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Antònia Solomando, **Xavier Capó**, **Carme Alomar**, **Montserrat Compa**, José María Valencia, Antoni Sureda, **Salud Deudero**, 2022.

[Assessment of the effect of long-term exposure to microplastics and depuration period in *Sparus aurata* Linnaeus, 1758: Liver and blood biomarkers.](#)

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Abstract: The constant increase in plastic pollution has attracted great attention in recent years due to its potential detrimental effects on organisms and ecosystems. While the consequences of ingestion of large plastic litter are mostly understood, the impacts resulting from a long-term exposure and a recovery period of microplastics (MPs) are still limited. The aims were to monitor oxidative stress, detoxification and inflammatory biomarkers in liver, plasma and erythrocytes of *Sparus aurata* exposed during 90 days to low-density polyethylene (LDPE)-MPs enriched diet (10% by weight) followed by 30 days of depuration. Exposure to LDPE-MPs progressively activates the antioxidant and detoxification system and induces an inflammatory response in liver and plasma, whereas no significant changes were observed in erythrocytes. The plasma activities of catalase, myeloperoxidase (MPO), lysozyme and the levels of malondialdehyde (MDA) as maker of lipid peroxidation significantly increased after exposure to LDPE-MPs for 90 days compared to the control group. The activities of all antioxidant enzymes – catalase, superoxide dismutase, glutathione peroxidase and glutathione reductase-, the detoxification enzyme glutathione s-transferase, MPO, the production of reactive oxygen species and the levels of MDA were also significantly increased in liver after MPs exposure. Additionally, all these biomarkers tended to recover during the depuration period, most of them reaching similar levels to those of the control group. In conclusion, the ingestion of a diet containing LDPE-MPs for 90 days induced a progressive increase in oxidative stress and inflammation biomarkers in liver and plasma of *S. aurata* but not in erythrocytes, which tended to regain control values when not exposed to MPs for 30 days. The present study contributes to a better understanding of the toxic effects of MPs in

S. aurata

and highlights the usefulness of plasma that can be obtained in a minimally invasive way to monitor these effects.

Keywords: Microplastics, Polyethylene, Oxidative stress, Immune response, Aquaculture, Fish