435j Enhancing Biological Methane Production from Biomass

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The biological conversion of biomass to methane is an important natural process in the breakdown of organic wastes. In any biological process pH, temperature, and availability of nutrients are all critical factors affecting the rate of production. The enrichment of environmental samples has resulted in a methanogenic consortia capable of utilizing biomass as the sole carbon and energy source. This consortia was then screened using known methanogenic substrates to help determine the final biomass intermediate in the production of methane from biomass. Current studies have focused on screening the effect of pH, temperature, and biomass particle size on methanogenic rates and overall yields. When methanogenesis rates increase with particle size, this indicates that the initial step in biomass conversion is rate limiting. Results from preliminary pH experiments indicated that initial methane production rates were higher at the lower pH values; however, the pH changed during the experiment as the substrate was consumed. In later pH experiments, the only substrate present was biomass, and the pH did not change as it was converted to methane. This allowed a direct comparison of both the production rate and total methane produced as a function of pH.