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Professor Doutor Pedro Rodrigues

ijup@reit.up.pt

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21461 | Invisible dangers on our plates: a critical review of the widespread presence of microplastics and nanoplastics in food

Carolina Mota[1]; Zita E. Martins[1,2]; Helena Ramos[1]; Isabel M. P. L. V. O. Ferreira[1]; Márcia Carvalho[1,3,4]; Ana M. Araújo[1]

LAQV/REQUIMTE, Bromatology and Hydrology Laboratory, Faculty of Pharmacy of the University of Porto, Portugal[1]; Faculty of Nutrition and Food Sciences of the University of Porto, Portugal[2]; FP-I3ID, FP-BHS, University Fernando Pessoa, Porto, Portugal[3]; Faculty of Health Sciences, University Fernando Pessoa, Porto, Portugal[4]

Background & Aim: Plastics have become ubiquitous, revolutionizing many aspects of daily life [1,2], but at a cost to the environment and human health. Their widespread use and inadequate disposal practices have filled our environment with tiny particles known as microplastics (MPs) and nanoplastics (NPs) [3,4]. MPs/NPs endanger both animals and humans; not only by carrying adsorbed toxic chemicals, but their presence in the food chain also poses a direct threat to human health [1-3,5]. This study aims to assess the extent of MPs/NPs contamination in our food and beverages, highlighting the urgent need to mitigate this invisible danger and explore future directions. **Methods:** An exhaustive literature review was conducted on PubMed, Scopus, and Web of Science up to August 15, 2023, identifying 4078 studies on MPs/NPs in the food chain. After removing duplicates and unrelated studies, 229 articles focusing on edible products/beverages were reviewed, yielding 1630 data points. Data on food type, detection methods, color, shape, chemical composition, and MPs/NPs count were systematically organized. **Results:** Our study revealed that over 95% of tested food items were contaminated. Detection methods predominantly used were FTIR spectroscopy and microscopy, revealing mainly blue, black, red, transparent, and white fragments and fibers. Polypropylene, polyethylene, and PET were the main polymers found in the diverse food groups. Fruits and vegetables emerged as the most contaminated group with an alarming rate of 126150 items/g, followed by sauces, beverages and dairy products with 45 to 8 items/L. Seafood, sweeteners, canned food, salts, and meat (0.7 up to 0.014 items/g) as well as rice (56 µg/g) and soy-based products (0 µg/g) showed the lower contamination levels. **Conclusions:** The research highlights significant knowledge gaps in understanding MPs/NPs occurrence in our diet and their health implications, emphasizing the need for broader studies and urging policy reforms to mitigate this environmental issue.

Keywords: Microplastics, Nanoplastics, Prevalence, Food Chain Contamination.