

Characterization of sewage sludge from different treatment systems

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Abstract

The Vacuum Filtration and the Capillary Suction Time tests can be used for coagulant dosage evaluation. The tests indicate that there is an optimal range of synthetic polymer dosage to ensure the best performance of the coagulated sludge compared to the raw sludge. Tests with FeCl_3 indicate that increasing the coagulant dose decreases time for sludge filtration.

Key words: Vacuum Filtration, Capillary Suction Time, Sludge

Introduction

Capillary Suction Time is an empirical test that assists in determining the optimum coagulant dosage and it was indicated by Vesilind (1988), Andreoli et al (2001) and APHA et al. (2012). On the other hand, the Vacuum Filtration test is intended to check the sludge resistance to filtration. In Brazil there are no studies to evaluate the application of these two tests for the same type of sludge. In the literature there are no results that demonstrate whether these two assessments generate similar or contradictory results. It is proposed in this study, the evaluation of both tests for different sludge generated in sewage treatment plants.

Results and Discussion

The Image 1 shows the results to Vacuum Filtration test with bottom sludge of UASB reactor with synthetic polymer (Superfloc® 8394) as coagulant.

The total solids concentration was 14,0 g/L and the polymer addition was performed in accordance with percentages indicated in Image 1.

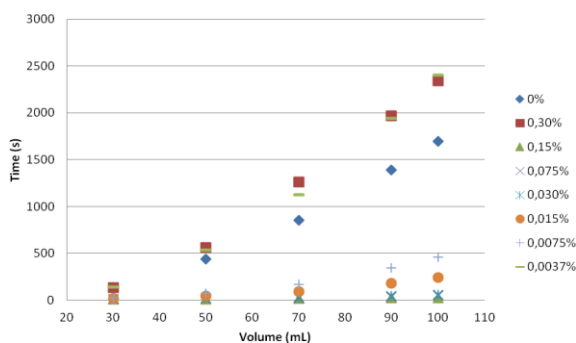


Image 1. Vacuum Filtration test with bottom sludge of UASB reactor with synthetic polymer as coagulant.

For this sludge, concentrations up to 0.3% and below 0.0037% decreased filtration performance compared to the raw sludge. For overdose, this worse performance was due to increasing viscosity of the liquid to be filtered.

Testing conducted according to the Capillary Suction Time method (APHA et al. 2012) indicated that for the raw sludge the time required for the water percolating through the porous was 10.4 s. For 1.5% polymer dose the time was 52.4 s, also indicating an overdose.

Tests with FeCl_3 indicate that increasing the coagulant dose decreases time for sludge filtration.

Conclusions

According to Vacuum Filtration test there is an optimal range of synthetic polymer dosage to ensure the best performance of the coagulated sludge compared to the raw sludge.

The Capillary Suction Time test agrees with Vacuum Filtration test in terms of determining polymer overdose.

Using FeCl_3 as coagulant, the time to sludge filtration decreases with increasing the coagulant dose.

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