

# Pot-grown Swiss chard and Kale Responses to Variable Rates of Manure Compost in *Mycorrhizal* Fungi Inoculated Medium

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## Overview

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- Discussions



## Background

- Containerized crop production is highly encouraged as consumers' demand for organic foods and all-year supply increase
- Composts (incl. vermicomposts) contain chemicals that need proper management to minimize...
  - salinity stress on plants
  - nutrient-rich runoff & leaching potential
  - threat to the environment & ecosystems
- Thus, there is a need for judicious application, and efficient plant uptake/use to minimize any negative impact

## Background cont'd...

- ▶ Many studies have confirmed that addition of *Arbuscular Mycorrhizal* (AM) fungi to growing medium reduces salinity stress in host plant
- ▶ This is achieved through:
  - ▶ accumulation of osmoregulation compounds
  - ▶ Increased water- and nutrient-use efficiency
  - ▶ increased photosynthesis
- ▶ However, plant growth and AM fungi colonization potential is affected by prevailing rhizosphere condition amongst other factors

## Objectives

- To determine the effects of variable rates of manure compost on growth of kale and Swiss chard plants
- To assess the potential for nutrient mobility during the growing period

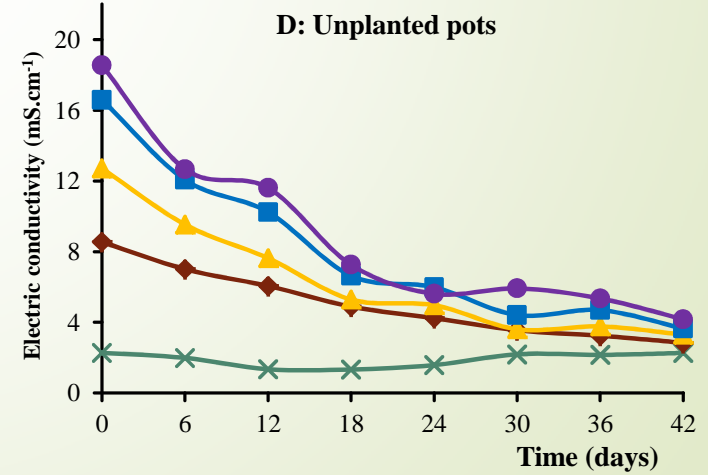
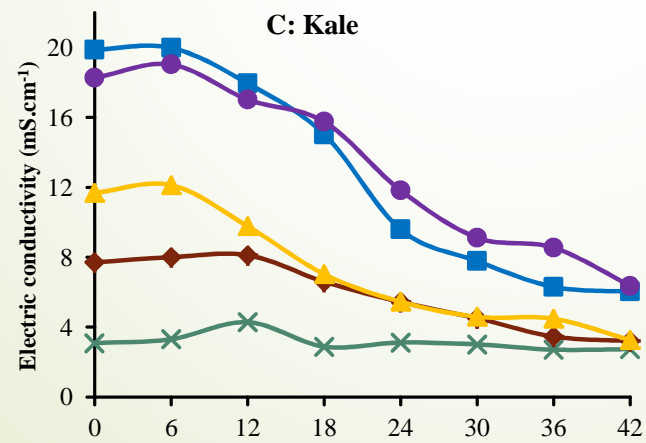
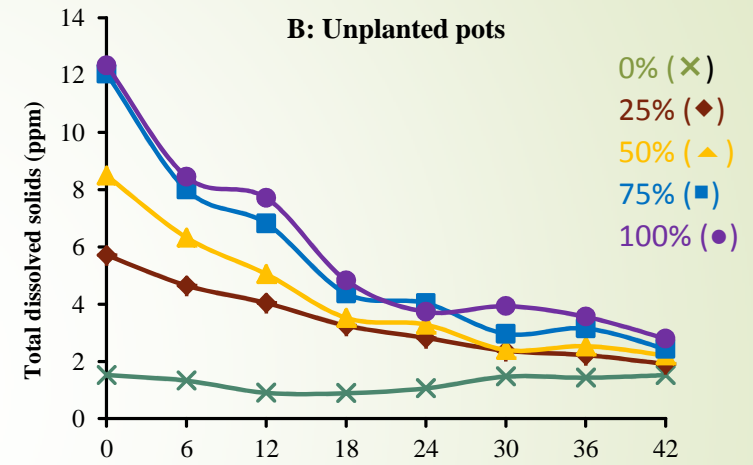
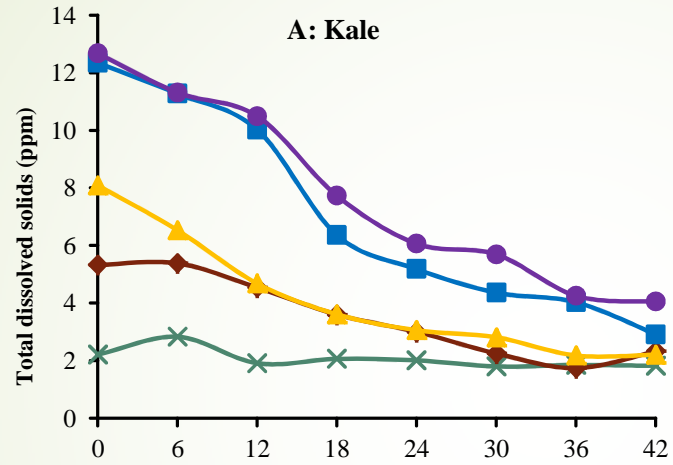
## Materials & Method

- ▶ Two separate greenhouse experiments:
  - ▶ using the same mixed medium treatments
  - ▶ two different crop species: kale (*Brassica oleracea* L. 'Ripbor F1') & Swiss chard (*Beta vulgaris* L. subsp. *cicla* 'Silverstar')
  - ▶ all plants were exposed to similar growth conditions
- ▶ 12-cm dia pots placed in saucers were filled with ca. 800 g of different proportions of the mixed medium
- ▶ Treatments were: 25%, 50% & 75% (w/w) mixture of manure compost/Pro-mix BX *Mycorrhizae potting mix*

## Materials & Method cont'd...

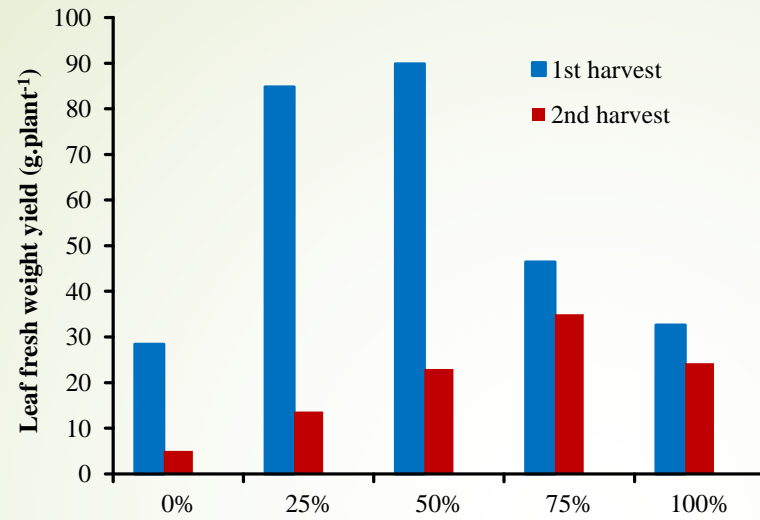
- ▶ The control treatments were: Pro-mix BX *Mycorrhizae* alone (0%) & manure compost alone (100%)
- ▶ Simulation of leaching was done every week for 6 weeks as follows:
  - ▶ All pots were filled with water to the brim and the excess water was captured in saucers beneath each pot
  - ▶ The amount of water added to each pot varied (not quantified) for the different growing medium

# Results

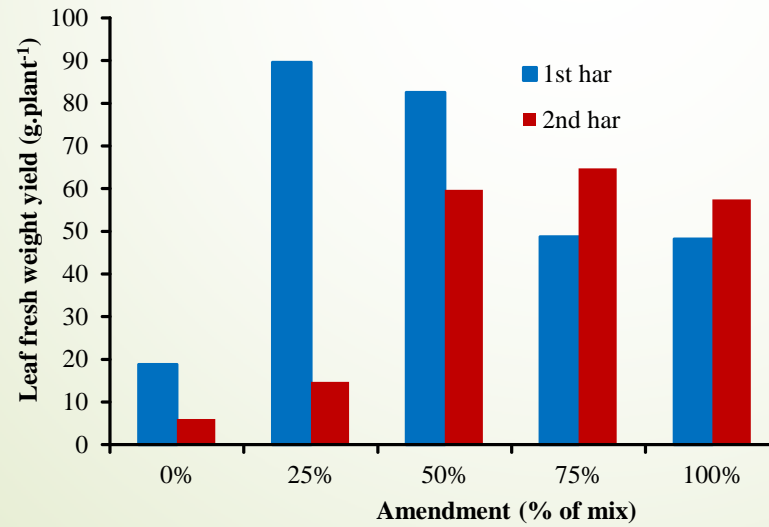


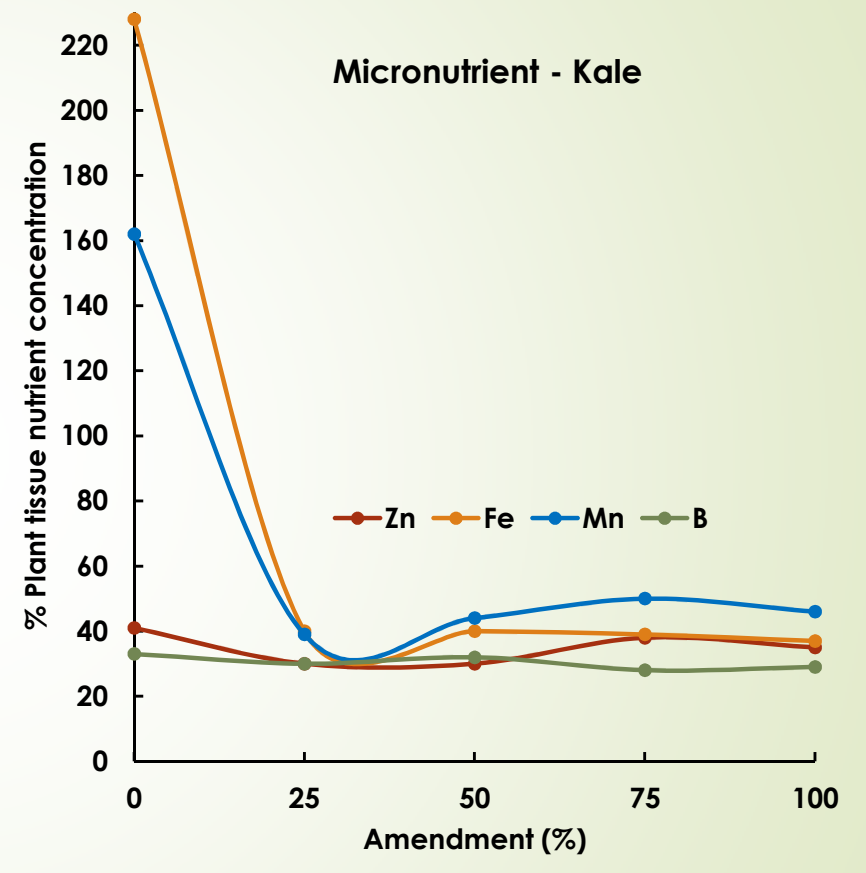
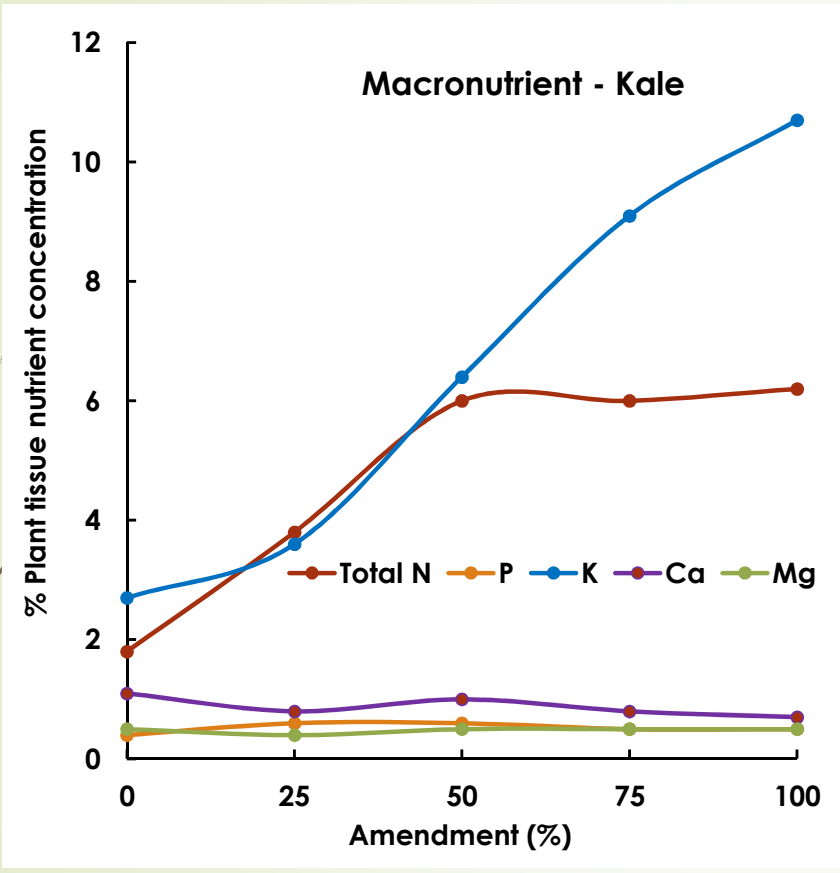


**A: Kale**



**B: Swiss chard**





## Summary/Conclusion

- ▶ >50% manure compost had the greatest soluble chemical mobility in captured water
- ▶ >50% manure compost adversely affected plant growth
- ▶ The observed high plant tissue N, K & Mn did not correlate with growth & yield
- ▶ The results suggested the need to capture and recycle water in greenhouse production operations for agronomic, environment & economic benefits



THANK YOU!!