BIOPOLYMER AND CATION RELEASE IN AEROBIC AND ANAEROBIC DIGESTION AND THE CONSEQUENT IMPACT ON SLUDGE DEWATERING AND CONDITIONING PROPERTIES

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Sludge dewatering and chemical conditioning requirements were examined from the perspective of biopolymer and cation release from activated sludge flocs. Both aerobic and anaerobic digestion processes were considered from two different activated sludge sources at a temperature of 20°C. Polymer demand and specific resistance to filtration increased with an increase in total soluble biopolymer concentration for all temperature ranges. In anaerobic digestion, the protein release was three times greater than the polysaccharide release. Conversely, aerobic digestion of the same sludge resulted in a greater release of polysaccharides than proteins. Polymer conditioning requirements in the anaerobic digestors were an order of magnitude higher than in the aerobic digestors; proteins were considered to be the biopolymer fraction responsible for the high polymer conditioning requirements and poor dewatering properties. Biopolymer is released to the supernatant as colloids bound by divalent cations. Peptidase and glucosidase activity were used to monitor enzymatic activity relative to biopolymer release and degradation. The reasons for the increases and decreases in hydrolase activity are unknown.
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