

KEY WORD : SULPHATE REDUCTION/ ANAEROBIC TREATMENT

ANGSANA SOOKAHOOT : SULPHATE REDUCTION IN ANAEROBIC TREATMENT OF DISTILLERY WASTE. THESIS ADVISOR : DR. SUMETH CHAVADEJ, Ph.D., DR. PIENPAK TASAKORN, Ph.D. 205 pp. ISBN 974-581-879-8

The purpose of this research study was to determine the factors affecting sulphate reduction in anaerobic treatment. In this experimentation, an anaerobic filter used had the volume 19 litre. The PVC tubes ( $\phi$  1.7 cm.) were used as packing media which had the total surface area of 604 cm<sup>2</sup>. The distillery waste was used as the raw material and it had the sulphate concentration of 4,000 - 5,000 mg/l. From the experimental results, it indicated that the sulphate reduction efficiency reduced significantly when the levels of the volatile fatty acids and the dissolved sulphide in the fermenter increased. The highest feed sulphate concentration of 4730 mg/l did not affect the system performance. The anaerobic filter could handle the highest COD loading up to 21.2 kg/m<sup>3</sup>d with good process stability. At the optimum loading of 11.3 kg COD/m<sup>3</sup>d corresponding to HRT of 5.99 d, the system had the maximum sulphate removal of 99 %, COD reduction of 47.5 %, the gas yield of 0.13 m<sup>3</sup>/kg COD removed, (0.06 m<sup>3</sup>/kg COD fed) and gas production of 0.71 m<sup>3</sup>/m<sup>3</sup>d. The biogas produced contained 45.7 % methane. Under this loading, the system had the methane yields of 0.06 m<sup>3</sup>/kg COD removed, 0.03 m<sup>3</sup>/kg COD fed and 0.33 m<sup>3</sup>/m<sup>3</sup>d. Moreover, under the optimum COD loading of 9.34 kg/m<sup>3</sup>d and HRT of 7.33 d, the system had the maximum COD removal of 55.3%. The system also had the maximum biogas and methane production efficiencies of 1.17 and 0.49 m<sup>3</sup>/m<sup>3</sup>d, respectively when it was operated at the COD loading of 21.2 kg/m<sup>3</sup>d corresponding to HRT of 7.33 d.