Compost Immersion

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In this project our goal was to create a machine capable of heating water with compost. The machine uses a process called hot composting. This occurs when a compost pile is made with the correct ratios of material and is in an insulated environment. In earlier experiments our hot composting reactions reached temperatures in excess of 70 degrees Celsius. Keeping the needs of hot composting in mind we designed and built a highly insulated rotating compost container. To heat the water, there is an Arduino pump system which circulates water through the compost in a coiled pipe. The Arduino system also contains temperature probes that record temperature data. The system circulates water at low pressure between an insulated flask and the compost continuously. Our compost mix consists of a 2-1 grass to straw ratio. In hot composting grass (rich in nitrogen) produces the most heat while straw (rich in carbon) helps sustain high temperatures for longer. Our design tries to minimise maintenance time. Hot composting requires regular aeration (oxygen supply). Our design using a rotating compost container allows for easy mixing and aeration. A typical 2-week experiment, shown in detail in this project, showed that water and compost temperatures of about 40 degrees could be sustained while surrounding ambient temperature was about 10 degrees. This temperature differential shows the efficacy of our composting and insulation strategies.

Awards Won: