

Extraction and Quantification of Microplastics in Several Food Matrices: Estimate of the Contribution During the Production for the Protection of Public Health

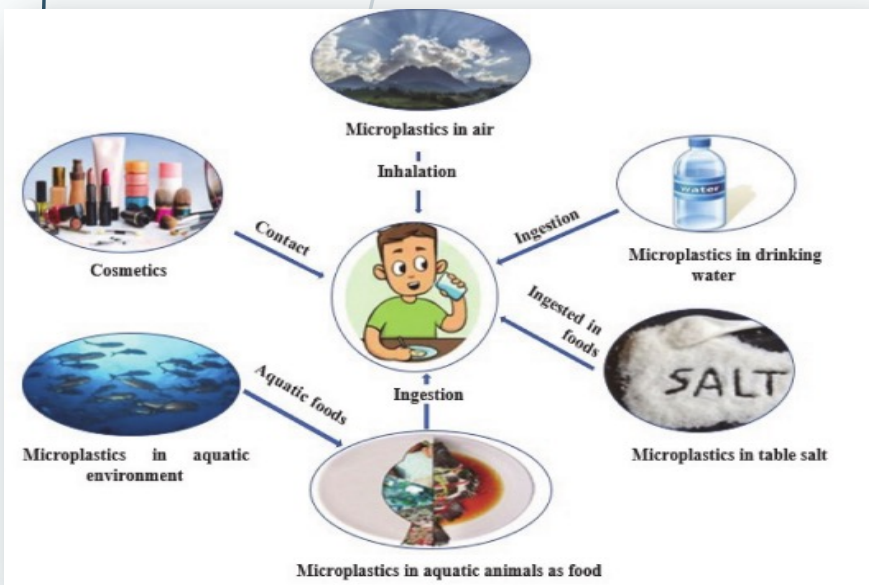
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Goal of PhD Project

This PhD thesis research project aims at developing a sampling methodology for microplastics (MPs) in indoor and outdoor air for determining the concentration with which they are present in food production environments. Actually, a harmonized analytical methodology for sampling and pre-treatment and a chemical determination of MPs in several food matrices also is necessary. The purpose pursued is that of estimating the risk for human deriving from their intake.

State of Art

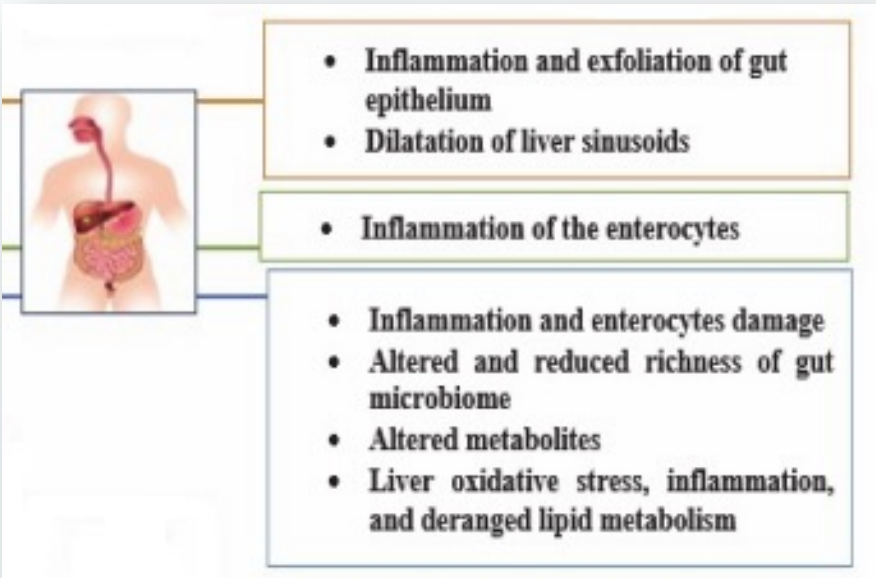
Sources



Usman et al., 2020

Over the past few year, the attention regarding the environmental impacts of microplastics was increasing. Due to its resilient properties, plastic is a very desirable material for various sectors, also for the food one (Kedzierski et al., 2020). Food and food containers may be continuous source of plastic particles (Li et al., 2020). Actually, the ingestion of plastic particles can cause problems because human body cannot digest them (Hwang et al., 2020).

Effetcs

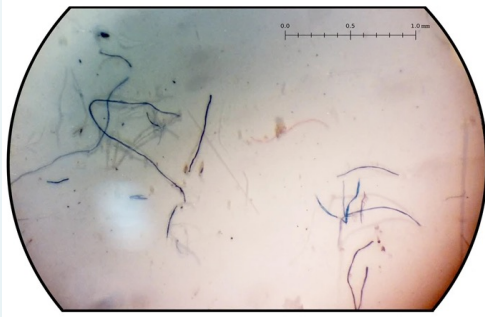


Usman et al., 2020

Analytical Methodologies

	FTIR imaging	Py-GC/MS
General Information	Identification of the polymer by means of the spectral library	The polymer is determined by its pyrolysis product
Quantification	Particle counts in terms of size and particle shape of distinct polymers	It allows determining polymer-type masses
Advantages/ Disdvantages	Non - Distructive method	Distructive Method

The morphology of a plastic particle is determined by **Microscopy**



Optical microscope image of a filter after the filtration of a salt sample, Iñiguez et al., 2017

Expected Results

The expected results from this PhD project are the following: the development of a method of pre-treatment of the sample prior to optical analysis by means of the scanning electron microscope. The main expected result foresees the development of an analytical methodology for the chemical characterization of microplastics applicable to all food matrices. Furthermore, it is expected to develop a sampling method for microplastics in the indoor food production environment, standardizing the type of plastic-free filters that can be used. One of the main problems for the sampling of microplastics, in fact, is the absence of a certified filter that is free from plastics, in order to obtain non-artificial results.

References

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Hwang J, Choi D, Han S, Jung S, Choi J, Hong J, (2020) *Potential toxicity of polystyrene microplastic particles*, Sci. Rep.10:7391.
Kedzierski M, Lechat B, Sire O, Le Maguer G, Le Tilly V, Bruzau S, (2020) *Microplastic contamination of packaged meat: Occurrence and associated risks*, Food Packag. Shelf Life 24: 100489.
Li D, Shi Y, Yang L, Xiao L, Kehoe DK, , Gun’ko YK, Boland JJ, Wang JJ, (2020) *Microplastic release from the degradation of polypropylene feeding bottles during infant formula preparation*, Nat. Food 1: 746–754.
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