

# **Controlling Clostridial Dermatitis & Associated Medication Costs**

37th Annual North Carolina Turkey Industry Days  
Wilmington, North Carolina  
October 1 & 2, 2014

**Dr. Arun K Bahl, *DVM, MPH, PhD, Diplomate ACPV***

# Issues Facing Poultry Growers

- High Cost of Ammonia Control to Ensure Health & Welfare of Birds
- High Cost of Antibiotics for Clostridial Dermatitis Control



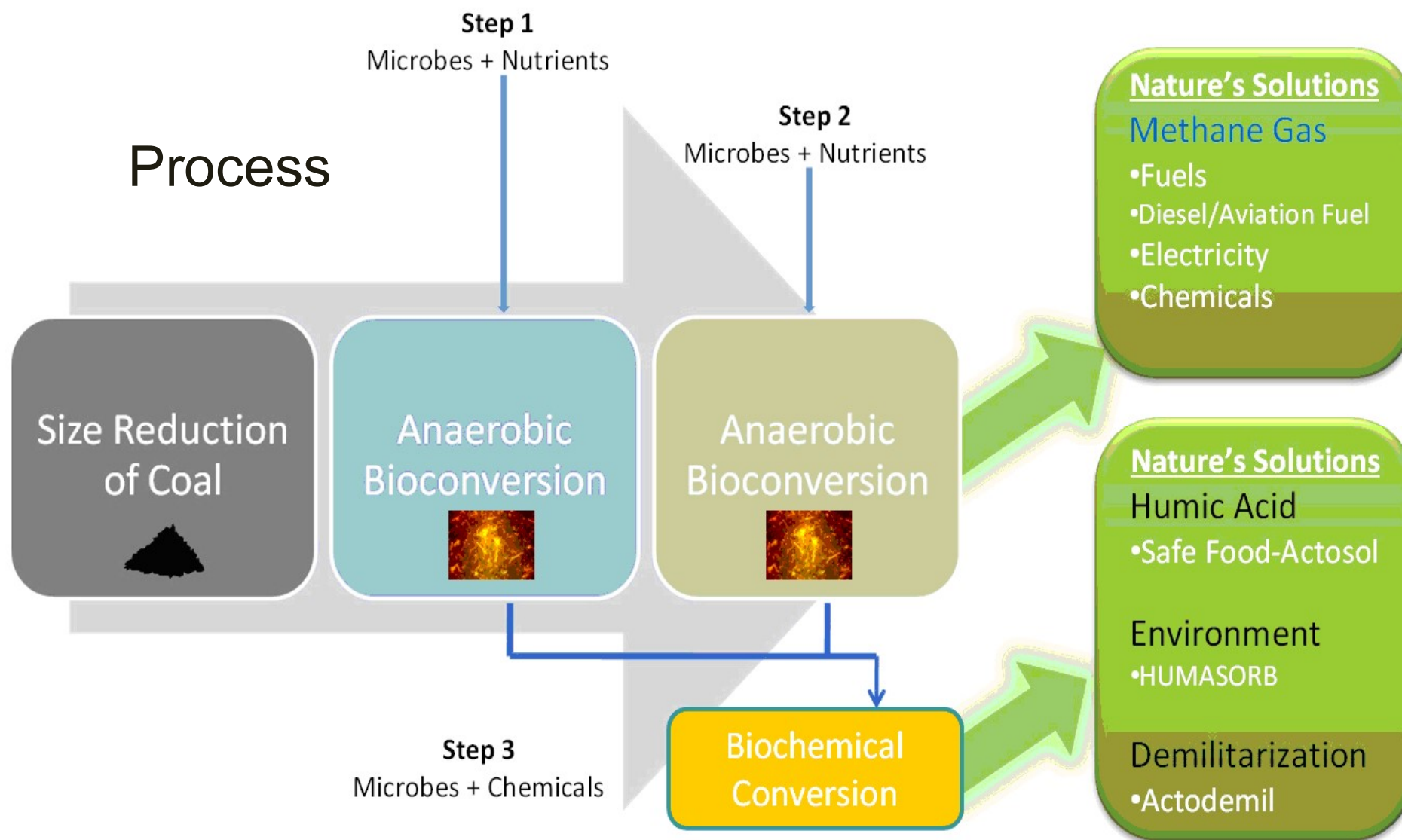
# **ActoCLEANSE™ For Ammonia Control**

*A Multipurpose EcoFriendly General Purpose Industrial Cleaner*

- **Innovation of ARCTECH Inc. USA**
  - Biotechnology Based Energy, Environmental, & Agricultural Products & Solutions
  - Multiple Patented Protected Technologies
  - Research Center in Chantilly, Virginia
  - Manufacture Products in South Boston, Virginia

# MicGAS™ Clean Coal Biotechnology

## Process



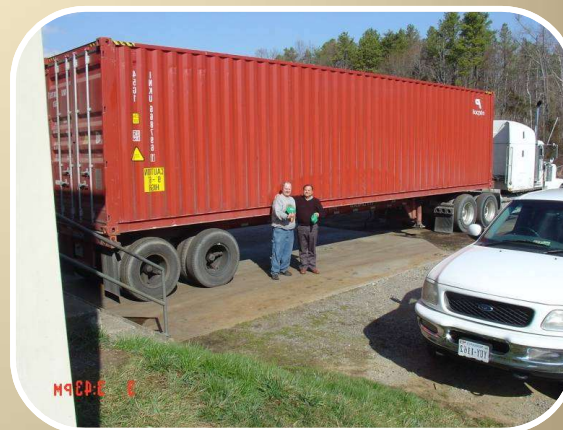
# ARCTECH Corporate Profile

- Established in 1988 as Spin-Off Company
  - From a Major US Aerospace Company
- Corporate Headquarters & Technical Research Center
  - Chantilly, Virginia
- Manufacturing Plant
  - South Boston, Virginia
- Market Profile: Develop Innovative Solutions from Concept to Commercialization in the Energy, Environmental, and Agricultural markets
- Commercial Products Applications in the US, Egypt, Gulf Countries, & South Korea
- Creating Biotechnology Solutions since Mid 70's
- Selected as One of the Top Six Bio-Processing Firms in the United States
  - By Ernst & Young in 1989
- Founding Member of *Humic Products Trade Association (HPTA)* in 2011





# Organic Humic Products Production Plant in South Boston, Virginia



**ARCTECH's** Humic Based Products:

**actosol®**: Organic Humic BioStimulant & Fertilizer

**HUMASORB®**: Multipurpose Pollution Filter

**Actodemil®** / **a-HAX™**: Safe Destruction & Recycling of Explosives & Wastes

**ActoCLEANSE™**  
EcoFriendly General Purpose Industrial Cleaner

# Laboratory Evaluation Facilities

- **ARCTECH Inc. Laboratories**
  - Chemistry Laboratory
  - Microbiology Laboratory
  - Process Engineering Laboratory
- **Southeast Poultry Health Services, Inc.**

# Effectiveness of A10 Deactivating Clostridial Spores

- Dr. Thachil & Nagaraja Laboratory
  - University of Minnesota
- Other custom preparations tested:
  - ActoDetox, ActoBiocide, aHax, A5, A15



# Real World Turkey Farm Field Evaluations

- North Carolina
- South Carolina
- Ohio
- Indiana
- Illinois
- Michigan
- Missouri
- Arkansas
- Iowa

# NORTH CAROLINA FIELD TRIALS

TOTAL NUMBER OF BARNS TREATED	121
DATA REPRESENTS # OF FLOCKS	31
NUMBER OF BARNS WITH TOTAL CLEANOUT	33
NUMBER OF BARNS THT BROKE WITH CD	29
NUMBER BARNS THAT BROKE WITH TOTAL CLEANOUT	9
NUMBER OF TREATED BARNS THAT HAD TO BE MEDICATED	29
NUMBER OF FLOCKS SOLD	10
3,500,000 SQ. FT. OF TREATED FLOOR AREA	

# **SOUTH CAROLINA FIELD TRIALS**

**FOUR FARMS, FOUR FLOCKS**

**LIMITED SUCCESS, DELAYED ONSET OF CD**

**300,000 SQ. FT OF FLOOR SPACE TREATED**

# INDIANA FIELD TRIALS

ONE FARM, ONE FLOCK

NO INFORMATION AVAILABLE AS OF TODAY

75,000 SQ. FT FLOOR SPACE TREATED

# MISSOURI FIELD TRIALS

THREE MONTHS, FIVE FARMS, FIVE FLOCKS

LIMITED SUCCESS, DELAYED ONSET OF CD

BUILT UP LITTER, BEING EVALUATED ON TOTAL  
CLEANOUT

250,000 SQ. FT FLOOR SPACE TREATED

# ARKANSAS FIELD TRIALS

THREE MONTHS, FIVE FARMS, FIVE FLOCKS

LIMITED SUCCESS, DELAYED ONSET OF CD

BUILT UP LITTER, BEING EVALUATED ON TOTAL  
CLEANOUT

250,000 SQ. FT FLOOR SPACE TREATED



# OHIO FIELD TRIALS

7 MONTHS, TWO FARMS, 4 FLOCKS

LIMITED SUCCESS, BUILT UP LITTER AND TOTAL  
CLEANOUT.

DELAYED ONSET OF CLOSTRIDIAL DERMATITIS

400,000 SQ FT FLOOR SPACE TREATED

# MICHIGAN FIELD TRIALS

2 YEARS, 10 FLOCKS, 30 BARNs

900,000 SQ FT LITTER SPACE TREATED

NO CLOSTRIDIAL DERMATITIS AS A PROBLEM

6 FLOCKS NO PENICILLIN USED TO TREAT

OTHERS SMALL QUANTITIES USED AS NEEDED

FOUR MONTHS BACK ADDED TWO MORE FARMS

FARM ONE, 200,000 SQ FT GROWOUT SPACE

FARM TWO, 400,000 SQ FT GROWOUT SPACE

ALSO ADDED A "BLACK HEAD" FARM 200,000 SQ FT

TOTAL SQUARE FEET TREATED 1700,000 SQ FT

NO CURRENT ACTIVE CLOSTRIDIAL DERMATITIS

# ILLINOIS FIELD TRIALS

2 YEARS, 10 FLOCKS MARKETED

550,000 SQ FT FLOOR/LITTER SPACE TREATED

NO CLINICAL CLOSTRIDIAL DERMATITIS  
AT PRESENT

SOME PENCILLIN USED AT TIMES

# LAB EVALUATION OF DIFFERENT PREPARATION FOR BACTERICIDAL AND SPOROCITAL ACTIVITY

A 25

ACTODETOX

ALFAX A5

A15

A10

CHOSEN PREPARATION A10

ACTOSAN

ACTOCLEANSE

# **BACTERIOCIDAL ACTIVITY**

## **ACTOCLEANSE\***

- CLOSTRIDIUM SEPTICUM
- SALMONELLA TYPHIMURIUM
- SALMONELLA HEIDDBERG
- SALMONELLA HADAR
- SALMONELLA SEFTENBURG

\*SOUTHEAST POULTRY HEALTH SERVICES, INC.

215 HORNE TOWN ROAD

POLKTON, NORTH CAROLINA 28135

1:500 DILUTION EFFECTIVE

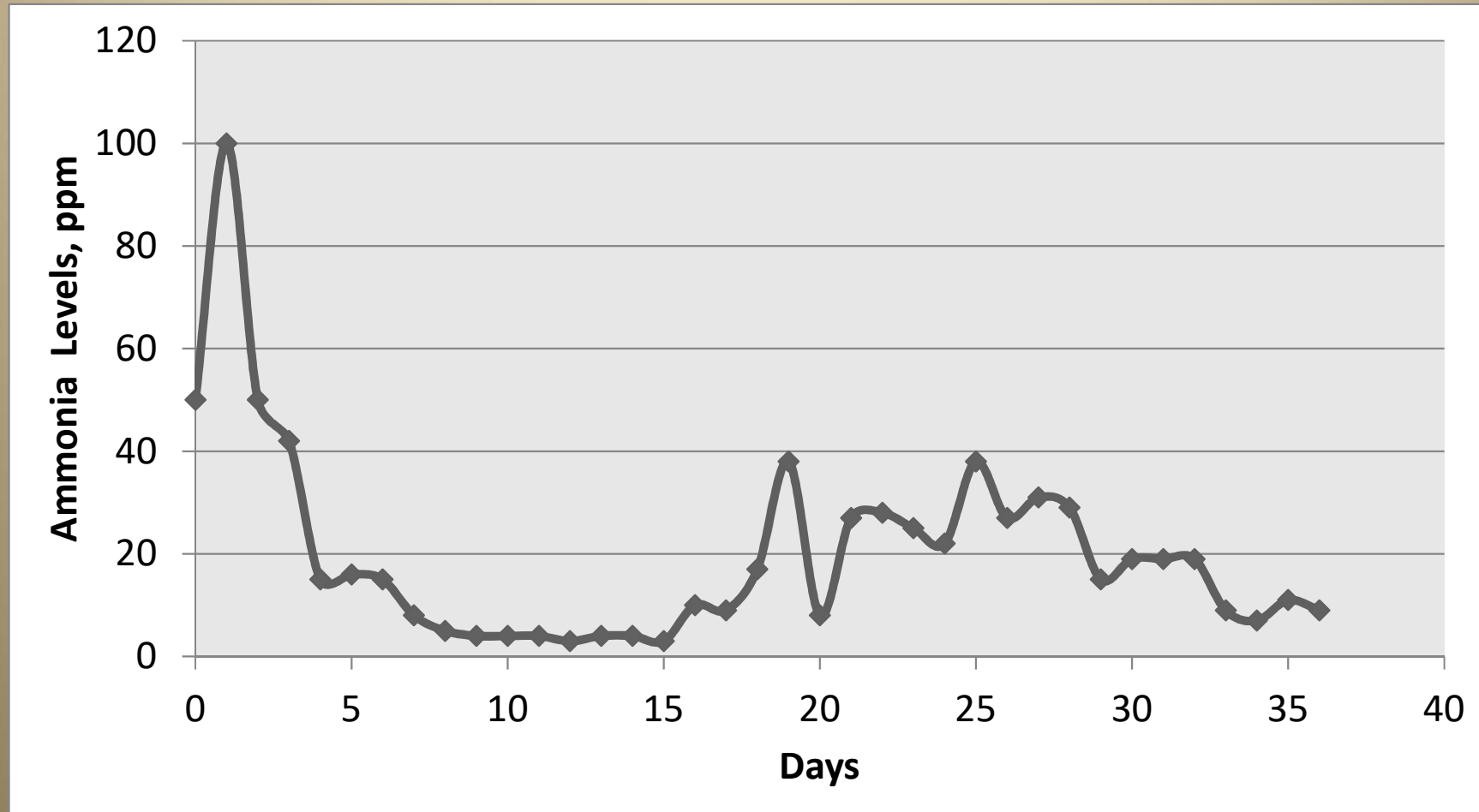
# **SPOROCIDAL ACTIVITY OF ACTOCLEANSE\* CLOSTRIDIUM SEPTICUM SPORES**

- A10 PREPARATION  
ACTOCLEANSE

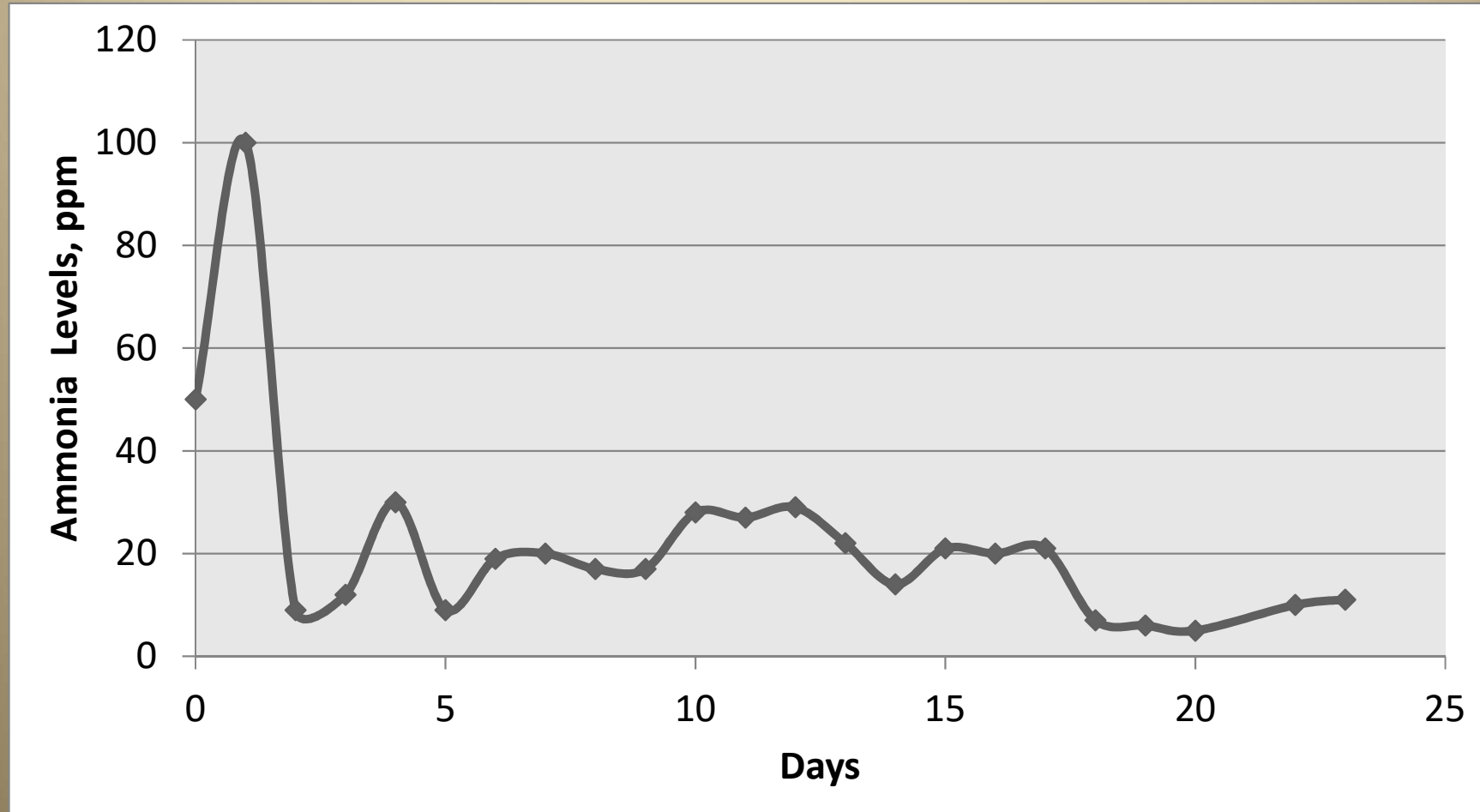
\*DRS. NAGARAJA AND THACHIL'S LAB  
UNIVERSITY OF MINNESOTA  
COLLEGE OF VETERINARY MEDICINE  
ST. PAUL, MINNESOTA 55108



# Ammonia Levels in a Natural Ventilated Barn after **ActoCLEANSE** Treatment



# Ammonia Levels in a Tunnel Ventilated Barn after **ActoCLEANSE** Treatment



# Results

# Do's & Don'ts of Practical Importance

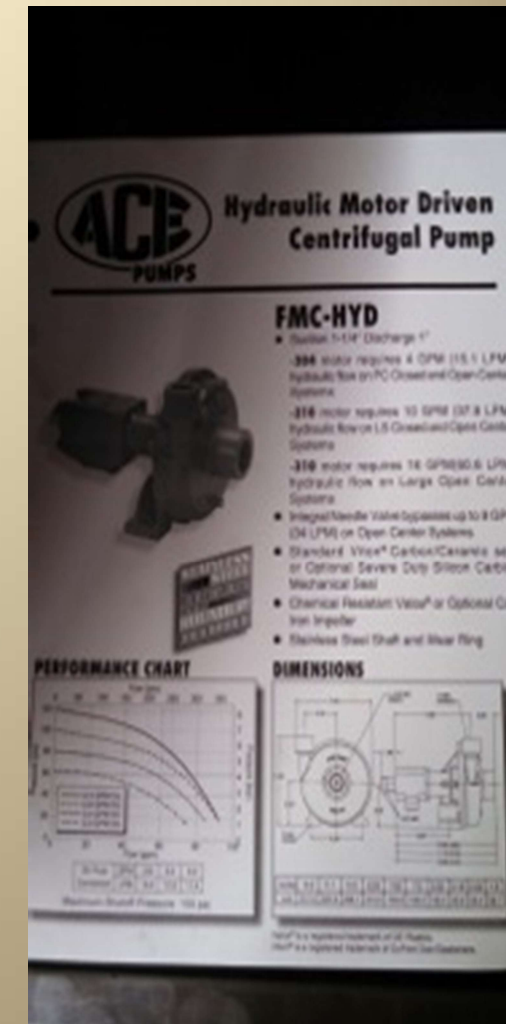
Proper Application of ActoCleanse is a Prime  
Important Factor of Success



50BT



40BT







**ActoCLEANSE™**   
EcoFriendly General Purpose Industrial Cleaner



# Lessons Learned & Path Forward

# **3PM<sup>TM</sup> PROCESS**

*Pollution Prevention & Profit from Manure Process*

*Produces Humic Rich Fertilizer*

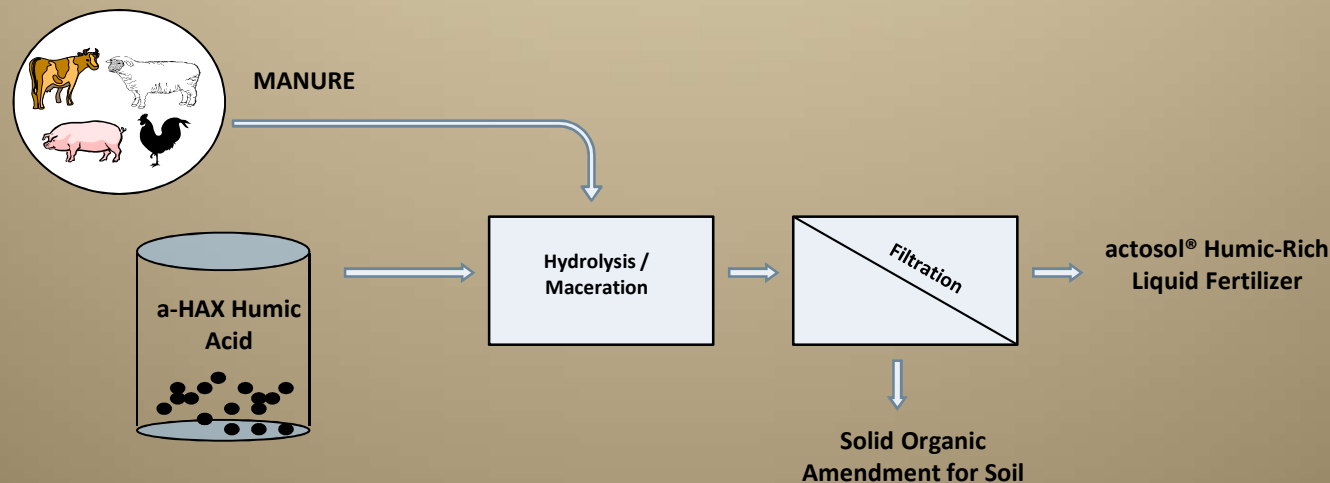
*Eliminates Odor, Pathogens, &  
Viruses from Manures*

*Modular Design, Applicable for Small to  
Large Scale Operations*

*Converts Problem into Economic Opportunity*

# What is **3PM™**

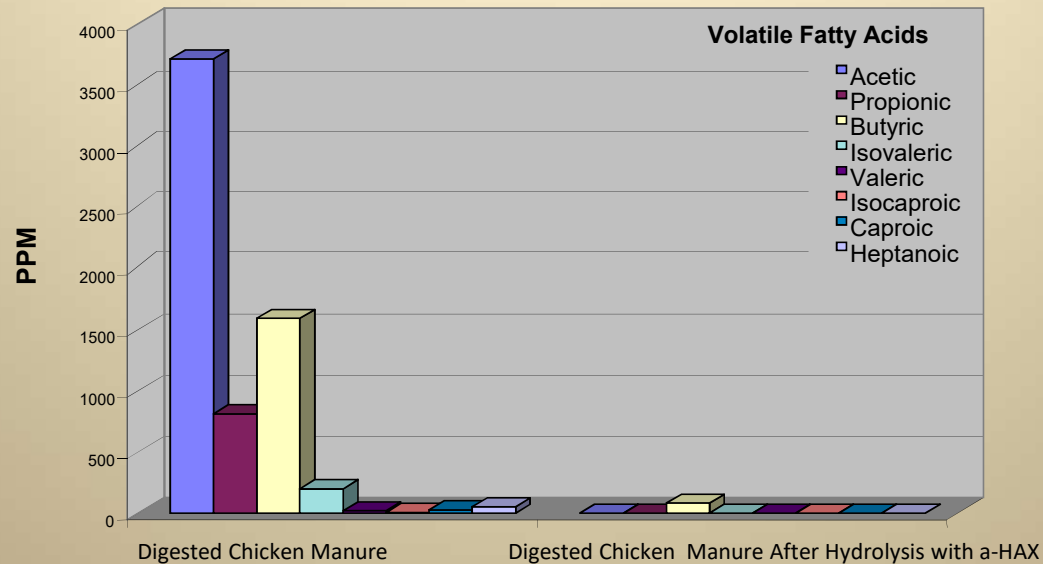
3PM™ is an “outside the box”, innovative process that simultaneously de-odorizes, and macerates particulates, and completely converts animal wastes (e.g., chicken manure) into humic rich fertilizer. The use of natural organic matter derived a-HAX™ humic acid in this Process is the unique innovation that 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:



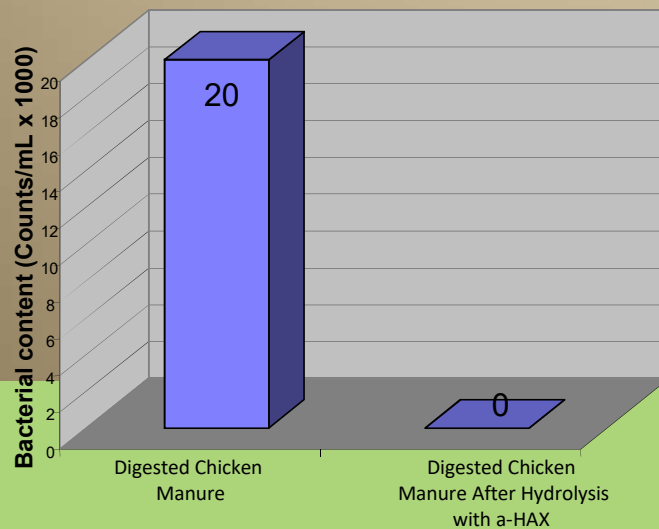
**ActoCLEANSE™**  
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# **a-HAX™** Destroys Odor Causing Chemicals & Pathogens, & Solubilizes Solids

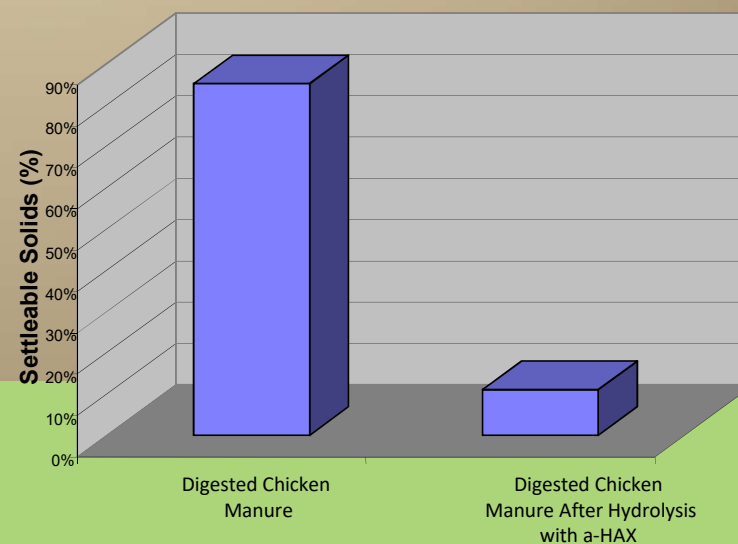
**a-HAX Treatment Reduces Volatile Fatty Acids**



**a-HAX Treatment Destroys Bacteria**



**a-HAX Treatment Reduces Settable Solids**



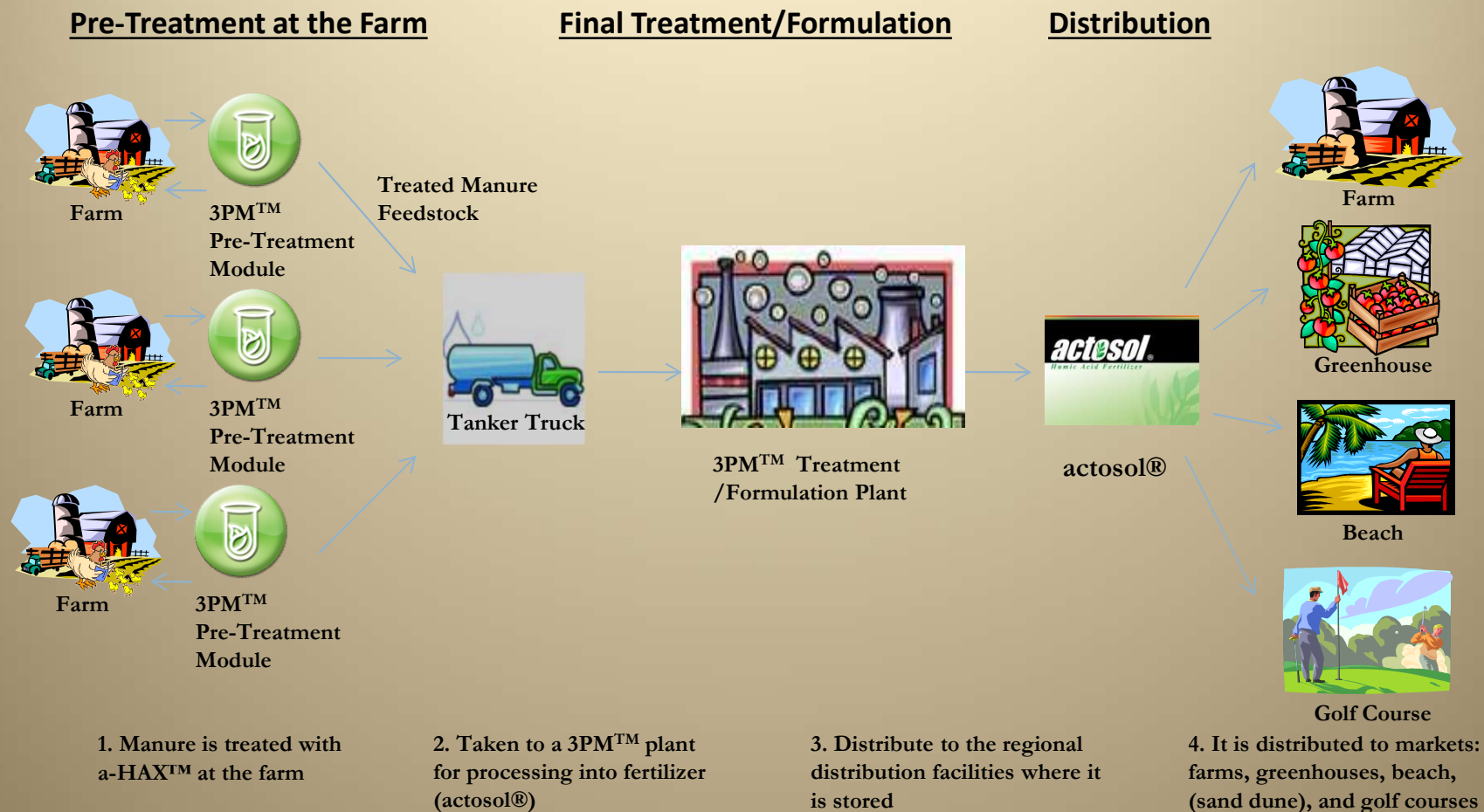
# Panelists Confirmed Removal of Offensive Odor from Swine Manure with **a-HAX™**

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.

# Envisioned Implementation Approach For Manure Producing Farms



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

**ActoCLEANSE™**  
EcoFriendly General Purpose Industrial Cleaner



# ActoCLEANSE Label

**ActoCLEANSE™** is a natural, organic product to meet the demands for healthy & environmentally friendly approaches...

One Step Control of odor from ammonia, hydrogen sulfides, mercaptans, biologicals as well as safe elimination of toxic organics, energetics, & the binding of toxic metals & radionuclides.

## **ActoCLEANSE™**

**EcoFriendly General Purpose Industrial Cleaner**

**CAUTION:**

Please apply wearing a protective rain suit, eye protection, face mask, & gloves. In case of contact, flush

**CAUTION:**

Please apply wearing a protective rain suit, eye protection, face mask, & gloves. In case of contact, flush with plenty of water.

KEEP OUT OF REACH OF CHILDREN  
NET 55 US GALLONS (213 LITERS) ~ 560 LBS

**ARCTECH**  
Preserving Tomorrow's World...Today  
P.O. Box 323

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P.O. Box 323  
South Boston, VA 24592 USA  
[www.arctech.com](http://www.arctech.com)

**ActoCLEANSE™**  
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## Product Handling & Application



## ActoCLEANSE™

EcoFriendly General Purpose Industrial Cleaner

**ActoCLEANSE™** is a natural organic industrial cleaner specially formulated to meet the current demands for environmentally friendly products for use in livestock production systems at a lower cost than higher priced chemical-based litter amendments.

**ActoCLEANSE™** also enriches composted poultry litter with organic matter for agriculture application which results in increased yields and a higher production value.

For Further Information & Technical Guidance  
Please Contact:

### Dr. Arun K. Bahl

DVM, MPH, PhD, Diplomate ACPV  
Bahl Farms Inc.  
(704) 904-8373

value.

For Further Information & Technical Guidance  
Please Contact:

### Dr. Arun K. Bahl

DVM, MPH, PhD, Diplomate ACPV  
Bahl Farms Inc.  
(704) 904-8373

Manufactured By:

### ARCTECH, Inc.

14100 Park Meadow Drive  
Chantilly, VA 20151  
(703) 222-0280  
www.arctech.com

## ActoCLEANSE™

EcoFriendly General Purpose Industrial Cleaner



## For Use on Poultry Farms

- Reduces Caking of Litter
- Forms a Biological Barrier
- Controls Ammonia & Other Odors

## For Use on Dairy Farms

- Reduces Caking of Litter
- Forms a Biological Barrier
- Controls Ammonia & Other Odors
- Reduces Shavings & Bedding Costs

An Innovation By:

**ARCTECH**  
Preserving Tomorrow's World...Today



## Why Use **ActoCLEANSE™**?

Livestock production farms today are facing a major challenge in maintaining the robust health & welfare of poultry, hogs, & cattle raised in confined spaces. Antibiotics are no longer providing the desired controls & impose increasing costs due to repeated medication requirements.

Industry experts recognize that livestock health & welfare directly depends upon the release of excessive odor & ammonia resulting from the breakdown of the buildup of uric acid & organic nitrogen from animal excreta along with pathogens contained within the litter bed.

**ActoCLEANSE™** is a natural organic derivative which has been proven to effectively address both of these issues by eliminating the root causes in a single-step application unlike many poultry amendment products which are limited to providing only ammonia control.

It is a One-Step Solution for:

- Cost Effective Litter Odor Control
- Extended Ammonia Control
- Microbial Pathogens Reduction & Control



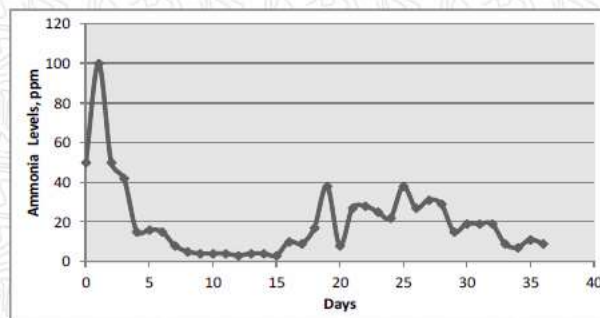
**For Chicken & Turkey Farms**

## **ActoCLEANSE™** is Formulated with Natural Organic Derivatives

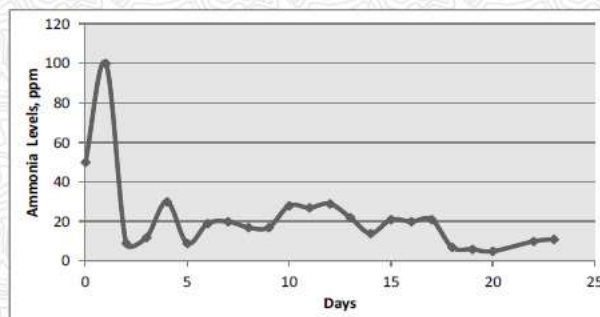
### **Ammonia Causes Damage In Confined Animal Production Systems:**

25 ppm & Up: Impaired Tracheal Cilia Functions  
50 ppm & Up: Erosion of Tracheal Lining & Eye Damage  
75 ppm & Up: Increased Susceptibility to Viral Diseases  
100 ppm & Up: Functional Damage to the Respiratory System; Increased Bacterial Infections Leading to Airsacculitis; Higher Mortality & Morbidity; Condemnations Highlighted by Poor Economical Performance & Lower Financial Returns

### **Ammonia Levels in a Natural Ventilated Barn\* after **ActoCLEANSE™** Treatment:**



### **Ammonia Levels in a Tunnel Ventilated Barn\* after **ActoCLEANSE™** Treatment:**



*\* Turkey Grow Out Barns With Built Up Litter At a United States Mid Western Location During the Severe Winter in March 2014*

## DIRECTIONS FOR USE:

Apply soon after de-caking & before dressing top barn bedding with new or recycled brooder litter.

Apply at a rate of one to one & a half gallon per 1000 square feet floor space. **ActoCLEANSE™** is to be diluted to 1:10.

For example, 20,000 square feet of barn or litter space will require, 20 to 30 gallons of **ActoCLEANSE™**, diluted with 200 to 300 gallons of water. This must be done as uniformly as possible; both for dirt floor in case of clean-out or built up litter after conditioning & before addition or topping with brooder barn litter or topping with new litter addition.

Apply uniformly using liquid sprayer system (low pressure).

Seal the barn for 24 hours after application.

Air out and prepare to move birds in.

### **CAUTION:**

When using sprayer, remove nozzle screen & preferably use largest nozzle diameter to ensure clog free flow.

### **WARNING:**

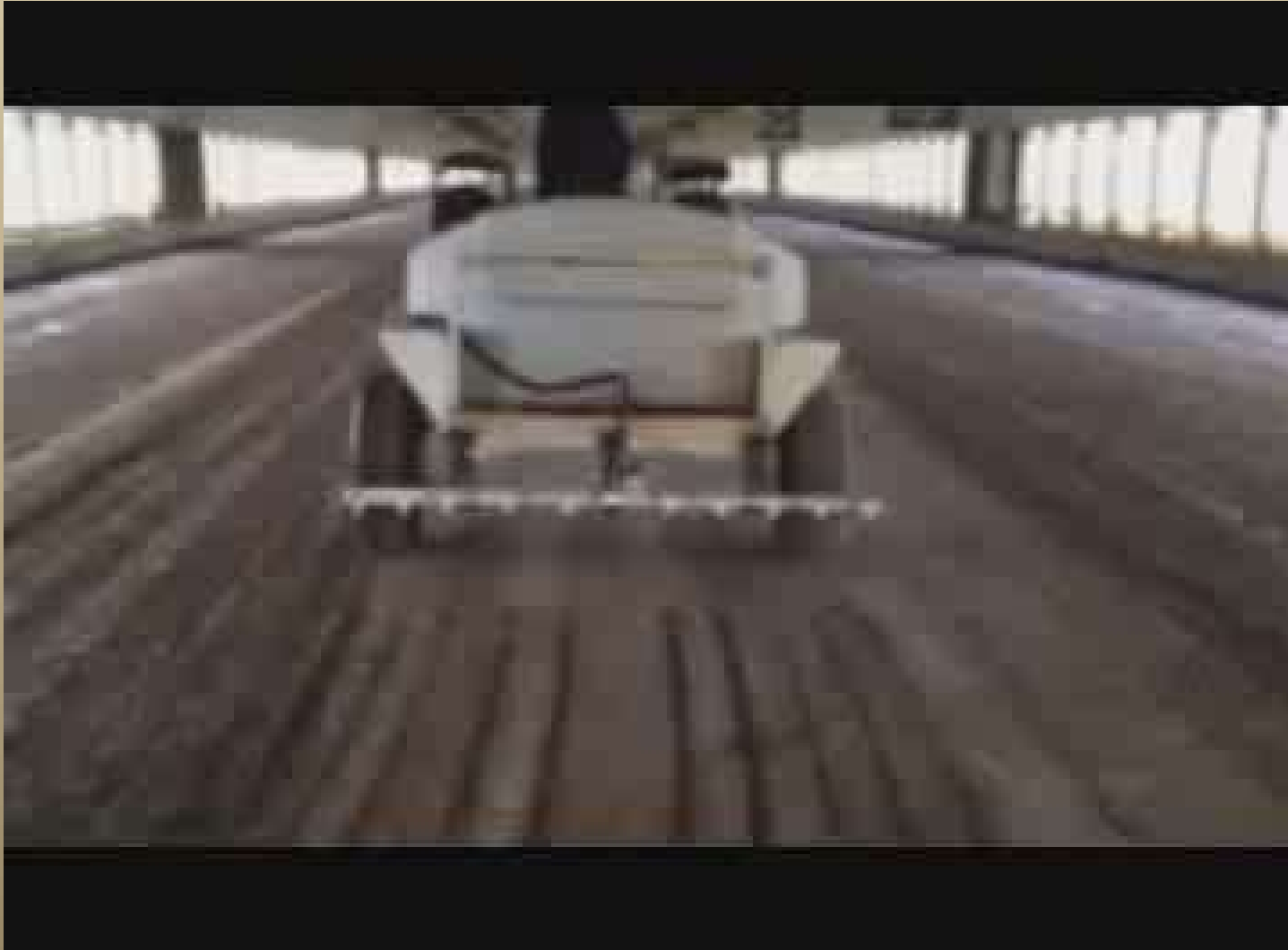
Avoid contact with skin & eyes. In case of contact, flush with plenty of water. Keep out of reach of children. Please use rain suit, gloves, eye protection, breathing masks, & protective boots.



# ActoCLEANSE MSDS

ActoCLEANSE™		MATERIAL SAFETY DATA SHEET	
<b>SECTION I: PRODUCT IDENTIFICATION</b>		<b>SECTION V: HEALTH HAZARD DATA</b>	
Product Name:	ActoCLEANSE™ Size: All	OSHA PEL:	2 mg/m <sup>3</sup>
Manufacturer:	ARCTECH, Inc. Creation Date: 7/29/2010	STEL:	None established
Address:	2348 Eastover Drive Revision Date: 01/07/2013	TLV:	2 mg/m <sup>3</sup>
	P.O. Box 323	Carcinogenicity:	NTP: No
	South Boston, VA 24592		IARC: No
			ZLIST: No
			OSHA Reg: No
For more Information call:	(703) 222-0280	Routes of Entry:	Lung (breathing), ingestion (swallowing), skin and eye contact
<b>SECTION II: COMPONENTS</b>		Toxicity Data:	None established
Hazardous Component: Aqueous Basic Reagent of Proprietary Formulation Derived From Natural Organic Matter		Symptoms of Overexposure:	Dizziness and headache, nausea and vomiting, eye irritation
		Acute Effects:	Causes eye and skin irritation. Can cause ulceration and burns to mouth, throat, stomach, respiratory system, skin and eyes
		Reproductive Effects:	None identified
		First Aid:	Eyes - Immediately flush with large amounts of water for at least 15 minutes. Call a physician.
			Inhalation - remove to fresh air; if not breathing give artificial respiration, and if breathing is difficult, give oxygen. Call a physician.
			Skin Contact - Wash thoroughly with soap and water. Wash clothing before reuse.
		SARA Title III Hazards List:	Acute: Yes Chronic: Yes
			Flammability: No Pressure: No
			Reactivity: No
		Extremely Hazardous Substance:	No
		CERCLA Hazardous Substance:	No
		SARA313 Toxic Chemicals:	No
		TSCA Inventory:	No
<b>SECTION III: PHYSICAL DATA</b>		<b>SECTION VI: REACTIVITY DATA</b>	
Appearance and Odor:	Black Liquid; odorless	Stability:	Stable
Boiling Point:	230°F (110° C)	Hazardous Polymerization:	Will not occur
Melting Point:	14°F (-10°C)	Incompatibilities:	Acids, Strong oxidizing agents, zinc, aluminum.
Solubility in Water (77°F):	Soluble (100%)	Hazardous Combustion or	
Specific Gravity (H <sub>2</sub> O=1):	1.0-1.3	Conditions to Avoid:	None
Vapor Pressure:	12mm Hg (77°F, 25°C)		
Vapor Density (Air=1):	N/A		
Evaporation Rate:	N/A		
Percent Volatile:	60-97%		
pH:	>14.0		
Physical State:	Liquid		
<b>SECTION IV: FIRE AND EXPLOSION HAZARD DATA</b>		<b>SECTION VII: SPILL AND DISPOSAL PROCEDURES</b>	
Flash Point:	N/A	Steps to be Taken if	Wear self-contained breathing apparatus and suitable eye and foot
Autoignition Temperature:	N/A	Material is Spilled:	protection and rubber gloves. Carefully neutralize spill with appropriate spill kit. Cover spill area with absorbent material.
Flammable Limits:	Upper: N/A Lower: N/A		Wash spill site after material pickup is complete.
Flammability:	ActoCLEANSE™ is a non-flammable liquid. It will not support combustion	Disposal Procedure:	Dispose in accordance with all applicable federal, state and local regulations.
Extinguishing Media:	Water spray, carbon dioxide, dry chemical powder		
Special Fire Fighting Procedures:	Use self contained breathing apparatus and protective clothing to prevent contact with skin and eyes.	<b>SECTION VIII: INDUSTRIAL PROTECTIVE EQUIPMENT</b>	
Unusual Fire and Explosive Hazards:	Can react with metals to produce hydrogen gas which can form explosive mixture with air.	Ventilation:	Use general or local exhaust ventilation. None required
Explosion Data, Sensitivity:	Impact: Static Discharge: None None	Respiratory Protection:	except in misting conditions where a dust/mist respirator is recommended. If airborne concentration exceeds TLV, a self-contained breathing apparatus is advised.
		Eye/Skin Protection:	Safety goggles/face shield and rubber gloves are recommended
N/A= Not applicable, not available		<b>SECTION IX: STORAGE AND HANDLING DATA</b>	
N/E= Not established		Storage Requirements:	Keep container closed. Suitable for storage in caustic chemicals storage area.
N/D= Not Determined		Special Precautions:	None identified.
The above information, data and recommendations contained herein, are believed to be correct, but are not all-inclusive, and shall be used only as a guide. ARCTECH shall not be held liable for any damage resulting from use, handling or contact with the above product. ARCTECH disclaims any warranties, expressed or implied with regard to the products supplied hereunder, their merchantability or fitness for any particular purpose.		<b>SECTION X: TRANSPORTATION DATA AND ADDITIONAL INFORMATION</b>	
		Domestic (DOT)	
		Shipping:	Hazard Class: 8; Label: Corrosive
		International (IMO):	Hazard Class: 8; Label: Corrosive
			Marine Pollutants: No
		Air (ICAO):	Hazard Class: 8; Label: Corrosive
		UN Number:	1814

# ***Acto*CLEANSE Application**



**ActoCLEANSE™**   
EcoFriendly General Purpose Industrial Cleaner