As emerging contaminants, microplastics (MPs) have raised concerns within the aquaculture sector due to plastic pollution levels in aquatic environments and their presence in various stages of seafood production (FAO, 2022). Indeed, the aquaculture sector is the fastest-growing food industry, becoming a vital contributor to human nutrition through the production of over 50% of fish in markets (B´en´e et al., 2016; FAO, 2022). MPs may also carry other contaminants incorporated during plastic manufacturing or adsorbed through environmental exposure, which may further compromise human health (Campanale et al., 2020; Liu et al., 2022). For that reason, MP presence in food commodities, including seafood, has become a global food safety concern (Garrido Gamarro and Constanzo, 2022). MPs are plastic particles smaller than 5000 μm (GESAMP, 2016) and can reach aquaculture systems from several exogenous and endogenous sources. Exogenous MPs may originate from human activities and reservoir environments, such as the surrounding atmosphere and water bodies (Chen et al., 2021; Zhou et al., 2021). The occurrence of MPs has been widely reported in many aquatic ecosystems (Ajith et al., 2020; Stenger et al., 2021), including in regions with elevated aquaculture production (Chen et al., 2020; Feng et al., 2019; Lin et al., 2022; Ma et al., 2020; Wu et al., 2020; Xiong et al., 2022). Farmed fish can also be exposed to other external MP sources, like fish feed, that may be contaminated by the ingredients, such as fishmeal, or during the different stages of the feed production process (Gündogdu ˘ et al., 2021; Karbalaei et al., 2020; Rahman et al., 2022; Thiele et al., 2021; Wang et al., 2022). Endogenous MPs may originate from the weathering of plastic components used in aquacultures. Fish exposure to these MPs may depend on the reliance of aquaculture systems on plastic compo nents (e.g., fishing gear, tanks, and filters), and their potential release into the water system (Lu et al., 2019; Wu et al., 2020). The uptake of MPs has been reported in several commercial fish species, including Nile tilapia (Oreochromis niloticus), Atlantic salmon (Salmo salar), common carp (Cyprinus carpio), European seabass (Dicentrarchus labrax) and gilthead seabream (Sparus aurata), either collected from the wild or farmed in cages and ponds (Aiguo et al., 2022; Alomar et al., 2022; Barboza et al., 2020; Corami et al., 2022; Dehm et al., 2022; Ferrante et al., 2022; Garcia et al., 2021; Guilhermino et al., 2021; Kılıç, 2022; Liboiron et al., 2019; Reinold et al., 2021; Sanchez-Almeida ´ et al., 2022; Savoca et al., 2021). Recirculation aquaculture systems (RAS) provide an opportunity for seafood production to address environmental sustainability since it is based on the principles of nutrient recycling, reduced water usage and improvement of waste management (Belton et al., 2020; Naylor et al., 2021). Current technology in RAS guarantees optimal water quality and all-year-round controlled rearing conditions (d'Orbcastel et al., 2009). However, RAS might face some challenges due to the potential accu mulation of contaminants, such as heavy metals, drug residues, and metabolites (Deviller et al., 2005; Martins et al., 2009). The occurrence of MPs in fish reared in this production system type remains poorly documented (Lv et al., 2020). But, as RAS heavily relies on plastic components, MP impacts on seafood health and quality have raised concerns within the aquaculture sector, and they have already stimu lated the development of non-plastic alternative components, such as natural biofiltration media (Lu et al., 2019; Mnyoro et al., 2022). Based on experimental studies exposing fish to MPs, either through the uptake of contaminated water or food, lesions associated with im mune responses in first-barrier tissues, such as the intestine, gills, and skin, were often observed (Abarghouei et al., 2021; Espinosa et al., 2019;

Karbalaei et al., 2021; Montero et al., 2022). Other effects associated with MP exposure include tissue oxidative damage (Alomar et al., 2017; Barboza et al., 2018a; Espinosa et al., 2019; Lu et al., 2016), neurotox icity and behavioural changes (Barboza et al., 2018b, 2018c; Mattsson et al., 2017; Shi et al., 2021), and growth impairment (Jabeen et al., 2018; Lu et al., 2022; Naidoo and Glassom, 2019). Moreover, MPs can cross biological barriers and enter into the bloodstream, potentially being retained in edible tissues, such as muscle, as already reported in some farmed fish species (Ferrante et al., 2022; Garcia et al., 2021; Lv et al., 2020; Rahman et al., 2022; Wu et al., 2020). Such physiological responses may reduce the nutritional quality of fish to their predators and humane consumers (Hanachi et al., 2021; Lai et al., 2021; Yin et al., 2018). The European seabass (Dicentrarchus labrax, Linnaeus 1758) is a marine species with high commercial value in European countries, representing €262 million in economic weight (EUMOFA, 2021). Studies have reported MP uptake in wild seabass (Akoueson et al., 2020; Bar boza et al., 2020) and specimens produced in cage and pond aquacul tures in Atlantic and Mediterranean waters (Kılıç, 2022; Reinold et al., 2021; Sanchez-Almeida ´ et al., 2022). But so far, MP presence has only been reported in the edible tissues, specifically muscle, of wild seabass (Akoueson et al., 2020; Barboza et al., 2020). The main goal of the present study was to investigate the direct exposure to plastic particles (PLs) from water and feed of European seabass specimens produced in a RAS facility and determine their presence in fish body sites (i.e., gastrointestinal tract, gills, liver, and dorsal muscle). Antioxidant and detoxification biomarkers in the liver were evaluated to determine the .potential effects of PLs exposure on fish health status