Supplementary Information

Ammonia volatilization reduced from composting with oxidized biochar

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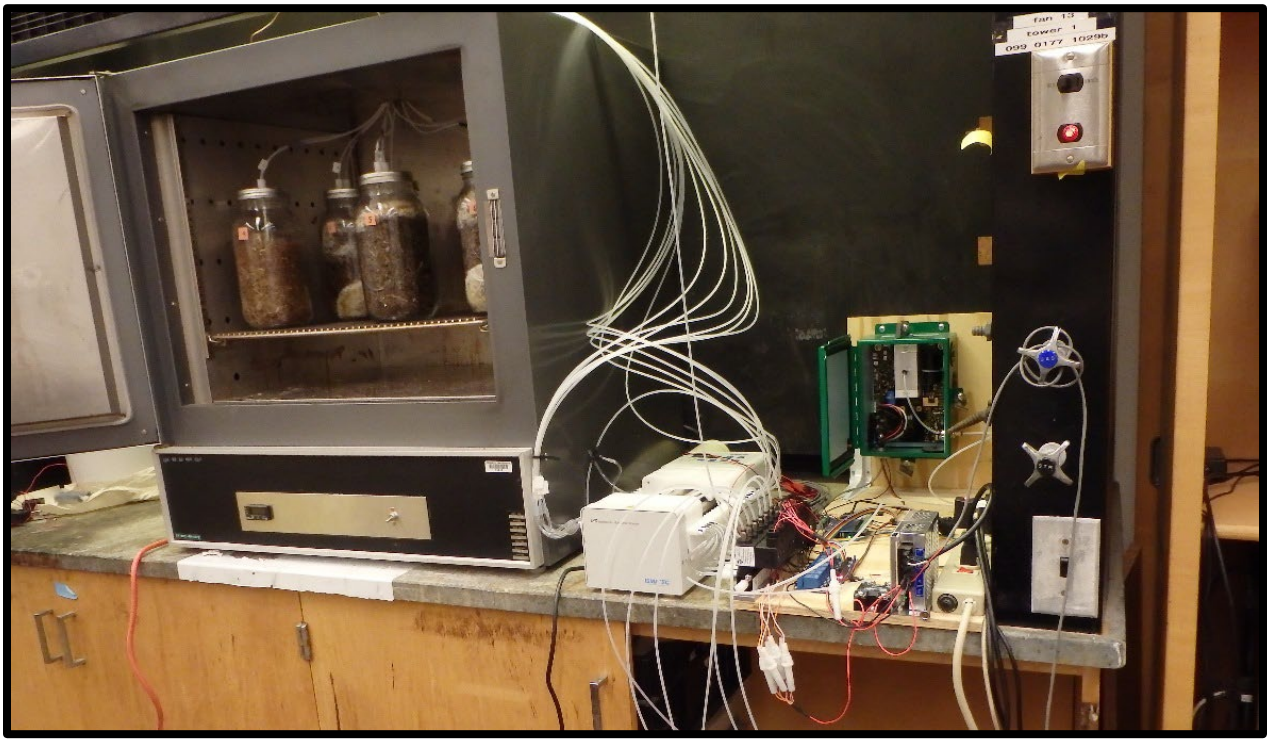
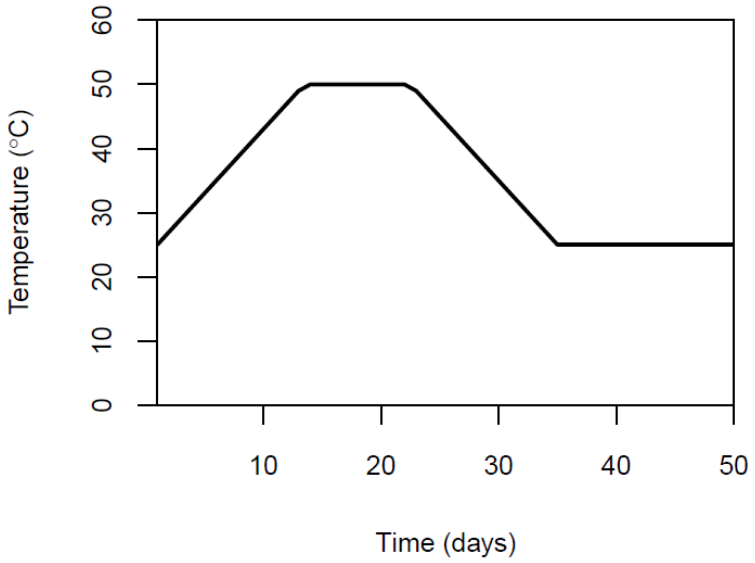
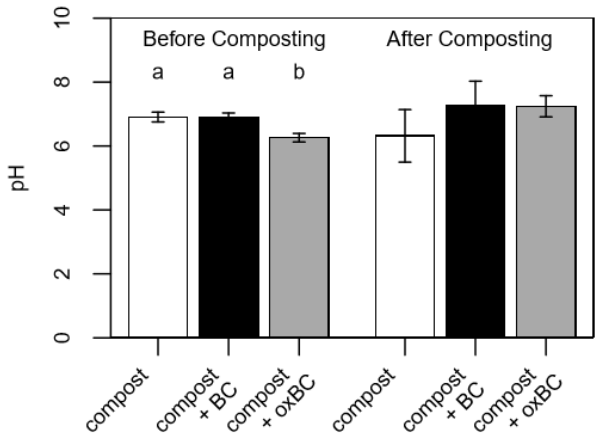


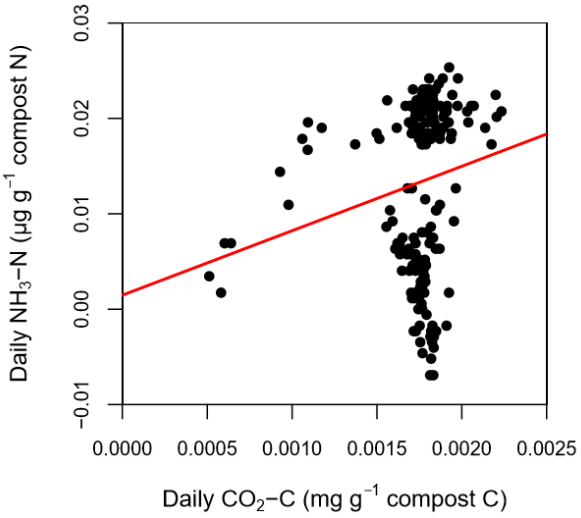
Supplementary Figure 1. Lab-scale compost incubation design. Compost jars were incubated inside an oven in order to mimic the internal temperature of a compost pile. All jars were sealed with tight-fitting lids that contained two ports—one for gas inflow and one for outflow. A multichannel peristaltic pump was used to control air flow in and out of the jars. Stainless steel tubing was placed through the inflow ports to conduct air into the bottom of each jar and maintain constant compost aeration throughout the experiment. Infra-red CO_2 and NH_3 sensors were used to measure gas concentrations in outflow gas.



Supplementary Fig. 2. Compost temperature (°C). The compost temperature was set to mimic the internal temperature of a compost pile.



Supplementary Fig. 3. Compost pH before and after 7 weeks of composting. Bulk pH before composting is shown on the left; bulk pH after 7 weeks of composting is shown on the right for compost without biochar (compost), compost with unoxidized biochar (compost+BC), and compost with oxidized biochar (compost+oxBC), respectively. Error bars represent the standard error (n = 4). Letters denote the results of a Tukey's HSD test for means comparisons for pH of the compost mixtures before composting ($p < 0.05$). The pH of the compost mixtures after 7 weeks of composting was not significantly different between treatments ($p < 0.05$). A separate means comparison of the pH change within each treatment (compost, compost+oxBC, and compost+BC) over time indicates that the pH did not change significantly after 7 weeks ($p < 0.05$).



Supplementary Figure 4. Relationship between daily CO_2-C and NH_3-N emissions from compost with oxidized biochar. Daily CO_2-C and NH_3-N emissions from compost with oxidized biochar are not closely correlated ($y = 0.006757x + 0.000001472$, adjusted $R^2 = 0.029$; $p < 0.01$, $F_{1,194} = 6.84$, $RSE_{194} = 0.0000087$, $n = 196$). CO_2-C and NH_3-N values are normalized by initial compost feedstock N and C contents.