

Taro: Field to Plate

A Virtual Field Day

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Learning Objectives

Implement techniques in production to maximize nutrition content of taro

Compare and contrast nutrients available in taro with other starchy vegetables

Describe health benefits of nutrients found in taro

Create value added product using taro- Poi Banana Bread



Zoom Reminders

Please keep your microphone muted while you are not speaking

Place questions in chat box as they come up

Video OFF can sometimes help with poor connection



Agenda

4:30- 4:35 Zoom Reminders & Learning Objectives

4:35-4:45 Introductions & Zoom Poll

4:45- 5:05 Taro Production

5:05-5:25 Taro Nutrient and Bioactive Components
for Health

5:25-5:35 Taro on your plate: Poi Banana Bread

5:35-5:55 Question and Answer

5:55-6:00 Zoom Poll and What's Next



Introductions

Jensen



Kacie



Monica



Participants- Share in Chat!

- Organization name
- Primary reason you are here with us!



Taro Production

- Preparing Huli
- Field Prep
- Irrigation Setup
- Planting
- Fertilization
- Water requirements
- Harvest





Selecting Huli

Prepping Huli





Field Prep





Preplant Inputs





Irrigation Setup

Plant Spacing



2' Spacing



Planting

Fertilizer Program

Pre-plant

Compost

Lime

Phosphorus

Calcium

Magnesium

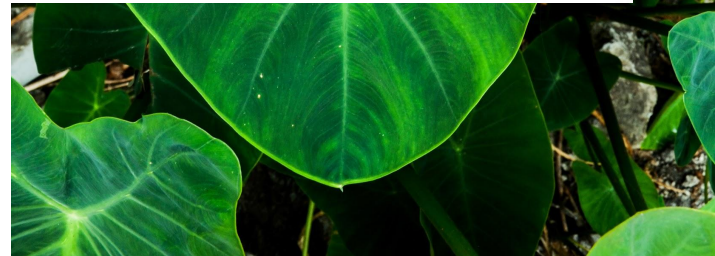
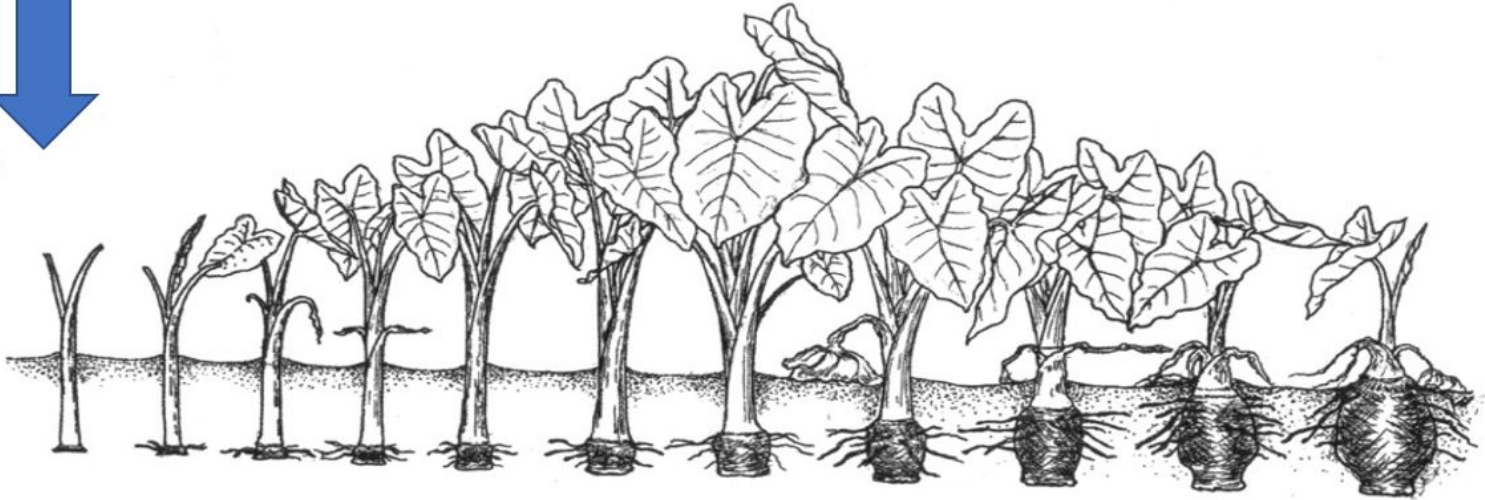
Micronutrients



Nitrogen 300-500lb/acre



Potassium 300-500lb/acre



Fertigation



Taro Calcium Trial

- Taro Variety: Lehua (Planted June 15, 2020)
- Calcium Fertilizer Treatments
 - **Ca0** – 0lbs of Calcium/acre
 - **Ca25** – 30lbs of Calcium/acre
 - **Ca75** – 91lbs of Calcium/acre
 - **Ca100** – 91lbs of Calcium/acre
- Nitrogen (Urea/Calcium Nitrate)
 - 400lbs/acre Split
 - 6/30/20
 - 7/15/20
 - 8/14/20
 - 9/14/20
- Potassium (Muriate of Potash)
 - 400lbs/acre
 - 10/14/20
 - 11/14/20
 - 12/14/20
 - 1/14/21



Tissue Nutrient Analysis

%	Ca	N	K	P
Ca0	2.22	3.48	4.42	0.48
Ca25	2.37	3.69	4.43	0.49
Ca75	2.21	3.64	4.57	0.46
Ca100	2.22	3.61	4.95	0.53
Range	0.7-1.5	4.0-4.5	3.2-5.5	0.3-0.5

¹ Analysis based on 4 replications and 3 composite leaf samples per replication

² Miyasaka et. al., Nutrient Deficiencies and Excess in Taro, 2002



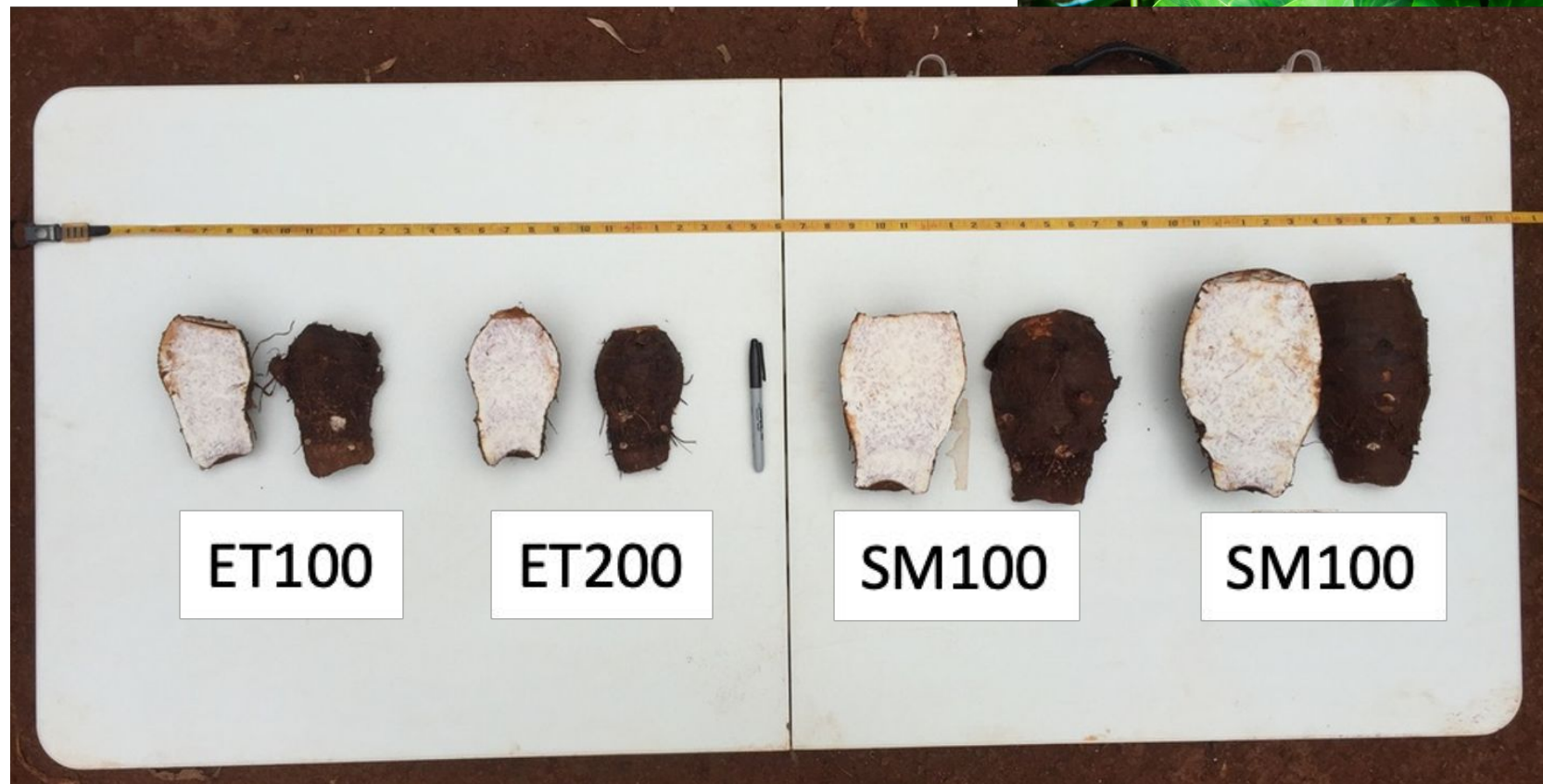
Observations

- Additional Calcium had zero effect on accumulation of tissue calcium
- Suggest no luxury consumption of calcium in tissue
- Analysis of corm needed
- Calcium: Potassium uptake interaction
- Too much of either inhibits uptake of the other
- Adequate soil potassium prior to corm development
- No Impact on Phosphorus
- Adequate soil phosphorus
- Deficient tissue nitrogen





Irrigation management



Harvest



Taro Nutrition

- Carbohydrate source
- No fat
- Low in sodium
- High in fiber
- Contains essential minerals
- Calcium, Iron, Potassium

Nutrition Facts	
Serving size	1 cup (132g)
Amount Per Serving	
Calories	190
% Daily Value*	
Total Fat 0g	0%
Saturated Fat 0g	0%
<i>Trans</i> Fat 0g	
Cholesterol 0mg	0%
Sodium 20mg	1%
Total Carbohydrate 46g	17%
Dietary Fiber 7g	25%
Total Sugars 1g	
Includes 0g Added Sugars	0%
Protein 1g	2%
Vitamin D 0mcg	0%
Calcium 24mg	2%
Iron 1mg	6%
Potassium 639mg	15%
*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	



Antioxidants and Pigments in Taro

- Polyphenols

- Broad class of antioxidant compounds
- Some (anthocyanins) are pigmented (red to blue)

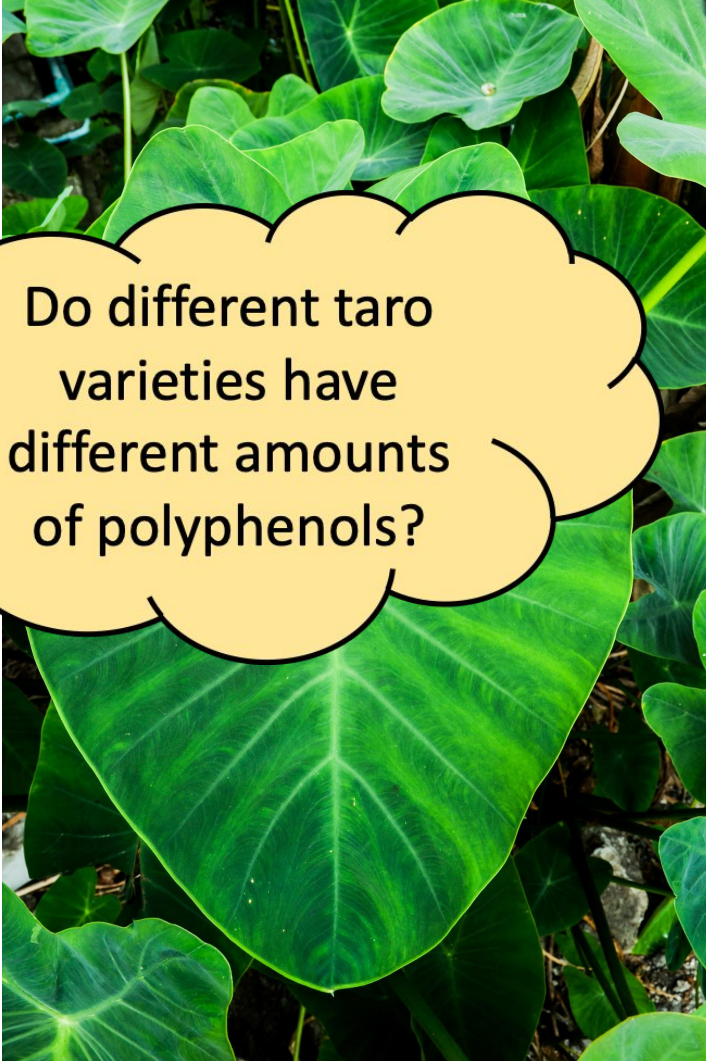
- Carotenoids

- Type of lipophilic (oil-liking) antioxidant compounds
- Range in color (yellow, orange, red)



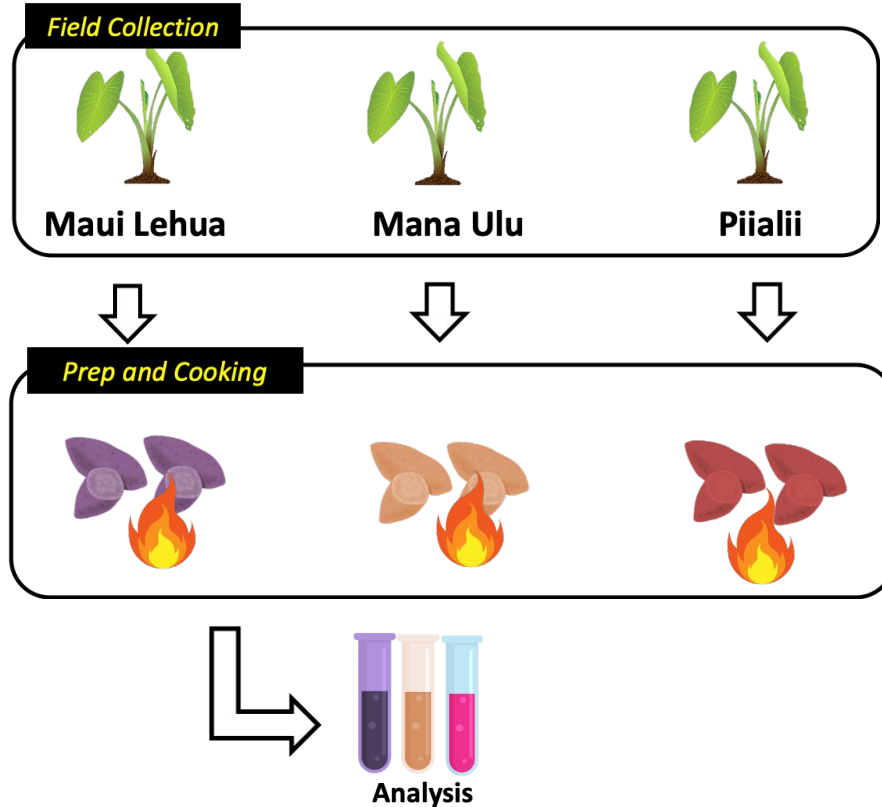
Some Taro Varieties

- Maui Lehua
 - Purple variety with large corms
 - Commercially used for poi
- Mana Ulu
 - Variety with orange-colored corm
- Piialii
 - Variety with red pigments in both the corm and stem



Do different taro varieties have different amounts of polyphenols?

Our Process



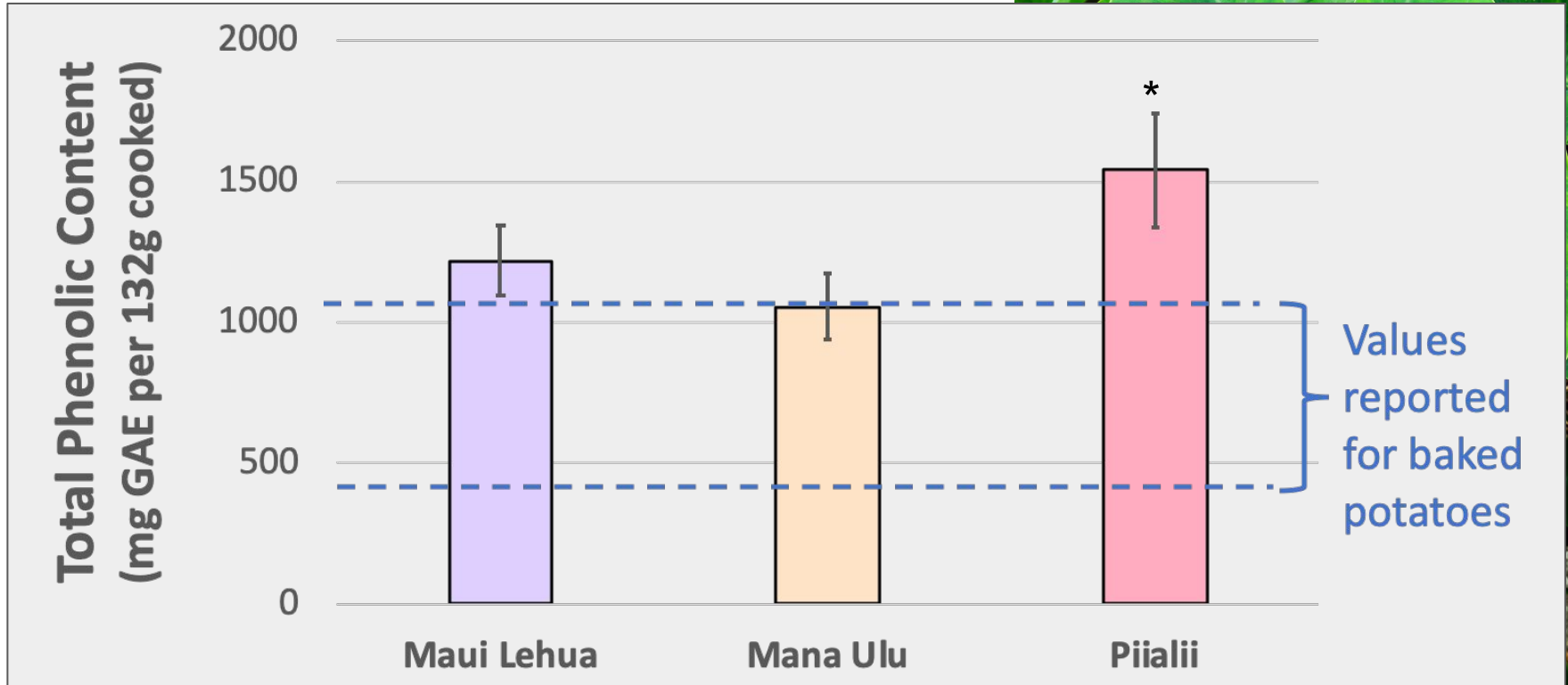
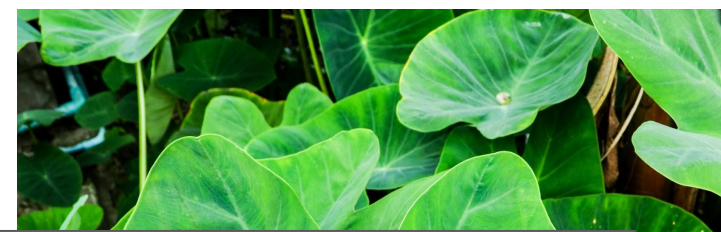
Analysis

Total Phenolic Content

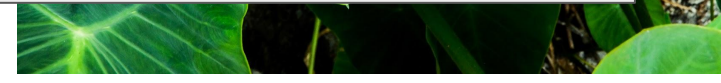
- Estimate of total polyphenol content
- Expressed in terms of *Gallic Acid Equivalents* (GAE)
- Do not specify the different types of polyphenols or anthocyanins in the food
- Broadly estimates overall content (good for quick comparisons)



Polyphenol content differs across variety



*Indicates significantly different value ($P<0.05$); $n=9$; error bars represent standard deviation



What's Next?

- In progress
 - Specific polyphenol identification (anthocyanins)
 - Specific carotenoid identification
- Upcoming Work
 - Bioaccessibility (how absorbable are these compounds?)
 - Differences depending on how you cook the taro?



Health Benefits-Anthocyanins

Antioxidant activity- reduce free radical damage

Cardiovascular Disease

- Inhibit platelet aggregation (blood clotting)
- Vasorelaxation
- Improved blood lipid profile (i.e. cholesterol, triglycerides)

Anticancer effects- Reduce cancer cell proliferation, inhibit tumor formation

Diabetes- Improve insulin sensitivity

Khoo et al. Food Nutr Res. 2017;61(1):1361779.



Health Benefits- Polyphenols

Long term consumption of polyphenol rich foods:

Protect against neurodegenerative diseases
(Parkinsons, Alzheimer's)

Anti-inflammatory

Anti-cancer- specifically colon, prostate, epithelial,
endometrial, breast

Cardiovascular health

Type 2 Diabetes

Cory et al. Front Nutr. 2018; 5:87.



Health Benefits: Connections

Pilinahā: Indigenous Framework for Health

Connection to place: growing food

Connection to others: sharing food

Connection to past and future: carrying traditional practices

Connection to your better self: awareness of what we put into our bodies

Odom, et al. Curr Deve Nutr. 2019 Aug/ 3 (suppl 2).



Value Added: Poi Banana Bread

Recipe by Nutrition PhD Student- Cherese Shelton

Adapted to

- Reduce added sugar
- Increase whole grains

Potential audience:

- Breakfast option to support farm to school
- Incorporate poi into daily eating habits

Cooking Demonstration Video: **go.hawaii.edu/3K9**

- Created by Kristen Jamieson, Junior Extension Agent, Farm to School



Open Question & Answer



2 Minute Survey

go.hawaii.edu/hK3



Next Steps

Huli and banana bread sample pick up at Oahu Urban Garden Center 1-3!

Sharing more results on calcium taro field trials

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