



A Mighty Mushroom and the Power of Poop : Testing Biogas Production using Spent Mushroom Substrate

Biogas is a type of fuel produced by the breakdown of organic materials. This experiment tested which type of animal manure (sheep or cow or a mixture of both) would produce the most biogas. The spent mushroom substrate, specifically the leftover material that oyster mushrooms was grown on, was added to the manure to see whether the volume of biogas produced could be further increased. It was hypothesized that the mixture of cow dung and spent mushroom substrate would produce the most gas. A total of three trials were run. Anaerobic digesters were made from 1 L plastic bottles. Manure was added (either cow dung or sheep manure, or both) to all bottles and topped up with distilled water. To a second set of bottles, the process was repeated and the spent mushroom substrate was also added. Each bottle was covered by a balloon, tightly sealed, and kept at an average temperature of 33o Celsius. In Trials 1 and 2, the circumference of each balloon was measured. In Trial 3, the water displacement method was used. Overall, the most gas was produced in the bottles containing the mixture of cow dung + sheep manure + spent mushroom substrate. As predicted, spent mushroom substrate increased gas production, but it was the combination of manures that yielded surprising results. Using one waste product to more efficiently convert another waste product into a useful form of clean energy is exciting! Further studies to find the best combination of manures and ideal mass of each substance are planned.

