NanoMONITOR- A new real-time monitoring system to support the risk assessment of ENMs under REACH

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The evaluation of the potential impact of ENMs in human health and the environment requires data on both effects and exposure.

In terms of exposure potential, the vast majority of studies are focused on workplace areas, where inhalation is the most common route of exposure. The skin has also been investigated, however, most studies have shown little to no transdermal ENMs absorption (Karjalainen et al, 2012).

In contrast to occupational exposure, current studies focused on the environmental release of ENMs and exposure to ENMs in areas other than industrial settings (e.g. urban areas) are scarce, which is mainly due to the lack of techniques to quantitatively monitor ENM emissions to and concentrations in urban areas and/or the environment, and hence, very little is known about the presence, type, composition and form of released ENMs.

To cope with this situation, the LIFE project NanoMONITOR (LIFE14 ENV/ES/000662) has developed an on-line information system consisting in two elements:

- A software application to support the acquisition, management and processing of data on the concentration of ENMs
- A new monitoring station prototype to support the outdoor and indoor monitoring of airborne ENMs.

Moreover, a new guidance on the sampling methods and analytical techniques for the measurement and monitoring of ENMs in the environment has been developed to support the selection of adequate sampling and monitoring procedures and techniques to characterize the concentration of ENMs in heterogeneous environments, including industrial settings, indoor and outdoor areas in urban locations and natural environments.

Up to 4 monitoring stations (figure 1) equipped with a measurement device optimized for continuous sampling of nanosized (1 to 100 nm in diameter) and ultra-fine airborne particles (10 to 300 nm in diameter) in indoor workplaces and outdoor environments have been developed, providing data on the number concentration (number / cm3), mass concentration (mg/cm3), lung deposited surface area (µm2/cm3), and average particle diameter (nm).

References

[1] Yokel RA, MacPhail RC. Engineered nanomaterials: exposures, hazards, and risk prevention. Journal of Occupational Medicine and Toxicology (London, England). 2011;6:7. doi:10.1186/1745-6673-6-7.

Figures

Figure 1: NanoMONITOR Station

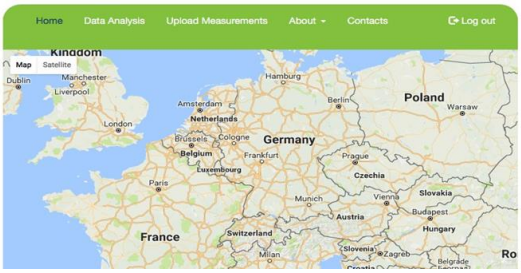

Figure 2: NanoMONITOR acquisition software