

## TOPIC:        Nanoparticles in Food: Emerging Analytical Task

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### BIOGRAPHY

Dr. Stefan Weigel currently works at RIKILT – Institute for Food Safety, within Wageningen University and Research Centre in The Netherlands, as Senior Project Manager and Deputy Programme Manager for veterinary drugs and contaminants. He is assistant coordinator of the FP7 project CONFIDENCE (developing rapid tests for chemical contaminants in food and feed) and coordinator of the future FP7 project NanoLyse (Analytical methods for detection and characterisation of engineered nanoparticles in food, starting in 2010). His main research interests are in the area of trace determination of organic residues and contaminants by means of mass spectrometry and biosensor technology. This spectrum was recently extended to the analysis of nanoparticles in food.

Stefan Weigel graduated in Chemistry at the University of Hamburg/Germany where he also obtained a PhD in Analytical Chemistry, working on the ultra-trace analysis of organic contaminants in marine environments, mainly North Sea, with focus on occurrence, distribution and transformation of residues of pharmaceuticals.

At Eurofins | Wiertz-Eggert-Jörissen (Hamburg/Germany), part of the international Eurofins Scientific group, he was responsible for coordination and management of research and development activities for the analysis of residues and contaminants. He was also head of the Eurofins Technology Transfer and Training Centre.

## ABSTRACT

### Nanoparticles in Food: Emerging Analytical Task

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A number of recent reports and reviews have identified the current and short-term projected applications of nanoparticles for food and beverages. These include nano-sized or nanoencapsulated ingredients and additives for food, beverages, and health-food applications as well as the use of engineered nanoparticles for the improvement of food contact materials with view to mechanical properties, gas permeability or antimicrobial activity. Although potential beneficial effects of nanotechnologies are generally well described, their potential (eco)toxicological effects and impacts have so far received little attention. A prerequisite for toxicological, toxicokinetic, migration and exposure assessment is the development of analytical tools for the detection and characterisation of nanoparticles in complex matrices such as food. Given the huge diversity of engineered nanoparticles for use in the food and feed sector in terms of chemical composition, size, size distribution, surface activity/modifications etc. and potential interaction with food matrix components (e.g. proteins) this is a challenging task requiring tailored solutions.

The presentation highlights some current applications of nanoparticles in food and food contact materials and reviews analytical approaches suitable to address food safety related issues of nanotechnology. This includes sample preparation aspects, imaging techniques such as electron microscopy, separation methods (e.g. flow field fractionation, hydrodynamic chromatography) and detection/characterisation techniques (e.g. light scattering, mass spectrometry). First applications are shown for the analysis of inorganic nanoparticles in food matrices.

Keywords: nanoparticles, separation, imaging, characterisation