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ABSTRACT BOOK

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ISOLATING MICROPLASTICS FROM HUMAN MILK: A CHEMICAL DIGESTION APPROACH FOR EFFECTIVE POLYMER EXTRACTION AND ATR-FTIR ANALYSIS

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ABSTRACT

INTRODUCTION: Detecting microplastics (MPs) in human milk remains a major challenge due to its complex biological matrix containing a high content of lipids and proteins, which limits research in this area. The lack of a standardized protocol for MP extraction from breast milk presents a significant gap in environmental exposure research.

OBJECTIVE(S): This study aims to develop and evaluate a chemical digestion method to effectively isolate MPs from human milk, enabling polymer identification using Attenuated Total Reflectance Fourier-Transform Infrared (ATR-FTIR) spectroscopy.

MATERIALS & METHODS: An optimized extraction protocol was developed, involving a lipid removal step with hexane (1:1), followed by sequential digestion with 10% potassium hydroxide (KOH) and 30% hydrogen peroxide (H_2O_2) to eliminate organic matter. Digested samples were filtered and dried before ATR-FTIR analysis. Positive and negative controls were used to assess recovery efficiency and contamination risk.

RESULTS: The optimized protocol preserved microplastic integrity and enabled the identification of several polymer types, including polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET), and polyacrylamide. Positive controls demonstrated high MP recovery, while negative controls confirmed minimal contamination throughout the process.

CONCLUSION: This study presents a reliable and reproducible chemical digestion protocol for isolating and identifying MPs in human milk. The findings highlight the presence of environmental pollutants in a critical early-life nutrition source, underscoring the potential health implications for infants and the broader need for planetary health research addressing MP pollution. This protocol may serve as a foundation for future biomonitoring efforts involving complex biological matrices.

KEYWORDS: Microplastics, Human milk, Chemical digestion, ATR-FTIR, Environmental exposure