

“New approach methodologies for evaluating human health risks resulting from exposure to micro- and nanoplastics”

Chiara Ritarossi – *Department of Environment and Health, Istituto Superiore di Sanità, 00161 Rome, Italy*

Micro- and Nanoplastics (MNPs), mainly derived from plastic fragmentation processes, are persistent environmental pollutants with an average size of <5 µm and <100 nm, respectively (EFSA Journal, 2016). They are detected worldwide in marine and terrestrial ecosystems, including oceans, rivers, air, drinking water, sediments, and food. The widespread presence of MNPs in the environment is an emerging risk that requires urgent risk assessment and management strategies to mitigate their consequences on human health and ecosystems. New Approach Methodologies (NAMs) are one of the first choices to generate the information needed to improve mechanistic understanding of nanoscale processes, as they can support chemical risk assessment by informing on the hazard of a chemical without the use of animal testing. Since ingestion is considered one of the main routes of exposure to MNPs, the present study proposes the use of *in vitro* intestinal models and the *in vivo* *Caenorhabditis elegans* model, included in NAMs by EFSA Supporting publication 2024 (Usmani, S.M et al., EFSA Supporting Publications, 2024), as 3Rs-compliant models to evaluate the biological effects of environmentally relevant MNPs. Polystyrene Nanoplastics (PS-NPs) in two different sizes (100 and 20nm), and the biodegradable polycaprolactone 100 nm in size (PCL) biological effects were studied through an *in vitro* and *in vivo* approach aimed to support the development and standardization of reliable NAMs suitable for the assessment of human health risk resulting from exposure to MNPs in a "One Health" perspective.