

What Would Your  
Recommendations Be If  
Manure Had Negligible  
Phosphorus ?

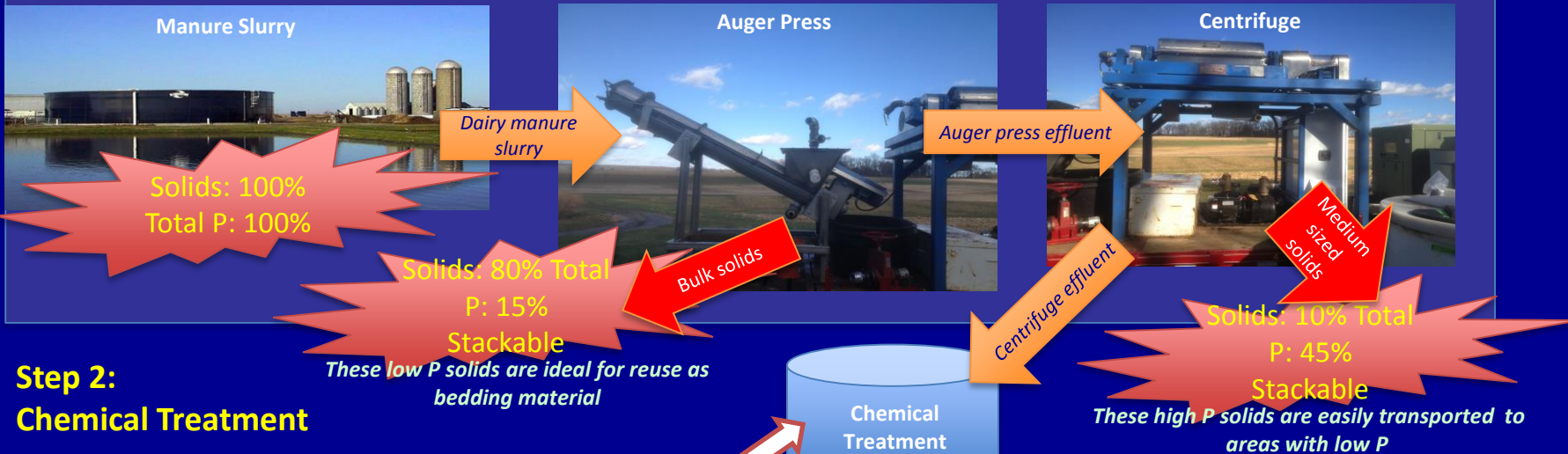
# A Mobile Treatment System to Remove Phosphorus from Dairy Manures

Clinton D. Church<sup>1</sup>, Alex N. Hristov<sup>2</sup>, Ray B. Bryant<sup>1</sup>, and Peter J. A. Kleinman<sup>1</sup>

<sup>1</sup> USDA Agricultural Research Service, <sup>2</sup> Pennsylvania State University - University Park, PA



## Step 1: Initial Liquid/Solid Separation



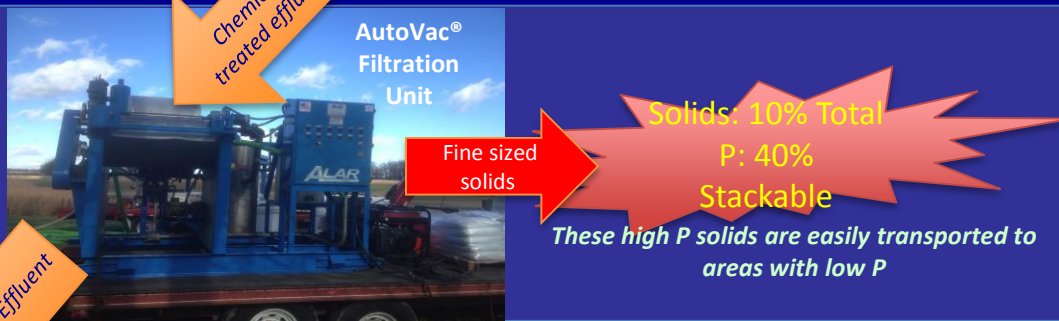
## Step 2: Chemical Treatment

Fe sulfate with Polymer

Chemically treated effluent

Chemical Treatment Tank

## Step 3: Final Liquid/Solid Separation



96 – 99% P removal efficiency  
99% solids removal efficiency  
All solids stackable (~70% moisture)  
Most nitrogen is retained (N:P ~ 50:1)  
Ideal for fertigation of crops  
pH unchanged by process

## HIGHLIGHTS

Cost for a 1000 cow dairy	
Per day	\$750
per cow/yr	\$180
per kg P removed	\$38
per lb P removed	\$17

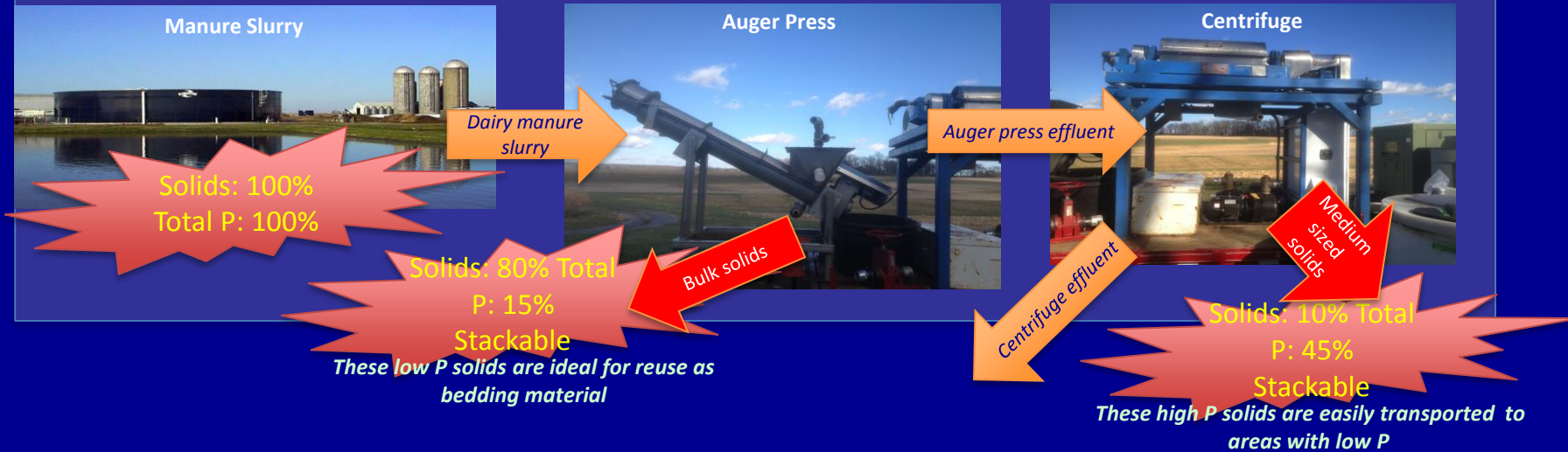
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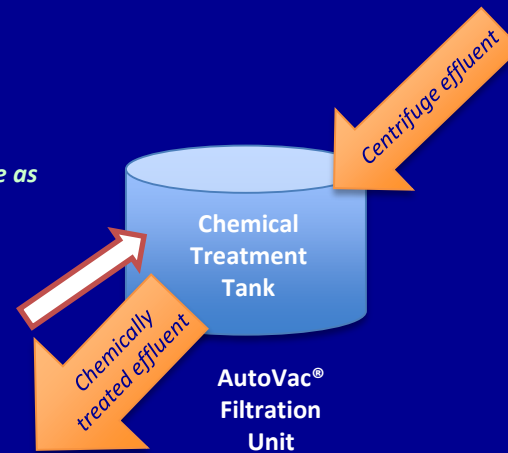
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## Step 2: Chemical Treatment

*These low P solids are ideal for reuse as bedding material*

Fe sulfate with Polymer



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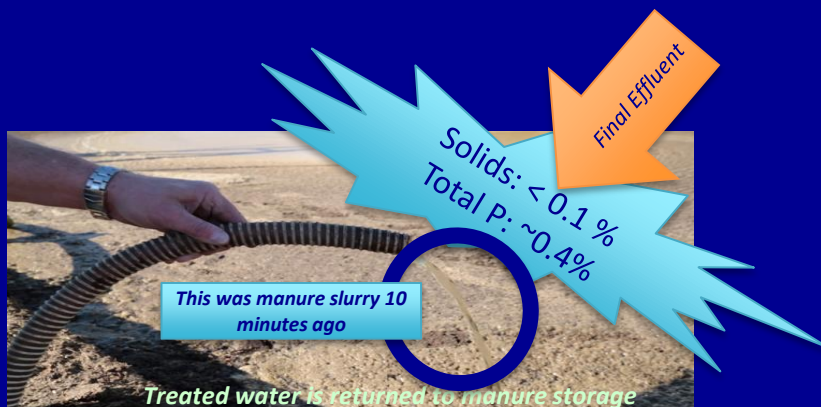
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## Current Work:

- 1) Construction of a Full-Scale Mobile Treatment System
- 2) Construction of a Full-Scale On-Farm Treatment System
- 3) Implementation of a Research-Scale System for Optimization/Sizing and substrate testing



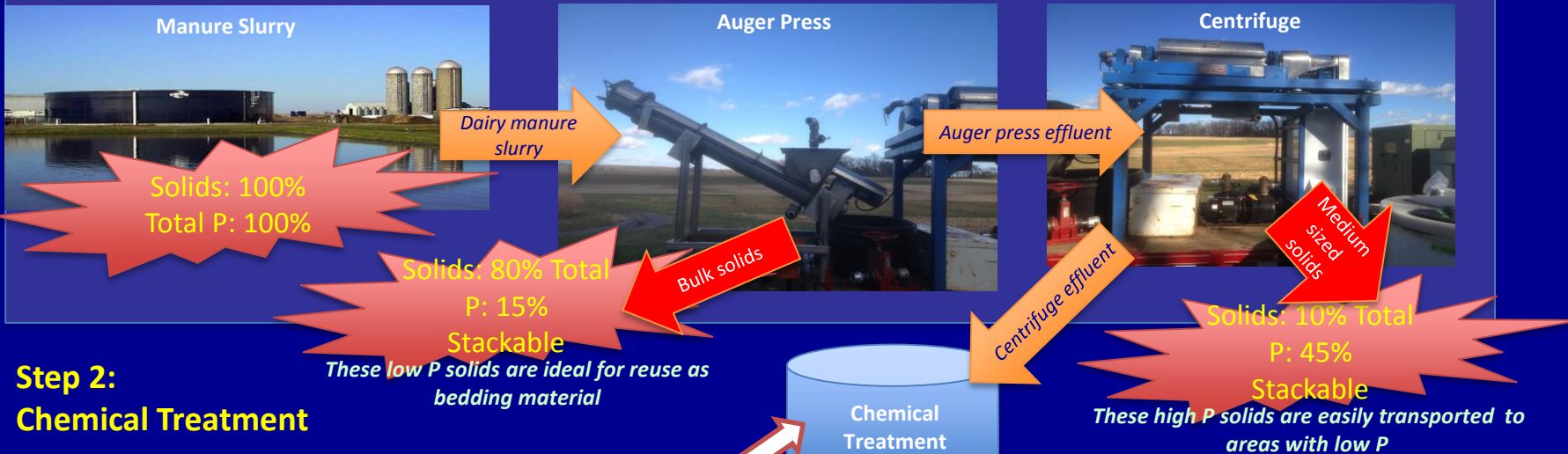
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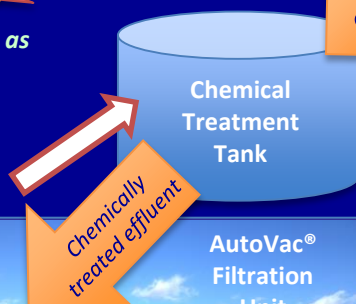


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