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Food Safety 101

Tech Note 9 | March 2021

Microplastics and food

Background

Global awareness of the presence of tiny bits of plastic in our food, drinking water, and even the air we breathe is rising.

Initially the focus was on microplastics (MP) in our aquatic ecosystems and seafood contamination. These concerns now extend to terrestrial ecosystems and resulting impacts on agricultural production.

What are microplastics?

MP are defined as plastic particles with an upper size limit of 5mm. They are either:

- Primary: intentionally manufactured *e.g.* microbeads found in personal care products or microfibres shed from synthetic textiles
- Secondary: generated through the degradation and breakdown of larger plastics into smaller pieces through the action of sunlight, wind, or wave action.

A recent study of metadata by the University of Newcastle suggests that an average person could be ingesting approximately 0.1 to 5 grams of plastic every week through various exposure pathways.

The largest source of plastic ingestion is drinking water (tap water and bottled water).

Health impact

MP may represent a potential threat to public health either directly (through ingestion or inhalation) or indirectly as a vector for chemical contamination.

While the effects of consuming MP on health are largely unknown, potential concerns have been identified. In the gut, they can release chemicals used in plastic production or pollutants and toxins absorbed from the environment. The very small particles may translocate into human tissue and cause localised immune responses.

Microplastics in agriculture

Unfortunately, there is lack of detailed knowledge regarding the fate of MP in terrestrial agricultural systems, and the extent to which food chain contamination occurs resulting in human exposure.

What we do know is that MP and nanoplastics can penetrate seeds, roots, and leaves, and be transported and distributed via the vascular systems of vegetables and fruits into edible tissues.

Studies by Conti *et al.* (2020) hypothesised that fruits contain more microplastics because of the high vascularisation of the fruit and the greater size and complexity of the root system and age of the trees years) compared to vegetables.

The sources of microplastic in agricultural production include irrigation water, plastic mulch, and soil amendments and fertilisers produced by fermentation and composting.

There are also issues around the effects of MP on soil properties, soil biota, and plant performance.

Current regulatory situation

The European Food Safety Agency considers plastic contamination of the food chain an emerging issue. It will convene a scientific colloquium to examine a coordinated approach to assess the human health risks of micro- and nanoplastics in food in May 2021.

Summary

MP are increasingly being spread throughout the environment, yet our understanding of the impact on ecosystems and foods is still in its infancy. Further research is needed to fully understand the implications of exposure on human health.

Nonetheless there is also an urgent need to consider strategies that reduce microplastic contamination of our food producing ecosystems.

References

Conti *et al.* (2020). *Micro- and nano-plastics in edible fruit and vegetables. The first diet risks assessment for the general population.* Environmental Research, 187

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