Detection and characterisation of aluminium-containing nanoparticles in Chinese noodles by single particle ICP-MS

This study investigated Chinese noodles for the presence of aluminium-containing nanoparticles by using inductively coupled plasma mass spectrometry in single particle mode (spICP-MS) after enzymatic digestion by α-amylase. The aluminium concentrations in the noodle samples, determined by conventional ICP-MS without or with the use of hydrofluoric acid for digestion, were 5.4 ± 1.9 µg/g and 10.1 ± 2.2 µg/g (N = 21), respectively. Aluminium-containing nanoparticles were detected by spICP-MS in all 21 samples. Depending on the assumed particle composition, Al2O3 or Al2O3∙2SiO2∙2H2O, the median particle diameters were either below or above 100 nm, respectively. The minimum detectable particle diameter by spICP-MS was between 54 and 83 nm. The mass recovery of aluminium in the form of particles was between 5% and 18%. The presented work reports for the first time the detection of Al-containing particles in food by spICP-MS.

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Corresponding author: Löschner, K.
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