

Isolation of hydrogen generating microflora from cow dung for seeding anaerobic digester

ABSTRACT

The effectiveness of using cow dung as a source for isolating hydrogen generating microflora was investigated under varying isolating conditions based on viz.: pH adjustment and pH adjustment coupled with heat treatment. The viability of the isolated microflora was tested in an anaerobic jar with respect to biogas generation, hydrogen content and pH. The results showed that for pH adjusted microflora isolated from cow dung with solids content at 10% resulted in a cumulative biogas generation of 1494, 2404 and 3327 ml, whereas the corresponding cumulative hydrogen generation was found to be 424, 701 and 47 ml during the anaerobic fermentation for 120 h at a pH of 4, 5 and 6, respectively. The biogas was free from methane when operated at pH 4 and 5, whereas at pH 6 methane generation was observed. In the case of microflora isolated from cow dung with 10% solids, by subjecting to pH adjustment coupled with heat treatment resulted in biogas free from methane content during the fermentation at pH 4, 5 and 6, respectively. At the end of 120 h of fermentation for a reactor pH at 4, 5 and 6 the cumulative biogas generation was 1685, 2610 and 2353 ml, whereas the cumulative hydrogen generation was 509, 1198 and 1165 ml, respectively. A maximum of 41% and 62% hydrogen was obtained at pH 5 for microflora isolated based on pH adjustment and pH adjustment coupled with heat treatment. The effect of initial solids content of the cow dung on the isolating efficiency of hydrogen generating microflora was also investigated at pH 5 and 6 coupled with heat treatment. The results revealed that with the increase in initial solids content of the cow dung the optimum heat treatment period also increased as the pH increased from 5 to 6.

Keyword: Biohydrogen, Anaerobic digestion, Cow dung, Isolation, Hydrogen generating microflora