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Abstract

Microplastic Presence in Commercial Sea Salt: Sampling and Quantification Challenges †

Cristina Di Fiore [1,*], Maria Pia Sammartino [2], Cristina Giannattasio [2], Pasquale Avino [1] and Giovanni Visco [2]

[1] Department of Agricultural, Environmental and Food Science, University of Molise, Via De Sanctis, 86100 Campobasso, Italy; avino@unimol.it
[2] Department of Chemistry, University of Rome "La Sapienza", p.le Aldo Moro 5, 00185 Rome, Italy; mariapia.sammartino@uniroma1.it (M.P.S.); cri.giannattasio@hotmail.it (C.G.); giovanni.visco@uniroma1.it (G.V.)
* Correspondence: cristina.difiore@unimol.it
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Introduction: The presence of microplastics in sea salt has become an issue of a public concern due to the potential negative effects that microplastics could have on human health. Salt, in fact, could be seen as a carrier of microplastics into organisms. However, the quantification of microplastics in sea salt is still hampered by methodological limitations. In Italy, there are three important salterns characterised by global relevance, given the significant export of Italian salt to foreign countries.

Methods: In this work, sea salts collected from Italian salterns were investigated in terms of microplastics contamination. From a methodological point of view, the salt samples were solubilised in MilliQ water and filtered to extract the microplastics. The microplastics were visually quantify using a stereomicroscope. Hence, the microparticles present were classified by their morphological characteristic details, like shape, size and colour. Afterwards, the microparticles isolated were chemically identified using ATR-FTIR and Raman spectroscopy to assess the polymer type.

Results: The results showed an average of 1653 ± 29 microplastics/kg of sea salt. Regarding the shape, 80.6% of the microplastics had a fiber shape, 18.9% had a fragmented shape, and 2.7% were spheres. The sizes of the microplastics ranged between 0 and 500 µm, reflecting the presence of a potentially relevant fraction from a human health perspective. ATR-FTIR and Raman spectroscopy confirmed the plastic nature of the microparticles. Particularly, polypropylene, polyamide, and polyethylene were the most abundant polymer types in the samples.

Conclusions: This work confirmed the presence of microplastics in the sea salt samples, with a fraction of "small" microplastics, which could represent a threat to humans. Further investigations are required to assess the contamination levels of microplastics in the food chain in depth, as well as their impact on humans.

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