



Influence of DOM on the Toxicity of Phenanthrene to the luminescent Bacteria *Vibrio fischeri*

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Dissolved organic matter (DOM) is not only found in the aquatic environment but also in soil pore water. Organic contaminants like polycyclic aromatic hydrocarbons (PAHs) are bound to DOM leading to changes in their bioavailability and consequently in their toxicity. It is assumed that the portion of contaminant available to organisms is mainly determined by the freely dissolved concentration and is not affected by the dissolved DOM-bound fraction. Reduced bioavailability of PAHs has been shown for many organisms but not for bacteria so far.

The aim of this study was therefore to clarify whether the presence of DOM in pore water influences the acute toxicity of phenanthrene (PHE) to the marine bacteria *Vibrio fischeri* when tested by LUMIStox® luminescent bacteria test. Humic acids in distilled water were used as a model of DOM in pore water. PHE was shown to bind to humic acids but it could not be ruled out that the freely dissolved concentration was affected by the saline environment necessary for the performance of the LUMIStox® test. The present study suggests that there is no relationship between the amount of humic acid and the IC₂₀ of phenanthrene to *Vibrio fischeri*. On the other hand, in some cases the presence of humic acid leads to an increase of light inhibition. This phenomenon was most likely an effect of the coloured test solutions rather than a toxic effect induced by the pollutant.

Our results indicate that it is the total dissolved concentration of phenanthrene that is governing the toxicity to the bacteria *Vibrio fischeri* and not the freely dissolved concentration.