

Anaerobic Fluidized Bed (AFB) Reactor

previously named EGSB,

previously, previously named HRUASB

Abstract

The AguaClara Team is looking to expand from providing sustainable drinking water solutions to also providing highly efficient sustainable wastewater treatment processes. The Fall 2016 Anaerobic Fluidized Bed Reactor (AFB) group is focused on assessing the treatment capabilities of an AFB reactor through the removal of chemical oxygen demand (COD) and the production of biogas. Previous groups have designed AFB reactors to handle a flow rate of 0.18 mm/s with a hydraulic retention time (HRT) of one hour. This group shall continue using the previously designed reactors to begin developing a characterization of reactor performance based upon the previously mentioned flow rate and HRT. The goal is to make recommendations for reactor modifications to meet optimal COD removal and biogas production for the treatment of wastewater.

Spring 2017

The Anaerobic Fluidized Bed (AFB) team will pick up where the previous semester left off. The team is looking to solve the issues associated with the lab scale reactors such as granule plugs forming and granule washout. The team will work to overcome these challenges and then characterize the wastewater degradation. Further calculations and designs will be looked into to optimize reactor performance. Collaboration with the UASB team and methane sensing team will be critical to achieve our mutual goals of designing a low cost, efficient wastewater treatment system.

Fall 2016

The anaerobic fluidized bed (AFB) team was created to work within the wastewater sub-team to operate and analyze bench-scale anaerobic reactors. The team will utilize existing reactors designed in previous years and evaluate performance based upon the design influent flow rate, hydraulic retention time, biogas yield and COD removal efficiency. Initial literature review was conducted on upflow anaerobic sludge blanket (UASB) and expanded granular sludge bed (EGSB) reactors to inform reactor design. Further calculations will be conducted to determine optimal influent upflow velocity, influent flow rate, reactor dimensions, and number of reactors.

Spring 2016

The expanded granular sludge bed (EGSB) team was created to work within the wastewater subteam to design and run new anaerobic reactors. New designs are being drafted to increase upflow velocity and flow rates of influent, create a fluidized bed, decrease hydraulic retention time, and increase granular retention. Initial literature review was conducted on UASBs and expanded granular sludge bed (EGSB) reactors to inform reactor design. Calculations are being done to determine optimal influent upflow velocity, influent flow rate, reactor dimensions, and number of reactors. Designs will be finalized and reactors will be constructed in upcoming weeks.

Members

Zoe Maisel - zam7@cornell.edu

Peter Martin - pm552@cornell.edu

Clare O'Connor - ceo45@cornell.edu

Evan Greenberg - ecg77@cornell.edu

Former

Erica Gardner - eg477@cornell.edu

Dylan Vu - dv236@cornell.edu

Stephen Galdi - smg296@cornell.edu

Qiu Shen - qs62@cornell.edu

Documents

	Challenges	Tasks	Symposium	Final Presentation	Final Report
Spring '17					
Fall '16					

Spring '16			Spring 2016 EGSB Symposium.pptx.pptx			? Unknown Attachment
------------	--	--	--	---	---	----------------------