

# Soil Amendments of Biological Origin

## Application and Utilization

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# “Organic Amendments”

- Compost
- Manures
- Mulches
- Powders
- Liquids
- NOP allowed or not
- Integrated Nutrient Management
- Other purposes
  - Erosion control
  - Seeding Medium
  - Soil Conditioners



# Source Materials or Feed stocks

- Biogenic material
  - Once living, carbon based
- Treatments
  - Aerobic (with oxygen) v. Anaerobic (without oxygen)
- Application Considerations



# California's Soil Health Initiatives

- Healthy Soils Action Plan
  - Executive order
  - Aims to protect soils and increase organic matter
  - Promote inter agency cooperation
- HSP Incentive Program
  - Financial Incentives to Growers
  - Many NRCS practices qualify
  - Applications due April 13th
- HSP Demonstration Projects
  - Outreach Requirement (40 farmers)
  - Larger Award



# California Organics Legislation

AB 939 – The Integrated Waste Management Act 1985

- 50% diversion by 2000 (mandate)

AB 341 - Mandatory Commercial Recycling 2011

- 75% diversion by 2020 (goal)

AB 1826 - Mandatory Commercial Organics 2014

- April 1<sup>st</sup> 2016 8 yds<sup>3</sup> a week or more

AB 876 – Organics Infrastructure 2015

- Audit Organics processing capacity and generation

AB 1045 – Compost Development and Application 2015

- Reduce greenhouse gases using compost

# Composted Soil Amendments:

## Composting Process Validation:

### Enclosed or within-vessel composting:

Active compost must maintain a minimum of 131° F for 3 days

### Windrow composting:

Active compost must maintain aerobic conditions for a minimum of 131° F or higher for 15 days or longer, with a minimum of five turnings during this period.

### Aerated static pile composting:

Active compost must be covered with at least 12 inches of insulating materials and maintain a minimum of 131° F for 3 days

## Target Organisms:

- Fecal coliforms
- Salmonella spp
- E. coli O157:H7

## •Acceptance Criteria:

- Fecal coliforms <1000 MPN/gram
- Salmonella: Negative or < DL (<1/ 30 grams)
- E. coli O157:H7: Negative or < DL (<1/ 30 grams)

# Food Safety and Modernization Act (FSMA)



- Time Intervals
  - 9 months if untreated
  - 45 days if composted
- Must compile with requirements for treatment
- Document time of application, intervals, rates and time of harvest

# Application Considerations

- Objectives
  - Change soil physical properties
  - Mulch/ Erosion Control
  - Increase Drought Resilience
  - Nutrient Planning
- Rates
  - 10% to 25% PAN 1<sup>st</sup> Season
  - Excess P and K
- Cost
  - 20 to 40\$ per yard
  - 2-3 yards per ton





# Application Rate Recommendations

## CDFA

- C:N < 11 2.2-3.6 tons/acre
- C:N > 11 4 -5.3 tons/acre

## ATTRA

- 5-20 tons/acre

## Center for Agroecology & Sustainable Food Systems

- 5-7 tons/acre

## UCANR Grower's Guide

- 3-6 tons/acre





**US COMPOSTING  
COUNCIL**

*Seal of Testing  
Assurance*

**Z-Best Products**

Kelli Lopez  
980 State Highway 25  
Gilroy  
CA 95020

Date Sampled/Received: 04 May. 17 / 04 May. 17

<b>Product Identification</b> Compost
5.2017 Zbest Organic Compost

## COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188			
<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	% weight basis	% wet weight basis	% dry weight basis
Nitrogen	Total N	0.79	1.6
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.27	0.52
Potassium	K <sub>2</sub> O	0.54	1.1
Calcium	Ca	1.6	3.2
Magnesium	Mg	0.41	0.81
Moisture Content	% wet weight basis	49.6	
Organic Matter Content	% dry weight basis	51.2	
pH	units	8.42	
Soluble Salts <i>(electrical conductivity EC<sub>s</sub>)</i>	dS/m (mmhos/cm)	3.7	
Particle Size or Sieve Size	% under 9.5 mm, dw basis	100.0	
Stability Indicator ( <i>respirometry</i> )		<i>Stability Rating:</i>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	1.4	Very Stable
	mg CO <sub>2</sub> -C/g TS/day	0.71	
Maturity Indicator (bioassay)			
Percent Emergence	average % of control	93.3	
Relative Seedling Vigor	average % of control	104.5	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i> <i>Mo,Ni,Se,Zn</i>

## Findings

- Pepper related organic amendment research

- Higher yields when are combined with synthetic (20-50% price premium needed)

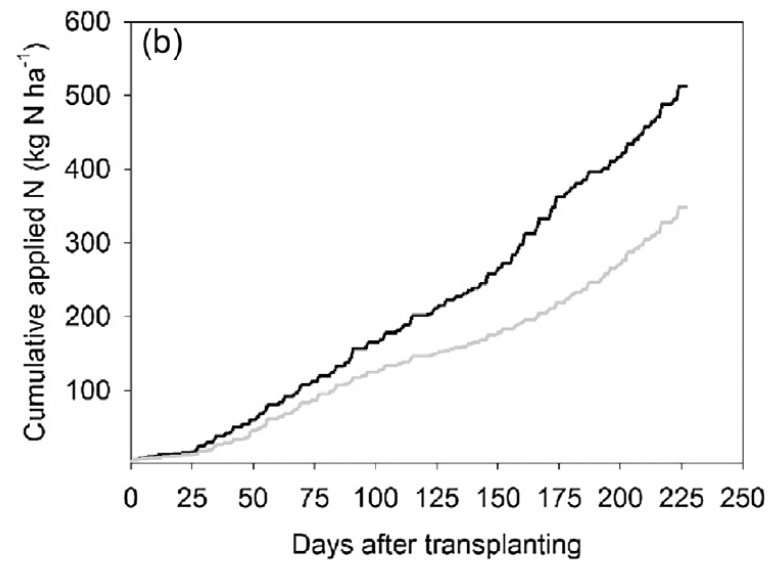
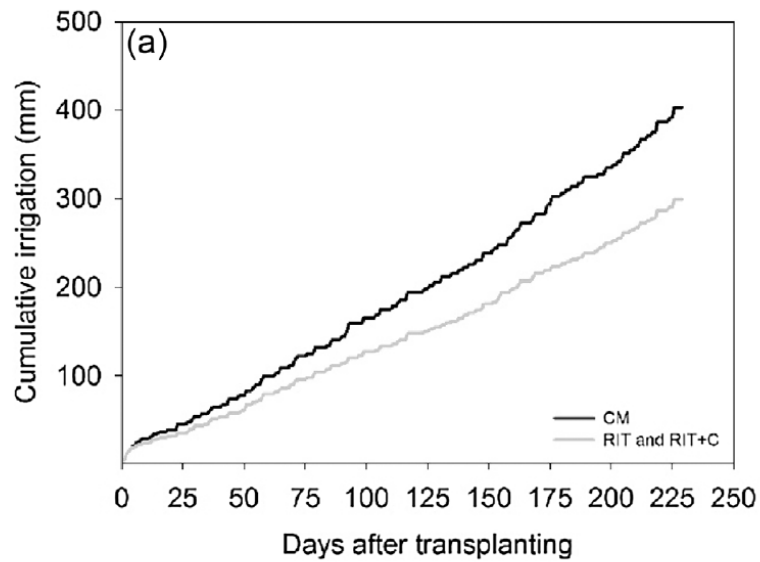
*G.K Appireddy et al. 2008*

- Soil carbon and nitrogen levels peak at approximately 15 to 20 tons/acre

*Aram and Rangarajan 2005*

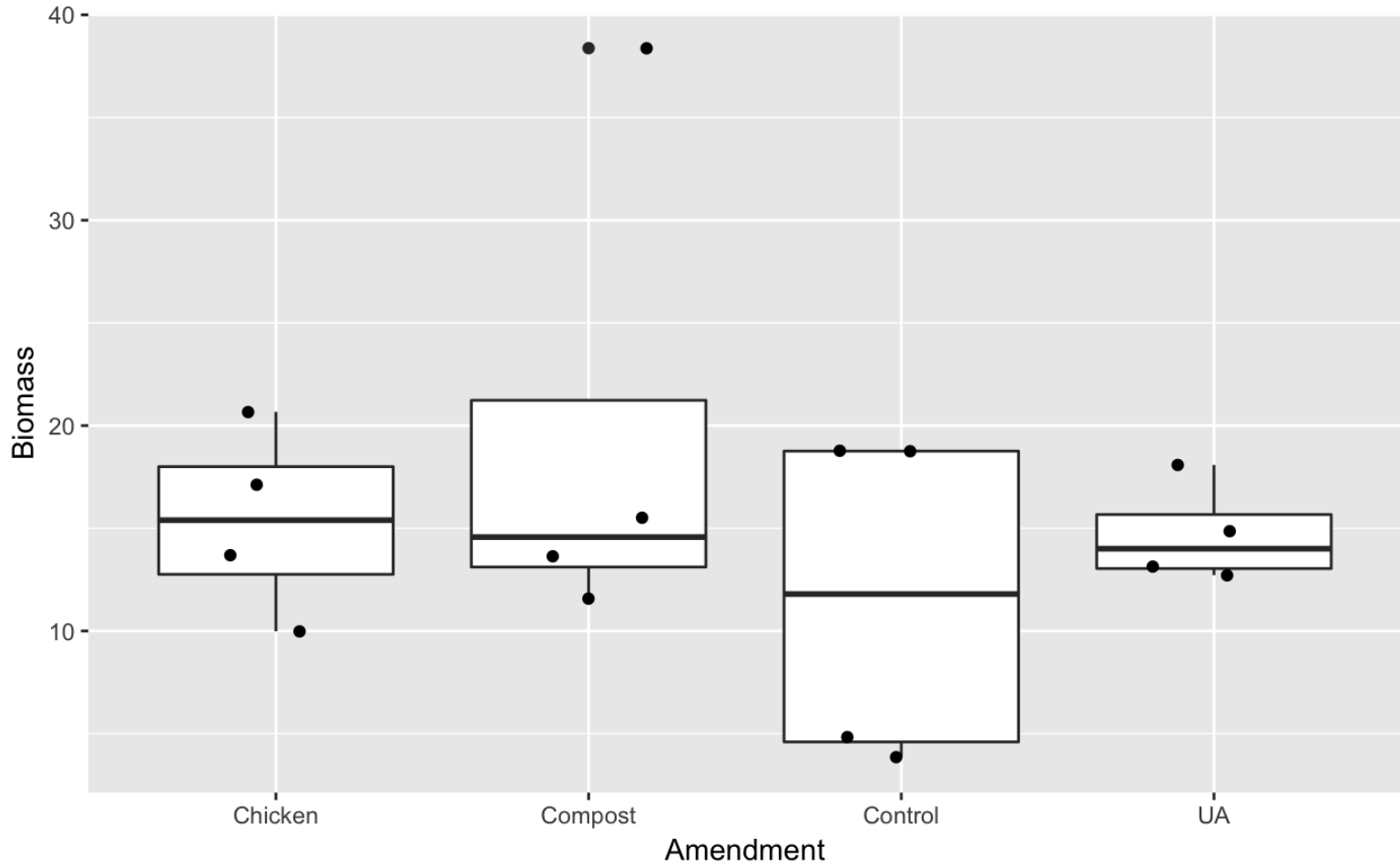
- Compost increased biomass and seedling growth development

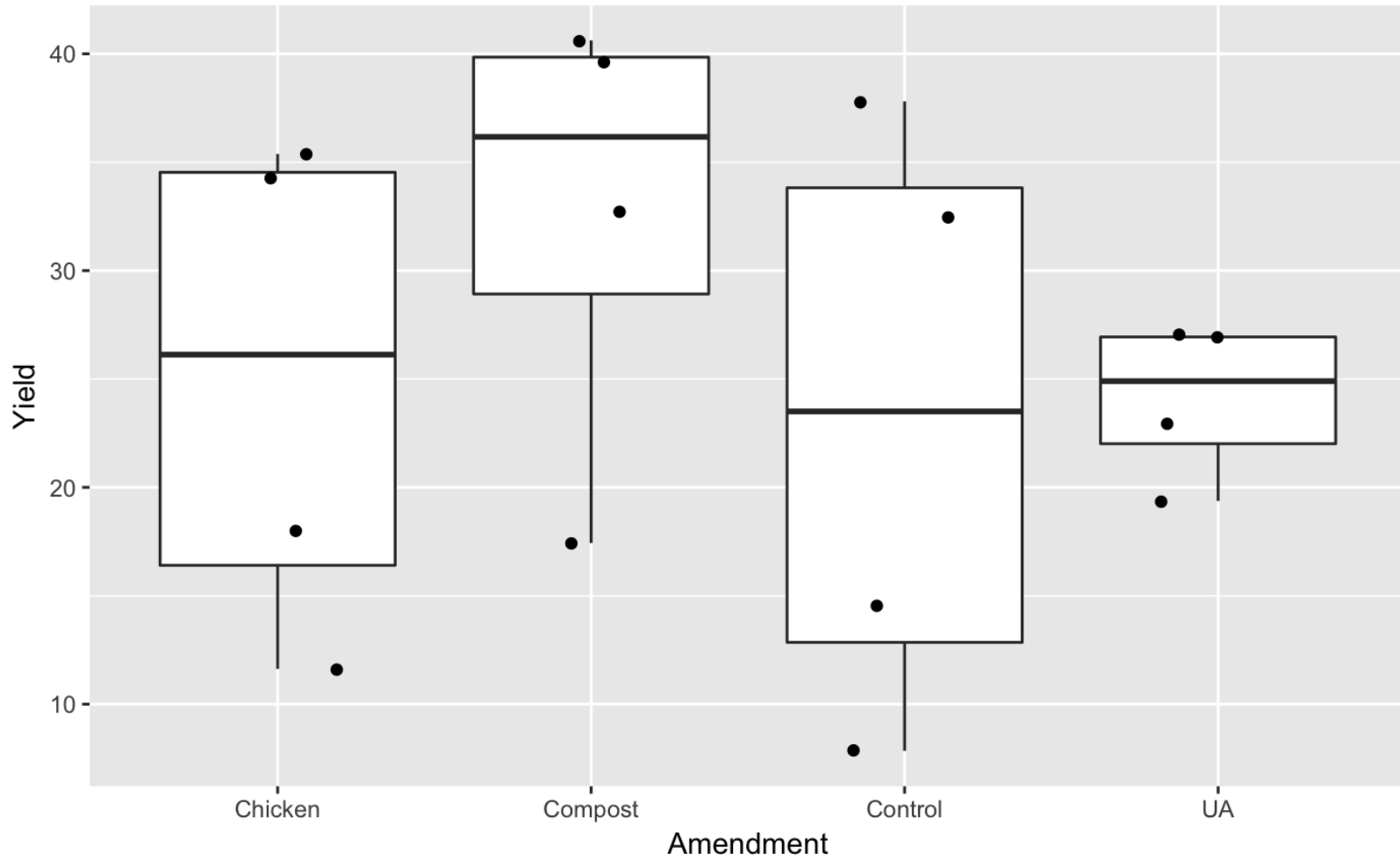
*M.L. Fiasconaro et al. 2015*



**Fig. 2.** Cumulative (a) irrigation and (b) applied N for the conventional management (CM), reduced input and tillage (RIT) and reduced input and tillage + compost (RIT + C) packages. RIT and RIT + C had identical irrigation and N management.

F.M. Padilla et al. 2017





# Questions?

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