

### **Anaerobic / cell molecular bio**

The purpose of the study is to chronicle and evaluate the effects of different doses of ferric (III) chloride. This experiment is performed to help treat wastes and waste water using bacteria that could ferment it into methane and less toxic products. They used the process called anaerobic digestion, digestion without the presence of oxygen, to fulfill this task. This technology is presumed to have great advantages. However, waste manufacturers who use it are bereaved by its languid process during the period of digestion at a given quantity of waste. Therefore, scientists and authors in this journal, Charles J. Banks and Zhengjian Wang, have conjured a scheme using an ionic salt to enhance the desired yields quickly. Banks and Wang actually used the research and investigations from other two scientists- Anderson and Zhou, as mentioned in the article- to further analyze the ionic salt's, Iron chloride or ferric chloride, effect in the medium containing the bacteria and waste. The bacterial species are mesophiles, that is, bacteria who grow in moderate temperatures. In the experiment, they are very sensitive to the products it makes such as COD, or known as chemical oxygen demand, and sulphide concentrations. Their sensitivity decreases their rates of digestion gradually. Consequently, scientists are determined to discover an alternative route to eradicate the impediment to the bacteria. They will use different doses of the salt to monitor the effect of the reaction.

Four stirred-tanks reactors were used in the study with a volume capacity of 4 liters. They acquired a 4 -liter sample of waste water to utilize for the test. Ferric Chloride was dispensed each day to the reactors. One reactor was used as a control while the other as a variable containing ferric chloride. Ferric chloride was used proportionally to the

sulfur concentration. Also, the experimentation was carried out in the duration of 50 days. The products or effluent of the reactors were analyzed extensionally. They measured the pH level, fatty acid concentration, sulphide, and sulphate concentration. Also, there were preventive measures to relinquish any other substance to enter the reactor's apparatus such as cement kiln dust. In order to fulfill the task, there must be high supply of ferric chloride. Even though the growth of bacteria is apparent, it does not give them the advantage of the quick dispersal of chemical oxygen demand or COD. The ferric chloride takes the role of a catalyst even though they are consumed. Theoretically, catalyst lowers the activation energy without being consumed and shortens the rate of time of product yields. (Bodner)

During the experiment, their implementation of adding ferric chloride to the reactors had some success but not the desired success of the scientists. There was improvement in digestive activity however; there was a lack of COD removal. As mentioned, the researchers' revelation that “.7- 1.0 mole” of ferric chloride is required to react with one mole of hydrogen sulphide was another drawback.

In summary, the scientists must go back to the drawing table to reassess their strategy. They must conjure another system that is efficient and less costly. Dispensing the salt in doses is non-efficient. The only positive advantage in this experiment is the increase of bacterial population.

Work Cited

Bodner, George M. Chemistry: An experimental Science. London: John Wiley and Sons, 1989

Banks, Charles J. and Zhengjian Wang. Report: Anaerobic Digestion of a Sulphate Rich Landfill Leachate: The Effect of Differential Dosing with Ferric Chloride. University of South Hampton, 2006