les dossiers d'AGROPOLIS

Expertise of the Agropolis scientific community

Water Resources and Management

Number 3

Screening methods for the control of the chemical and biological quality of water

The water quality monitoring requirements – linked to the enforcement of the European Water Framework Directive (EWFD) elaborated in 2000, depend directly on the available techniques able to provide reliable data at a reasonable cost. The development and validation of *screening* methods (sensors, kits, probes) play a key role, within the framework of the European Directive enforcement, for the control of the chemical and biological quality of water. These *screening* methods complement conventional laboratory analyses. Moreover, the EWFD is a high performance water resource management tool, only if the data provided are of comparable quality. Within this context, the *Environnement industriel et risques industriels et naturels* Research Center (centre LGEI, École des

Mines d'Alès) coordinates a STREP (Specific Targeted Research Project) of the 6th PCRDT (call FP6-2002-SSP-1, Domain 8.1.B.1.5 (Task 6)). This SWIFT-WFD project (Screening methods for Water data InFormaTion in support of the Water Framework Directive) comprises 40 partners, research organisations (institutes, universities) and companies (private laboratories, consulting office, Small and Middle Entreprises and industries), from 18 European countries. This project concerns the validation and the development of rapid measurement methods for the chemical and ecological quality of aquatic zones.

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The nonylphenols, endocrine disruptors



Watercourses convey minants like nonylphenols as trace elements

Nonylphenols (degradation products of tensioactive and conservative agents) are known as endocrine disruptors. Their oestrogenic activity was studied by the UMR 5569 HydroSciences Montpellier on MELN cellular lineage expressing the oestrogen receptor; this work is carried out in collaboration with Unit 540 Endocrinologie moléculaire et cellulaire des cancers (Inserm, French National Institute of Health Medical Research). Nonylphenols are active at concentrations close to 10-7 M (mol/kgH2O). In water and river sediment samples, the nonyphenol concentrations and the oestrogenic activities are measured in parallel. It appears that nonylphenols are

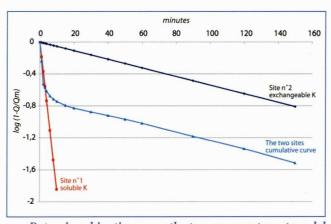
involved in the oestrogenic activity detected in sediments but they contribute little to the oestrogenic activity detected in the water. The *in vivo* activity of the nonylphenols is being studied on *Sarotherodon melanotheron*, a tropical fish (tilapia). This fish can withstand high concentrations of nonylphenols in its food.

More information, see: Fenet H., Gomez E., Pillon A., Rosain D., Nicolas J.C., Casellas C. and Balaguer P. 2003. *Arch. Environ. Contam.* 44:1-6.

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Study of the compartmentalisation of an element in the soil: potassium (K)

Conventional determination of exchangeable potassium does not make it possible to show the presence of soluble K. The Cirad "Laboratoires d'analyses physico-chimiques des sols, eaux et végétaux" have developed a technique that makes it possible to describe the potassium kinetics using a two-compartment model: a first compartment with high release speed which corresponds to the soluble K, and a second one which corresponds to the exchangeable K. The principle of this technique is a continuous dissolution through a column that contains 10 grams of soil and through which a CaCl₂ N/50 solution is passed.



Potassium kinetics as per the two-compartment model

More information, see: Bourgeon, G., 2000. Étude de la fertilité des sols de Wallis & Futuna. Rapport de fin d'études, Cirad - Amis, Montpellier, France. 81 p.

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