
EFFECTS ON ZEBRAFISH OF CHEMICAL CONTAMINANTS AND ADDITIVES PRESENT IN MICROPLASTICS

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Abstract

Plastic pollution is an emerging threat with serious consequences for animal health and the environment. Among them, microplastics (MPs) with a size below 5mm are the ones that could cause harmful effects to biota since they can be ingested by a wide variety of species. The risks associated with these small fragments come from the material itself and the chemical contaminants that are absorbed into it from the surrounding water. To assess bioaccumulation in tissues, a feeding study of 4 treatments was conducted with zebrafish for 60 days. Exposure experiments were carried out through the diet (10% of total) and two more experiments, one using clean pellets from a factory and a blank control experiment without MPs in the fish diet. The analysis of chemical pollutants was by liquid chromatography coupled to a high-resolution mass spectrometry (LC-HRMS).

Our results verify the bioaccumulation of chemical pollutants in zebrafish tissues, also over the time. In addition, in some cases, pollutants have more tendency to adsorb to microplastics instead of being desorbed. The family of plasticizers show most of the compounds in level 2 of identification, while plastic synthesizers were quantified as the highest concentration in zebrafish tissues, followed by plasticizers.

Our main findings support the hypothesis that, in this real scenario, plastic additives and chemical contaminants adsorbed on environmental microplastics (EMPs) bioaccumulate in the fish tissues due to long-term ingestion of MPs.

Keywords: Microplasticis, Plastic additives, Canary Islands, Zebrafish experiment, HRMS

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