

Release of microplastics from tea bags produced in Sri Lanka

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Microplastics (MPs) are defined as plastic particles less than 5 mm in size. The presence of MPs in food items is not good. Ceylon Tea is globally recognized due to its unique aroma, rich colour and smooth taste. Objective of this study was to investigate whether tea bags produced in Sri Lanka would release MPs at brewing temperature (95 °C) into tea. Current knowledge on this subject is limited. Tea bag materials, tea leaves in those tea bags and the threads attached to tea bags of six tea brands were studied. Duplicate analyses and blank experiments were carried out in a plastic free environment. Tea bags containing tea leaves were emptied and MPs were extracted by treating with deionized water (95 °C, 5 min), followed by H₂O₂ treatment (60 °C), filtration, washing and drying. Abundance, shapes and colour of MPs were studied using the light microscope. Polymer composition was identified by Attenuated Total Reflectance – Fourier Transform Infrared Spectroscopy (ATR – FTIR). According to the Scanning Electron Microscopy studies, the size of MPs was 2 – 600 µm. Microplastics were observed in all the samples. The highest average abundance of MPs in tea bag material, tea leaves and the threads were 319000, 17625 and 62500 particles/kg respectively. Fibers were the most abundant shape of MPs extracted from tea bags (92%), tea leaves (81%) and threads (80%). Black was the

dominant colour of MPs in tea bags (96%), tea leaves (78%) as well as in threads (81%). Other colours (blue, red, brown, orange, green, purple and transparent) were in low amounts (0 – 15 %). Ten types of polymers were present: polystyrene, polyethylene, polypropylene, polyethyleneterephthalate, polyurethane, polyacrylamide, polyacrylonitrile, polyvinyl chloride, polytetrafluoroethylene and polyvinylidene fluoride. Polystyrene was found in tea bag material, tea leaves as well as in threads. These findings suggest the importance of using non-plastic materials for tea bags and threads.

Keywords:

Microplastics, Tea bags, Tea leaves, Thread attached to the tea bag

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