

# **Municipal Wastewater To Real Fertilizer!**

## **The Unity Fertilizer Solution**

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## **Overview of Presentation**

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- **Background**
- **The Technology**
- **Product Characteristics**
- **Health & Safety Issues**
- **Field Data & Research**

# The Mission

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To Manufacture & Market  
High Value Inorganic Fertilizers  
with Organic & Micronutrient  
Components

## Municipal Trends in Biosolids

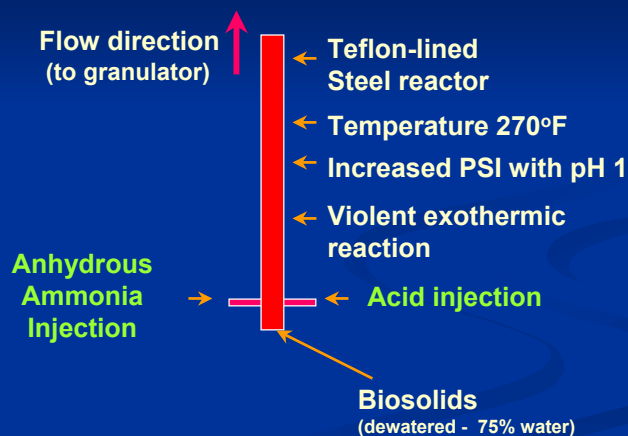
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- More
- Beneficial Use Required
- Class A/EQ Required
- Products
- Traditional disposal technologies declining

# The Unity Technology

## Unity "Pipe Cross Reactor"

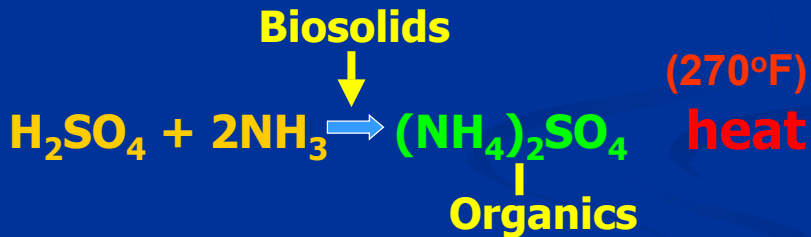
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# Chemistry

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The formation of UNITY



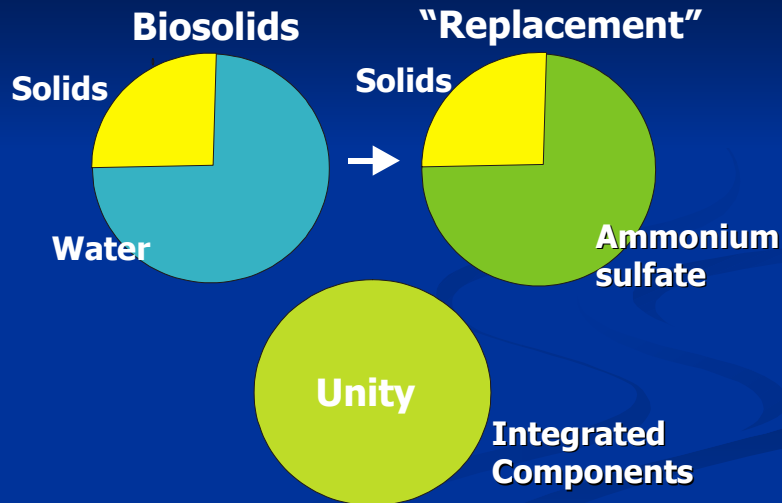
(270°F) = (131°C - Sterilization Temperatures)

## Unity – Granular Fertilizer

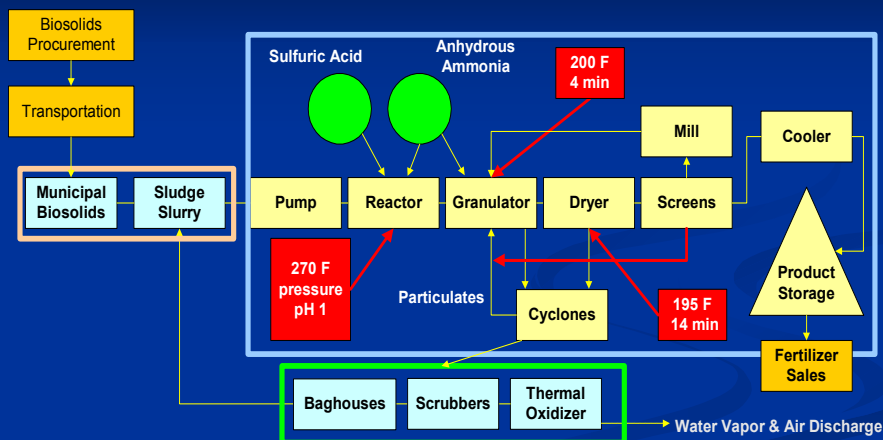
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# Unity Fertilizer Conversion



# Unity Fertilizer Process



# The Cypress Plant



## Unity - Product Comparison

Product	N-P-K Analysis	As mg/kg	Cd mg/kg	Pb mg/kg
40 CFR 503 Biosolids Std	NA	41	39	300
Unity	17-1-0	0.7	0.4	31
Hechinger Great Start-up Fert	18-24-6	na	5	50
Milorganite Natural Fert	6-2-0	na	7	140
Ortho General Plant Food	10-10-10	na	30	50
CA Agri Commodities Survey	46 blends	14	28	530

# Unity Health & Safety

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- **USEPA Class A / EQ Compliant**
- **No microbial pathogens – sterile processing**
- **Metals significantly below USEPA and USDA requirements and future plans**
- **Standard fertilizer application rates: pounds per acre — not tons.**
- **Rigorous Quality Control Program – independent certified laboratory**

## Physical Characteristics

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<b>pH</b>	<b>5.8</b>
<b>% Total Solids</b>	<b>98+%</b>
<b>Mean Size</b>	<b>2.5 mm</b>
<b>Hardness</b>	<b>6 lbs</b>

# Unity Fertilizers

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## Unity - Ammonium Sulfate

N	P	K	S	Organic
16.5	1	0	19	15 %
+ Micronutrients				

## Unity – Ammonium Phosphate Sulfate

N	P	K	S	Organic
12	12	0	14	15%
+ Micronutrients				

(Registered as a Commercial Fertilizer in 31 US states)

## Unity Fertilizer Marketing Strategy

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- **Sell in Bulk as Registered Fertilizer**
  - **Unity NS+**
  - **Unity NPS+**
- **Sell to Distributors**



# Field Studies

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- Citrus
- Corn
- Cotton
- Rice
- Turf & Forage
- Wheat

## Roles for Organics in Inorganic Fertilizer

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- Provide nutrient
- Decrease N volatilization
  - Decrease N leaching
  - Positive crop effects

## **UNITY-Treated Rice**

- 210# / acre
- Excellent stooling
- Well-developed roots
- Earthworm balls in roots
- Superior growth by 5" to urea

July



September



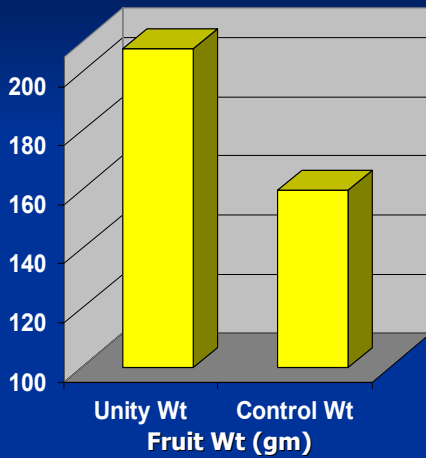
## **Unity Rice Trials at the Univ of Arkansas Stuttgart Ag Experiment Station**



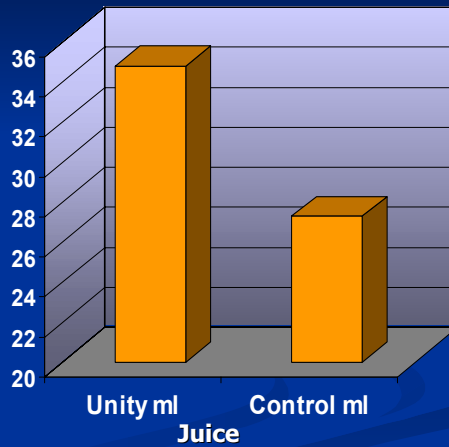
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## Unity Citrus Results - 2002

### Lemons



### Oranges



Study by Dr. Jack May, Arroyo Grande, CA

## Continued **Unity** 2002 Orange Study

Date	Day	Treat ment	Chloro- phyll	Gm/ Fruit	Juice (ml)	Brix
9/14	126	Unity	53.0	192.9	46.4	9.2
11/19	160	Unity	79.5	204.7	68.8	10.6
9/14	126	Urea	51.4	164.8	36.5	8.8
11/19	160	Urea	67.4	166.2	39.1	10.1

# Unity – Turf Grass Study I

Marysville, OH

Bluegrass Sod - 2000

	Days				
Treatment	14	28	42	56	Wt (g)
Urea	3.3	3.7	1.7	1.3	296
Ammonium Sulfate	3.7	4.0	2.3	2.0	316
Sulfur-coated Urea	4.3	3.7	2.0	2.0	269
Methylene Urea	4.0	3.0	2.3	2.0	234
Unity	5.0	4.3	3.3	3.0	476
Untreated	1.3	1.0	1.0	1.0	143

Application @ 43 lbs N / acre

## Unity – Bermudagrass Study

#	Treatment	Yield Dry Matter	Crude Protein %
1	Unity 200 #/acre (17-1-0-19)	3,086	19.6
2	Triple 200 #/acre (17-17-17)	2,903	15.2

[ 2003 Lafayette County, AR ]

# Turf Findings

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- **More chlorophyll**
- **Grass greener**
- **Retains green longer**
- **More mass per time**

## Discussion

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Wastewater biosolids can be used to make a fertilizer product that:

- is safe and meets regulations.
- is valuable with significant nitrogen & other nutrients.
- contains an organic component that can meet State Ag Registration Requirements.
  - provides excellent crop results.

**Thank you**