

USE OF PASSIVE SAMPLERS EXTRACTS FOR TOXICITY ASSESSMENT OF ENVIRONMENTAL REALISTIC MIXTURE OF PESTICIDES ON NATURAL BIOFILMS COMMUNITIES

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The objective of this study was to evaluate the potential use of passive samplers extracts in order to highlight effects of representative pesticide mixtures on natural biofilm communities.

Chronic and acute impacts of pesticides in mixture were evaluated using POCIS (Polar Organic Chemical Integrative Sampler) extracts on natural biofilm communities. Biofilms were exposed to POCIS extracts or placed in clean water in order to model different levels of toxic pressure in relation with a realistic pesticide mixture directly isolated from the field.

After 13 days of exposure, a significant decrease of diatoms density on upstream and downstream biofilms exposed to PE compared to non exposed biofilms was observed; moreover DW and AFDM were lower for downstream biofilms exposed to PE compared to non exposed biofilms. Taxonomic analyses revealed impacts of mixture of pesticides on diatom composition. These results indicated that the mixture of pesticides has an impact on growth of the biofilms and particularly on diatom density evolution and on structural composition diatom communities.

Acute toxicity tests at day 13 on downstream biofilms revealed a significant higher tolerance for biofilm exposed to PE compared to non exposed biofilms.

Moreover a decrease of tolerance of downstream biofilms from day 0 to day 13 was observed for both treatments; with 51 ± 13 and $43 \pm 2\%$ of inhibition at day 13 compared to $25 \pm 3\%$ of inhibition at day 0 in the highest concentration (d0). This global decrease of tolerance to PE with time could be explained by differences between channel and field conditions (light intensity, PE composition different from real river exposure due to POCIS selectivity, pesticides concentrations lower in channels than in river,...)

Nevertheless, tolerance of downstream biofilms at day 13 still be much more higher than tolerance of biofilms originated from upstream site (significant inhibition of F_v/F_m for d0, d1, d2 and d3 for upstream biofilms).

Our results underline impacts of pesticides in mixture on growth (DW, AFDM and diatoms density), diatom composition, and community tolerance of a natural biofilm. For downstream biofilm, in the one hand, removing the toxic pressure stimulates global biofilm growth but in the other hand it leads to a decrease of biofilms tolerance. A global decrease of tolerance over time for downstream biofilms was observed; nevertheless without reaching the tolerance levels of upstream biofilms.

This study highlights the potential use of passive sampler extracts combined with acute toxicity tests in order to evaluate effects of more realistic pesticide mixtures on natural biofilms communities, and then the future and likely applications of such approaches for ecological risk assessment.