



“Hepatic gene expression in the European sea bass (*Dicentrarchus labrax*) experimentally exposed to PVC microplastics”

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ABSTRACT

The effects of microplastics (MPs; <1 mm) on fish species are still under debate. Few species have shown toxicological or physical impact due to the ingestion of MPs, as liver toxicity or alteration of intestinal tissues. The European seabass (*Dicentrarchus labrax*) is one of the most consumed fish species in Europe and it is potentially exposed to the ingestion of MPs both in its natural habitat and in the aquaculture plants. We measured, by quantitative Real-Time PCR, the variation of four different early warning signals in the liver of the European sea bass exposed for 90 days to virgin (MPV) and marine polluted PVC (MPI) MPs supplemented with food. The selected genes are: the TNF receptor associated factor 3 (TRAF3), the Peroxisome Proliferators Activator Receptors (PPAR α/γ), the Estrogen Receptor alpha (ER α). The mRNA levels were quantified on 66 fish at time 0, after 30, 60 and 90 days of exposure to the two treatments (MPV and MPI) and control. The expression of TRAF3 is down-regulated with increasing time of exposure. The ER α mRNA levels are higher in the control compared to MPI and MPV for all the exposures, suggesting an upregulation of the gene related to contaminated food pellets. On the contrary, the PPAR α gene expression increases over the time from 60 to 90 days of exposure. The PPAR γ seems to be mostly affected by the MPV exposure, suggesting an effect due to leaching of plastic additives from PVC. This study represents one of the first investigation on the effects of the exposure to virgin and marine polluted PVC MPs on an edible species, which shows an early warning signal on the chemical and physical hepatic stress on this species. Further data are needed to better understand the role of the partitioning of chemicals from and to MPs and the related effects on fish and, potentially, on human health.