

Producing High Nitrogen Liquid Fertilizer from Organic Inputs

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Vermicompost and Compost “Tea”

• Uses air and water to extract:

- Nutrients
- Organic acids
- Microbes

• Ratio of water to compost
(10:1-100:1)

• Water is not circulated, only air

• 12-24 hrs

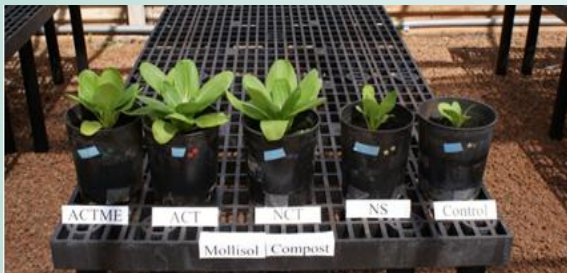
No additives needed.



Compost Tea Application



Oxisol



Mollisol



Peat

- Positive growth response.

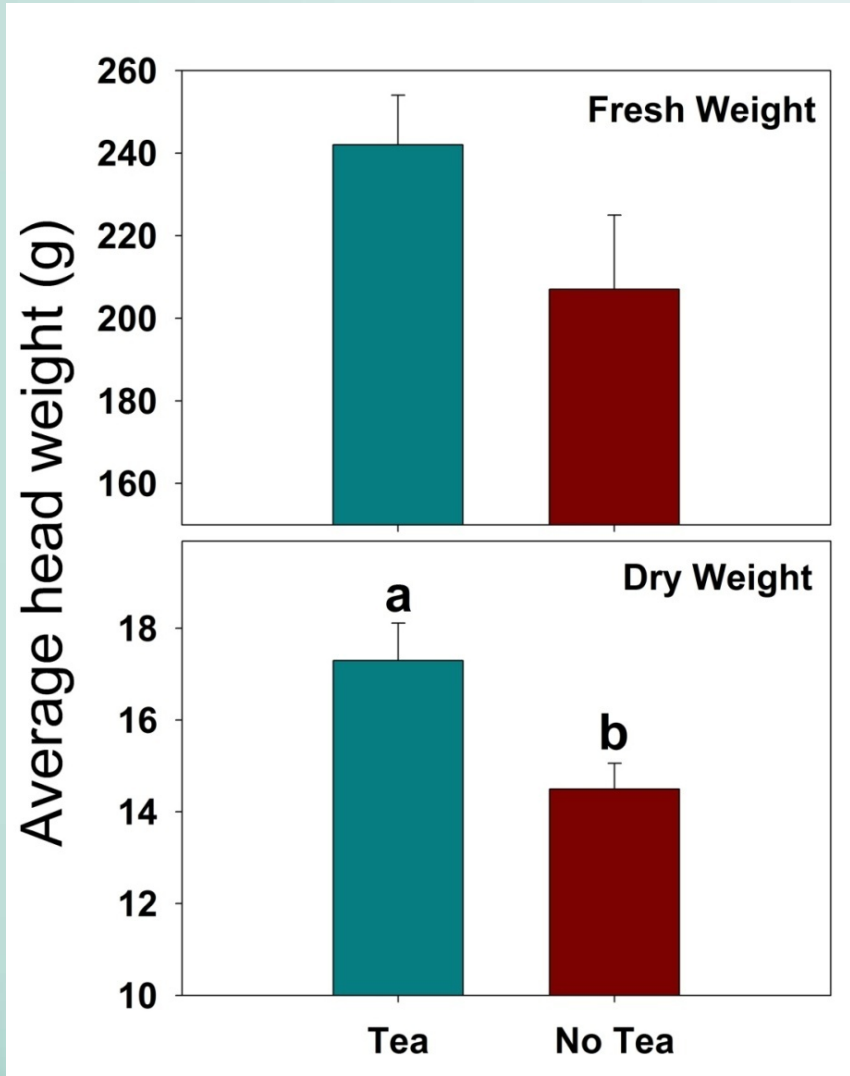
- Effect is consistent across soil and media.

- Response dependent on rate and quality of compost.

Pant et al. 2011. Compost Science and Utilization.



Similar results in the field



Tankage

Meat and Bone Meal by Products.

Produced Locally in Hawaii by Island Commodities.

It contains:

**Nitrogen = ~ 10%,
Phosphorus = ~2.5%,
C:N Ratio = 5:1**



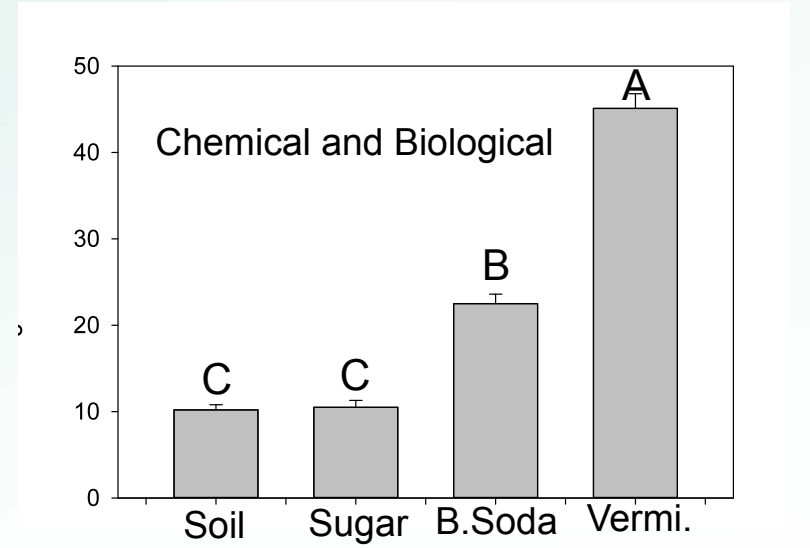
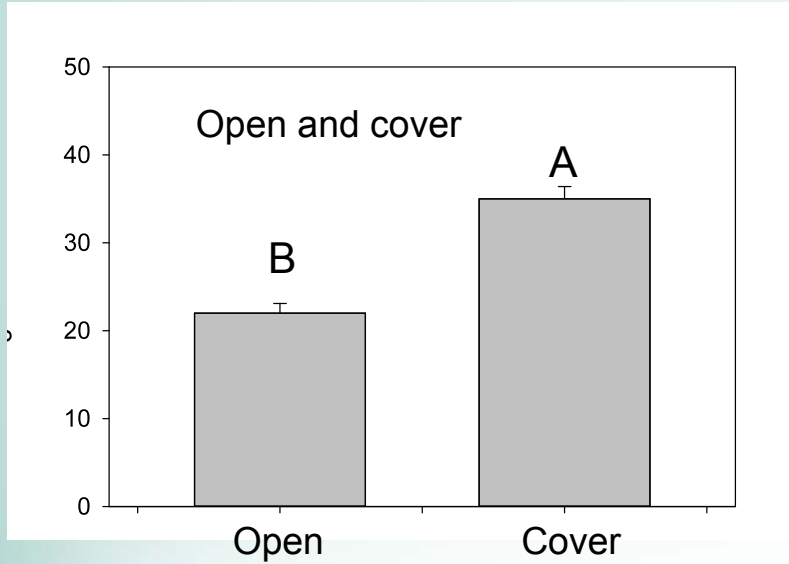
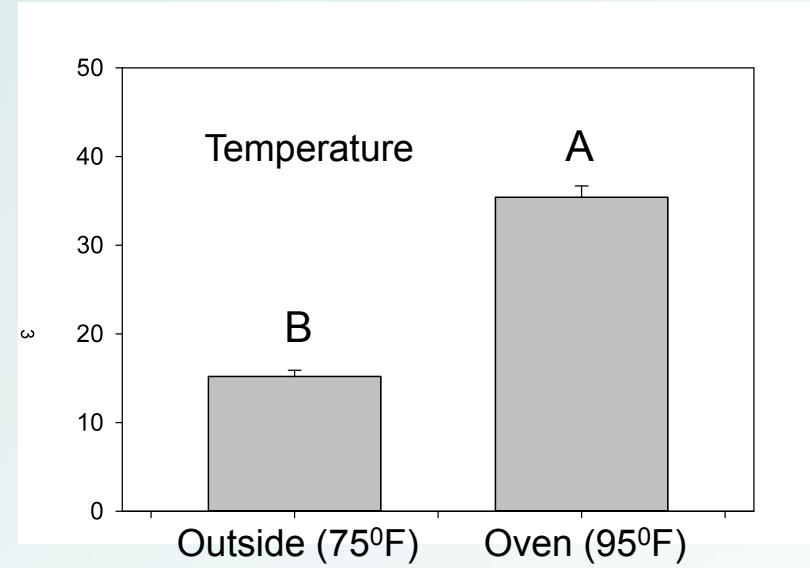
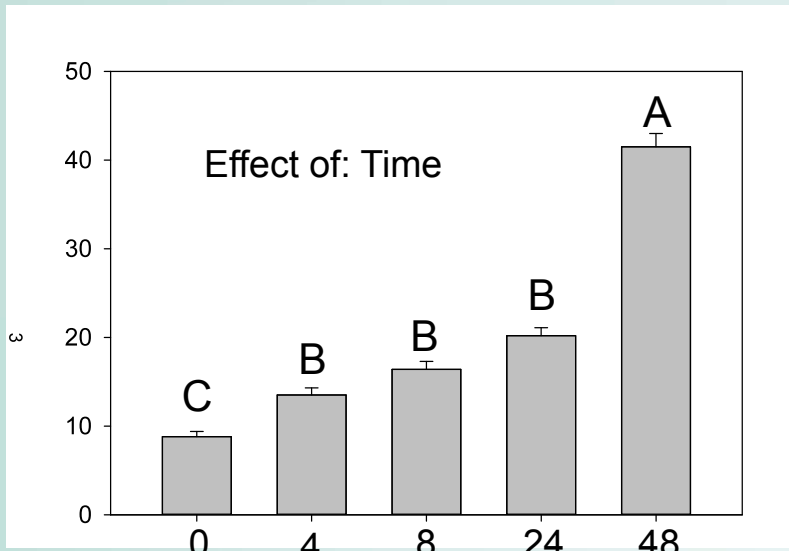
Liquid fertilizer with high nitrogen from tankage



Meat and bone meal by products (Tankage). High nitrogen content (10%). Also good source of other nutrients.

125 ml flask (covered and uncovered) contain 1 gram tankage and 50 ml deionized water. Each treatment was replicated 3 times.





Nitrate release (ppm) from tankage under the effect of: Time; Temperature; Open or covered conditions, and Different materials.



Liquid Fertilizer from Tankage

Application Recipe:

- 1.5 lbs of tankage into 10 gallon water.
- Add about 1 ounce vermicompost
- Air for 12-24 hours
- Strain and apply with drip irrigation (Fertigation).



Collaboration with local farmers:

From: Jared Davis

On: April 29, 2015

“Thanx Ahmad for awesome recipe, my first delivery!! We use no chemicals, no pesticides just Ahmad recipe, now that's organic. Super sweet this year. I'll keep you posted on the tonnage.”



Measure BRIX in watermelon from the collaborator on Molokai

Sample# Location along Fruit Center Core

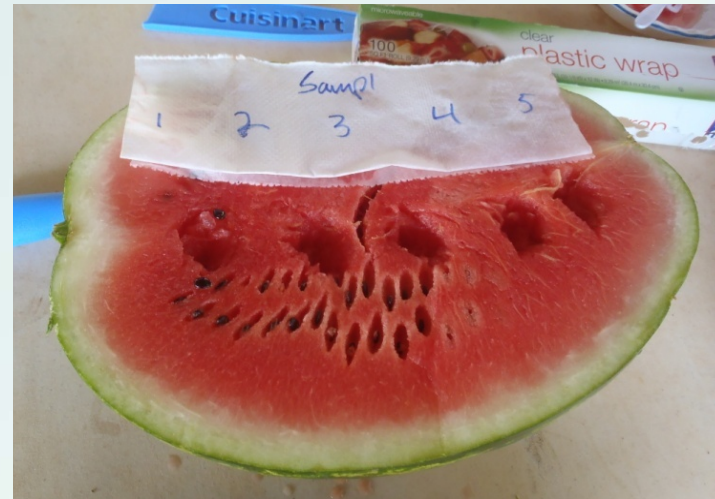
1-Fruit Peduncle End

2-Center Peduncle

3-Center

4-Center Blossom Calyx End

5-Fruit Blossom Calyx End



Melon #	Fruit Peduncle End Weight (lbs)	BRIX/Sample Location					Blossom Calyx End	Average
		1	2	3	4	5		
1	24	10.2	12.0	12.2	12.3	12.1	11.8	
2	19	10.8	12.0	12.2	11.8	10.8	11.5	
3	18	11.2	13.0	13.0	13.0	12.0	12.4	
Average	20.3	10.7	12.3	12.5	12.4	11.6		

Data taken by: Alton Arakaki on Molokai.



Replicated Field Trials

- Poamoho Research Station on Oahu.
- Pak choi, lettuce and daikon crops were used.
- Tankage and synthetic 10-30-10 were used.
- Randomized complete block design (RCBD) with 3 replicates (blocks).
- Fertigation applied through drip irrigation.

Measured: Relative chlorophyll content in leaf weekly using SPAD meter and fresh and dry weight after harvest.



Field Trial



Field trial setup at Poamoho Research Station on an Oxisol soil.



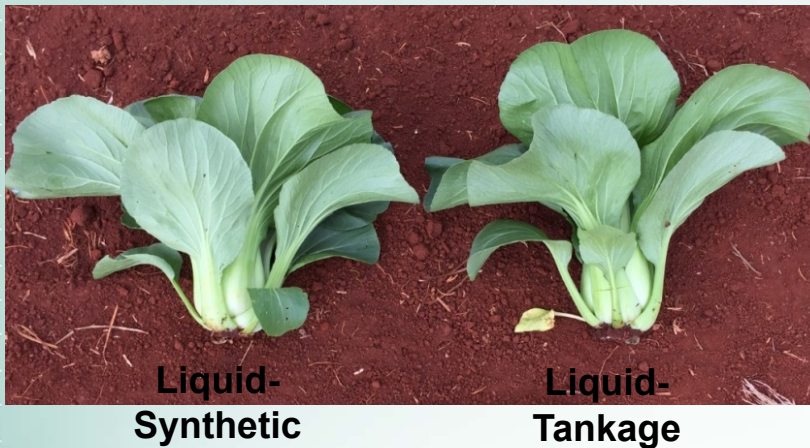
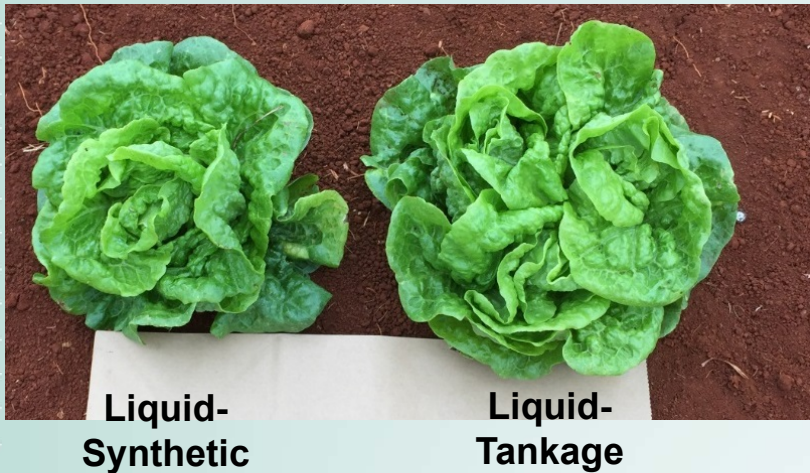
Field Trial



Fertigation from 20 gallon bucket.



Results-Lettuce, Pak Choi, and Daikon



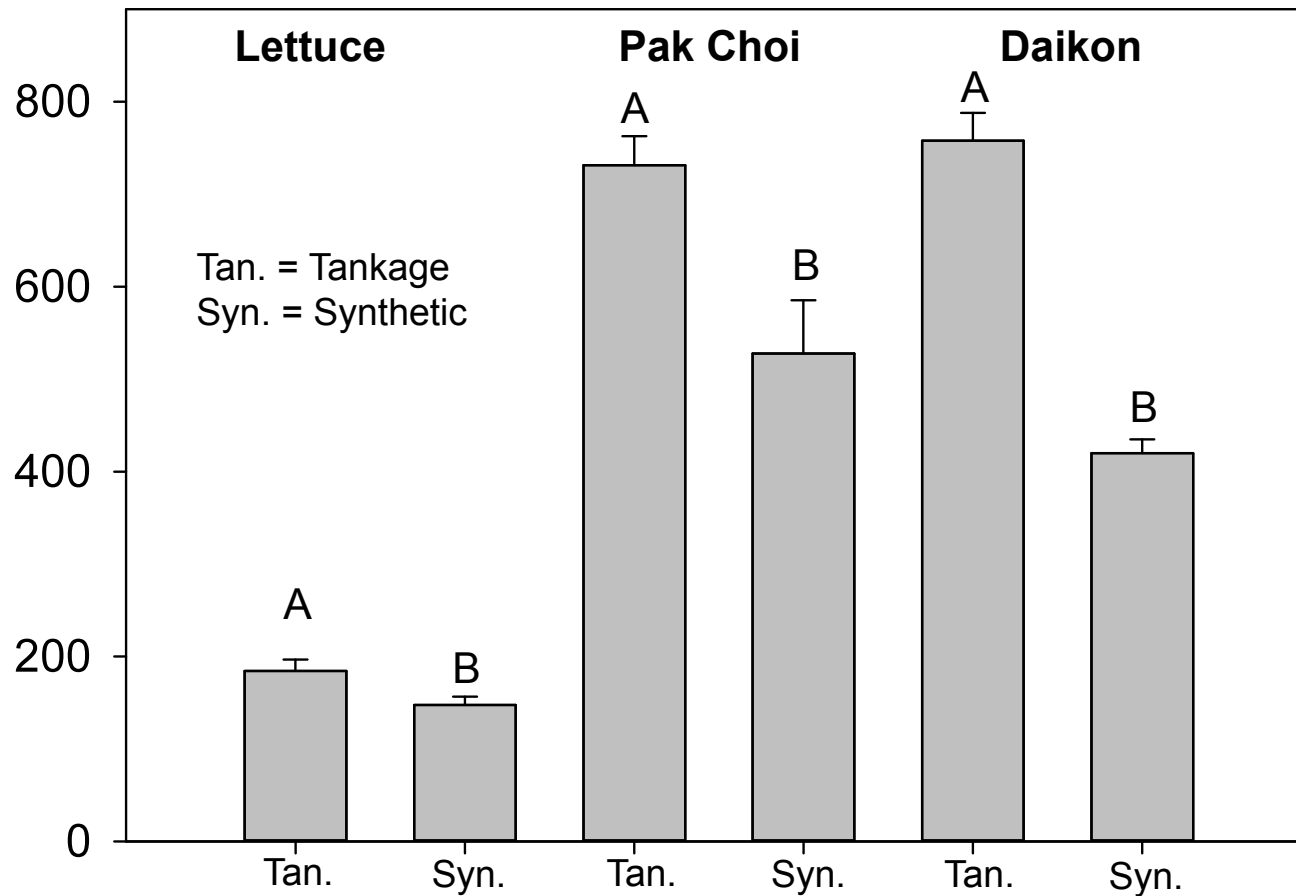
Lettuce and Pak choi were harvested after 4 and 5 weeks of seedlings transplant, respectively



Daikon was harvested after 9 weeks of planting



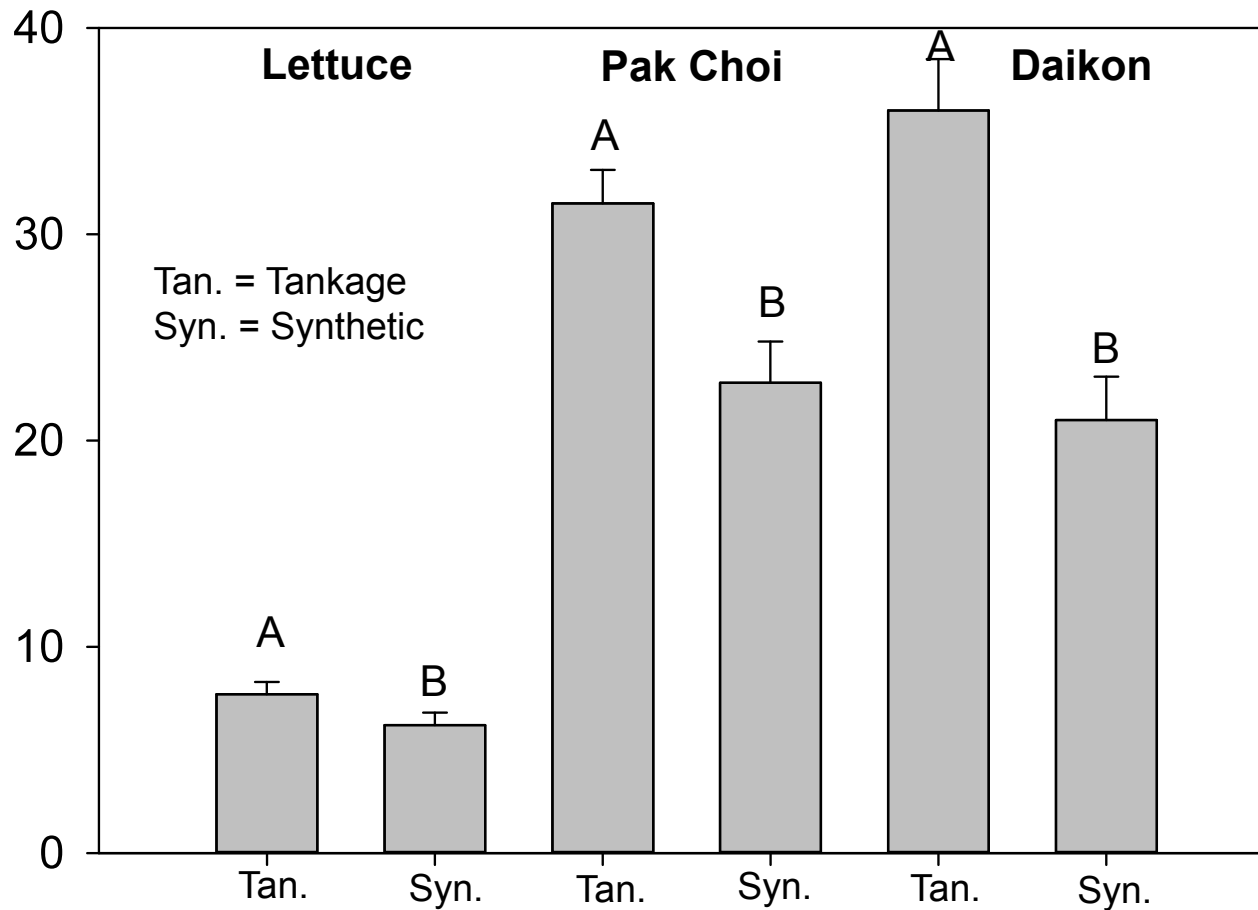
Results-Fresh weight (g)



Fresh weight (gram) for lettuce, pak choi, and daikon under organic and synthetic liquid fertilizers application.



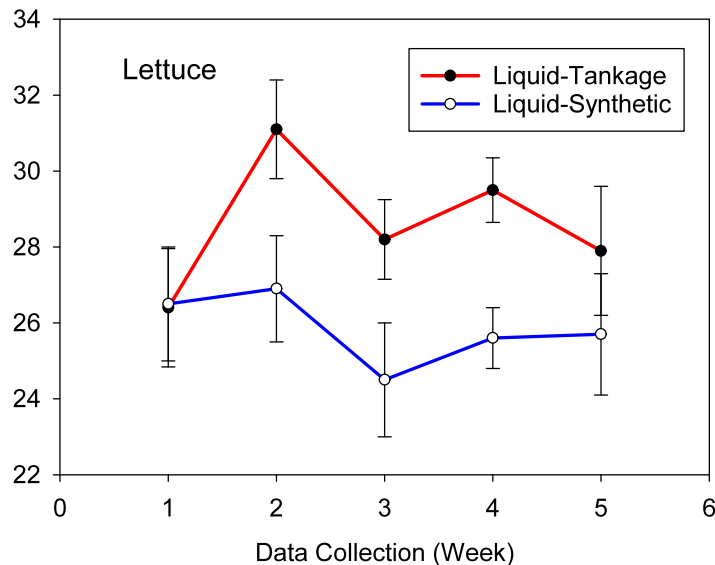
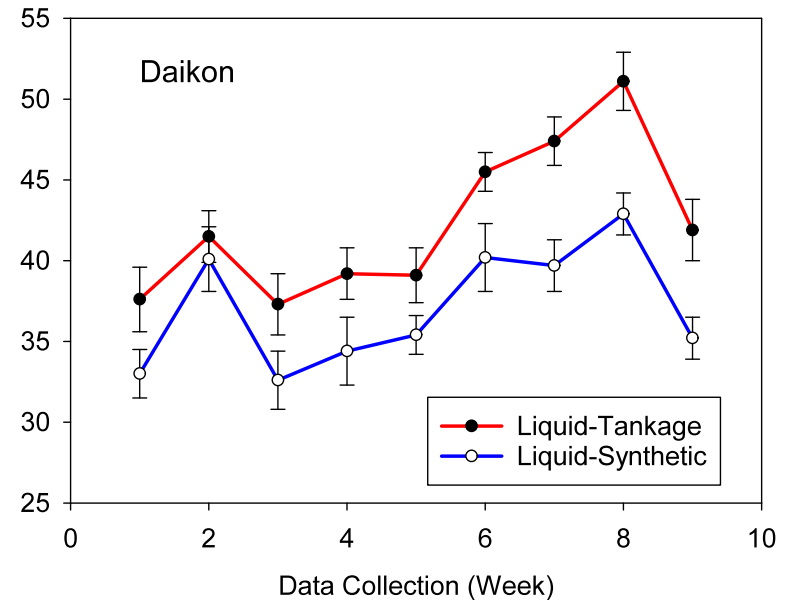
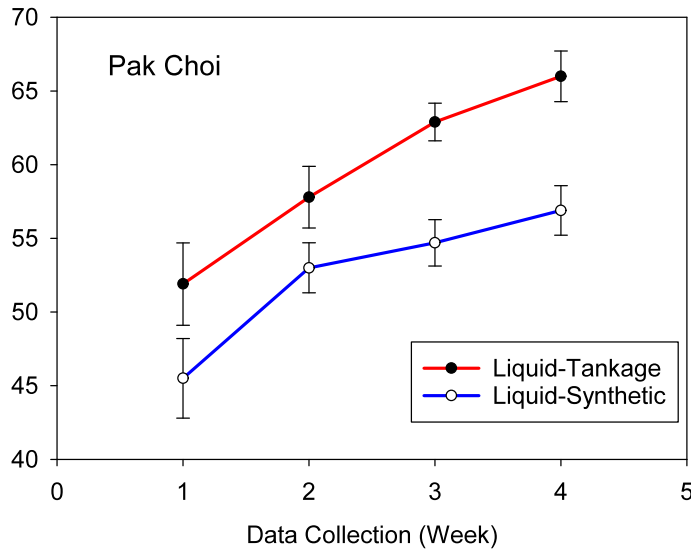
Results-Dry weight (g)



Dry weight (gram) for lettuce, pak choi, and daikon under organic and synthetic liquid fertilizers application.



Results-Chlorophyll content



Relative chlorophyll content, data were taken weekly using Minolta SPAD meter, for pak choi, lettuce, and daikon under organic and synthetic liquid fertilizers application.



Conclusions:

- It's possible to produce high nitrogen liquid fertilizer from organic local sources at a farm level.
- Time, temperature, and biological agents are useful tools to enhance nitrogen mineralization from tankage.
- The use of tankage in producing liquid fertilizer may provide different nutrients for plant growth besides nitrogen.



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Thanks for listening

..... Questions?

