

The Usage of Nitrogen Gas and Alum for Sludge Dewatering

Authors : Mamdouh Yousef Saleh, Medhat Hosny El-Zahar, Shymaa El-Dosoky

Abstract : In most cases, the associated processing cost of dewatering sludge increase with the solid particles concentration. All experiments in this study were conducted on biological sludge type. All experiments help to reduce the greenhouse gases in addition, the technology used was faster in time and less in cost compared to other methods. First, the bubbling pressure was used to dissolve N₂ gas into the sludge, second alum was added to accelerate the process of coagulation of the sludge particles and facilitate their flotation, and third nitrogen gas was used to help floating the sludge particles and reduce the processing time because of the nitrogen gas from the inert gases. The conclusions of this experiment were as follows: first, the best conditions were obtained when the bubbling pressure was 0.6 bar. Second, the best alum dose was determined to help the sludge agglomerate and float. During the experiment, the best alum dose was 80 mg/L. It increased concentration of the sludge by 7-8 times. Third, the economic dose of nitrogen gas was 60 mg/L with separation efficiency of 85%. The sludge concentration was about 8-9 times. That happened due to the gas released tiny bubbles which adhere to the suspended matter causing them to float to the surface of the water where it could be then removed.

Keywords : nitrogen gas, biological treatment, alum, dewatering sludge, greenhouse gases

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