3PM™ PROCESS

Pollution Prevention and Profit from Manure Process

Produces humic rich fertilizer

Eliminates odor, pathogens and viruses from manures;

Modular design, applicable for small to large scale operations

Converts Problem into economic opportunity

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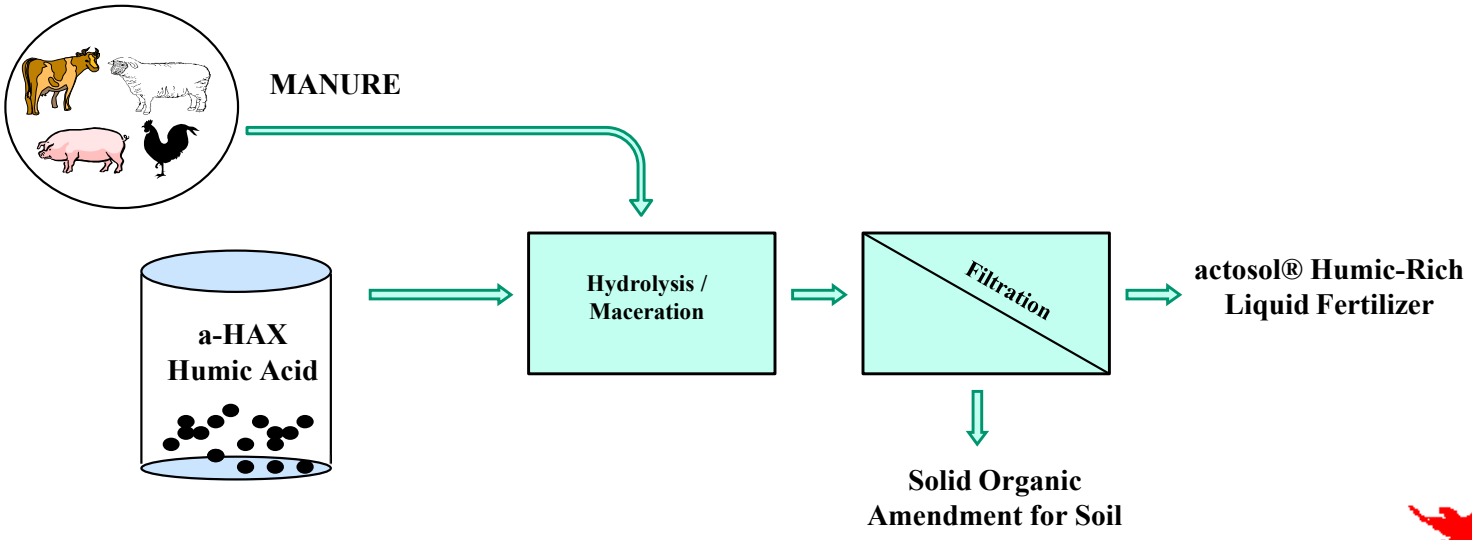
What is 3PM™ ?

3PM™ is an "outside the box", innovative process that simultaneously de-odorizes, and macerates particulates, and completely converts animal wastes (e.g., chicken manure) into humic rich fertilizer. **The use of natural organic matter derived a-HAX™ humic acid in this Process is the unique innovation that sets 3PM™ apart from any other process that also produces fertilizer from animal wastes**. Preliminary economic analysis even for a small 0.25 to 0.5 ton per day processing plant, shows the process to be economical due to effective, high value humic acid fertilizer. A generalized flow scheme of the 3PM™ process is as follows:



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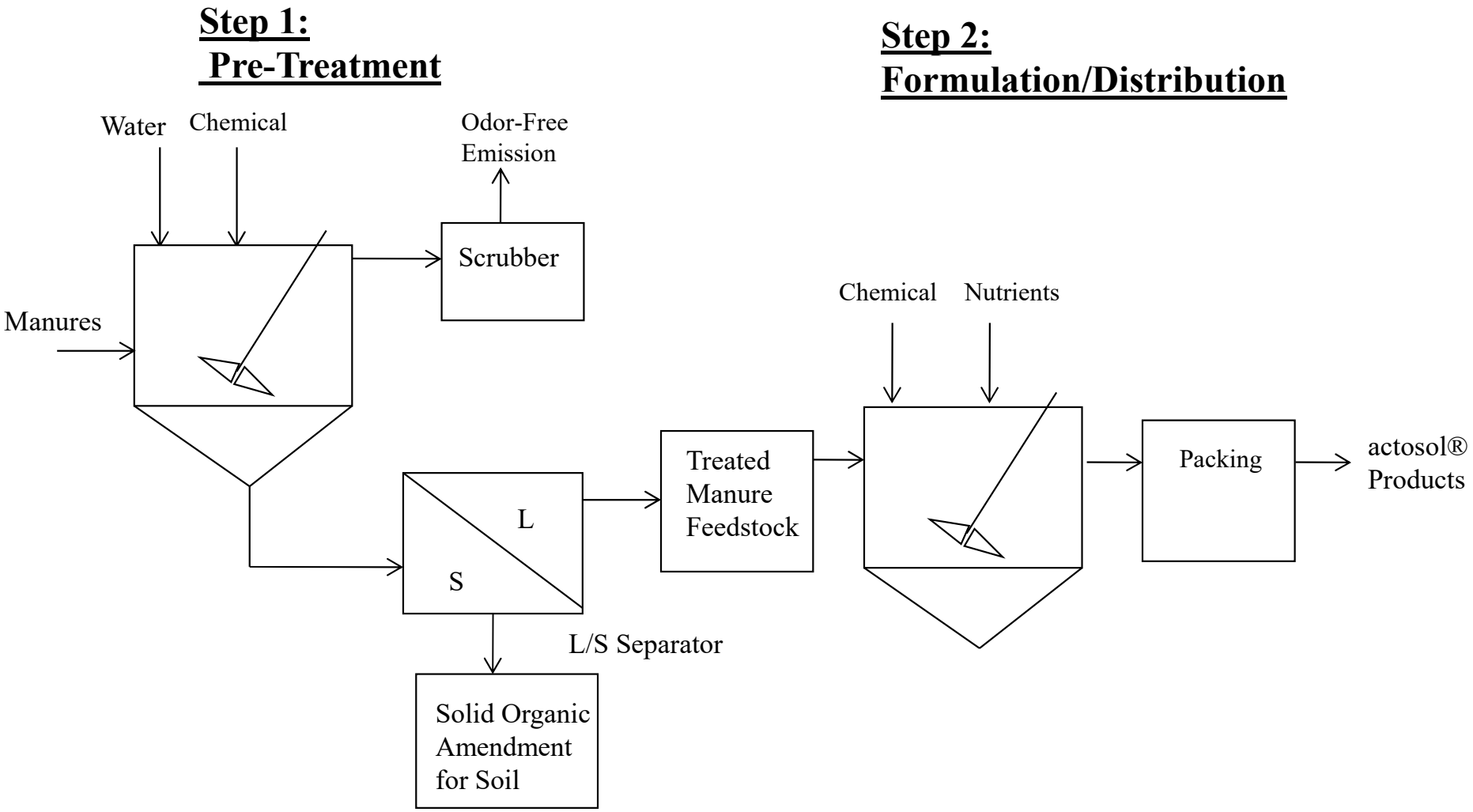
Flow Diagram of 3PM™ Manure Waste Recycling Process



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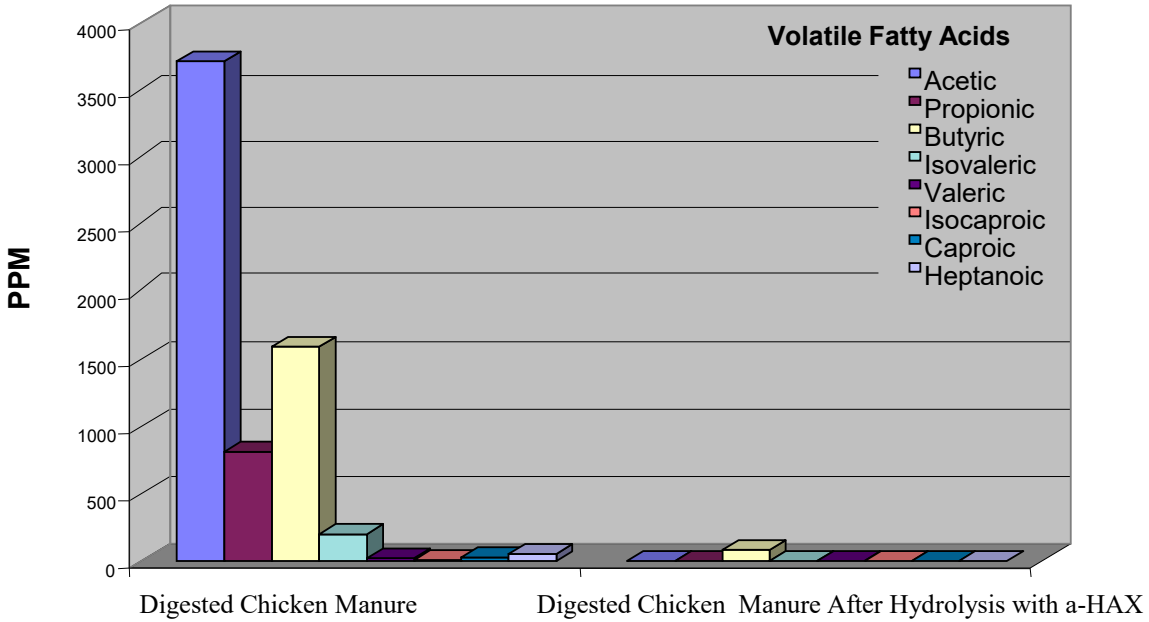
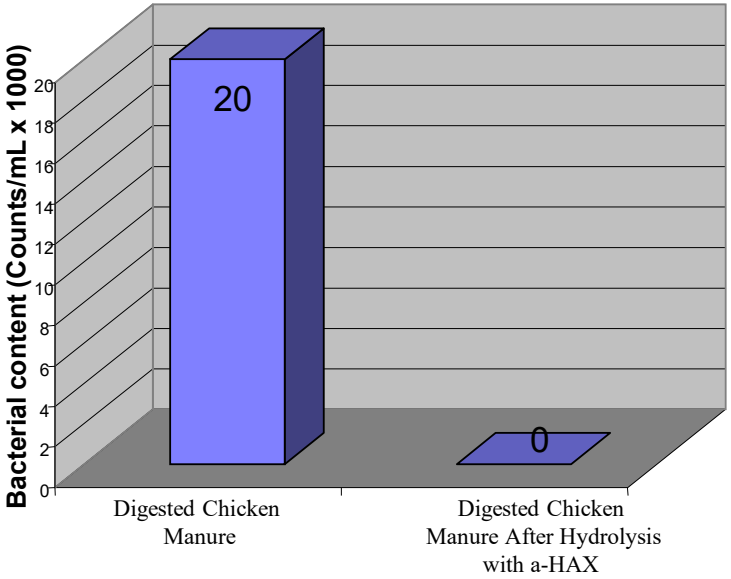
a-HAX™ Destroys Odor Causing Chemicals and Pathogens, and Solubilizes Solids

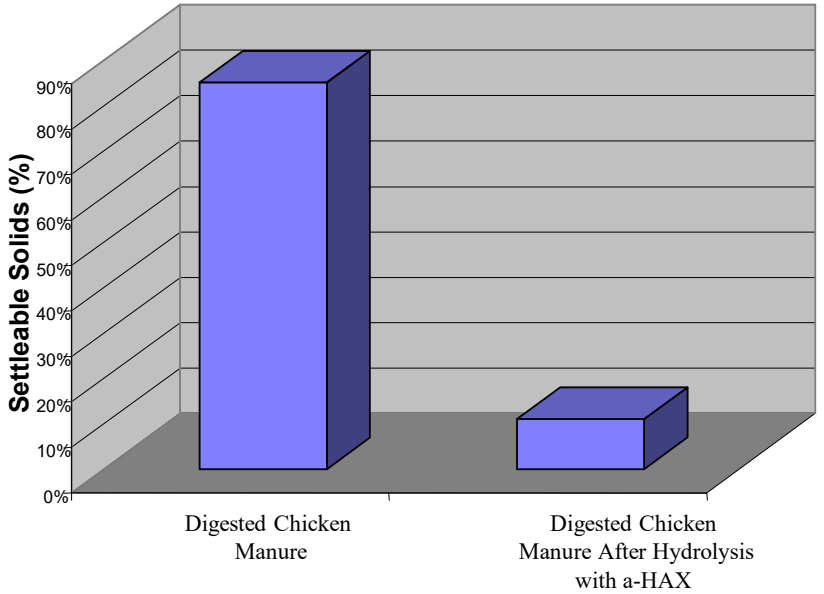
a-HAX Treatment Reduces Volatile Fatty Acids



a-HAX Treatment Destroys Bacteria



a-HAX Treatment Reduces Settable Solids



Panelists Confirmed Removal of Offensive Odor from Swine Manure with a-HAX™

Treatment (mL of a-HAX)	Panel Ratings*				
	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5
None	5	5	5	5	5
0.5	4	3	4	4	3
1.0	1	2	2	2	2
2.0	3	4	**1**	**1**	**1**
5.0	2	4	3	3	4

*1: best smelling, 5: worst smelling.

Test data performed by Penn State University.

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3PM™ Step Change Superior Process Over the State-Of-The-Art Solutions

Solutions	Benefits/Limitations
A. State-of-the-art	
1. Direct Application as Fertilizer	Contaminates crops and environment with pathogens and wet difficult to handle, highly offensive odor with weed seeds . Crop burnout due to high Ammonia.
2. Compost as Fertilizer	Improves handling but results in inert matter with limited agronomic benefits.
3. Heat Treated for Fertilizer	Results in pathogen free but inert matters with little or none agronomic value.
4. Biogas for Energy	Results in very low Gas yield (0.5-1.0 SCF/lb), needs upgrading and uneconomical with natural gas. Also results in very large waste liquid.
B. 3PM™ for Organic Humic-Rich Fertilizer	Results in odor free and pathogen free highly effective organic humic-rich soil amendment and liquid fertilizer with high agronomic value. No waste.

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Envisioned Implementation Approach for Multiple Small Manure Producing Farms

Pre-Treatment at the Farm

Farm

3PM™ Pre-Treatment Module

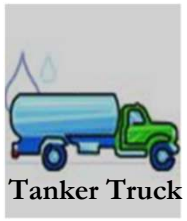
Farm

3PM™ Pre-Treatment Module

Farm

3PM™ Pre-Treatment Module

Treated Manure Feedstock



Tanker Truck

Final Treatment/Formulation

3PM™ Treatment /Formulation Plant

Distribution

actosol®

Farm

Greenhouse

Beach

Golf Course

1. Manure is treated with a-HAX™ at the farm

2. Taken to a 3PM™ plant for processing into fertilizer (actosol®)

3. Distribute to the regional distribution facilities where it is stored

4. It is distributed to markets: farms, greenhouses, beach, (sand dune), and golf courses

FOR LARGER MANURE PRODUCTION FARMS A FULLY INTEGRATED 3PM™ FACILITY CAN BE INSTALLED AT THE FARM

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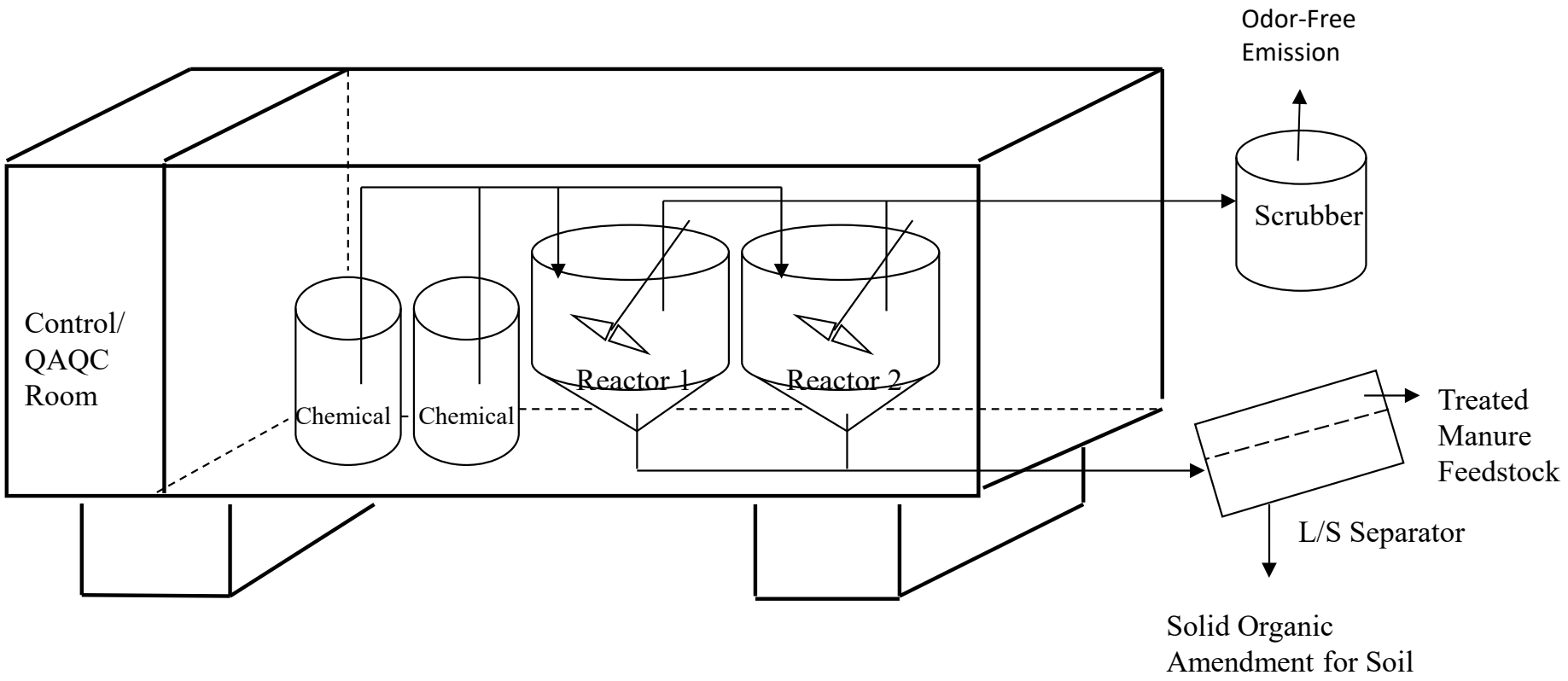
3PM™ Manure Pre-Treatment Recycling Module



Dimensions: 8ft (W) x 20 ft (L) x 9 ft (H)

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Example of Roll Off Container Filter for Solid/Liquid Separation of 3PM™ Manure Recycling Module

* from Flo Trend® Systems, Inc.
(www.flotrend.com)

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Typical Expected Mass Balance and Economic Analysis

1 Ton of Manure
(2000 lbs with
25-50% moisture)

+

250 gallons of
a-HAX™ ,
$1,000-1,500

800 gallons of
Organic Humic Fertilizers
@$3-5 selling Price =
$2,400-4,000

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Manure Production by Livestock

LIVESTOCK	(lbs/day/head)		
	Manure	Nitrogen	Phosphorous
Beef Cow	59.10	0.310	0.110
Dairy Cow	112.00	0.630	0.098
Hogs and Pigs	18.93	0.126	0.048
Chickens (layers)	0.24	0.003	0.0012
Chickens (broilers)	0.32	0.004	0.0014
Turkey	0.52	0.009	0.0034

Source: U.S. Department of Agriculture, Natural Resources Conservation Service, Agricultural Waste Management Handbook (1992)

Typical Analysis of actosol® from 3PM™ Process

Organic Humic Acid	**3 %**
Nitrogen as N	**3 %**
Phosphorous as P_2O_5	**3 %**
Potash as K_2O	**5 %**

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How Does actosol® Organic Humic Fertilizer Help?

• **Physical -** by agglomerating the soil (improves tilth and improves infiltration of soils) especially soils compacted with high Na and salt build up, by increasing moisture holding capacity; thus resistant to drought, high salinity and soil erosion.

• **Chemical -** by increasing EC of soils, increasing nutrient up take especially P, increasing buffering capacity.

• **Biological -** by being electron accepter and thus increases cell division or growth, hormonal activity, and enhanced photosynthesis.

actosol® Enhances Growth of Turf

actosol® Creates Vegetation in Sand Dunes

Ocean City, MD

Hydroseed Mix **Hydroseed Mix Plus actosol®**

6 weeks growth, Virginia Tech., testing

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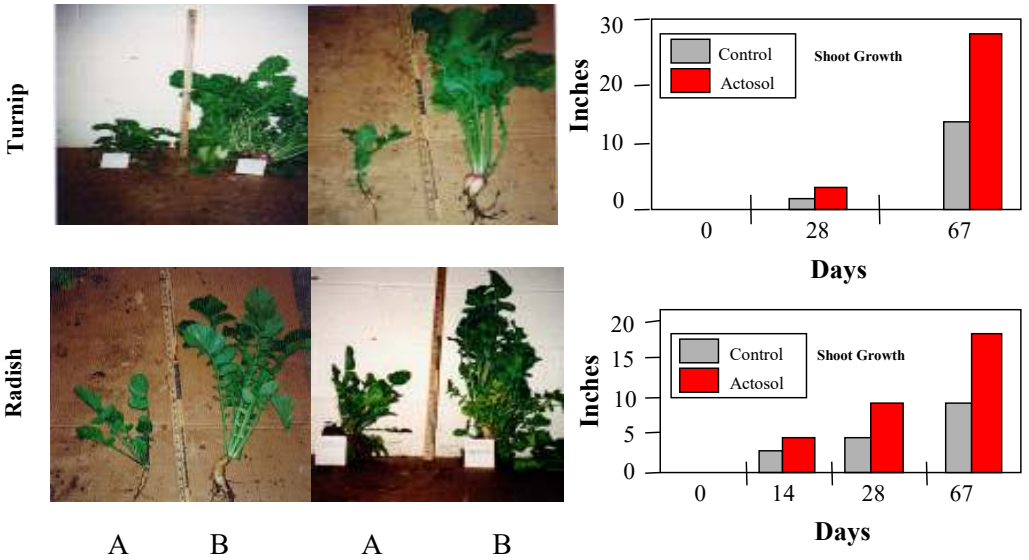
actosol® Enhances Growth of Flowers and Vegetables

Floriculture

actosol® Brightens Flowers

Horticulture

actosol® Miracle On Vegetables



A - Standard Garden (20-20-20) **B - Garden actosol® (10-10-10)**

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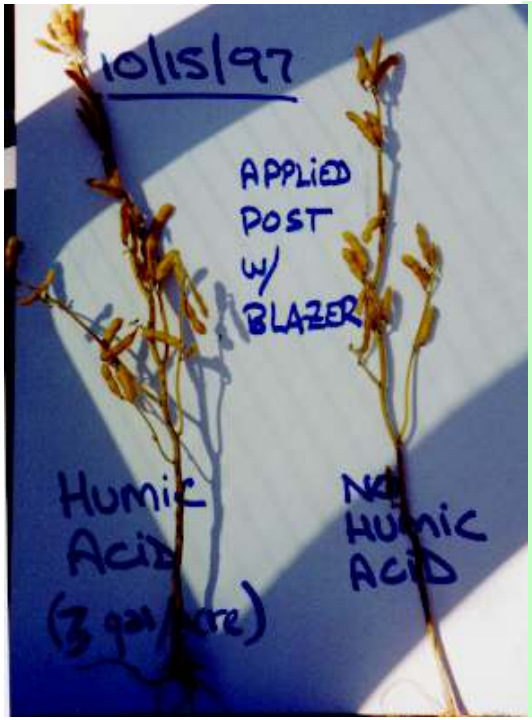
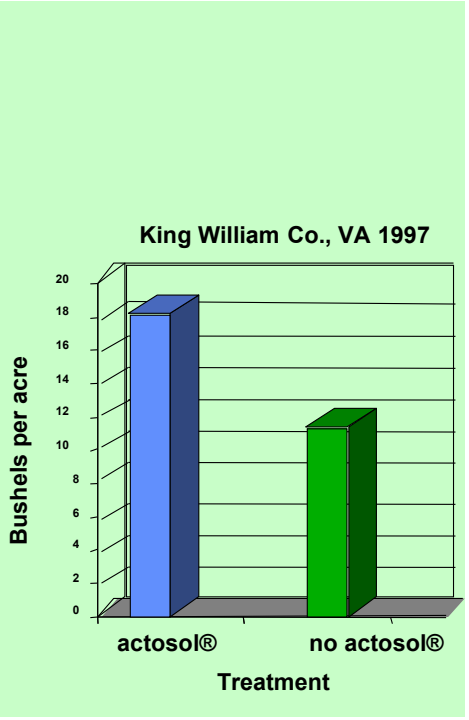
actosol® Enhances Growth of Crops

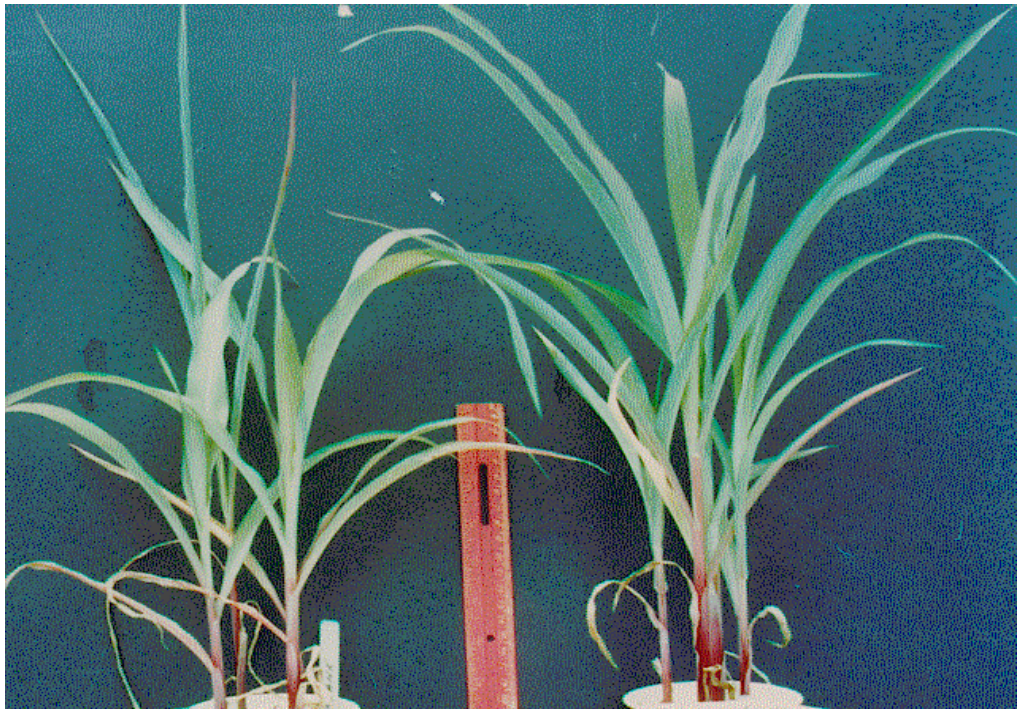
Agriculture

60% Increase in Soybean Yield Using actosol®





Effect of actosol® on Corn Plants



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actosol® Application Increased Number of Harvests and Color of Clover in Kafr El Sheik, Egypt

Untreated

Treated

	Yield (Tons/fed for total of 5 Fresh Cuts)
Treated	75.7
Untreated	67.2
% Yield Increase 12.65	

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Approval of actosol® Humic Acid

A. USDA National Organic Food Production Program
October 21, 2002

Allows use of Humic Acid for Growing Organic Foods

Additional Info : www.ams.usda.gov/nop

B. US Environmental Protection Agency

June 13, 2003

Approves humic acid as environmentally safe and exempts from Tolerance requirement when used as an ingredient (adjuvant, UV protectant) in pesticide formulations

Additional Info : www.epa.gov/fedregstr

C. OMRI Listed (Organic Materials Review Institute)
February 18, 2005

Additional Info : www.omri.org

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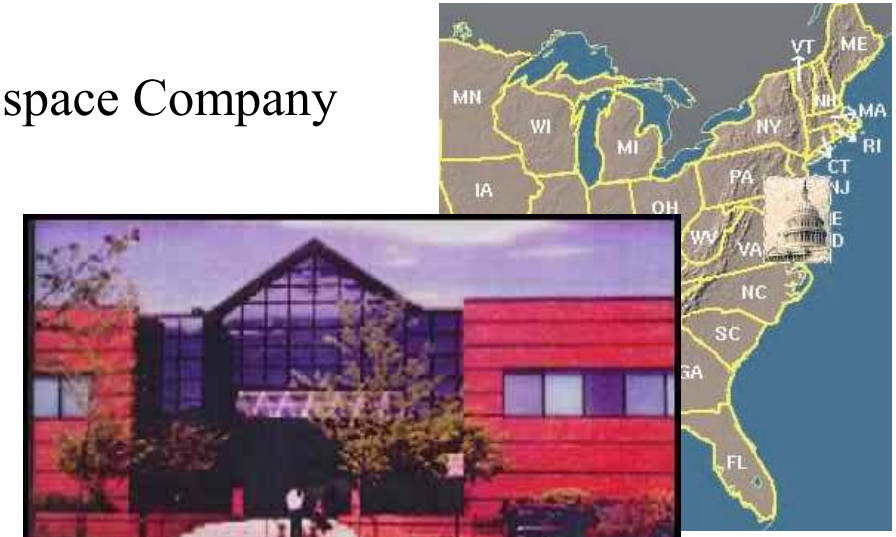
ARCTECH CORPORATE PROFILE

- Established in 1988 as spin-off company from Atlantic Research Corp., an large U.S. Aerospace Company
- Headquarter and Technical Center – Chantilly, Virginia
- Manufacturing Plant – South Boston, Virginia
- Market Profile: Develops Innovative Solutions from Concept to Implementation for Energy, Environment and Agriculture markets



- Commercial Products Applications in U.S.A,Egypt, Gulf Countries and S.Korea
- Creating Biotechnology Solutions since Mid 1970's.
- Selected as one of the six top bioprocessing firms in the United States (Arthur Young, 1989)

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ARCTECH, Inc. is a diversified company that provides technologies, services and products to meet growing needs of clean energy and for preserving the environment. Formed as a spin-off company from the Environmental Science and Technology division of the Atlantic Research Corporation, the ARCTECH group through 25 years of experience in energy, energetics, environment and agriculture, has created holistic solutions in these interrelated market sectors. The entrepreneurial scientists and engineers at ARCTECH have pioneered the use of vast resources of coal and coal-derived humic acid products such as actosol® fertilizer, HUMASORB®, a multipurpose contaminant adsorber, Actodemil®, for cost effective disposal of munition, and an overall encompassing MicGAS™ technology for production of clean energy while reducing the build up of greenhouse CO_2 emissions. For additional information about our outside the box solutions, please visit our Web Site: **www.arctech.com**.

For Your Specific Application needs, please contact:

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