Determination of in-situ biodegradation rate constants of nonylphenolic compounds in the Seine River
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**1- INTRODUCTION**

Assessing the fate of endocrine disrupting compounds (EDC) in the environment is currently a key issue for determining their impacts on aquatic ecosystems. The 4-nonylphenol (4-NP) is a well known EDC as well as its precursors, the nonylphenol monoethoxylate (NP1EO) and the nonylphenol acetic acid (NP1EC). To date, the biodegradation rate constants of nonylphenolic compounds have been mostly studied in laboratory and only Jonkers et al. (2005) focus on *in-situ* rate constants but in estuarine salt water. Therefore data on *in-situ* biodegradation of nonylphenolic compounds in river water are scarce or not up to date. 

This study aims at evaluating the *in-situ* biodegradation of 4-NP, NP1EC and NP1EO in the Seine River downstream of Paris City.

**2- METHODOLOGY**

- 40 km long transect downstream of Paris city
- 2 sampling campaigns: July and September 2011
- Hours of sampling estimated according to velocity of the Seine River
- Samples collected in the same volume of water
- Analysis: UPLC-MS-MS & quantification of 4-NP, NP1EC and NP1EO
- Results & calibrating a sub-model of NP1EO biodegradation of ProSe model
- The spatial and temporal variabilities of concentrations are considered for calibration
- Calibration of $K_i = K_i'$, $K_2$ and $K_3$ based on first order kinetics equations
- Calibration of "precursor inputs" to symbolize biodegradation of NP1EO and NP1EC

**2- RESULTS**

**July**

- Biodegradation rate constants are far higher than those reported by Jonkers et al., (2005) or by Staples et al., (2001).

**September**

- Biodegradation rate constants are close to those reported by Jonkers et al., (2005) or by Staples et al., (2001).

**3- DISCUSSION / CONCLUSION**

The variability of bacterial biomass likely induces the variance of biodegradation rate constants of nonylphenolic compounds.

The first-order kinetic approach seems reliable to describe a punctual state of biodegradation but does not take into account the variabilities generated by the fluctuation of bacterial biomass.