Effect of irrigation with Anaerobic Baffled Reactor effluent on Swiss chard (*Beta vulgaris* cicla.) yield, nutrient uptake and leaching.

By

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Introduction

- **Previous research:** Use of Decentralized Wastewater Treatment System (DEWATS) in low income communities
- **Problem:** Effluent disposal

Linking ABR effluent to crop production (Courtesy of Hering South Africa)
Objectives

• To determine the effect of irrigation using ABR effluent on:
  
  – Swiss chard yield
  – Swiss chard N and P uptake
  – Soil N and P leaching
Materials and Methods

Experimental site

Newlands Mashu, Durban (30°57’E, 29°58'S)

Experimental location showing the DEWATS system, experimental field and the river
Land preparation and laboratory analysis

- Experimental design: Single factor analysis (3 blocks)
- Soil chemical analysis
- ABR effluent analysis: N and P
Trial management

- ABR and TWF drip irrigated
- Soil moisture measured using a neutron probe

Data collection:
  - Yield
  - Leachates
Leachates

- Collected:
  - During heavy rainfall
  - From 30 cm and 50 cm WFDs
- Nitrates and Phosphates analysis:
Results and Discussion

Swiss chard yield results
N and P Leaching results

Nitrate-N (mg l⁻¹)

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<thead>
<tr>
<th>Depth (cm)</th>
<th>30.00</th>
<th>50.00</th>
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Phosphate-P (mg l⁻¹)

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P leaching variations in different treatments and time

![Graph showing P leaching variations in different treatments and time]

- **Phosphate-P (mg l⁻¹)**
  - ABR
  - TWF
  - RFF

- **Sampling time (DCE)**
  - 7
  - 45
  - 53
  - 72

**Legend:**
- Depth 30
- Depth 50
Conclusions

• Yield:
  - ABR effluent increased Swiss chard yield as a source of water

• Leaching:
  - Leaching of N and P could not be attributed to irrigation with ABR effluent

• Nutrient uptake:
  - N and P uptake after irrigation with ABR effluent was comparable to other conventional agricultural practices
Future Work

• Dealing with excess effluent in summer

• Modelling work on nutrient movement after irrigation with ABR effluent

• Estimation of land required to irrigate specific soils and crops with ABR effluent
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THANK YOU!