CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

William R. Mackie

Project Number

35526

Project Title

Methane Madness

Abstract

Objectives/Goals

To find out which fruit or vegetable produces the most methane.

Methods/Materials

Materials: (5) 3/4 inch valves,(5) 3/4 inch plumbing fittings, (5) 5 gallon buckets with lids, (1-2) bottles of silicone sealant, drill with 3/4 inch bit, (1) 5 gallon bucket that is marked in 250 ml increments (basically, a graduated cylinder), 6 feet of PVC pipe, clear plastic sheeting, blender, (10) Mylar balloons, (1) gas analyzer with methane concentration measurement, 10 gallons of horse (or cow or chicken) manure.
Method: I took 8 L of apples, bananas, corn, potatoes, and the control (horse manure)and sealed them each in the bucket with no oxygen and 3 L of manure and 2.5 L of water. The bucket lid had a valve attached to it, with a Mylar balloon on the end to collect gas. I calculated the volume of methane produced in each balloon by finding the total volume of the balloon (by water displacement). I measured the methane percentage of each balloon with a gas analyzer and multiplied it by the volume of the balloon.

Results

The corn produced the most methane(methane produced: corn - 2100 cc, apples - 1398 cc, bananas - 1020 cc, potatoes - 976 cc, manure - 896 cc).

Conclusions/Discussion

I thought the apples would produce the most methane because of the high sugar level, but the corn produced the most. This might have been because of the compatibility of the corn and the bacteria in the horse manure. Another factor might have been the duration of the experiment; the food was not completely digested at the end of the experiment.

Summary Statement

I took apples, bananas, corn, potatoes, and the control (horse manure) and sealed them in buckets with no oxygen and 3 L of manure and 2.5 L of water to create methane; I found that corn made the most methane.

Help Received

Preliminary