tables S1 to S3

**Table S1.** Trace metal mass-related concentrations in biofilm extracted from microplastics at the different sites (TLN: Toulon, GEN: Genova and OLB: Olbia), seasons (W: winter and S: summer), zones. F = ANOVA’s Fisher statistics and p = p-value. <DL : Under detection limits.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **Site** | **Pb** | **Fe** | **Cu** | **V** | **Cd** | **As** |
| *mg.kg-1* | *mg.kg-1* | *mg.kg-1* | *mg.kg-1* | *µg.kg-1* | *µg.kg-1* |
| TLN-W-TW | **TLN** | 1.82 | 22.0 | 2.54 | 1.53 | 2.6 | 862 |
| TLN-W-TE | <DL | 181.8 | 46.03 | 1.98 | 2821.3 | 400 |
| TLN-S-TW | 0.66 | 7.8 | 15.06 | 1.11 | 23.6 | 444 |
| TLN-S-TE | 2.08 | 71.3 | 2.57 | 1.09 | 9.98 | 504 |
| GEN-W-TW | **GEN** | 11.72 | 89.8 | 6.00 | 2.15 | <DL | 185 |
| GEN-W-TE | 3.78 | 37.6 | 12.74 | 0.40 | <DL | <DL |
| GEN-W-TO | 7.97 | 187.2 | 23.32 | 1.25 | <DL | <DL |
| GEN-S-TW | 1.34 | 10.0 | 3.25 | 0.70 | 5.2 | 273 |
| GEN-S-TE | 1.89 | 5.2 | 3.25 | 0.51 | 1.0 | 211 |
| OLB-W-TW | **OLB** | 3.79 | 80.4 | 0.73 | 0.31 | 1.7 | 258 |
| OLB-W-TE | 12.98 | 25393.3 | 29.58 | 21.50 | 176.0 | 969 |
| Analysis of variance | | H=4.06 | H=2.00 | H=0.06 | H=0.65 | H=2.00 | H=4.31 |
| p=0.131 | p=0.367 | p=0.968 | p=0.720 | p=0.367 | p=0.115 |

**Table S2.** Bioconcentration factors (BCF) of trace metals in biofilm extracted from microplastics at the different sites (TLN: Toulon, GEN: Genova and OLB: Olbia), seasons (W: winter and S: summer), zones (TW: west, TE: east and TO: outer transect). <DL : Under detection limits.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **Pb** | **Fe** | **Cu** | **V** | **Cd** | **As** |
| *L.kg-1* | *L.kg-1* | *L.kg-1* | *L.kg-1* | *L.kg-1* | *L.kg-1* |
| TLN-W-TW | 5.19E+04 | 7.44E+03 | 2.83E+04 | 8.57E+02 | 3.24E+02 | 6.63E+02 |
| TLN-W-TE | <DL | 6.14E+04 | 5.11E+05 | 1.11E+03 | 3.53E+05 | 3.08E+02 |
| TLN-S-TW | 1.89E+04 | 2.62E+03 | 1.67E+05 | 6.23E+02 | 2.94E+03 | 3.42E+02 |
| TLN-S-TE | 5.93E+04 | 2.41E+04 | 2.86E+04 | 6.10E+02 | 1.25E+03 | 3.88E+02 |
| GEN-W-TW | 3.35E+05 | 3.03E+04 | 6.67E+04 | 1.21E+03 | <DL | 1.42E+02 |
| GEN-W-TE | 1.08E+05 | 1.27E+04 | 1.42E+05 | 2.23E+02 | <DL | <DL |
| GEN-W-TO | 2.28E+05 | 6.32E+04 | 2.59E+05 | 6.99E+02 | <DL | <DL |
| GEN-S-TW | 3.84E+04 | 3.38E+03 | 3.61E+04 | 3.93E+02 | 6.56E+02 | 2.10E+02 |
| GEN-S-TE | 5.41E+04 | 1.77E+03 | 3.61E+04 | 2.84E+02 | 1.20E+02 | 1.62E+02 |
| OLB-W-TW | 1.08E+05 | 2.72E+04 | 8.08E+03 | 1.73E+02 | 2.13E+02 | 1.99E+02 |
| OLB-W-TE | 3.71E+05 | 8.58E+06 | 3.29E+05 | 1.21E+04 | 2.20E+04 | 7.45E+02 |

**Table S3.** Trace metal surface-related concentrations in biofilm extracted from microplastics and macroplastics in Genova. H = Kruskal-Wallis χ2 statistics, F = ANOVA’s Fisher statistics and p = p-value.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **Type** | **Pb** | **Fe** | **Cu** | **V** | **Cd** | **As** |
| *ng.cm-2* | *ng.cm-2* | *ng.cm-2* | *ng.cm-2* | *pg.cm-2* | *ng.cm-2* |
| GEN-W-TW | Microplastics | 56.8 | 434.7 | 29.1 | 10.4 | <DL | 0.9 |
| GEN-W-TE | Microplastics | 23.8 | 236.6 | 80.1 | 2.5 | <DL | <DL |
| GEN-W-TO | Microplastics | 40.8 | 959.4 | 119.6 | 6.4 | <DL | <DL |
| GEN-S-TW | Microplastics | 14.6 | 108.7 | 35.3 | 7.6 | 57.0 | 3.0 |
| GEN-S-TE | Microplastics | 37.6 | 104.1 | 64.6 | 10.1 | 19.1 | 4.2 |
| GEN-MACRO1 | Macroplastics | 0.8 | 25.5 | 6.6 | 0.7 | 5.5 | 0.3 |
| GEN-MACRO2 | Macroplastics | 2.4 | 5.2 | 1.8 | 0.4 | 10.2 | 0.2 |
| GEN-MACRO4 | Macroplastics | 4.0 | 36.7 | 42.3 | 1.2 | <DL | 0.2 |
| GEN-MACRO6 | Macroplastics | 1.0 | 106.3 | 5.1 | 1.2 | 2.4 | 1.0 |
| Analysis of variance | | H=6.00 | H=4.86 | F=6.46 | F=15.77 | H=3.00 | H=13.13 |
| p<0.05 | p<0.05 | p<0.05 | p<0.05 | p=0.083 | p=0.077 |