

**Title:**

**Impact of micro- and nano-plastics on human health**

The presence of microplastics in the marine environment, air and soil represents a concern of enormous proportions for food security and human health. It has been estimated that a part of the plastic produced in the last 60 years -about 8.3 billion tons –inevitably arrived in water basins directly in the form of microplastic or plastic objects and after mechanical degradation entered the water and biological cycles. Microplastics are plastic fragments less than 5 mm in diameter that current water purification systems cannot hold, whereas nanoplastics are smaller, with diameters less than 0.001 mm.

Recent research has demonstrated the presence of microplastics in seafood and foodstuff around the world, meaning we are always exposed to microplastic ingestion. However, little is known about its direct effects on human health. Few emerging pieces of evidences carried out in experimental model of zebrafish, sea urchins or mice shed new light of the enormous risk of microplastic for human health in term of increased kidney, liver or gastrointestinal disease, reduced fertility, cancer predisposition or gut microbiome dysbiosis.

The toxic effect can also depend on chemicals that bind the surface of microplastics including pesticides, dioxins and bisphenols and these compounds can also influence global methylation patterns.

Future research should focus on microplastic monitoring techniques along the supply chain. Finally, plastic waste management must be improved, along with microplastic legislation.