Analysis of Nanoparticles in Food, Cosmetics and Consumer Products

Stefan Weigel[1*], **Ruud Peters**[2]
[1,2] RIKILT – Wageningen UR, Institute of Food Safety, Wageningen, The Netherlands
*Corresponding author - E-mail: stefan.weigel@wur.nl, Phone: +31 317 485518

Nanoparticles are currently present in many products of everyday use. Titanium dioxide particles as UV filters in sun screen lotions, nano-sized fractions of approved particulate food additives such as silica (E551) and titania (E171), colloidal silver as preservative in household cleaners and nano-encapsulated anti-oxidants for use in food and cosmetics are just some examples. In the EU, several regulations already address the presence of nanomaterials in food and products within the approval procedure, the safety assessment, and/or by a labelling obligation. These regulations cover i.a. biocidal products, cosmetics, medical devices, (novel) food and food additives as well as food contact materials. For instance, the labelling of nanomaterials on the ingredient list is obligatory for cosmetics (since 2013) and for food (since 2014).

Reliable analytical methods for the detection and quantification of nanoparticles in food, cosmetics and products are thus required both for exposure assessment in the framework of risk assessment/management as well as for the enforcement of existing regulations. In recent years a number of methods have been developed that are capable of detecting and quantifying nanoparticles in food and related matrices. The developed approaches include sample preparation aspects, imaging techniques such as electron microscopy, separation methods (e.g. field flow fractionation, hydrodynamic chromatography, centrifugation) and detection/characterisation techniques (e.g. light scattering, mass spectrometry). The current state of the art will be reviewed in the presentation and highlighted with some examples. Further improvement and consolidation of the analytical capabilities are still priorities. Techniques have to be improved (i.a. with view to particle size detection limits and particle counting according to the EC definition of nanomaterial), further methods for specific analyte/matrix combinations need to be developed and the harmonisation of data quality and thus confidence in results has to be improved, e.g. by provision of suited reference materials, interlaboratory method performance studies, harmonised validation guidelines and standardised methods. Respective efforts are currently ongoing, i.a. in the EU research project NanoDefine. The progress will be presented.