Biodigestion: Turning Nothing Into Something

Munson, Alexia (School: Grants High School)

The purpose of this project is to produce methane from waste using a student made Bio-digestion system. Bio-digesters are closed systems decompose organic waste and produce natural gas. There are two types of bio-digesters; aerobic digesters which use oxygen, and anaerobic ones which do not. Anaerobic bacteria are selected as the most likely to reliably produce biogas. Manure is an agricultural waste that has been shown to produce methane, a good source of energy. The hypothesis is manure put into an anaerobic bio-digester will produce the most methane. Grass clippings, dried leaves, compost, and cow manure were tested in bioreactors for production of methane by measuring the change in mass of material and volume of gas produced. Grass clippings produced highest average volume of gas 105.0ml followed by cow manure 27.1ml, dried leaves 24.5ml , and compost the least 6.9ml. Grass clippings and cow manure, were selected for a larger scaled bio-digester, using activated charcoal to adsorb the gas. The activated charcoal in both reactors gained 1g from adsorbed gas, but attempts to confirm the presence of methane were inconclusive as during subsequent calorimetry testing, both experimental charcoals produced less energy than the plain charcoal control. The last experiment conducted showed manure produce 9g of gas adsorbed by activated charcoal while grass clippings showed no change in mass due to undergoing fermentation over a ten day period.

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