

## *Innovative process for the removal of persistent organic pollutants present in wastewater streams*

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### ***Description***

This is the first time that surfactants-based aqueous phase segregation has been proposed for the remediation of aromatic organic pollutants. Up to know, biological degradation was used alone or in combination with other physical and chemical methods (e.g. volatilization, sorption, electrokinetic, oxidation, extraction with supercritical fluids, etc.), that often entail economic and environmental disadvantages. Therefore, the proposed strategy is an environmentally friendly alternative that entails benefits such as low energy consumption, low cost, availability of reagents at bulk quantities and easy implementation.

The proposed technology makes up a quite simple way of remediating wastewater effluents containing aromatic hydrocarbons by means of coupling two different strategies, a biologically-based step and another one consisting on phase segregation. In this way, the detergents existing in the aqueous stream (both in biological remediation methods and soil washing techniques) are leveraged to trigger phase segregation by the addition of potassium-based organic biodegradable salts.

The process flowsheet diagram proposed includes two main steps: the first one consisted of inoculating the aromatic hydrocarbons-polluted effluent with the bacterium *Pseudomonas stutzeri*, and to add different chemical compounds allowing the optimum microbial growth and biodegradation ability. The process will be carried out in a bioreactor, which should include agitation, aeration and temperature control. The second step requires the operation at a composition within the immiscibility region in the systems composed of surfactants, organic salts and water at room temperature. Therefore, only a sedimentation tank is necessary to perform this operation.

### ***Innovative aspects and advantages***

The proposed strategy is an environmentally friendly alternative that entails undoubted benefits in term of an economic and technological standpoint. Thus, advantages such as low energy consumption, low cost, short times of operation, simplicity, availability of reagents at bulk quantities and easy implementation.

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***Commercial applications and potential users***

Additionally, since detergents are commonly used to solubilise recalcitrant hydrophobic organic contaminants, both in biotechnological and soil washing processes, the present strategy is suitable to be coupled as a second step in order to reduce the contaminant charge in aqueous streams.

This invention can be applied immediately in any plant for the treatment of industrial wastewater from sectors ranging from metallurgical to petrochemical.

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***Patent status***

Spanish patent and PCT application.

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***Type of collaboration***

Licensing of the technology and collaboration on the commercialization of the product.