Microplastics in deep water: a combined GC-MS e FT-IR approach

Enrico Davoli[1], Giancarlo Bianchi[1], Stefano Magni[3], Andrea Binelli[3], Luigi Falciola[2]

[1]Dipartimento Ambiente e Salute, Istituto di Ricerche Farmacologiche Mario Negri IRCCS, Milano
[2]Dipartimento di Chimica Università degli Studi di Milano
[3]Dipartimento di Bioscienze, Università degli Studi di Milano

Microplastics are water-insoluble, solid polymer particles that are characterized by1 µm<MP<1 mm[1]. A lower size boundary has not been defined, but particles below 1 µm are usually referred to as nanoplastics rather than microplastics.
The ubiquity of microplastics[2] of all sizes in surface water, groundwater and wastewater has raised the question if pollution of drinking water occurs and to date, few studies indeed described the presence of this new contaminant in tap and bottled water[3].
Toxicity it is not yet known[4], they might cause local inflammations in the gut, but a transport into organs might occur. CI SONO DIVERSI ARTICOLI CHE DIMOSTRANO L'INGRESSO NEI TESSUTI ANCHE DI MICROPLASTICHE
As a final problem in this field, microplastics in the environment are difficult to sample, to identify and standardized methods do not exist.
For this reason, we have been involved in a research project finalized to the definition of a protocol strategy for sampling and analysis of microplastics in drinking waters, coming from deep water wells, in the networks of three large cities in the Northern part of Italy.
The project is on going and presently two groups of deep water samples have been collected in the city of Milano and Brescia, before and after the treatment stages used for the urban network. Great attention has been paid to sampling and extraction steps as microplastic contamination, in this kind of samples, is expected to be very low[5] and contamination during sampling might occur through air or materials. Analytical methods have been defined for the detection of main microplastic contamination, like PE/PP, PS, PA, PVC e PET residues > 1 µm.
Samples have been analysed first by a non-destructive approach using a Spotlight 200i microscope equipped with a µATR probe and coupled to an FT-IR spectrophotometer, followed by a mass spectrometric characterization of the polymers by a solid phase microextration (SPME) GC-MS of thermal decomposition products (TED) of microplastic residues.
Results will be presented and critically discussed.

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