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BOOK OF ABSTRACTS OF THE 8TH MEETING ON MEDICINAL BIOTECHNOLOGY

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Impact of Simulated Digestion on Microplastics: Surface Changes and Intestinal In Vitro Exposure

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Microplastics (MP) have been widely detected in a variety of food products[1], and ingestion is one of the main pathways for human exposure to these contaminants. Once ingested, MP might interact with the gastrointestinal (GI) environment, yet it remains unclear whether digestive processes alter their chemical structure or mainly influence their surface properties, and possibly their interaction capacity[3]. This study investigates digested-induced modifications in MP and establishes suitable conditions for intestinal *in vitro* assays. Simulated digestion of six polymers (PTFE; PMMA, PA6, uPVC, PET, and LDPE) followed the INFOGEST model[2]. Following digestion, particles were analysed using Fourier-transform infrared spectroscopy (FTIR) to assess structural and surface changes. Cell viability was evaluated, by MTT, in Caco-2 and HT29-MTX intestinal cell lines exposed to different dilutions (1:10, 1:20, and 1:40) of digestion fluids, with respective MP. FTIR results indicated that all polymers maintained their fundamental chemical structure after digestion. Instead, consistent surface-related alterations were observed, including reduced intensity of characteristic polymer bands and enhanced signals in regions associated with proteins and hydroxyl groups, suggesting biomolecules adsorption and increased hydration. Cell studies demonstrated that 1:20 dilution of digestive fluids with MP maintained the cell viability above 70%, representing the most suitable condition tested. Simulated GI digestion appears to preserve the intrinsic chemical identity of MP, while promoting surface modifications that may affect their biological interactions. The identification of 1:20 digestion fluid dilution supports its application in future studies using advanced intestinal models, including three-dimensional systems and assessment of cellular oxidative stress responses.

KEYWORDS: *gastrointestinal digestion, chemical structure; intestinal cell models*

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