

## noPills

noPills : for a better management of pharmaceutical residues in water



# PROJECT

Urban-water pollution linked to pharmaceutical residues is a real issue. With NoPills, LIST's researchers are targeting this pollution by avoiding the introduction of pharmaceutical residues in wastewater and through developing efficient environmental elimination processes.

### INSPIRATION

The noPILLS project is a follow up of the Interreg IVB PILLS European project which focused on analysing pollution linked to pharmaceutical residues in the urban water cycle and the impact thereof, but also on technical solutions to be implemented in order to limit their harmful effects. This initial project anticipated their direct elimination at hospital level where their concentrations are normally higher through a decentralized wastewater treatment, but the specific conclusion was that the treatment of these residues at point source did not constitute a cost-effective solution compared to conventional wastewater treatment plants. Coming up with convincing results remains a complex and onerous process and concentrating uniquely on the hospital as point source did not allow the issue to be solved, since a significant number of patients are not hospitalized and get rid of the products at home, without forgetting those who habitually just flush their outdated medication down the toilet.

LIST's researchers working with partners from PILLS have consequently looked at another approach, which is developed in the noPILLS project. Like its predecessor, it is a Interreg IVB European project but this one focuses more on the source of the pollution, by meaning consumer behaviors in medical use. "It's an issue of developing sustainable management strategies for medicine residues found in wastewater", notes Dr Silvia Venditti, a researcher at LIST in charge of coordinating the project. "We think that the best means of tackling the issue today is to first and foremost reduce the introduction of these residues into urban wastewater systems possibly accompanied by less energy consuming technology solutions."

### INNOVATION

noPILLS has two sections. The first involves working to increase awareness among patients and consumers about pharmaceutical substances, in order to avoid specific bad practices. The second lies in studying innovative technological solutions which could allow for better water treatment with respect to some components which are particularly harmful, introduced in the "watch list" of emerging pollutants of the European Water Framework Directive (2013).

In order to reduce these components being introduced into water systems, noPILLS concentrated on the consumption process for pharmaceutical substances, working with doctors, stakeholders involved in a hospital's chain of care -nurses, administrators= as well as those involved in water treatment. "We'd like to know how they understand this issue so we can work with them in finding feasible solutions", explained Dr Silvia Venditti. With them, LIST concentrated on the best way to reach out to the key players and to alert them to the dangers that these residues pose to nature but also to prepare water management stakeholders in particular to possible legal requirements being introduced in the following years. Beyond the issues of outreach and education, noPILLS has considered different technical options for avoiding specific harmful components, after medical treatment, entering into the water system. "For example, to avoid a contrast agent used in radiology being introduced to the water system, we asked patients to separate their urine for a 24-hour period after being administered with the substance by means of small bags. The collected urine, solidified within these bags thanks to an adsorbing material, can then be disposed of with household waste", specified Dr Silvia Venditti.

noPILLS is also studying environmental methods for eliminating pharmaceutical substances from wastewater. The research project is prioritizing sustainable methods with chemical-treatment processing. noPILLS is therefore focusing on innovative solutions, particularly on the use of biological activated carbon, which might be an alternative to traditional treatment approaches using ozone, UV irradiation, or reverse osmosis. Pharmaceutical residues are eliminated, first of all, by activated carbon, a substance also used here for its micro-organism binding properties. An active-biofilm formation then allows residues to be further reduced through biodegradability. This technology constitutes a very interesting solution, both in terms of its efficiency and its lifetime.

### IMPACT

At the end of this project, noPILLS will formulate recommendations for the authorities about measures which can be implemented to reduce the presence of pharmaceutical residues while taking the economic and environmental aspects of the proposed approaches into account.

### Partners

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