

Start-up of biohydrogen production from palm oil mill effluent under non-sterile condition in 50 L continuous stirred tank reactor

ABSTRACT

Feasibility study of biohydrogen production from Palm Oil Mill Effluent (POME) using POME sludge as a mixed culture of natural inoculum was conducted. The experiment was done using a 150 mL serum bottle and 50 L Continuous Stirred Tank Reactor (CSTR) in batch and continuous modes, respectively. The biogas produced from both fermentations was free from methane due to heat treatment of the sludge prior to inoculation. The results obtained showed that the biohydrogen content in 150 mL serum bottle was higher (70%) than that of 50 L CSTR (25%). The biohydrogen rates for serum bottle and 50 L bioreactor were 74 and 33 NmL/h/L, respectively. Butyrate, propionate and acetate were the main soluble metabolites produced during the fermentation and reduced the pH of broth.

Keyword: Biohydrogen; Palm oil mill effluent; Continuous culture; Non-sterile condition; Continuous stirred; Tank reactor