Brigita Gylytė doctoral dissertation

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Doctoral dissertation: BIOLOGICAL EFFECTS INDUCED BY THE SUSPENSIONS OF COPPER OXIDE NANOPARTICLES IN THE CELLS OF *NITELLOPSIS OBTUSA*
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Summary

Nanosized copper oxide particles (nCuO) are widely increasingly used in technological applications. Nanomaterials may be released to the environment with wastewater and activated sludge. The occurrence of these small size particles in the aquatic media may cause adverse effects to different organisms.
nCuO are acutely toxic to many organisms including crustaceans, algae, aquatic plants and fish, nevertheless, ionic copper is more toxic. Several studies have indicated that the acute toxicity of nCuO is due to the release of Cu^{2+} from NPs. Other studies affirmate that observed effects could not be explained only by dissolved copper from NPs. However, strict differentiation between the main mechanisms of NPs toxicity seems to be hardly achieved under current state of knowledge.
Current study is assigned for the investigation of toxicity effects of nCuO suspensions on the cell of freshwater algae *Nitellopsis obtusa* .
The data of experimentation demonstrated that: harophyte cell of *N obtusa* exposed for several seconds in the suspension of CuO nanoparticles accumulates sufficient amount of copper in the wall, which induces cell lethality within several days or months.
If similar concentrations accumulate in the cells of *N. obtusa* during their exposure to copper salt solution or CuO nanosuspension, the rapid depolarization (within several minutes) of cell membrane occurs in case of copper solution only; however, both impacts lead to cell lethality.

List of Publications

Manusadžianas L., Caillet C., Fachetti L., Gylytė B., Grigutytė R., Jurkonienė S., Karitonas R., Sadauskas K., Thomas F., Vitkus R., Ferard J.F., 2011: Toxicity of copper oxide nanoparticle suspensions to aquatic biota. – Environmental Toxicology and Chemistry, 12: 1–7.

Gylytė B., Manusadžianas L., Sadauskas K., Vitkus R., Jurkonienė S., Karitonas R., Petrošius R., Skridlaitė G., Vaičiūnienė J., 2015: Latent cell mortality after short-term exposure of *Nitellopsis obtusa* cells to copper oxide nanoparticles. – Botanica Lithuanica, 21(2) 89-98.