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Better Yield and Nutritional Value When Vegetable Crops are Grown in Compost-Amended Soils, Manitoba Agricultural Research Finds

Results of Five-Year Field Study using municipal solid waste compost described as "remarkable"

MANITOBA – The purpose of recycling your organics has been elevated from a discussion of waste diversion to one of improving soil, plant and human health, thanks to the results of a five-year agricultural research trial conducted in Brandon, Manitoba. The study shows that the addition of compost to food-growing soils produced higher yields with better nutritional values, energized through improved plant metabolism – the process by which plants live and grow.

Using compost made from food scraps and garden trimmings of the city's residential collection program, the study was conducted by Dr. Lord Abbey of Dalhousie University's Faculty of Agriculture, supported by Manitoba Conservation & Climate and the Compost Council of Canada.

"We grew 4 different vegetable crops – lettuce, beets, carrot, green beans – applying the city compost at different frequencies, once every year and once every two years with our control being none at all," said Dr. Abbey. ""Not only were the harvests more productive but the densities of the nutrients were greatly increased in the annual and biennial municipal compost applied soils at the end of year five of the study."

"Going into this work, we hypothesized that the long-term frequent application of municipal compost will potentially biofortify food plants, which has positive implications to human health," Dr. Abbey said. "We had the harvests analyzed at Alberta's Metabolomics Innovation Centre, Canada's national metabolomics core facility and what we found was truly remarkable."

Findings included:

- Annual application of the municipal compost markedly increased total amino acids* content in the edible portions of the harvested lettuce, beets, carrot, and green beans by approximately 323%, 109%, and 18%, respectively compared to their counterparts from the control;
- Overall, total phospholipids* were enhanced by the biennially applied municipal compost;
- Total organic acids* in the lettuce, beets, and green beans were altered by the annual and biennial MSW compost applications by approximately 35% and 23%; 6% and 6.4%; and 22% and 65%, respectively compared to the control;
- Like the other metabolites, total acylcarnitine* contents in the edible portions of lettuce and beets were increased by municipal compost application with the annual compost application increasing total acylcarnitine in lettuce and beets by 77.8% and 83.3%, respectively compared to the control;
- The annually applied compost increased choline* - known to play key roles in plant growth and development - contents of lettuce, carrot and green beans by 73.1%, 55.3% and 31.7% respectively; while the biennial treatment increased total choline contents by 90.4%, 0.8%, and 18.5% respectively compared to their individual control treatment.

"Dr. Abbey and this Manitoba study showcases the importance of recycling organic residuals,' said Susan Antler, executive director, The Compost Council of Canada. "As his study shows, turning these organic 'leftovers and remains' into compost produces a reservoir of essential plant nutrients and biomolecules such as macro- and micro-nutrients, amino acids, carbohydrates, lipids and mineral nutrients, vital for plant metabolism. At a time of global climate change, ever-increasing food and nutrition insecurity and these grave consequences on human health and well-being, it is a waste to throw them away."

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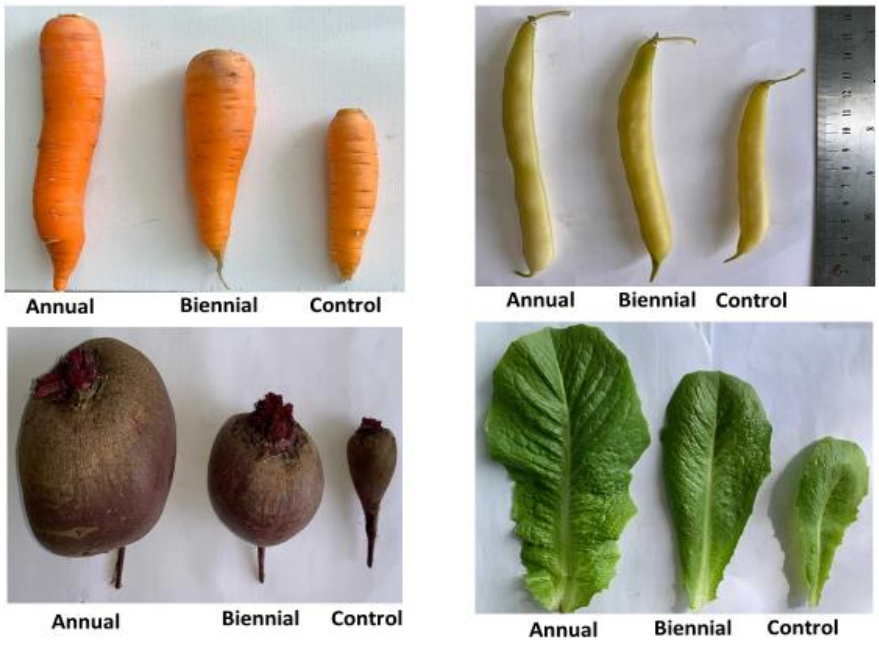
To hear a summary presentation of Dr. Abbey's research findings, please visit: https://youtu.be/at0oYPo2eIQ

To read the full results of Dr. Abbey's research findings as published in FOOD RESEARCH INTERNATIONAL, access here: Variation in frequency of CQA tested municipal solid waste compost can alter metabolites in vegetables



Growth results from year five of the Manitoba-based field study using municipal compost and different application frequencies (annual, biennial, none (control)).
Source: Dr. Lord Abbey, Faculty of Agriculture, Dalhousie University.

*Amino acids are known as the building blocks of proteins, fundamental to the essential functions including growth and development and the provision of energy. In plants, amino acids help in chlorophyll production which supports photosynthesis and the plant's ability to grow.

*Phospholipids occur naturally in all living organisms as the major components of cell membranes. Omega-3 and omega-6 are part of the phospholipids family and are important for the management of chronic diseases including diabetes and cardiac problems.

*Organic acids are essential for energy generation through respiration. Acylcarnitine plays an essential role in energy transportation between cells.

*All plant and animal cells need choline to preserve their structural integrity. (Source: National Institutes of Health).

About ….

Dr. Lord Abbey has a background in Horticulture and Crop Science with a research focus on sustainable horticultural production systems for human health and well-being. He is currently a tenured Associate Professor in Dalhousie University Faculty of Agriculture where he teaches and supervises undergraduate and graduate students. Some of his current research include exploration of natural soil and soilless amendments and pyrolytic products, integrated nutrient management systems, tropical ethnic crops and greenhouse production.

The Compost Council of Canada is the national non-profit, member-driven organization devoted to the advancement of organics recycling and the return of essential organic matter back to our soils.

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