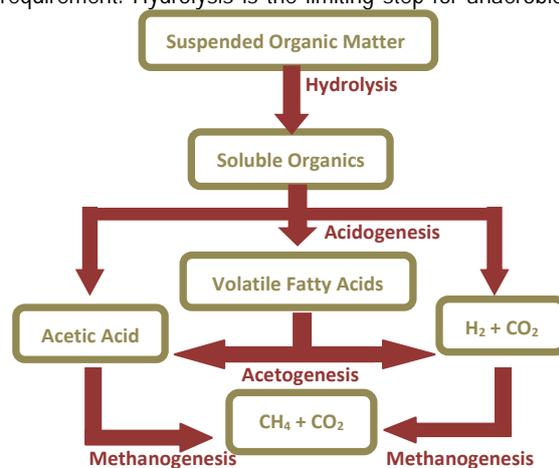


AUTOHYDROLYSIS PRETREATMENT OF SECONDARY SLUDGE FOR IMPROVING ANAEROBIC DIGESTION

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Secondary sludge is produced during biologic treatment in the activated sludge process in waste water treatment plants, and it is constituted by flocs of active microorganisms. The sludge produced should be treated, looking to reduce water and organic matter content. It also seeks to produce a stabilized and reusable effluent, principally obtain "Biosolids Class A" and harnessing the energy content of organic matter.

Anaerobic digestion is the most popular treatment for elimination of sludge in WWTP. It has associated production of biogas, a renewable energy source, and also low energy requirement. Hydrolysis is the limiting step for anaerobic digestion of secondary sludge, because is necessary to break off the sludge floc and after that the membrane cell. Different techniques to improve the hydrolysis of sludge have been proposed, were pretreatments of anaerobic digestion shows interesting results. There are many pretreatments of sludge using different mechanisms as mechanicals, chemicals, sonication, thermal and utilization of hydrolytic enzymes. The option of hydrolytic enzymes includes the possibility of use: (1) commercial enzymes, (2) enzyme-producing microorganisms, and (3) the enzymatic system of sludge to be treated. If we changes environmental conditions of sludge it is possible to stimulate production of hydrolytic enzymes such as proteases and then produce a better hydrolysis of organic matter.



This research uses autohydrolysis pretreatment, it involves subjecting the secondary sludge during short periods of time to a temperature of 55°C and limited amount of oxygen. This environmental condition causes secretion of hydrolytic enzymes that aided by the high temperature produce the deflocculating and lysis of sludge, improving the anaerobic digestion.

The study is currently develop in two lines of work, first a study of effect of pretreatment over anaerobic digestion with batch and continuous bioreactors; and a second line with study of enzymatic activity detection and secondary sludge characterization.



Relevant publications

Carvajal A., Peña M., Fdz-Polanco F., Elvira-Pérez S. (2010) "Evaluation of autohydrolysis pretreatment of secondary sludge". IWA World Water Congress and Exhibition, Montreal, Canada.

Peña M., Bravo O., Pérez-Elvira S., Fdz-Polanco F. (2008) "Enzymatic autohydrolysis of secondary sludge". IX Taller y Simposio Latinoamericano de Digestión Anaerobia, Isla de Pascua, Chile.