

Engineered nano materials in food with LC-ICP-MS

Elly Wijma, Martijn van der Lee, Ruud Peters

RIKILT- Institute of Food Safety, Wageningen UR.
Bornsesteeg 45, PO Box 230, 6700 AE Wageningen, The Netherlands

Engineered nano materials (ENMs, by definition particles with one dimension a diameter smaller than 100 nm) become increasingly more important in food and non-food industry. In the past decennia only silver particles were used since these improve the microbiological stability of the food material. Nowadays, ENMs based on titanium, iridium, copper, gold and silicon can already be found in food, non-food products and some food supplements. Beside these new materials the application of other elements in food and non-food products as well as in the production thereof are being studied. The EU has not added ENMs to the additive list yet because at present there are no good analytical tests for the determination of ENMs in food. Because of the lack of analytical tests the European parliament may not allow the use of ENMs in food and food technology on the European market before any proper risk assessment

Several methods for chromatographic separation of ENMs are described in literature (1) mostly based on field-flow fractionation (FFF) and often combined with light scattering to detect the sizes of ENMs.

Recently we developed a method for the analysis of nano particles in food and non-food materials based on hydrodynamic chromatography (HDC) in combination with ICP-MS. The method enables the detection of ENMs, their size and size distributions, as well as the elemental composition of the ENMs in food and non-food products. At first ENMs are separated from the food or non-food matrix by several physical processes. Size separation is achieved using HDC on a PL-PSDA cartridge type 1 800*7.5 mm column packed with non-coated, non-porous silica spheres. Finally, any ENMs are detected with ICP-MS

References:

1. Harald Prestel, Reinhard Niessner and Ulrich Panne, Increasing the sensitivity of asymmetrical flow field-flow fractionation: Slot outlet technique, *Anal.Chem.*, 2006, 78 (18), 6664-6669.