Running Head: COMPOST

Schools That Compost

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Abstract

As the world becomes more environmentally-conscious, people are looking for little ways that they can help stop the green-house gases from entering the atmosphere. From simple things such as turning off the lights when leaving a room, to more extravagant ideas like building solar panels, people are trying to help out. Therefore, our group, Amy Siebenthaler, Olivia Janson, Chris Grote, and Chris Emmett, is conducting an experiment to find out what blend of food waste makes the best kind of compost. The experiment will take place at Camas High School over a period of 20 days in April, 2008. Our group will be carrying out this research so that we can use the information to make the most successful compost pile to use at our school. We are going to control variables like the total amount of food waste used, the type of container the compost is made in, where the compost is kept, how often it is watered and aerated, how many and what kind of worms are used, and what kind of soil is used in the compost. Last, we think that if we change the blends of food in each pile, then the one with mostly vegetables, fruit, and grains, with little meat, will work best, because vermicomposting works best without meat. We are doing all of this work to start a compost pile at our school, which we hope will benefit the school by saving it money, and by helping it be more environmentally friendly.

Literature Review

Many other schools have already started to compost their food waste, including schools in other countries. Some colleges and high schools in Wiltshire, England have started to use composting as a way to reduce their trash content. The schools use machines to compost their food scraps instead of traditional composting, but overall the compost is a success. “In its first year, the ten schools diverted 30 metric tons of compostable waste from the landfill” (British, 2007). It is also a simple process, so it is easy for people to take part in the activity. "I put two liter buckets of kitchen waste into

the machine everyday and then add the pellets. If I have 25 kgs of waste, I add 2.5 kgs of pellets. Afterwards, I can add wood chips, shredded paper and garden refuse. The whole process takes me 15 minutes. We're getting good compost out of it for our flower beds with no problems at all," says a site supervisor (British, 2007). Our school can learn from these Wiltshire schools by starting a compost pile and saving food scraps from the landfills. Although it is unlikely that we will make as much compost as those ten schools in our first year, we can start the compost at our school, and then maybe expand to other schools in our district.

Other schools in our country have been composting too, such as Montclair University in New Jersey. The school was uncertain about the project in the beginning, saying they were, “concerned that odors would be an issue, since the vessel is located behind a new $78 million building that hosts campus visitors” (University, 2007) but the project has been a success. This school, like the ones in England, also uses machines to compost the materials, instead of vermicomposting. The machine “processes the material for three days at high temperatures,” (University, 2007) and then they use it on their gardens as a fertilizer, similar to what we want to with our compost. Hopefully, our project can be as successful as theirs. Also similar to us, the schools soon hopes to buy a larger machine that can process all of the food scraps of the school, like what we hope to do in the future.

Even closer to home are the schools in the Vancouver School District, which started composting in only three elementary schools, but now the plan has grown to 22 schools, and they are going to try to expand the idea to middle and high schools as well. They say “that it is essential that no one is blindsided by the new program. You need to first bring on board the custodians and kitchen staff and educate the teachers and students well before the new bins show up in the cafeteria” (DuBois, Ramey, 2006). The schools don’t compost their own food waste, but rather send their waste to the Waste

Connection's, who compost it and other food scraps from local businesses. We can learn from this school's success and try to model our project after theirs. This can also be a valuable resource for us, because they are very close to our school.

Because composting has spread to many different schools, businesses, and even homes, a lot of information is available to people so they know how to compost. When we start our project, we should know that it is important to "add equal amounts of green materials such as food waste that contain high levels of nitrogen, and brown material such as leaves that are rich in carbon" (Explained, 2008) Our group needs to consider this in our compost, because we do not know where we will collect "brown" materials, only where we will get our "green" stuff. Also, we can use the information from this site to see what kind of compost is best, for example, using worms or not, because the site has information on both types.

Even the United States government has put out information about composting for people to use. It gives information about composting such as the benefits of compost. For example, the benefits of compost include being able to "suppress plant diseases and pests," and "reduce or eliminate the need for chemical fertilizers." (Basic, 2007) Our group can benefit from this information because it also advises you on what to put in your compost and what not to.

Methods and Materials

We will go about finding what blend of foods produce the best compost by making eight mini-compost piles in 2 liter bottles and 100mL beakers. The bottles will just be brought from home to save money. First, we will wash the bottles with water. Then we will punch 50-60 small holes in the sides of the bottles with a nail. Then we will label the bottles and beakers so we know which has what ratio of foods. Each bottle will have alternating layers of soil, food waste, and water. On top, we will put 10 worms to turn the soil and waste into compost. After the bottles are filled 3cm from the top with the

soil and waste layers, we will put them in the greenhouse. Over a period of 20 days, we will obverse and record the distinctiveness of each bottle, on Mondays, Wednesdays, and Fridays, at the same time each day. We will use thermometers and a soil testing kit to find the temperature and pH of the soil. To aerate the soil we will mix it in a bucket with a spoon, before putting back in the container. After the 20 days, we will compare our compost in temperature, pH, and characteristics to compost that can be bought at the store, to see what kind is best.

After our research is carried out, we will use the information gathered to create a larger scale compost pile that can be put into use at the school. We will gather the food scraps from the students at lunch by putting out bins for them to put the food scraps. Then we will take the scraps and put them in a compost bin outside. That compost can be used in the garden that is going to be made by the other group. We can put our data into a graph or chart that compares the original test results to the temperature, pH, and other characteristics of the store-bought compost.

Results

In conclusion, the results for our experiment showed that the temperature, pH, and other characteristics such as color and smell are all similar in each of the different food blends. The mean temperature for the control blend over two weeks was 19.5^0 Celsius. This is similar to the fruit, grain, vegetable, fruit and coffee, noodle and fruit, fruit and bread, and bread and noodle groups, all of which were within 1^0C of each other. The average pH for all the blends was between 5 and 7, which is a normal pH for compost, according to Cornell Composting. The physical characteristics did not change between the groups because they all smelled like dirt or mud, were all dark brown, and were all moist. The only one that smelled different was the non-blended fruit. It smelled rancid and sour. As time grew longer, the temperature generally increased, except for the grain mix, and the pH differed for the different blends, but generally stayed the same. For our

control we found what the temperature, pH, and characteristics of good compost were supposed to be, and we found that our compost is normal. Compost is supposed to have a declining pH, which stays between 5.5 and 8, and an increasing temperature around 40^0C, like ours did as well.

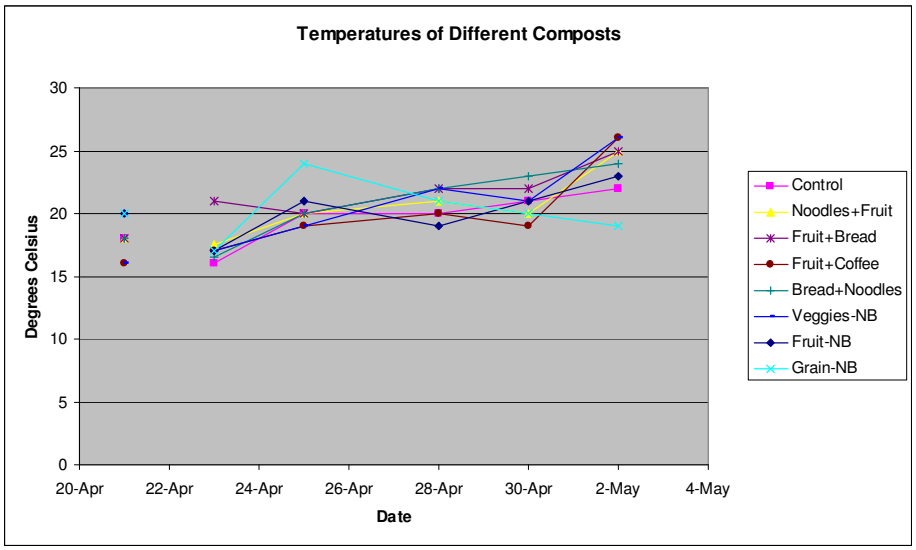
Conclusions

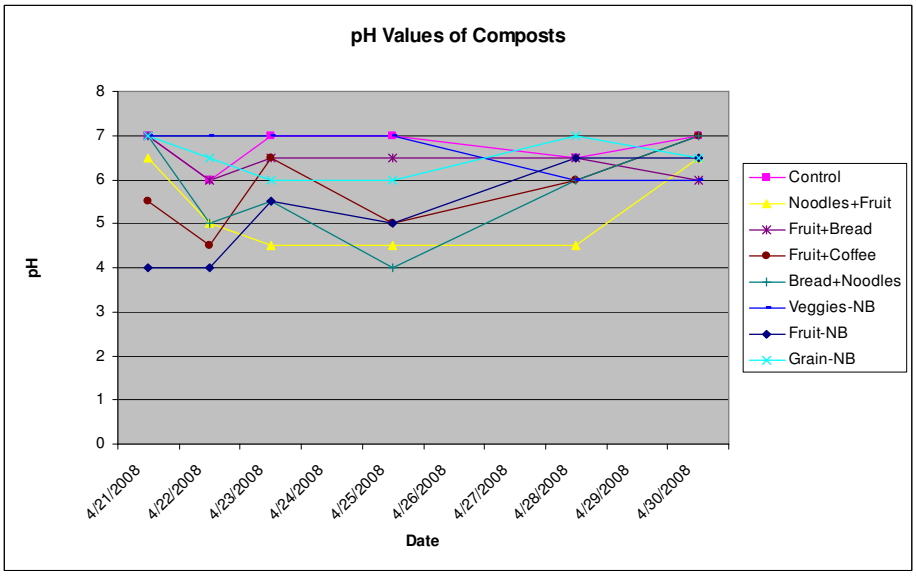
Our findings show that any blend of food will work to make good compost, because although the fruit smelled, when it was mixed with other foods it made good compost. Although the temperature is lower than it should be, this can be explained because our compost piles were so small compared to the compost piles of a household would be, so it couldn't have generated as much heat. Therefore we will use all kinds of food in our school wide composting program. To improve our experiment, we should have kept our compost in the same place the whole time. We had to relocate it to the greenhouse after it made the science classroom smell. Also, the thermostat in the greenhouse was changed over the weekend once, which might have affected our compost in some way. We also could have controlled the experiment better by keeping the different blends in the same type of container, and by monitoring more closely the amount of water and food put in. However, our results were still the effect of the different food blends, not an outside factor.

Further research could be done to test different variables, such as the number of worms used, type of container used, use of fertilizer, or type of soil. Or, you could make an experiment to see how the compost affects plants in a garden, and see if it helps them to grow better. Another experiment would be seeing how much less waste is generated when you compost at home or in a school. In conclusion, all kinds of food work well in compost, and compost can be an effect way to cut down your waste. We plan to use the information found in the experiment to initiate a school wide or district wide composting program, like they do in the Vancouver School District. We want to

start collecting food from the cafeteria and from the students that will be composted instead of put in a landfill. This has proven successful in other schools, and has cut the food waste in half.

In conclusion, a variety of experiments could be done to see how composting is beneficial to the environment, plants, and schools. We found that any kind of food can be composted, so we will try to use this information to initiate a larger-scale composting program in our school or district.





References

Basic information. (2007, September 7). Retrieved March 22, 2008, from Composting Web site: http://www.epa.gov/epaoswer/non-hw/composting/basic.htm

British schools take active role in composting technology program. (2007, March). *BioCycle, 48*(3), 6. Retrieved March 22, 2008, from AP Science database. www.proquest.umi.com

Composting Explained. Retrieved March 22, 2008, from Home Composting Solutions by Lugar Creek Web site: http://www.homecompostingsolutions.com/compostinginformation

Cornell Waste Management Institute (1996). Monitoring compost pH. Retrieved May 5, 2008, from Cornell Composting Web site: http://www.css.cornell.edu/compost/monitor/monitorph.html

DuBois, Peter Penny Ramey. Practical model for school organics recovery. (2006, February). *BioCycle, 47*(2), 36-37. Retrieved March 22, 2008, from AP Science database: www.proquest.umi.com

University takes on food waste with rotary digester. (2007, November). *BioCycle, 48*(11), 14. Retrieved March 22, 2008, from AP Science database: www.proquest.umi.com