

## Abstract

Biogas is a renewable and sustainable energy source that produced from anaerobic fermentation of organic matter. It can be use as a natural gas substitute for cooking purpose in households, however, up-grading or purifying of biogas for health and environmental concern is necessary. The removal of hydrogen sulfide ( $H_2S$ ) from biogas is an important step of biogas up-grading since  $H_2S$  is hazardous to human health, high corrosive and strong un-pleasant smell. The aim of this research is to develop the  $H_2S$  removal unit for up-grading of biogas using as cooking gas in households. The chemical absorption process using Fe(III)EDTA as an absorbent was employed. The  $H_2S$  removal unit comprises of a 5 cm diameter cylinder column, 50 cm height containing packing media of 1.5 diameter and Fe(III)EDTA solution of 350 mL were found suitable for this purpose. The results shown that at the optimum conditions, biogas flow rate of 5 L/min, Fe(III)EDTA concentration and volume of 1 mol/L and 350 L, respectively, and inlet  $H_2S$  concentration in biogas of 1000 ppm, the life time of Fe(III)EDTA that can control the outlet  $H_2S$  concentration at 200 ppm or less is 8 hr. The spent Fe(III)EDTA solution can simply be regenerated by bubbling air at flow rate of 5 L/min for 12 hr. The regenerated Fe(III)EDTA solution gave the same  $H_2S$  removal efficiency as the fresh one. Thus, it can be concluded that the  $H_2S$  removal unit developed in this work has a high potential to use as a biogas up-grading mean for household utilization.