{rokbox title=|Map of the locations of the sampling sites in the surrounding waters of the Cabrera Archipelago Maritime-Terrestrial National Park :: Image: Authors|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-biomarker-approach-responses-capo-2022-thumb-et-al.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-biomarker-approach-responses-capo-2022-et-al.jpg{/rokbox}

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A Biomarker Approach as Responses of Bioindicator Commercial Fish Species to Microplastic Ingestion: Assessing Tissue and Biochemical Relationships.
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Abstract:Plastic debris is a growing environmental problem on a global scale, as plastics and microplastics (MPs) can be ingested by marine organisms, inducing toxic effects. The aim of this study was to assess MP intake and antioxidant responses in three bioindicator species: red mullet, bogue, and anchovy (Mullus surmuletus, Boops boops, and Engraulis encrasicolus, respectively) for plastic contamination in the Mediterranean Sea. MP intake was assessed in the gastrointestinal tract of the fish. Further, several enzymes from both the liver and brain were analysed. The antioxidant defences, catalase (CAT) and superoxide dismutase (SOD), as well as the detoxifying enzyme glutathione-S-transferase (GST), were measured in both tissues. The acetylcholine esterase (AchE), as an indicator of neuronal damage, was measured in the brain. Malondialdehyde (MDA) was analysed as a marker of oxidative damage in the brain and liver samples. Total MP intake and MP typology differed between the three species, with M. surmuletus showing the lowest intake of MPs, while B. boops showed the highest intake of MPs. An increase in both antioxidant enzymes was evidenced in E. encrasicolus liver activity with respect to MP intake. In brain samples, an increase in CAT activity was found in M. surmuletus and B. boops as a consequence of MP ingestion. SOD activity in the brain increased in B. boops and E. encrasicolus that had ingested MPs. GST activity increased in the liver of M. surmuletus' and in brains of B. boops that had ingested MPs. The intake of MPs is species related, as well as being inherently linked to the habitat they live in and being able to induce a light activation of species-specific detoxifying and antioxidant mechanisms.

Keywords:oxidative stress,microplastics,biomarkers,detoxification.