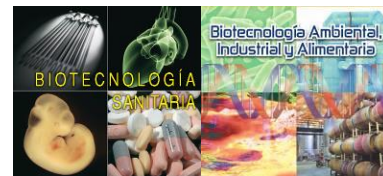

Talk

Synthesis of sustainable flocculants for phosphorus removal in urban wastewater from algae, marine and terrestrial plant wastes



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ABSTRACT

Motivation:

Wastewater treatment is a process that is constantly evolving in order to reduce both economic costs and the environmental impact. Since the Urban Waste Water Treatment Directive (UWWTD) was approved in 1991 [1], the minimum requirements for wastewater treatment have been increasing, and there are now plans until 2040 that introduce new limit values for certain elements such as Nitrogen and Phosphorus [2].

For this reason, there are several lines of research focused on finding new, less polluting alternatives for this process. In our study, we seek to reuse organic wastes from algae, marine and terrestrial plants, from which we can extract cellulose [3], subject it to a cationization process [4] and use it as a flocculant to clarify the water and remove a portion of the phosphorus.

The objective of this study is not only to try to substitute the chemical flocculants that are normally used, but also testing whether our cellulose can be combined with this flocculant (Ferrous Chloride) in order to achieve the same performance while decreasing economic costs and environmental impact.

Methods:

The most important method we are going to use is the jar test. This test allows us to analyze at the same time several 500 ml samples with different amounts of coagulant to evaluate the optimal dose and its efficacy.

Different methods will also be used to measure pH (Hach pH meter), conductivity (Hach conductivity meter) and concentrations of different elements such as P or N (Merck kits). A study of the microfauna will also be carried out by microscopic observation.

These tests are performed to ensure that the coagulants used do not modify the characteristics (physical, chemical and biological) in a negative way.

Results:

After preliminary tests with different cellulose samples, positive results were obtained in 3 different samples of cationized cellulose from terrestrial plants. In these tests, a reduction of soluble phosphorus by 14 to 20% was achieved.

Conclusions:

The results obtained so far are promising, as other types of cellulose are still to be tested and a higher P removal is expected when combining this flocculant with the Ferrous Chloride.

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