World Academy of Science, Engineering and Technology
International Journal of Energy and Environmental Engineering
Vol:14, No:05, 2020

Dewatering of Brewery Sludge through the Use of Biopolymers

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Abstract : The waste crisis has become a global issue, forcing many industries to reconsider their disposal methods and environmental practices. Sludge is a form of waste created in many fields, which include water and wastewater, pulp and paper, as well as from breweries. The composition of this sludge differs between sources and can, therefore, have varying disposal methods or future applications. When looking at the brewery industry, it produces a significant amount of sludge with a high water content. In order to avoid landfilling, this waste can further be processed into a valuable material. Specifically, the sludge must undergo dewatering, a process which typically involves the addition of coagulants like aluminum sulfate or ferric chloride. These chemicals, however, limit the potential uses of the sludge since it will contain traces of metals. In this case, the desired outcome of the brewery sludge would be to produce animal feed; however, these conventional coagulants would add a toxic component to the sludge. The use of biopolymers like chitosan, which act as a coagulant, can be used to dewater brewery sludge while allowing it to be safe for animal consumption. Chitosan is also a by-product created by the shellfish processing industry and therefore reduces the environmental imprint since it involves using the waste from one industry to treat the waste from another. In order to prove the effectiveness of this biopolymer, experiments using jar-tests will be utilised to determine the optimal dosages and conditions, while variances of contaminants like ammonium will also be observed. The efficiency of chitosan can also be compared to other polysaccharides to determine which is best suited for this waste. Overall a significant separation has been achieved between the solid and liquid content of the waste during the coagulation-flocculation process when applying chitosan. This biopolymer can, therefore, be used to dewater brewery sludge such that it can be repurposed as animal feed. The use of biopolymers can also be applied to treat sludge from other industries, which can reduce the amount of waste produced and allow for more diverse options for reuse.

Keywords : animal feed, biopolymer, brewery sludge, chitosan
Conference Title : ICEEE 2020 : International Conference on Ecology, Environment, and Energy
Conference Location : Montreal, Canada
Conference Dates : May 18-19, 2020