WATER REMEDIATION FROM CONTAMINANTS OF EMERGING CONCERN THROUGH FUNGI, ALGAE, YEASTS AND ENZYMES

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Background

In the last historical period, the technologies supporting the environmental characterization of municipal water are more efficient and effective. In fact, they allow us to identify trace particles [ppm]. Many of them entered ecosystems due to pollution deriving from industrial and civil processes and are called "Contaminants of Emerging Concern (CEC's)" because they show off with time to be harmful to the environment and for human beings. Heavy metals, drugs, dyes, pesticides and cosmetic products for selfcare are some of CEC's that we have not yet learned how to deal with and to handle their disposal. The field of study of the thesis is the characterization of CEC's and the production of technology able to dispose of them adequately with efficient processes from an energy point of view and which are based on the responsible use of a fundamental and primary resource such as water.

Objectives

The aim of the research is the decontamination of water trough different technology. Exploring the world of microorganisms to better understand how fungi, algae yeasts and enzymes work in the field of waste water remediation. The challenge to overtake is the build an effective and efficient Unit Operation to install in the wastewater treatment plant and enhance the use of innovative technologies at low cost, energy requirements and low environmental impact.

Methodologies

The method chosen for the research is the reading of the literature and the application of physical, chemical and biological processes like reverse osmosis, or the field of biomaterial and biobased mass, in fact nowadays we use more bacteria but we are kind of new to other microorganisms like fungi, enzymes and algae to remediate dyes, heavy metals and other Contaminants of Emerging Concern. Other methods are connected to physical processes like the evaporation, that based on literature, seems to be the most efficient and effective, and the capillarity that is actually to explore as unit operation in the field of waste water treatment plant.

Expected Results and Impact

Microorganisms like fungi, algae yeasts and enzymes are already known as bioremediatory factors, mostly in country of mid-east Asia. Their capacity of remediation trough biosorption and adsorption are high. Being organic process, they are expected to be at low cost and at low energy rate taking advance on the vision of the water reuse and circularity approach according to ecological transition paradigms. In the future they could play an important role in the remediation of specific industrial, pharmaceutical processes and rather in agricultural processes.