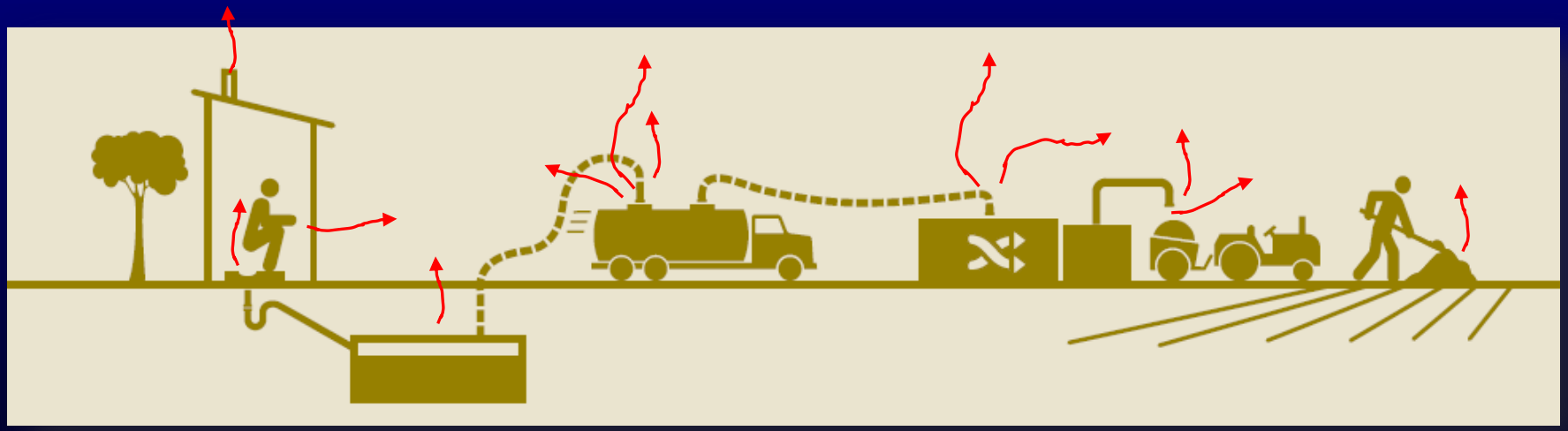
Odors in Fecal Sludge Management: A Roundtable Discussion

Marc Deshusses, Duke University
Karl Linden, University of Colorado Boulder



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Why a Roundtable Discussion on Odors?

- Malodor is a risk factor in FSM
- Odor nuisances affect technology selection and adoption
- However, odor issues have not been widely discussed
- A better understanding of the problem and of possible solutions is needed
- One part toward acceptance of a holistic FSM solution

Organization of this Session

- Introduction, background
- Talk 1: Kobina Afful
  Public perception of odor in Ghana
- Talk 2: Charles Chappuis
  Odor chemistry… What's in that smell?
- Roundtable Discussion with the audience

Odor Measurement

Odor can be quantified by **Dilution-to-Threshold** (D/T) method
D/T = number of dilutions required to reach the detection level
(Other methods are used to describe sensory aspects)

Field and lab olfactometry

In/around sewage tmt plant: 100-300 D/T
Process air primary treatment: 1000-5000 D/T
Very bad public toilet: 1000-10,000 D/T
Rendering plant process air: >1,000,000 D/T

A few odor thresholds:

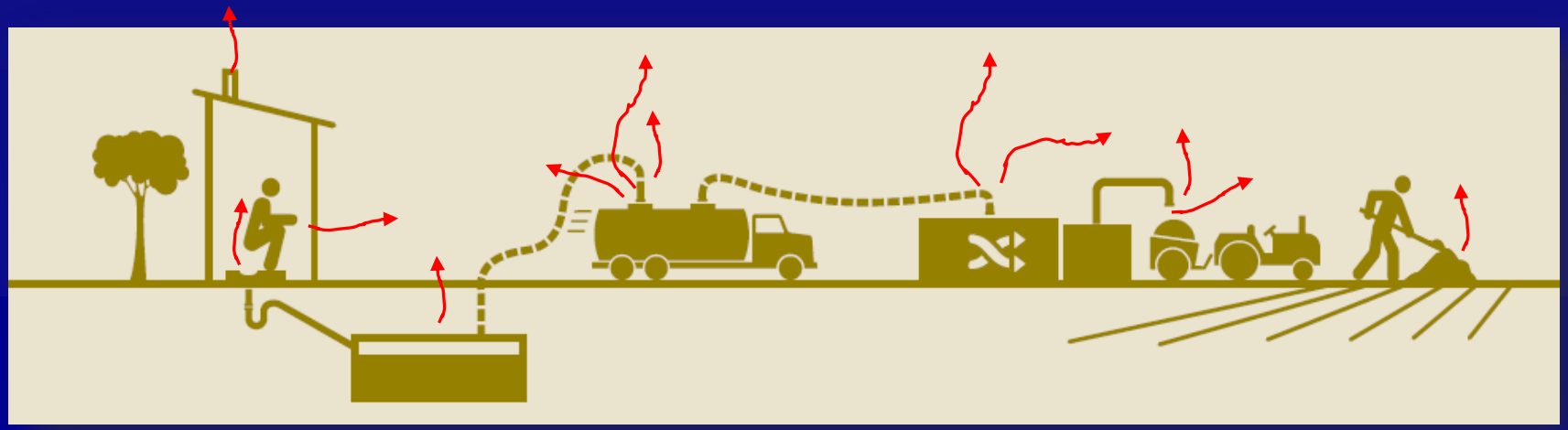
Skatole: 0.002 - 50 ppb_v
Indole: 0.5 - 2 ppb_v
H_2S: 0.5 - 3 ppb_v
Butyric acid: 0.1 - 20 ppb_v
Methylamine: 1 - 50 ppb_v
NH_3: 5000 - 20,000 ppb_v

Odor Control Approaches

Prevention
Avoid formation
or release

Control
Capture
Destruction
Transformation

Sensory Methods
Masking
Interference

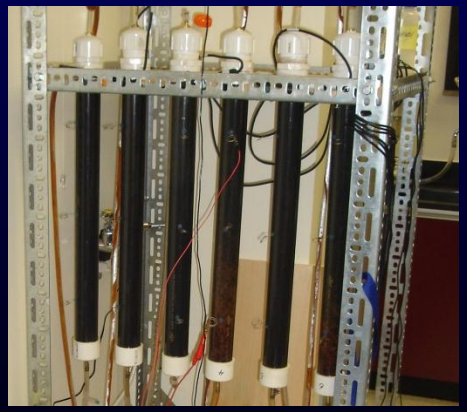


R&D Focus at Duke: Odor Control Using Biological Filters

Bacteria naturally grow on supports and **degrade** the odors

Biofilters are simple, inexpensive, scalable and very effective

Removal > 99%



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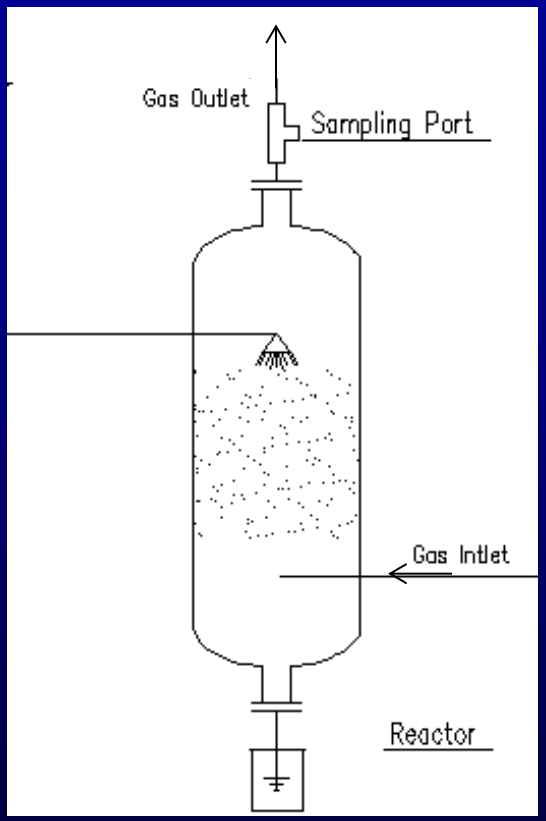
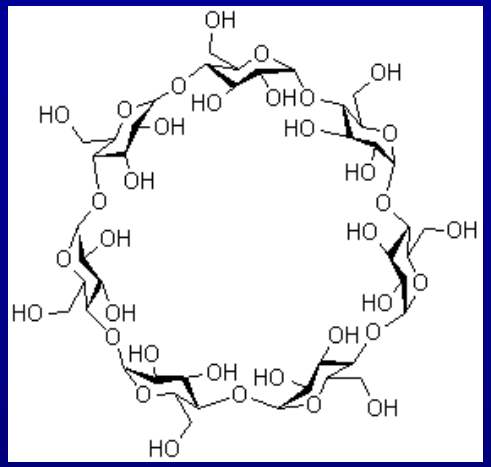
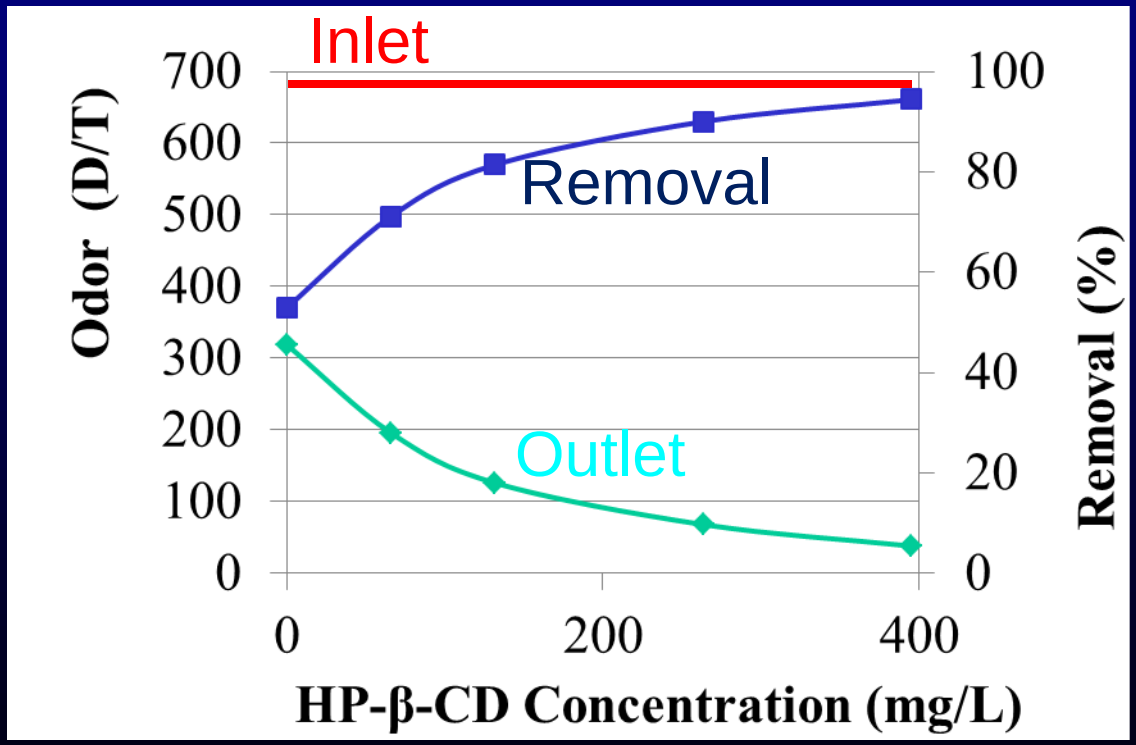
R&D Focus at Duke: Odor Capture using Chemical Misting





β-cyclo dextrin



Controlled environment with fecal odor feed

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R&D Focus Univ. Colorado: Odor Control Using Adsorbent Filters

Media

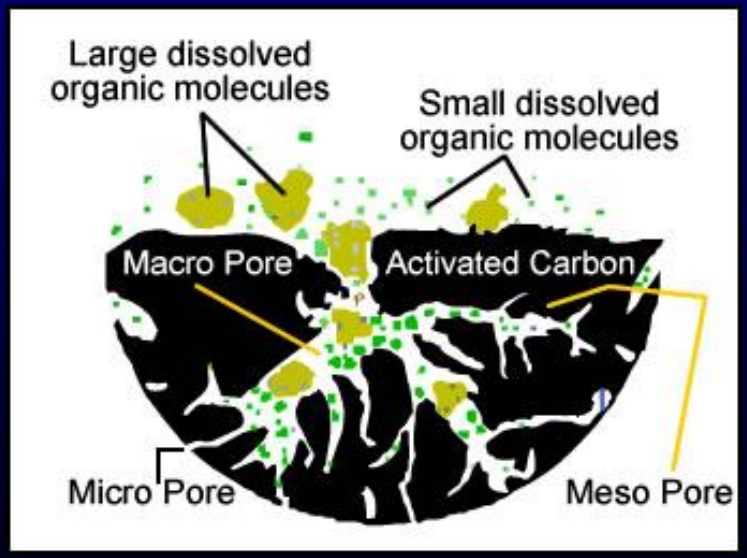
Highly adsorbent

*Activated carbon

*Biochar

Simple design, need information on sorption properties, breakthrough, contact time

Removal > 99%



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Questions for Discussion

1. How important is malodor in FSM? Where/what are the most acute problems?
2. What is the contribution of malodor as a barrier to toilet/latrine adoption?
3. Do you have concrete examples of odor control measures that work? or some that have failed?
4. Are there effective FSM practices that are not used because they are too smelly?
5. How are odors and off-gases from combustion-based FSM practices controlled?
6. What is more problematic: odors or other nuisances?
7. What research would make a direct impact?