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Increased methane production in cyanobacteria and methanogenic microbe co-cultures

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Abstract

A novel light-to-bioenergy system produced 3.5 times the baseline methane output using a co-culture of cyanobacteria (*Oscillatoria* sp.) and a methanogenic microbial community. Analysis of micronutrients in the system during the growth phase indicated that cobalt, iron, nickel and zinc were not appreciably consumed. The stable consumption and return of macronutrients calcium and magnesium were also observed. Essential macronutrients nitrogen, in the form of nitrate, and phosphorus showed no cycling during the growth phase and were depleted at rates of 0.35 mg/L/day and 0.40 µg/L/day, respectively. Biofilm formation increased the resilience of biomass to bacterial degradation in an anaerobic digester, as shown by viability assays of cyanobacterial biofilms in the co-culture.

Keywords: Bioenergy; Biofilms; Nutrient Cycling; Methanogenesis

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