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Safety of shellfish hatcheries by water treatment processes

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<https://projet-soap.fr>

In aquaculture, shellfish hatcheries water treatment processes are essential to give the required physicochemical properties of water and thus obtain optimal conditions for better productivity, particularly for very young (larval) sensitive steps. Shellfish farming must now use various techniques to deal with emerging contaminations. This is the case in shellfish hatcheries and nurseries, which have to face biological and chemical pollution that disrupts the conditions for spat production. It is indeed in a context of diversified and growing marine pollution that this project (SOAP-FEAMP-20 00072) is positioned: the presence of organic micro-pollutant in oysters and mussels has been proven for many years.



Partners



Objectives:

Ensuring safety of shellfish hatcheries and nurseries; disinfection and chemical decontamination of seawater upstream shellfish farms



✓ **Development of analytical methods**

✓ **Selection of adapted adsorbents**

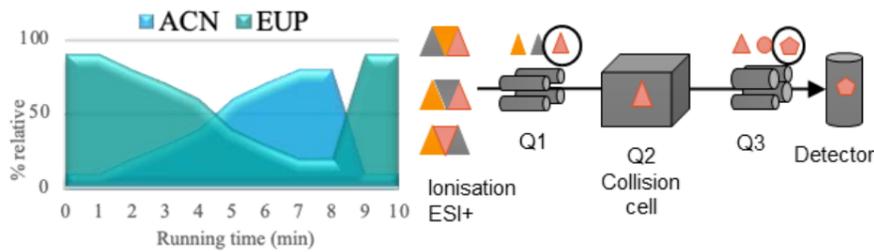
✓ **Development of innovative hybrid seawater treatment process i) under controlled conditions and ii) on hatcheries sites**

Development of analytical methods



Seawater sampling in french hatchery and analysis of organic micropollutants using UPLC-MS/MS

→ Targeted analysis of 22 molecules including pesticides and drug residues



Elution method

Triple quadrupole system : MRM detection



Multi-residue method allowing targeted analysis down to a few ng L⁻¹ detection

Treatment process

Adsorption on activated carbon (AC)

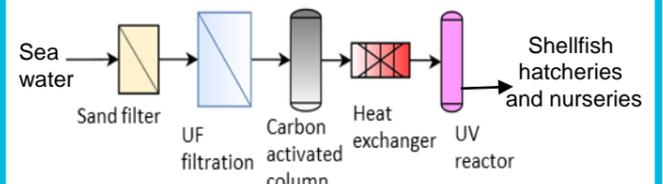
- ✓ Kinetics and adsorption isotherms of micropollutants
- ✓ Dynamic adsorption on Rapid Small Scale Column Test (RSSCT)



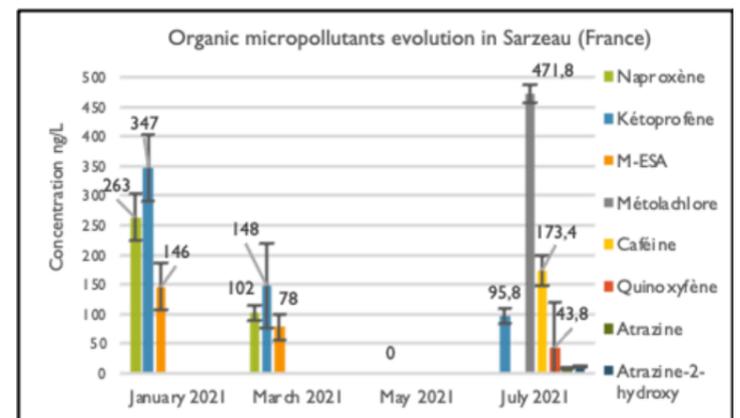
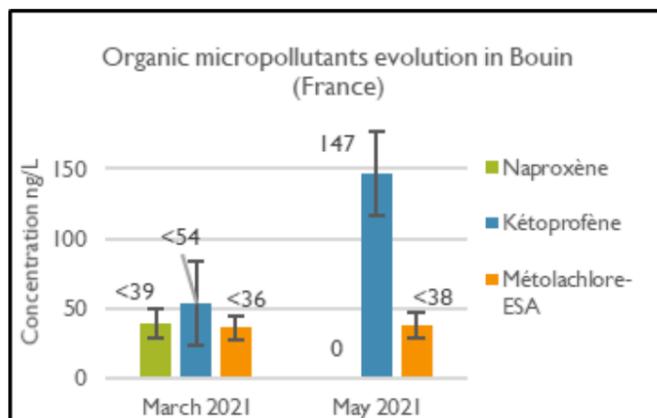
Selection of adsorbent and adsorption process

Coupling AC-Ultrafiltration and performance evaluation on hatcheries sites

- ✓ good physico-chemical parameters
- ✓ biological disinfection
- ✓ removal of organic micropollutants



Organic micropollutants in seawater



Pesticides and pharmaceutical residues are detected

Perspectives

- ✓ Looking for a non-targeted analysis
- ✓ Study of the ecotoxicology of detected compounds on mollusks