TOXICITY OF ARSENIC, CADMIUM AND LEAD IN MARINE MICROALGAE CHLORELLA SALINA AS DETERMINED BY FLUOROMETRY

V. Slaveykova1, I. Karadjova2, D. L. Tsalev2

1 Environmental Biophysical Chemistry, ISTE ENAC EPFL, Station 2, 1015 Lausanne, Switzerland, tel. ++ 41 21 693 63 31, fax ++ 41 21 693 57 60
2 1164 Sofia, 1, J. Bourchier Blvd., Faculty of Chemistry, University of Sofia, Sofia 1164, Bulgaria

Phytoplanktons (microalgae), the primary producers at the base of the aquatic food chain are the first targets to be affected by heavy metal pollution. The results from ecotoxicity tests employing microalgae therefore provide information for estimating the ecotoxic concentrations as well as to show the biological response under long-term exposure conditions. A variety of standard algae growth inhibition assays have been proposed for toxicity testing: direct cell counting in Erlenmeyer flask, small-scale toxicity tests based on cell optical density, fluorescence measurements, flow cytometry etc. In the present study the sensitivity of estuarine microalgae Chlorella salina to As (As(III), As(V), MMA, DMA), Cd and Pb by using microplate toxicity test with fluorometric growth quantification is present. As first step optimal instrumental parameters (48 well plate, excitation wavelength 460 nm, emission wavelength 690 nm) and linear range of calibration curve representing relationship between cell number and chlorophyll a emission intensity were established. All experiments were performed in Black sea water (algae was cultured in F2 medium in Black Sea water) The toxicity of four arsenic species was studied in the presence of different concentration of phosphate in the range 0.01 to 5.8 mg L⁻¹. As can be expected inorganic arsenic species are more toxic than organic. Results obtained undoubtedly showed that inorganic arsenic toxicity is decreased in the presence of high phosphate concentrations in the growth medium. The influence of Fe(III) and Ca on inorganic arsenic toxicity was also investigated however effects observed are not significant and well pronounced. The toxicity of Cd and Pb was investigated in the presence of Ca and Mg as competitors.

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