

UNPA Members Retreat – Kona 2016

Hawaii as an Emerging Natural Products Leader: a Look at its History of Traditional Use and Year- round Agriculture/Aquaculture

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Polynesians discover the Hawaiian Islands



An Environment that has Everything to Support Life





Calm waters Ideal for Reef & Off-Shore Fishing



Hawaiians: the 1st Aquaculturists



Ahupua'a System: a Self-Sustaining Unit



Ahupua'a System: a Self-Sustaining Unit

- **Moku – Ahupua'a** - wedge shaped sections of land extending from mountain to sea
- **Self-Sustaining Unit** – crops placed in areas most suitable for their growing
 - Fish, Salt, Coconut
 - Taro – irrigated system
 - Sweet Potato – rain fed system
 - Koa, Kukui
- **No Private Land Ownership**– taxes, communal labor & sharing of resources
- **KAPU Governance** – beliefs based on inter-relationship of elements & beings
 - Restricted fishing to seasons
 - Gathering of plants seasonal
 - Social rules
- **Great Mahele 1848**– King Kamehameha III split up the Ahupua'a



Traditional Use of Plants



Noni –for swelling



Taro – as a purgative



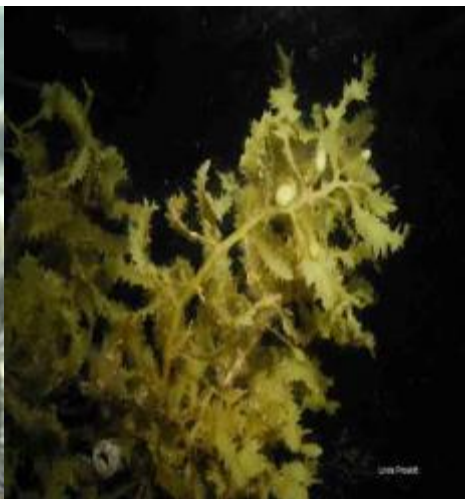
Taro – for bleeding



Marco Algae (Seaweed): Limu



Limu kohu
(*Asparagopsis taxiformis*)
Hawaiian Favorite



Limu kala
(*Sargassum echinocarpum*)
Forgiveness Ceremony



Limu
(*Turbinaria ornata*)
Fucoxanthin Rich

Limu: Hawaii's Traditional Wild Greens (Potential Natural Product)

- **Limu** – the 3rd part of the Hawaiian staple diet – high in polyphenols/antioxidants
Poi, Fish, Limu
- **Current Consumption?** – 2012 Student Survey, UH Manoa
Cultivated Seaweeds – All Students consumed
Wild Seaweeds – 1/3 Students consumed
Eating 3x week often with traditional foods
Wild Gathering 60% more prevalent – Native Hawaiian Students
More Antioxidant Activity & Health Benefits – Wild Seaweed
- **Gathering Practice & Traditional Diet** – has persisted
Hawaiian Cultural Renaissance – “EAT LOCAL”
Food Sovereignty – proactive movement to exercise rights
- **Political Support**– Development & Management
Over-picking, Excess nitrogen

Hart, et. al., Contemporary Gathering Practice and Antioxidant Benefit of Wild Seaweeds in Hawaii, Economic Botany, 2014

Hawaii

(Potential Natural Products Leader)

- **AHUPUA'A System** - historical knowledge of Sustainable Tropical Agriculture
- **Hawaii at a Cross-Roads**
 - Great Mahele 1848 - Plantation farming
 - 1990's crash of plantation mono-crops (pineapple/sugar)
 - Genetically Engineered crops
 - Hawaii was FOOD self-sufficient until the 1960's
 - Today we import 85%
- **Food Sovereignty** - proactive movement to exercise rights
- **Awareness** - Kohala Center, HISGN
- **Political Support** - Center for Food Safety, HB 1689
- **Hawaii Constitution** - "Public Trust" Doctrine
 - "all public natural and cultural resources are held in trust by the state for the benefit of the people"

Hawaii Farm to School and School Garden Hui

168 School – 21,577 Students – 30 Acres of Land



Cyanotech Corporation (Micro Algae - Case Study)

- World Leader's in Microalgae Production (since 1983)
(Arthrospira platensis) – Spirulina Pacifica
(Haematococcus pluvialis) – Hawaiian Astaxanthin, BioAstin
- 90 Acre Facility @ NELHA
Aquaculture/Ag, Food, Dietary Supplement Facilities (3 in 1)
Cultivation -- Harvesting -- Drying -- Packaging – Extracting -- Testing --- Distribution
- Spirulina Pacifica – Greens / Superfood
Ancient Aztec Food --- Excellent source of Beta Carotene, Iron, Vit K, B12
- BioAstin – Sports Recovery / Antioxidant
Stages of growth, Astaxanthin - Super antioxidant, Free Radical quenching compound

The First Cyanotech Crew in Kona



First Construction in Kona



Spirulina ponds @ our NELHA Facility, KONA



Astaxanthin ponds @ our NELHA Facility, Kona



Spirulina 500,000 liter ponds



Hawaii (Natural Products Alternative Industry)

- Micro Algae & NELHA (45% occupancy)
Economic Impact of NELHA: \$88 million, ~600 jobs
\$1 State Investment Becomes \$43
CYAN Net Sales: \$34 million – 20% increase
- Kona Coffee – 700 farms, \$14 million annual business in the KONA Brand
- Kona Red, Hawaiian Ola, Noni Biotech, Limu, UH
- Sustainable Ag, Aquaculture, Organic Farmers, Home Gardeners,
EAT LOCAL

Hawaii = Utah (\$924 MM, 1992 (DS GROWTH) \$7.2 Billion, 2012)