

# Passive sampling for monitoring organic contaminants in aquatic systems

de Alencastro Luiz Felipe<sup>1</sup>, Estoppey Nicolas<sup>1,2</sup>, Schopfer Adrien<sup>1,2</sup>, Dominique Grandjean<sup>1</sup>, Coudret Sylvain<sup>1</sup>.

<sup>1</sup>Central Environmental Laboratory, Ecole Polytechnique Fédérale de Lausanne (EPFL), Station 2, 1015 Lausanne, Switzerland.

<sup>2</sup>School of Criminal Sciences, University of Lausanne, Batochime, 1015 Lausanne, Switzerland

Passive sampling has been shown to be a good alternative to grab sampling. Because of the in-situ accumulation in samplers, limits of quantitation are low enough to measure organic pollutants in water. In addition, integrative passive samplers enable to sequester pollutants from episodic pollution and provide time weighted average (TWA) concentrations. Finally, they do not require a power supply in the field and are flexible enough to be deployed at sites that are difficult to access.

This study will present the interest and efficiency of passive sampling to reveal industrial and agricultural pollution trends. Two practical applications for nonpolar and polar contaminants are presented. Low-density polyethylene (LDPE) and Silicon rubber (SR) samplers were deployed in rivers to monitor indicator PCBs (iPCBs, IUPAC nos. 28, 52, 101, 138, 153 and 180). The results showed that the impact of PCBs emissions into the river is higher in summer than other seasons due to the low flow rate of the river during the summer period. Polar organic chemical integrative samplers (POCIS) were deployed in another river to investigate herbicides coming from vineyards. The results showed an increase of water contamination due to the studied agricultural area. The maximal contamination was observed in April and corresponds to the period of herbicide application on the crops.

The use of performance reference compounds (PRCs) to estimate aqueous concentrations is also presented and illustrated by examples.

Keywords: herbicides, LDPE, Silicon rubber, passive sampling, PCBs, POCIS, PRCs