

## Abstract

It is estimated that the wastewater generated by more than 80% of the world population is released into the environment without any treatment. In consequence, about half of all diseases in developing countries are caused by polluted water. As this problem is expected to grow in the future, wastewater treatment technologies are inevitable as a mean to preventing water resources from becoming unusable and to making water reuse possible. However, in many countries, the development of wastewater treatment systems is very limited due to financial obstructions.

Anaerobic treatment is a low-budget approach, but it results in releasing ammonia, which is toxic to fish and may result in algae blossoms. In order to avoid these problems, anaerobic effluents should be subjected to aerobic post-treatment.

This study aims to making aerobic and anaerobic wastewater treatment solutions comparable. Thereby, more cost-efficient techniques are examined, that are feasibly employable at aerobic or anaerobic Wastewater Treatment Plants (WWTPs) with integrated aerobic post-treatment. The removal of COD has been chosen as a parameter, as it is performed in both processes.

A tool was developed to calculate and compare construction, operational, and total costs for the removal of one kilogram COD for both: aerobic and anaerobic processes, respectively.

This tool's functionality was tested in a case study, in which an example on how to use the tool was illustrated. Therefore, the plants ETE Belém (aerobic) and ETE CIC Xisto (anaerobic), both in Curitiba, Brazil, were used as example. The results of the case study showed that the tool served their respective purposes efficiently.

As the main objective of this study was to develop a basis for decision-making on future investments in the construction of new WWTPs, this study could be of interest to anyone who considers building a new WWTP in the nearby future.