

Microplastic Migration from Food Packaging on Cured Meat Products

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Abstract : In recent decades, microplastics (MPs) attracted the interest of the research community as the level of environmental plastic pollution has increased over the years. Through air inhalation and food consumption, MPs enter the human body, creating a series of possible health issues. The majority of MPs enter through the digestive tract; they migrate from the plastic packaging of the foodstuffs. Several plastics, such as Polyethylene (PE), are commonly used as food packaging material due to their preservation and storage capabilities. In this work, the surfaces of three different cured meat products with varied fat compositions were studied (bacon, mortadella, and salami) to determine the migration of MPs from plastic packaging. Micro-Raman spectroscopic measurements were performed in an experimental set lasting 28 days, where the meat samples were stored in vacuum-sealed low-density polyethylene (LDPE) pouches under refrigeration conditions at 4°C. Specific measurement days (0, 3, 9, 12, 15, and 28 days of storage) were chosen to obtain comparative results. Raman micro-spectroscopy was used to monitor the MPs migration, where the Raman spectral profile of LDPE first appeared on day 9 in Bacon, day 15 in Salami, and finally, on day 28 in Mortadella. All the meat samples on day 28 were tainted because a layer of bacterial outgrowth had developed on their surface. In conclusion, MP migration from food packaging to the surface of the cured meat samples was proven. To minimize the consumption of MPs in cured meat products that are stored in plastic packaging, a short period of storage time under refrigeration conditions is advised.

Keywords : cured meat, food packaging, low-density polyethylene, microplastic migration, micro-Raman spectroscopy

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