The increasing use of nanoparticles for numerous materials and products raises questions about the risks they might pose for both individual and industrial users. As such, nanotechnologies and their products represent a serious challenge to the authorities responsible for environmental policies and human safety.

The NANOGRA project proposes a global approach to nanoparticles risks by a multidisciplinary assessment of explosion/fire, ecotoxicity and toxicity risks. This presentation focuses on preliminary results of ecotoxicological effects of titanium dioxide nanoparticles.

**NP choice in NANOGRA**

Criteria for nanoparticles choice:
- Production or significant use in Walloon region.
- Specific risks according to scientific literature.
- Data availability on risk assessment.
- Use as benchmark.
- Opportunity to evaluate the substance on the 3 categories of hazard.
- Nanomaterials availability.

**Experimental conditions**

Bioassays protocols
- Chironomus riparius
- Neoborysta incongruens (larvae)

Sediment spiking
- Based on:
  - Artificial sediment (OECD guideline n° 218)
  - Nano spiking for one month (ERDC protocol)
- Deposition method:
  - Microcrystalline cellulose
  - CaCO3
  - Deionized water

**Sediment**
- D0: many agglomerates in the water column for every concentration except for concentration 2.
- D2: less agglomerates for all concentrations except for concentration 2.

2 possibilities:
- Disaggregation of the NP over time
- Sedimentation of the NP

**Chironomid larvae**
- D0: Chironomus TiO2 concentration increases with sediment concentration (as expected)
- D2: No significant change of TiO2 concentration over time for every concentration.

**Chemical results**

**Nanopowder**
- XPS
  - TiO2 powder % Atomic
  - Ti2p 28.11
  - Cl2s 29.11
  - Cl2p (trace) 0.67

**Water column**
- D0: Many agglomerates in the water column for every concentration except for concentration 2.
- D2: Less agglomerates for all concentrations except for concentration 2.

**Sampling artefact in the concentration N°2**
- By resuspension of spinned sediment particles?

**Ecotoxicological results**

**Chironomids larvae**

**MORTALITY AND GROWTH INHIBITION:**
- After a 7-day exposure:
  - No effect of TiO2 NP for the 3 lowest concentrations.
  - Effects on mortality (66%) and growth inhibition (71%) at the highest concentration.

**Developement delay:**
- No effect of TiO2 NP on mortality or growth inhibition for the 4 concentrations.
- Chironomus riparius is less sensitive to metal pollution than Neoborysta incongruens even as a nanoparticle form.

**Ostracods**

**MORTALITY AND GROWTH INHIBITION:**
- After a 7-day exposure:
  - No significant effect of TiO2 NP on mortality or growth inhibition for the 4 concentrations.
  - Chromium is more toxic than metal pollution even as a nanoparticle form.

**Development delay:**
- Effect on mortality (65%) and growth inhibition (71%) at the highest concentration.

**Teratogenicity:**
- Morphological preparation technique has to be improved in order to obtain useful images.