

## Methodological considerations for using umu assay to assess photo-genotoxicity of engineered nanoparticles - DTU Orbit (08/11/2017)

### Methodological considerations for using umu assay to assess photo-genotoxicity of engineered nanoparticles

In this study we investigated the feasibility of high-throughput (96-well plate) umu assay to test the genotoxic effect of TiO<sub>2</sub> engineered nanoparticles (ENPs) under UV light (full spectrum) and visible light (455nm). Exposure of TiO<sub>2</sub> ENPs to up to 60min of UV light induced a photocatalytic production of ROS. However, UV light itself caused cytotoxic damage to *Salmonella typhimurium* at exposures >15min and a genotoxic effect at exposures >0.5min; and use of UV filters did not lower this effect. No genotoxicity of TiO<sub>2</sub> ENPs was observed under visible light conditions at concentrations up to 100µg/mL(-1); or under dark conditions at concentrations up to 667µg/mL(-1), though cytotoxicity was seen at the higher concentrations. Additionally, the growth factor calculation was influenced by a shading effect due to ENPs, and was corrected by considering the pre-incubation OD readings of Plate B. Recommendations provided in this paper, as well as investigation of the effect of the light sources should be considered when using the umu assay to quantify the photo-genotoxicity of engineered nanomaterials.

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Organisations: Department of Environmental Engineering, Environmental Chemistry

Authors: Cupi, D. (Intern), Baun, A. (Intern)

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