Physicochemical characterization of manufactured nanomaterials (TiO$_2$, SiO$_2$) used for genotoxicity testing

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- Methodology to test genotoxicity of manufactured nanomaterials (MNs) (harmonized protocols)
- Relevant and reliable data for risk assessment by public health authorities

WP4 (5 institutions – 4 countries)

Raw material Powder - dispersion

Dispersion protocols

Suspension in biocompatible medium

4 TiO$_2$, 4 SiO$_2$, CNT

Characterization techniques

XDR, Raman, TEM, SEM, AFM, BET, SAXS, ICP-MS/ AAS, MALDI-TOF, Dustiness, DLS, zetametry, redox, etc.

Detailed physico-chemical properties

Size, shape, polydispersity, specific surface area, impurities, surface modification, suspension stability, etc.

Small Angle X-ray Scattering (SAXS)

- Radiation-matter interaction
- Scattered beam I(q)
- Transmission T=Φ$_0$/ Φ$_0$
- Sample (thickness e)
- Scattering vector k$_s$

SAXS measurements on TiO$_2$ powders

Size measurement (hydrodynamic diameter)

Zeta potential measurement (surface charge)

Aggregate state

Stability over pH range

Size distribution

Stability over time

Atomic Force Microscopy (AFM)

Zeta accurate measurement (nm), independent of the probe

Shape, Aggregation state

Height distribution

Statistics (size, polydispersity)

Dynamic Light Scattering (DLS) - Zetametry

- Autocorrelation function
- Dynamic Light Scattering (DLS)
- Electrophoretic mobility

Dispersion protocols

Suspension in biocompatible medium
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