Poster

Assessment of the application of enzymes in the production of sewage sludge in WWTP

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ABSTRACT

Motivation: In the urban wastewater treatment plants (WWTP) a large volume of sewage sludge is produced due to the growth of microorganisms in the biological reactors. This sludge cannot spill directly to the environment, because it is legally forbidden (Directive 91/271/EEC). Nowadays, the searching of alternatives for treating/reducing this sludge is increasing. Some previous works [1] focused on different strategies for sewage sludge reduction in conventional activated sludge systems not interfering in the efficiency of the process. Among the different strategies, the use of hydrolytic enzymes seemed to be effective in the reduction of the excess sludge production (up to 30% reduction, [2]). On the other hand, the overgrowth of microorganisms and the accumulation of non-biodegradable organic matter in the filtering media of constructed wetlands produce the clogging and collapse of these natural treatment systems.

The above mentioned problems could be mitigated if reducing the amount of refractory matter in the influent and limiting the growth of microorganisms by the use of enzymes' technology. However, the application of enzymes is limited, mainly, by their high cost of acquisition. One alternative of commercial enzymes could be enzymes generated in the fermentation of sewage sludge or other by-products coming of WWTP [3].

This study aims at (1) the determination of the optimum conditions for the application of enzymes in the wastewater treatment and (2) the assessment of the effects on both intensive and extensive treatment systems.

Methods: In this study, lab scale pilot plants are employed for the assessment of the application enzymes to biological reactors. One pilot plant works as an activated sludge system (intensive tech.) and the other will simulate a constructed wetland (extensive tech.). Both pilot plants are fed with real wastewater. Commercial enzymes will be tested initially, and later, with the by-product obtained in the fermentation of sewage sludge. Physicochemical and microbiological parameters will be monitored in both systems to assess the effect of enzyme's addition on both systems. Besides, sludge production and "clogging" phenomena will be studied. According to the results of Lab scale tests, the study will continue extrapolating to a large- scale pilot plants, to verify the sewage sludge reduction and identify possible operative problems under real conditions.

REFERENCES

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