Biomethane Production from the Anaerobic Digestion of Different Organic Substrates

Buxani, Navin

Question/Purpose: Which Organic Substrate will Produce the Most Biomethane Through the Process of Anaerobic Digestion? Hypothesis: If Twelve Different Organic Substrates are Prepared, then Goat Manure will Produce the Most Biomethane Procedures: 1.Collect digesters 2. Put holes in cap 3.Create measuring tubes & protective seals 4. Set up apparatus 5. Fill each 500 mL container with NaOH solution 6. Collect manures 7. Set up labels 8. Make slurries of each and put in 1000 mL digesters 9. Add sodium carbonate 10. Measure initial pH and temperature 11. Check biomethane production at intervals Data: Biomethane was produced from all organic substrates except for horse control. The control digesters produced the least amount of biomethane. Adding sugar sources enhanced the biomethane production by 79-497 times compared to control. For horse/cow manure, adding 50 g sugar produced the most biomethane. For goat, fruit was the best. There is a weak correlation between biomethane production and pH (R2=.0085). Discussion: The control containers weren't very good at producing biomethane. This indicates that the bacteria strains in each manure may be more influential than organic composition. Conclusion: Biomethane was produced from all three manures. These three manures are potential options for biomethane. It can be concluded that 50 g of sugar is overall the best option, followed by 75 g of fruit and 25 g sugar respectively. Goat manure was found to produce more biomethane, on average, than horse and cow manure, which proved my hypothesis correct. The overall best substrate was the goat manure with fruit.

Awards Won: