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ASSESSING THE FEASIBILITY OF CAPTURING CARBON DIOXIDE FROM VERMICOMPOST AS A SOURCE FOR ENHANCED PLANT GROWTH

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Vermicomposting is the process of using earthworms in a bin of decomposing organic waste and the entire system is called vermicompost. Earthworms work as natural turbines that aerate the decomposed and decomposing material inside the system. The aeration increases the population of aerobic microbes that produce carbon dioxide (CO₂) as they respire. Since plants use CO₂ during photosynthesis for growth, the goal of the project was to observe whether vermicompost could be used as a natural source of CO₂ enrichment for enhanced plant growth. The dry weights and leaf surface area of lettuce and basil were used for plant growth indicators. As well, the concentrations of CO₂, the relative humidity and the temperature inside and outside the growth frames were also collected during the growth periods and were analyzed. There was no significant difference in growth or leaf surface area for any of the plants that were grown in the presence of vermicompost versus the control environments. There was, however, a significant difference in CO₂ concentration between the controls and the growth frames that contained vermicompost, with mean differences that ranged from 7–57 parts per million (ppm). There were also differences between in relative humidity and temperature inside the frames, which may have affected plant growth and could complicate future experiments. Based on these results, the predictions that vermicompost could create a CO₂ enriched environment that would be sufficient to increase plant growth was not proven.



Jonathan Howatt graduated from Horton High School in Greenwich, NS in 2004 and McGill University with a Bachelor of Commerce in 2008. He spent two years traveling, teaching English and studying Chinese Mandarin in Taiwan before coming to Acadia in 2010. He completed his Honours thesis in his 3rd year of Biology at Acadia after receiving a research grant from the Resource Recovery Fund Board. While at Acadia, Jonathan was awarded the Curtis H. and Margaret T. Chipman Achievement Award and the Clarke K. McLeod Pre-Medical Scholarship along with being named to the Dean's Honour list in 2012. He has been accepted to continue his studies next fall at Dalhousie Medical School.

