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Resource Recovery from Faecal Sludge: Opportunities and Challenges

Global picture

- 2.7 billion people are served by onsite sanitation technologies that require FS management
- Demand for FS management continue to increase due to population growth – 5 billion people by 2030
- Good FS treatment and management is essential for protecting public health
- Wastewater treatment systems designed for Europe and North America don't work
- New and innovative systems that provide local and sustainable solutions are needed

Photo credit: Jill Haas

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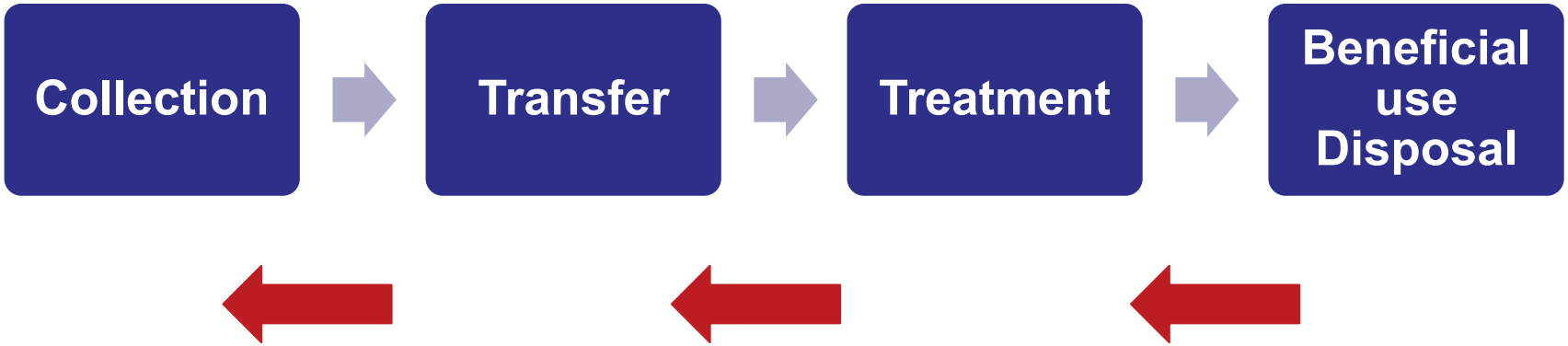
Photo credit: Jill Haas

Designing for resource recovery



- Resource recovery options and disposal possibilities should be considered before selecting treatment methods
- Treatment goal: stabilization & pathogen kill

Designing for resource recovery

Community A

End use: Incineration → Goal: Dry cake → Treatment focus: Dewatering

Community B

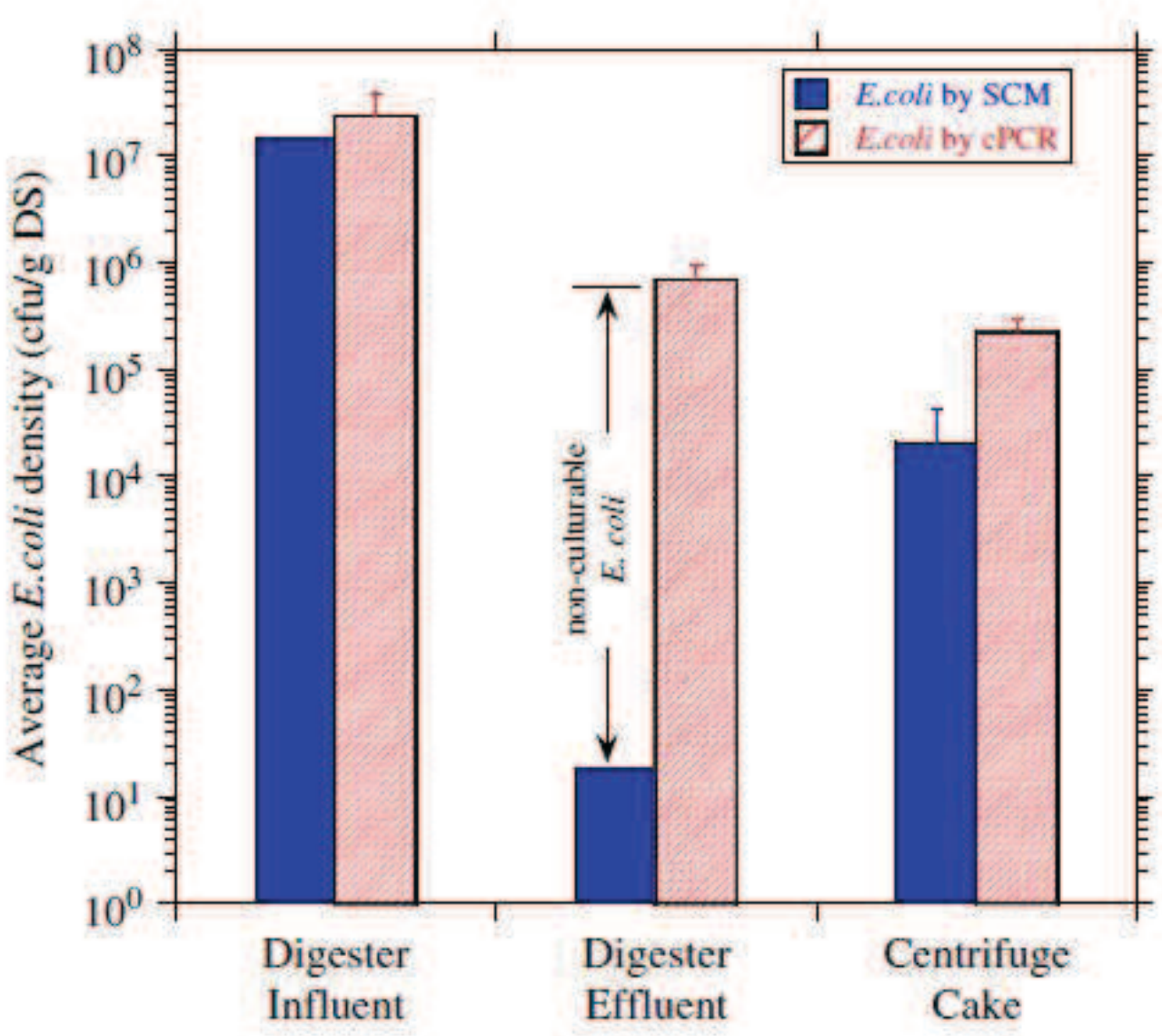
End use: Fertilizer → Goal: Pathogen kill → Treatment focus: Stabilization

Key considerations

- Simplicity is the key!
- Adequate and appropriate treatment
- Skills, capacities, technical difficulty
- Long-term operation
- Viable resource recovery options
- Revenue and value creation to offset costs
- Public acceptance
- Stakeholder involvement
- Problem with over-design or under-design
- Laws and regulations

Concerns

- Pathogens
  - Overestimation of kill rate
  - Regrowth
  - Exposure and health impacts
  - Fate and transport
- Heavy metals



Higgins et al. 2007, Water Research, 41, 665-673

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What is a successful application?

- One size does not fit all
- Local and sustainable solutions
- Achieve treatment goals
- Resource recovery - organic matter, nutrients, protein, water, and energy
- Beneficial use to generate value/revenue
- Is there a local demand or market pull?
- Public acceptance
- Feasibility analysis

Kashechewan outbreak, 2006

(CP Photo/Jonathan Hayward)

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Septic sludge management

- Hauled by truck in winter
- Air transport in summer

Strateco Resources Inc.

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Freeze-thaw treatment

- Freeze-thaw conditioning is a simple, effective, inexpensive, and sustainable sludge treatment method
- Ice front grows by incorporating water molecules only, all other impurities are pushed by the advancing ice front
- Freeze-thaw treatment converts sludge to a granular type material that drains readily

Pilot-scale testing

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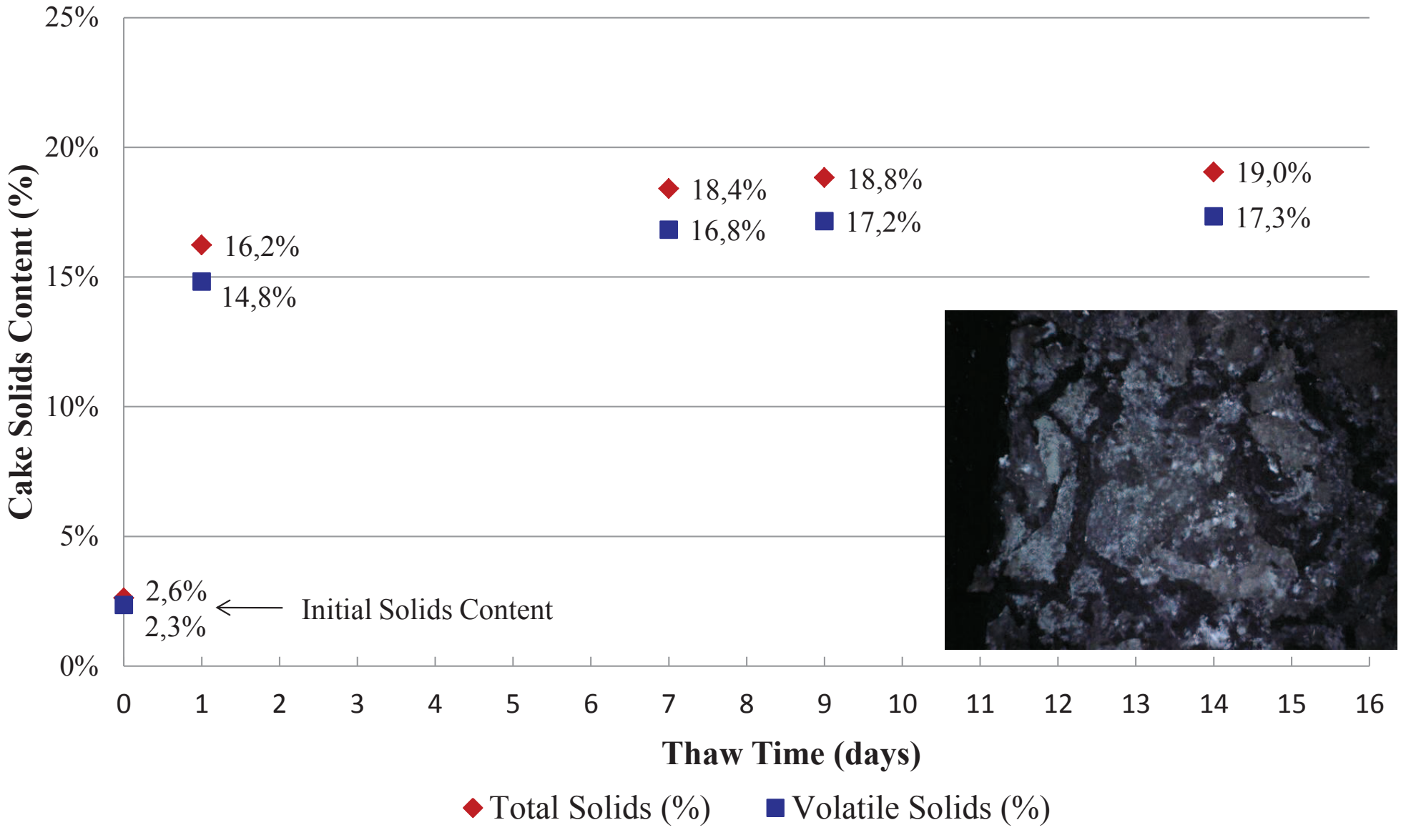
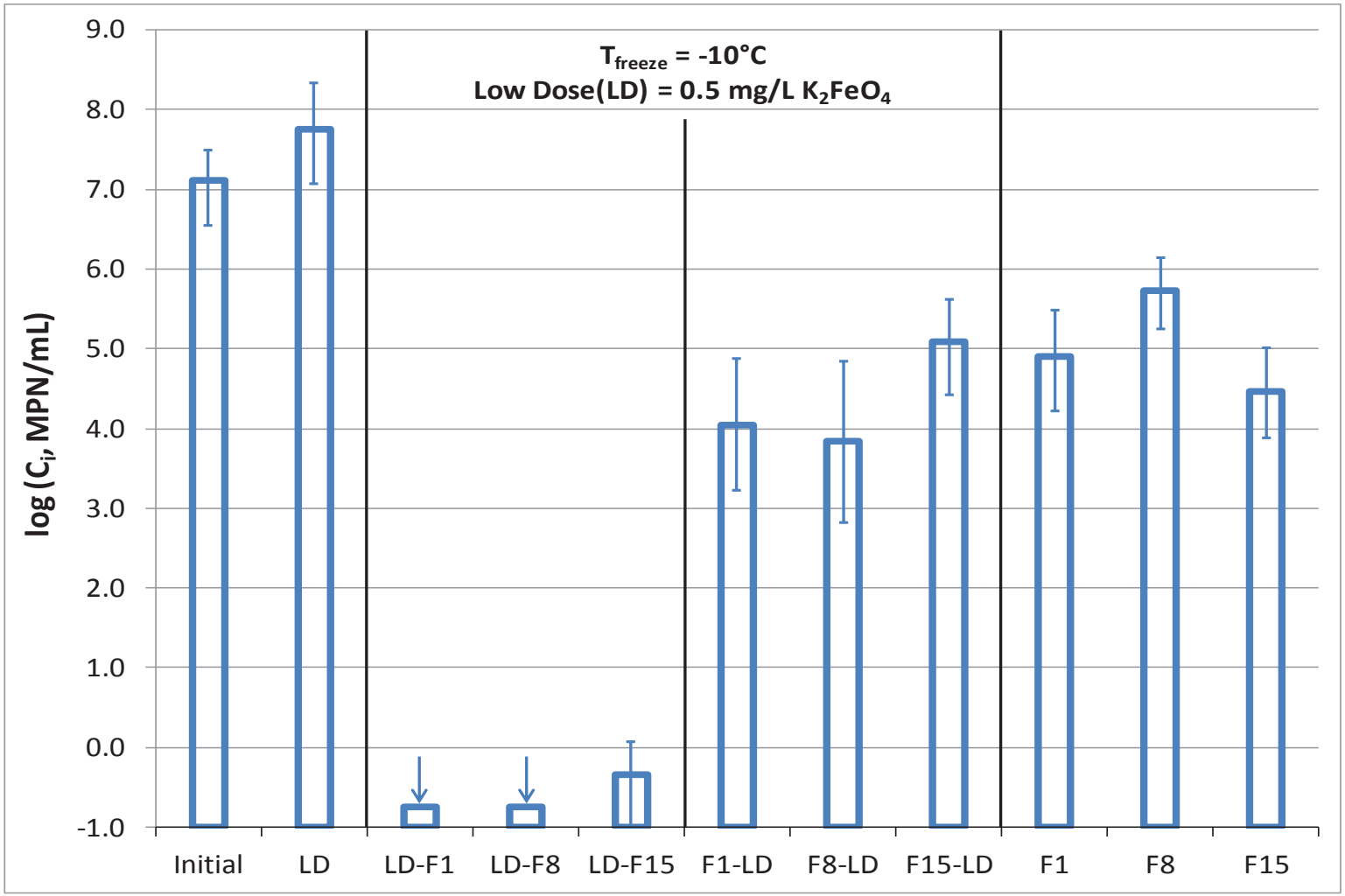
Cake Solids Content



Low ferrate dose (0.5 mg/L)



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FS resource recovery options

- Land application
- Fodder and plants
- Fish and plants
- Protein
- Building material
- Bioenergy

C and nutrient recovery

- Planted and unplanted drying beds
- Co-composting
- Vermicomposting
- Pellets
- Deep row entrenchment

Energy recovery

- Biogas
- Incineration/co-combustion
- Pyrolysis/gasification
- Biodiesel

So let's start!