Closing the Waste Loop: From Food Waste to Food

Le Zhang
Jonathan LEE, Jiachin CHEONG, Shibu THANKARAJ, Yen Wah TONG
Dept of Chemical and Biomolecular Engineering
NUS Environment Research Institute (NERI)
chetyw@nus.edu.sg

National University of Singapore
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Outline

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2. Research objective
3. Experimental design
4. Results and discussion
5. Conclusion

Introduction

- Utilising Food Waste Digestate nutrients as Fertilizer for vegetable cultivation

- Food waste (40kg/week) is collected from a canteen on campus and digested at mesophilic conditions

- Digestate is either used directly untreated or by heat treating it at 121 ℃, 15m (High) vs 70 ℃, >1h (Low) for hygienisation purposes

Research objective

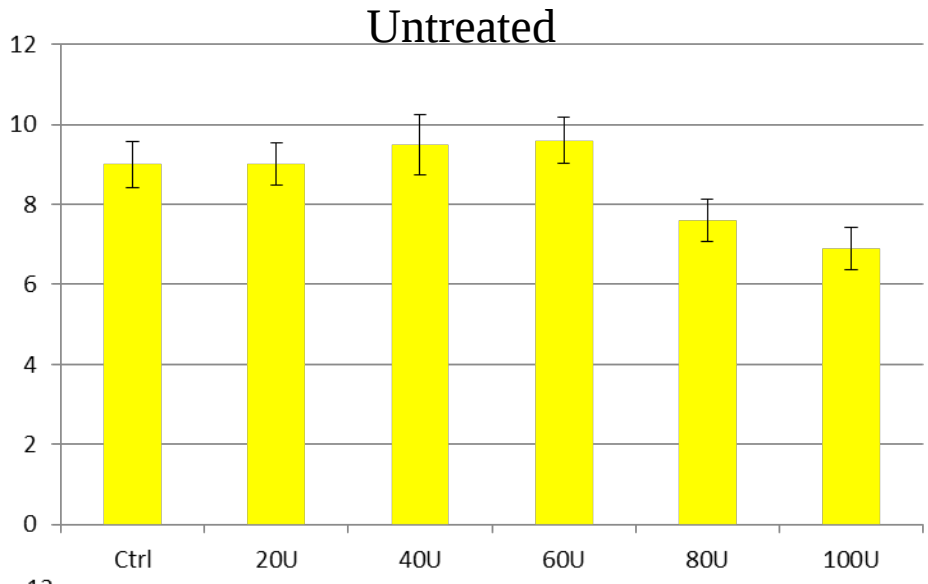
Aim

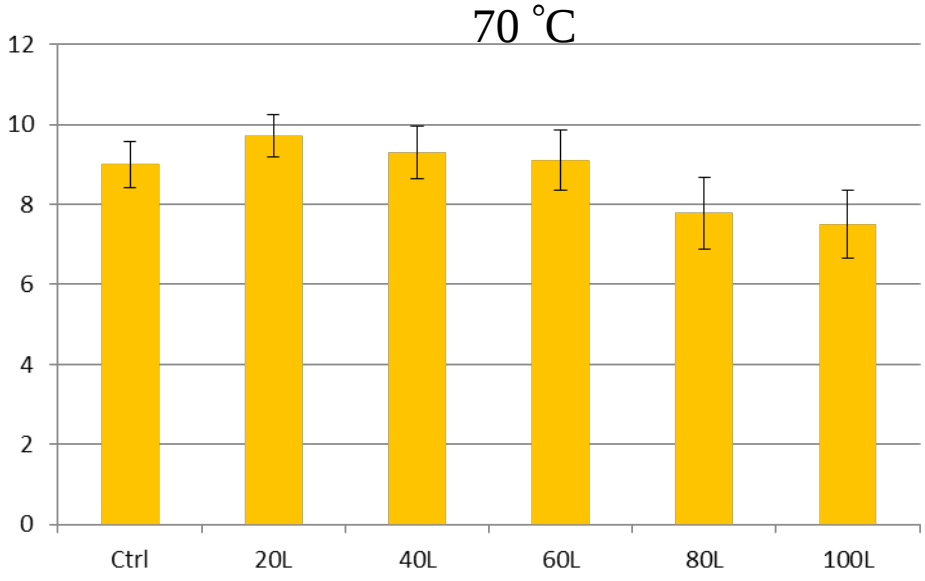
- Determine the optimal concentration and treatment temperature of food waste anaerobic digestate for cultivating *Brassica rapa* L. Cultivar Group Pak Choi Green-Petiole Form (synonym = *Brassica rapa* L. subsp. *chinensis* (L.) Hanelt)
  - By varying the concentration of food waste anaerobic digestate suspension through a soil drench application method.

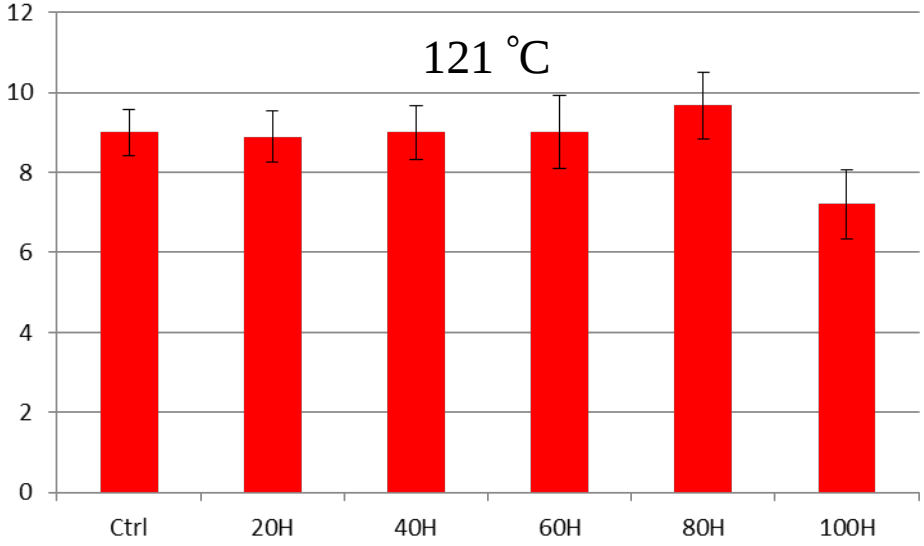
Experimental design

Concentration of anaerobic digestate (%)	Temperature treatments (°C)			Amount of commercial fertilizer (g)
0				1.2
20	Untreated	70	121	
40	Untreated	70	121	
60	Untreated	70	121	
80	Untreated	70	121	
100	Untreated	70	121	

Results (Leaf count)

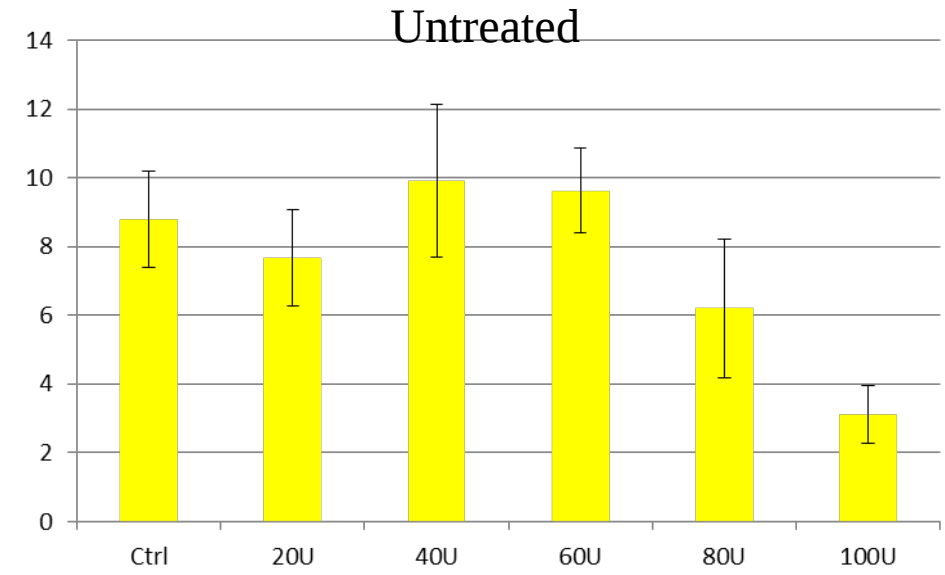


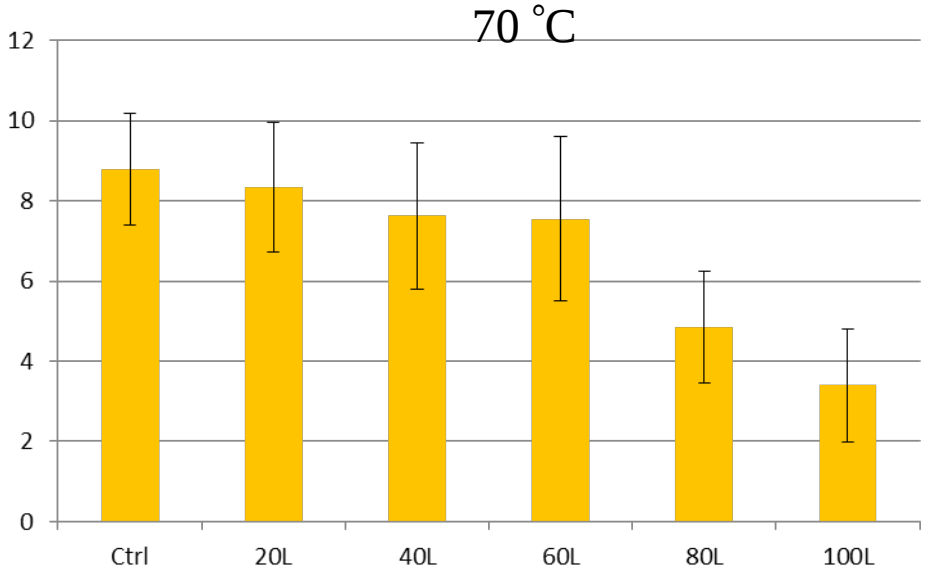


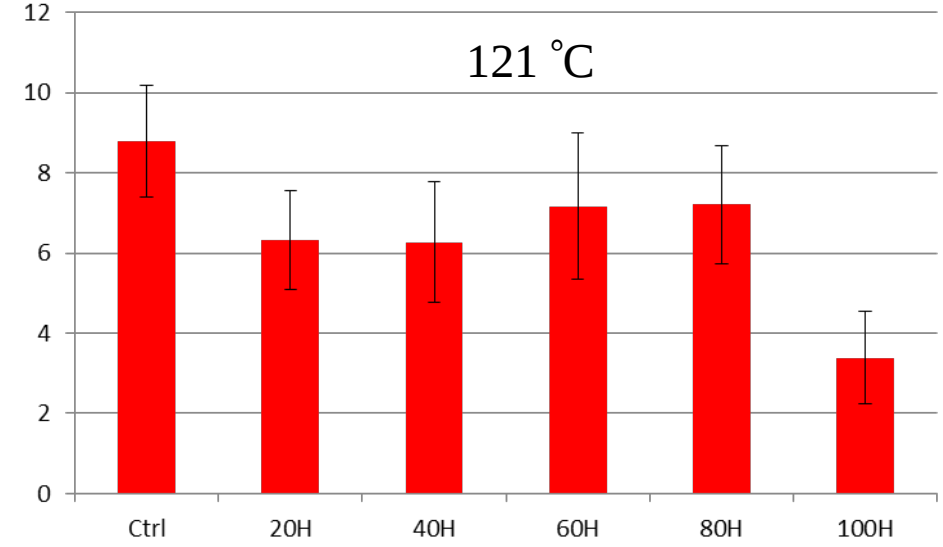


- Untreated & Low – anything below 80% works
- High- Up to 80%

Results (Fresh Weight)

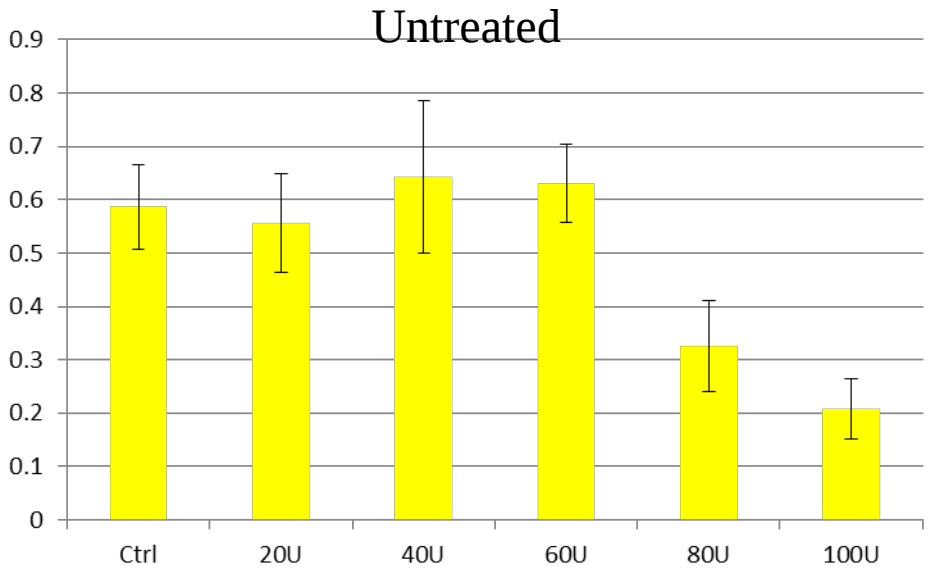


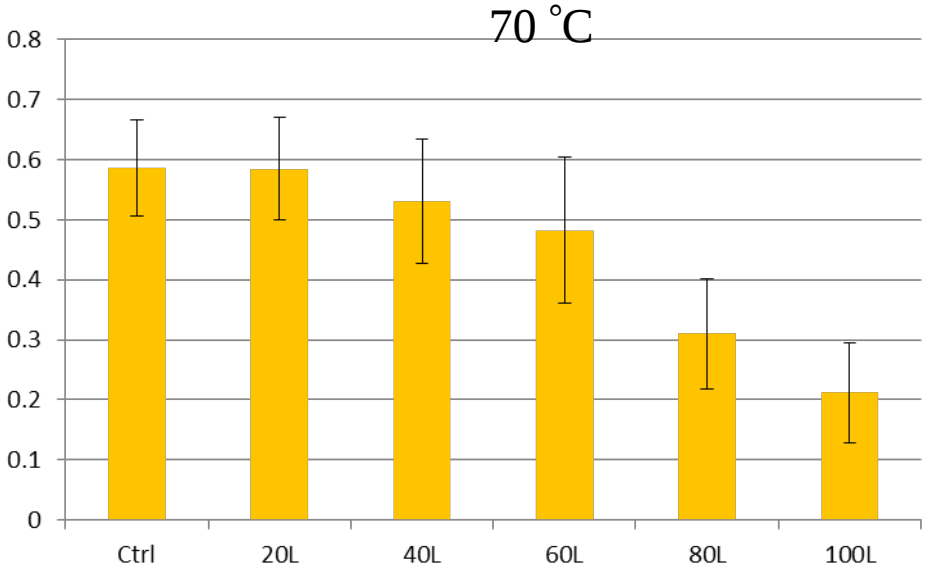


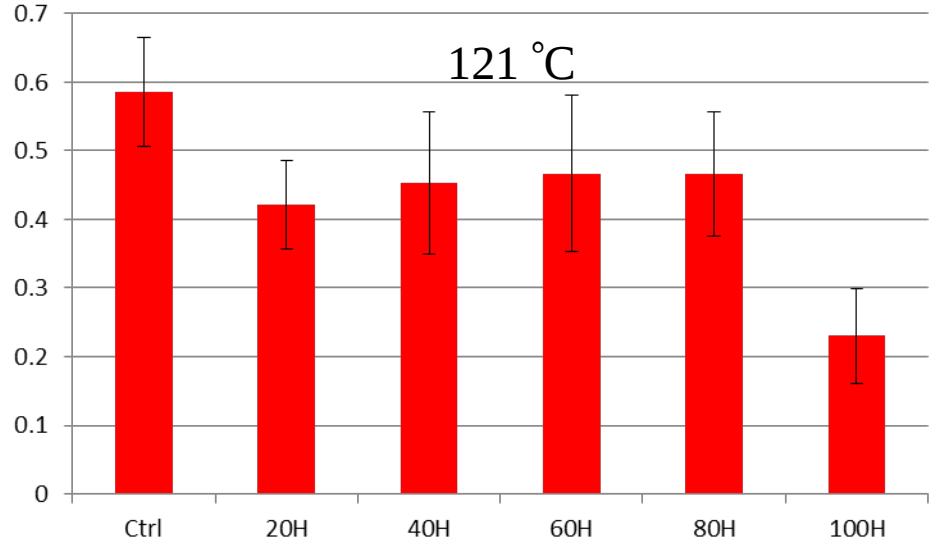


- Untreated & Low – anything below 80% works
- High- Up to 80%
- A little less than control

Results (Aerial Dry Weigh

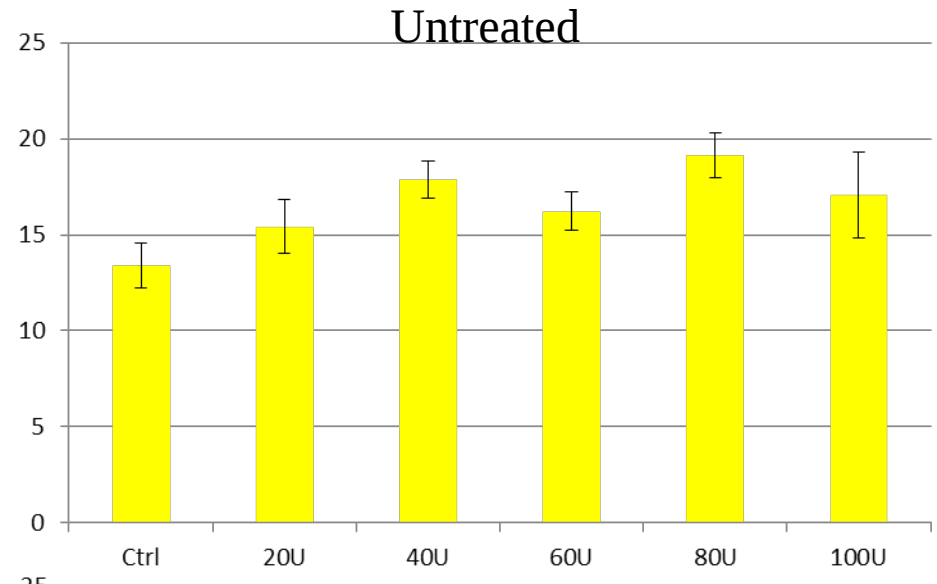


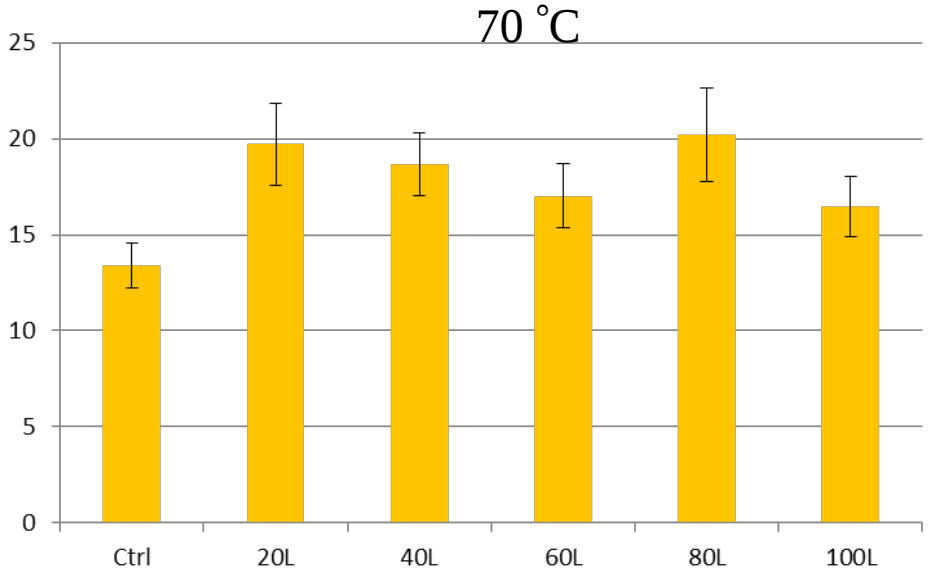


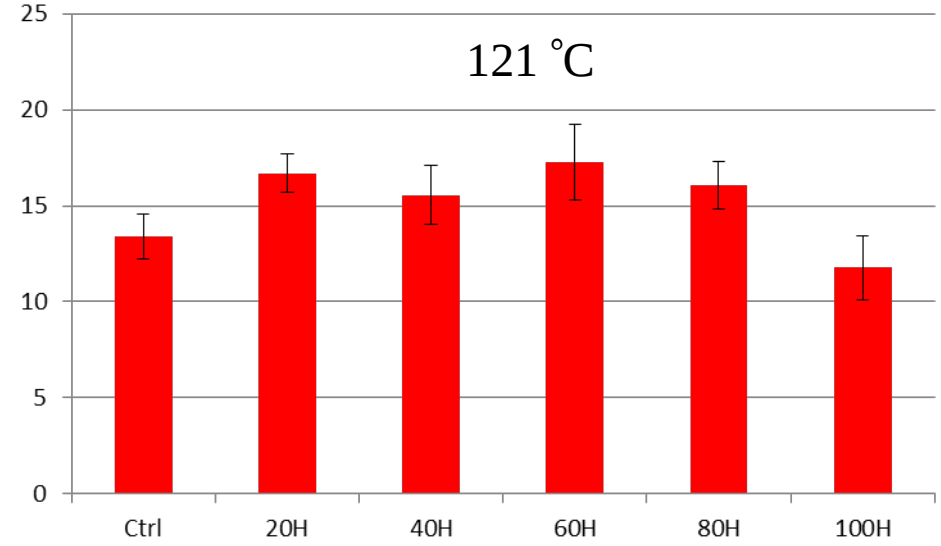


- Untreated & Low – anything below 80% works
- High- 40% to 80% but not as good

Results (Chlorophyll content)







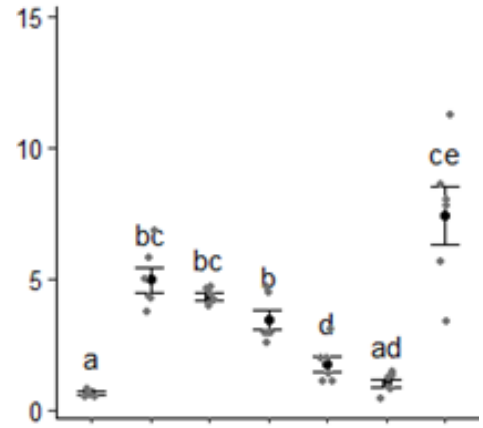
- All except 100% High Temp Treatment are better

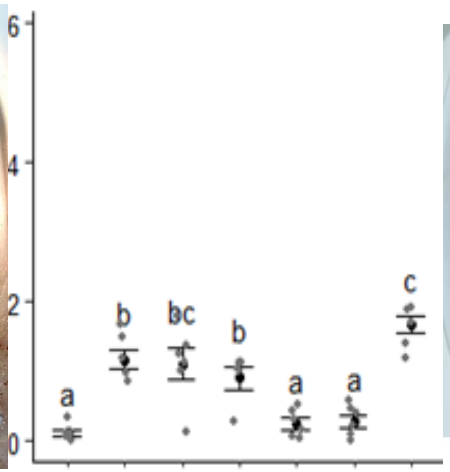
Conclusion-1

- Food Waste AD digestate appears able to replace commercial fertiliser when growing *xiao bai cai* on cocopeat/biochar media, with little impact on the success if heat treatment for hygienisation is required.

- Would it be as successful for other vegetables and methods of growth?

Multi-vegetable cultivation results for Fresh Weight

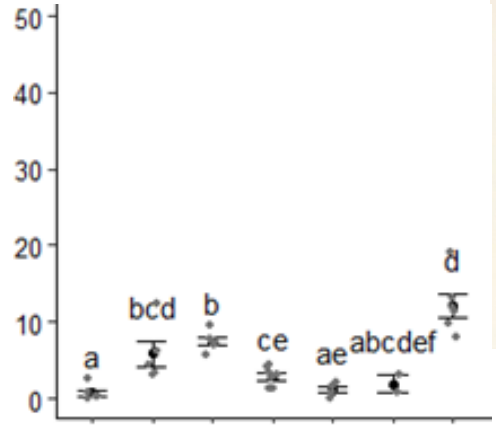




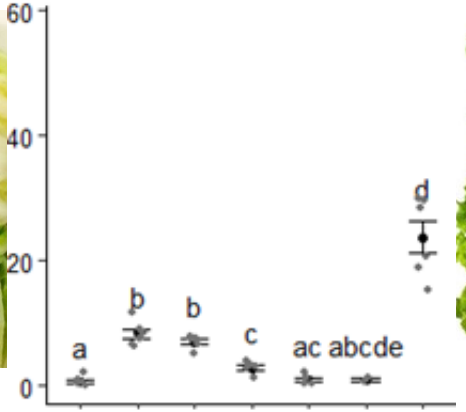
Kang Kong

Bayam

a: control, b-f: 20-100%, g: commercial



Chinese Cabbage



Lettuce

Multi-vegetable cultivation Hydroponics

5% Digestate	10 % Digestate	20% Digestate	TLL Nutrient Solution	
				2nd Week
				4th Week
				6th Week

Conclusion-2

- Untreated Food Waste AD digestate might replace a significant amount of commercial fertiliser when growing *kang kong, bayam* or Chinese cabbage on cocopeat/biochar media, but not lettuce.

- Supernatant of Food Waste AD digestate is not able to grow kale, oak leaf lettuce or *xiao bai cai* using hydroponics


EXIT

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E2S2 Website: http://e2s2-create.org/index.html
Address: 1 CREATE Way, CREATE Tower, #15-02 Singapore 138602

Thank you!