AQUAREF intercomparison passive sampling exercise: monitoring of pesticides in surface water

C Berho1, N. Mazzella2, D. Munaron3, B. Lepot4, H. Budzinski5, C. Gonzalez6, A. Gravelli7, R. Gunold8, E. Peinerud9, F. Smedes10, B. Vrana11, C. Miège12*

1 BRGM, Laboratories Division, 3 av. Claude Guillemin, 45060 Orléans, France, 2 IRSTEA, UR REBX, 50 Avenue de Verdun, Gazinet, 33612 Castes Cedex, France, 3 Ifremer, LERLR, avenue Jean Monnet, BP 171, 34203 Sète Cedex, France, 4 INERIS, F-60550 Vervielle-en-Halatte, France, 5 UMR 5805 EPOC – OASU, Equipe LPTC, Univ. Bordeaux 1, F-33405 Talence CEDEX, France, 6 Ecole des Mines d’Alès, 7 Environment Agency NLS, 8 UFZ, 9 ALS Scandinavia AB, 10 Deltares, 11 Water research institute, 12 IRSTEA, URI MALY, 5 rue de la Doua, C270077, 69626 VILLEURBANNE Cedex, France

* : corresponding author (cecle.miege@irstea.fr)

1 Objective of the AQUAREF intercomparison passive sampling exercise

Passive samplers (PSs) can be valuable tools as complementary method in monitoring water quality in the context of the WFD. Nevertheless, there is still a lack of quality assurance and control (QA/QC) procedures that demonstrate the reliability and the comparability of results obtained by passive sampling. The objective was to assess the potential function and the efficiency of PSs for monitoring pesticides in surface and coastal waters in the context of the WFD.

2 Description of the trials

- **2 TRIALS OF 14 DAYS DURATION AT TWO SITES**
  - **Coastal water**
    - Etang de Thau (Hérault)
    - April/May 2010
  - **Surface Water**
    - Fleuve Charente
    - Site de Beillant (Charente maritime)
    - May/June 2010

- **PARTICIPANTS:** 12 expert laboratories i.e IRSTEA Lyon, IRSTEA Bordeaux, BRGM, IFREMER, ALS Scandinavia AB, Ecole des Mines d’Alès, Environment Agency NLS, INERIS, EPOC-LPTC, UFZ, Water research institute, Deltaires
- **MOLECULES:** 9 pesticides (acetochlor, S-metolachlor, alachlor, atrazine, diuron, isoproturon, simazine and DEA, DIA). Some laboratories analysed less than the 9 pesticides.
- **QA/QC PROCEDURE:** Exposure of PS in triplicate & Field blanks ; Analysis of a reference solution (QC) to identity the outliers ; More information available : C. Miège et al, Trends Anal. Chem., 2012, 36, 128-143

3 Example of Results

- **DESCRIPTION OF ACCUMULATION in POCIS and TWA concentration (BEILLANT)**

- **POCIS**
  - Average concentration (n=5) in spot samples during campaigns (ng/L)
  - Thau (dissolved fraction) : Acetochlor < LOQ, Alachlor < LOQ, Atrazine 0.37+/-0.10, DEA < LOQ, DIA < LOQ, Diuron 2.41+/-0.34, Isoproturon 0.05+/-0.02, Metolachlor 1.73+/-0.84, Simazine 0.73+/-0.24
  - Beillant (dissolved fraction) : Acetochlor < 10, Alachlor < 10, Atrazine < 10, DEA < 49.24+/-18.7, DIA < 13.34+/-4.3, Diuron < 20, Isoproturon < 10, Metolachlor 18.3+/-4.2, Simazine < 10

- **TWA CONCENTRATION**
  - For acetochlor, alachlor diuron and simazine. -> For atrazine, DEA, DIA, maximum value was measured by the same laboratory.
  - Similar results are observed for TWA concentration : no additional dispersion induced by the calculation step for the estimation of the TWA concentration.

4 Conclusion

Few participants & delivered results at Thau did not allow data statistic treatment. At Beillant, PS pointed out the presence of molecules that were not detected by spot (or grab) sampling approach. A satisfactory estimation of mean TWA concentrations by comparison with average spot sampling concentration was observed. Statistical data treatments are limited because of too few passive samplers deployed (except for POCIS pharmaceutical configuration) and the fact that all molecules were not analysed by laboratories. To identify the sources of TWA concentrations variability, more quality controls tools should have been implemented.