

Utilization Of Biosolids As A Nutrient Source In Crop Production In Ontario

Purpose:

This project was initiated to demonstrate to growers in the Golden Horseshoe Soil and Crop Region (GHSCIA) and beyond the value of biosolids utilization in a crop fertility programs. This was accomplished through the establishment of a series of field demonstrations to document and communicate the benefits and impacts of using biosolids as a source of nutrients and organic matter in field crop production systems

Methods:

The project established 7 co-operator sites across the GHSCIA region and utilized 4 Municipal Biosolids (MBS) sources and 2 types (liquid or dewatered) and one Paper Mill Biosolids (PPMB) source. Each site generally used only 1 biosolids type in a multiple replicated field length plot design.

At each site soil quality parameters including pH, plant available phosphorus, and the 11 regulated metals were measured prior to the biosolids application and 2 years after application. The concentration of the 11 regulated metals was also measured in the crop leaves and harvested grain.

Plots were replicated and a commercial fertilizer standard was used as a check of production yields.

Table 1: Site Information

<u>County</u>	<u>Site ID</u>	<u>Biosolids Source</u>	<u>Biosolids Type</u>
Peel Site #1	P1	Toronto	Dewatered MSB
Peel Site #2	P2	Toronto	Dewatered MSB
Halton	A1	Halton Region	Liquid & Dewatered MSB
Niagara South Site #1	NS1	Niagara Region	Liquid MSB
Niagara South Site #2	NS2	Niagara Region	Liquid MSB
Brant	B1	Hamilton	Dewatered MSB
Haldimand	H1	Hamilton	Dewatered MSB
Niagara North	NN1	Abitibi, Thorold	PPMB

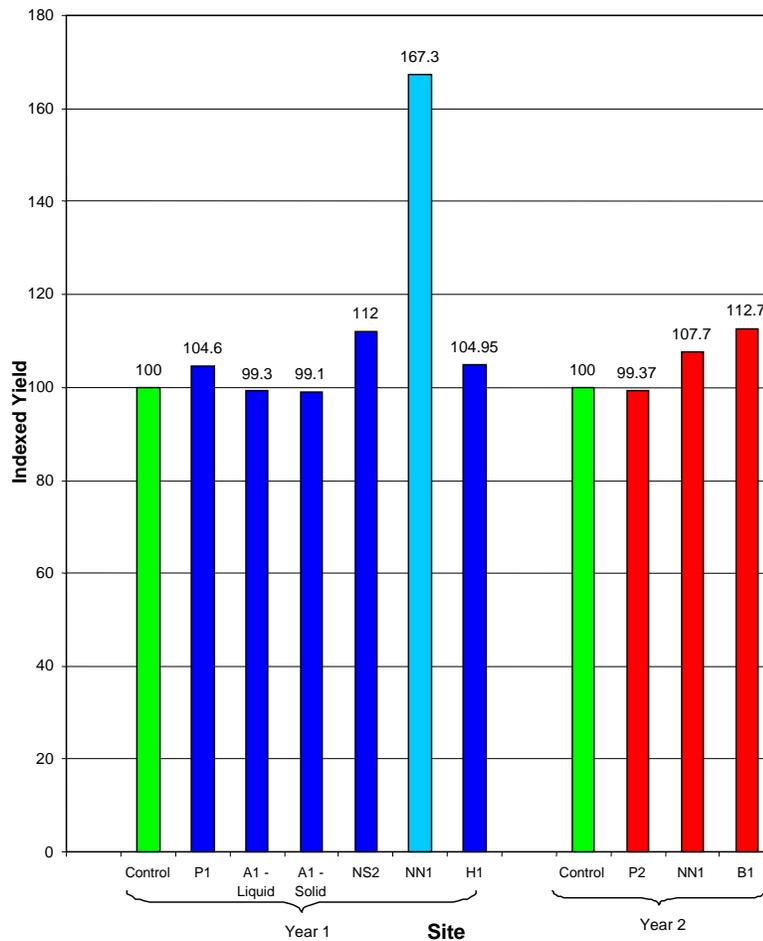
Results:

The analysis results showed no elevated concentrations of the 11 regulated metals and no change in soil pH in the biosolids treated plots compared to control plot that received commercial fertilizer. At 4 of the 6 MBS sites the biosolids application resulted in higher concentrations of plant available phosphorus measured 2 years after the biosolids application. The PPMB application site had lower plant available phosphorus. Although

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most sites showed no increases in the concentrations of the regulated metals in the tissue samples, the tissue samples at one site had high concentrations of copper and zinc in the treated compared to the control samples. The higher concentrations were 85% and 75% respectively of what would be considered the normal maximum concentration of these elements in plant tissue.

Figure 1: Indexed Crop Yields Comparing Biosolid and Commercial Fertilizer Plots



At all the MBS application sites the crop yield was comparable to the commercially fertilized control plots. The PPMB plot out yielded the commercial fertilizer plot and this may have partially been due to the very dry growing season and the moisture holding ability of the PPMB material.

Summary:

Use of biosolids and commercial fertilizer resulted in similar responses in soil quality, crop quality and crop yield. No detrimental effects were observed or detected in the utilization of biosolids as a nutrient source as compared to commercial fertilizer.

Next Steps:

The results from this project have been and will continue to be presented at various meetings and conferences such as FarmSmart and OSCIA Annual meetings where appropriate. The final report has been presented to the project partners for their use in further explaining the benefits of biosolids utilization in crop fertility programs and to the urban municipal governments local to the project sites to improve their understanding of the use of biosolids generated and utilized in the their community.

Acknowledgements:

Funding for this project was through an OSCIA Regional Partner Grant in partnership with matching funds from American Water Management (Terratec). The project leads would like to thank the farm cooperators who participated in the project for their involvement in providing land and conducting field operations leading to the success of the project. The involvement of those in Ag industry who provided weigh wagons and other resources is greatly appreciated. The GHSCIA would like to thank the Project Coordinator Rebecca Malo for her work and dedication to the success of the project.

Project Contacts:

Michael Payne, OMAFRA, michael.payne@ontario.ca

Donna Speranzini, OMAFRA, donna.speranzini@ontario.ca

Ian McDonald, OMAFRA, ian.mcdonald@ontario.ca

Location of Project Final Report:

John Shepherd, Regional Communication Coordinator, Golden Horseshoe Soil and Crop Improvement Association, john.shepherd1@sympatico.ca

Michael Payne, OMAFRA, michael.payne@ontario.ca