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# Microplastics in freshwater biotic and abiotic matrices sampled in the Loire River (France) and their ecotoxicology effects on *Corbicula fluminea*

Alice Vidal<sup>\*†1</sup>, Isabelle Metais<sup>1</sup>, Oihana Latchere<sup>1</sup>, Dider Georges<sup>1</sup>, Hanane Perrein<sup>1</sup>, Mohammed Mouloud<sup>1</sup>, Antoine Le Guernic<sup>1</sup>, Ngoc Nam Phuong<sup>2</sup>, Johnny Gasperi<sup>2</sup>, and Amélie Chatel<sup>‡1</sup>

<sup>1</sup>Laboratoire BIOSSE – Université Catholique de l'Ouest, Angers – 3 Place André Leroy, 49100, Angers, France

<sup>2</sup>Laboratoire Eau Environnement – Université Gustave Eiffel – Allée des ponts et chaussées - CS 5004 44344 Bouguenais, France

## Abstract

The diffuse and invisible pollution caused by microplastic (MP) represents a current and global concern. While the fragmentation of plastic debris into smaller particles occurs in rivers, few data about MP effects are available on freshwater streams compared to the marine environment. Also, still too few studies combine *in situ* approach with the assessment of the effects of MP on organisms. Plastic-Loire project, funded by the urban community of Angers Loire Métropole, demonstrates its innovation through the complementary field/laboratory approach that aims at characterizing *in situ* contamination of MP in the Loire river and at evaluating MP effects on a freshwater bivalve. Firstly, MP primary characteristics (concentration, size, type, shape and colour) were determined both in sediment and in biotic matrices (polychaetes and bivalves) sampled in the Loire, longest river in France. In parallel, the ecotoxicity of MP was assessed on bivalves *C. fluminea* in laboratory. Organisms were exposed during 21 days to field derived MP, at 4 concentrations (0.008, 10, 100 and 500  $\mu\text{g.L}^{-1}$ ). The exposure experiment was realized from an ecological realistic point of view: exposure of organisms to MP with a shape, a composition and a range of concentration similar to those found in the environment. While the condition index and the filtration capacity were not impacted by a MP exposure, the measured biochemical biomarkers involved in immune responses (CAT, GST, AchE and MDA) presented significant differences in digestive mass and gills of the organisms according to the MP concentration.

**Keywords:** Microplastics, in situ sampling, biomarkers, laboratory exposure, *C. fluminea*

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<sup>\*</sup>Speaker

<sup>†</sup>Corresponding author: a Vidal@uco.fr

<sup>‡</sup>Corresponding author: a Chatel@uco.fr