Project UASB reactor in Vicosa

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Goal of Project

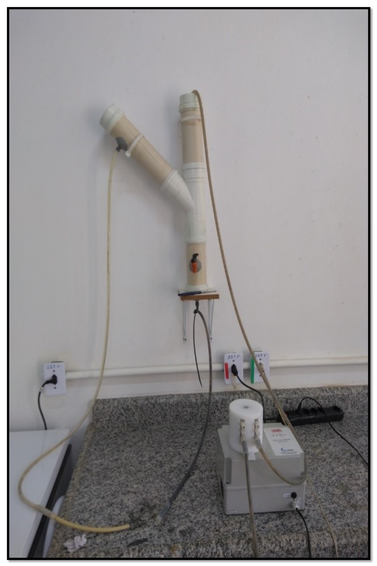
To construct a UASB reactor which is able to remove COD from sewage, and optimize this. The sewage will be characterized and compared to limit values provided by the state of Minas Gerais. Basic toxic identification will be applied in order to know what toxicants are present and how these can be removed

Hypothesis

- Theoretically the efficiency could be around 80-90%
- -No large-scale WWTP is located in Vicosa – will not meet limit values
- Toxicants will be present in various forms and various mechanisms should be used in order to remove them

The UASB reactor

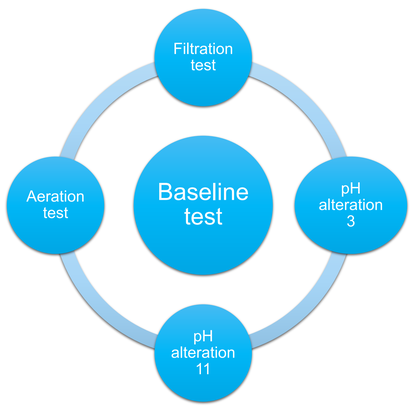
The Y-shape was chosen in order to keep the sludge inside the reactor.
Total volume was 3 Litres.
After 10 weeks, the sewage was heated, sifted and homogenized before entering the reactor.



Methodology: characterization

Physical	• Total suspended solids • Electrical conductivity
Chemical	• BOD & COD • Nutrient concentration • pH & alkalinity
Biological	• Algae inhibition test

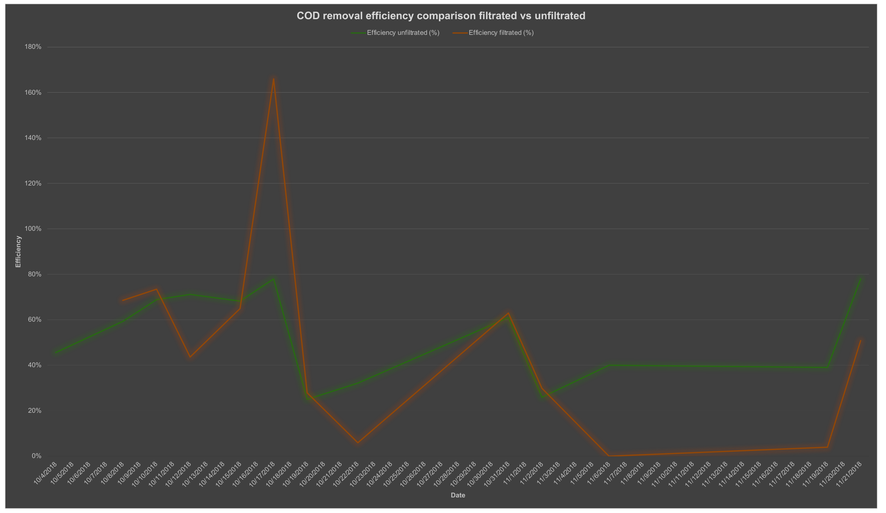
Toxicity identification evaluation Phase I



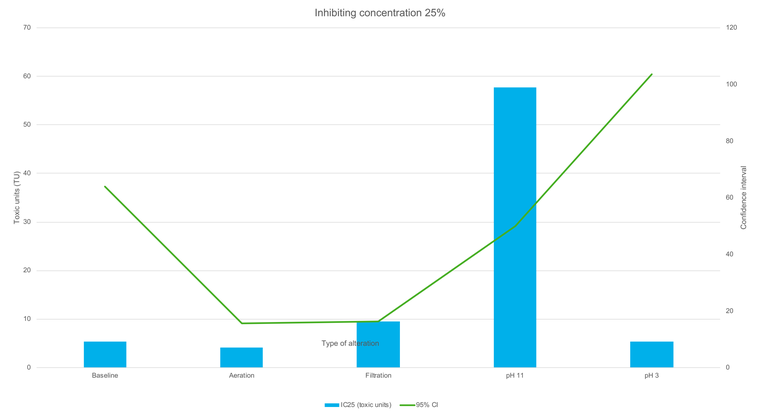
Toxicity identification evaluation can be seen as alterations on the conventional algae inhibition test.

- Filtration: sewage was first filtrated and algae test was compared to baseline test in order to see if filtration was a successful mechanism
- pH alterations: NaOH and HCl were added to the medium to raise and decrease their pH. After 1 hour, the ph was neutralized again.
- Aeration: medium was aerated for 1 hour in order to see if aeration is successful mechanism.
- Baseline: same as conventional algae test, used as comparison.

Results: COD efficiency



TIE Phase I



Conclusion

- The comparison with the limit values show that the wastewater quality is not in good shape. Phase II TIE has to be applied in order to successfully characterize toxicants and find a mechanism to remove them. The UASB reactor is a feasible measure for a WWTP, especially in Brazil's climate. However, a large scale WWTP has to be built in order to fulfil the needs. The UASB reactor has to be exposed to a stable environment in order for it to have optimal efficiency.