



## Ash as a Soil Amendment in Organic Carrot Production PEI Horticultural Association

### Introduction

Organic carrot growers must import sulfate of potash (SOP), generally from the United States. Atlantic Grown Organics, Spring Valley, PE, produce ash as a by-product of burning crambe and meadowfoam to heat their greenhouses. The ash contains significant levels of P (~11%), K<sub>2</sub>O (~15%), and Ca (~13%). In particular, the K content could potentially replace the need for SOP. In comparison, SOP and ash contain K<sub>2</sub>O at 50% and ~15%, respectively.

### Objective

The project was to determine effect of ash applications compared to sulfate of potash (SOP) in organic carrot production. Specifically, to evaluate the impact on soil and carrot tissue nutrient status, plant stand, field disease, yield and storage of carrots.

### Materials And Methods

The trial consisted of four treatments with four reps: Control (no application), SOP (250 kg/ha) (1x), Ash (830 kg/ha) (1x), and Ash (1250 kg/ha) (1.5x). The base rate of SOP was chosen based on pre-application soil test. Treatments were applied immediately prior to hill formation and carrots, cv. Neptune seeded using a Stanhay Precision Air Seeder in 2 in-row lines per bed at 35.2 s/ft to achieve 20 s/ft as a potential final field stand.

Table 1. 2015 Ash Trial - Soil at harvest

Treatment	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	S	pH
Control	147 a <sup>z</sup>	41 a	15 a	6.6 a
SOP 1x	150 ab	48 ab	23 c	6.5 a
Ash 1x	190 b	52 b	16 ab	6.6 a
Ash 1.5x	188 b	54 b	18 b	6.7 a

<sup>z</sup> Means followed by the same letter are not significantly different from each other based on Duncan's Multiple Range Test ( $P=0.05$ )

Table 2. 2015 Ash. Tissue at harvest

Treatment	P	K	S
Control	0.21 a <sup>z</sup>	1.6 a	0.30 a
SOP 1x	0.24 a	2.3 b	0.38 c
Ash 1X	0.22 a	1.9 ab	0.35 bc
Ash 1.5X	0.24 a	2.3 b	0.31 ab

<sup>z</sup> Means followed by the same letter are not significantly different from each other based on Duncan's Multiple Range Test ( $P=0.05$ )

Ash significantly increased soil K<sub>2</sub>O taken at harvest compared to the control (Table 1). Soil K<sub>2</sub>O from SOP was intermediate and not different from the Control and Ash. The P<sub>2</sub>O<sub>5</sub> response was similar to K<sub>2</sub>O response. SOP and Ash 1.5x increased soil S compared to the Control. Soil pH was not affected. Tissue K was significantly increased by SOP and Ash 1.5x compared to the control. Ash 1x was intermediate and not different from the Control and Ash 1.5x. Tissue P was not affected. Tissue S was significantly increased by SOP and Ash 1x. Plant stand, yield, carrot disease, and root storage were not affected by applications of SOP and Ash.

Early results from the first of a three year study, indicate that locally produced Ash has promise as a suitable replacement for SOP.

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