

Fate of Helminth eggs during the Co-composting of Faecal Sludge with Chicken Feathers and Market waste

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MUSA MANGA
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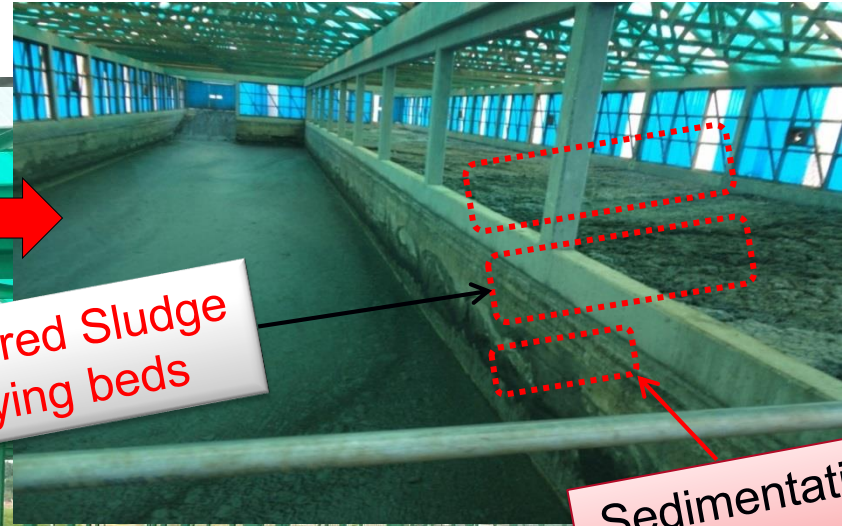


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Presentation Outline

1. Introduction
2. Methodology
3. Results and Discussion
4. Conclusions
5. Acknowledgements

Introduction



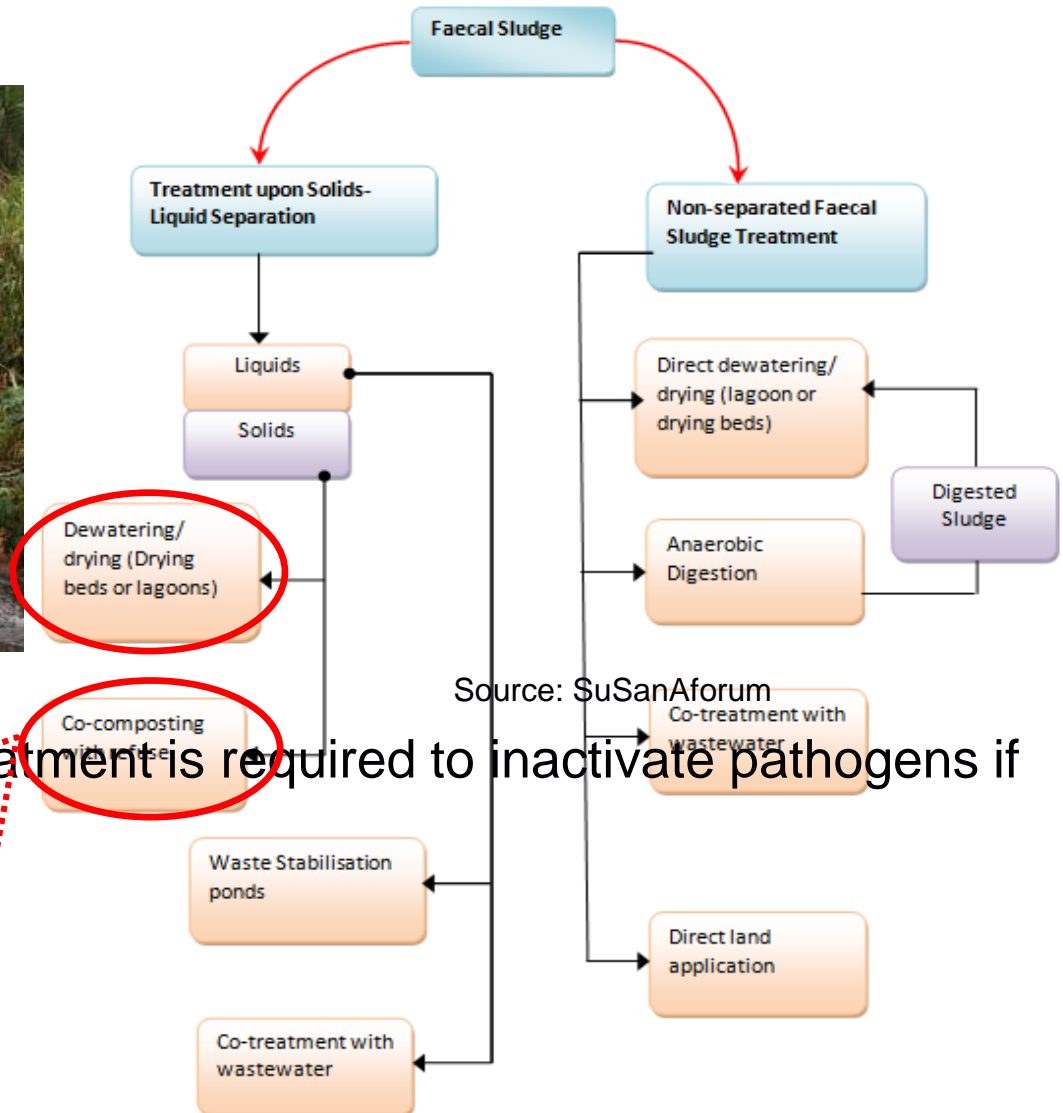
Covered Sludge
drying beds

Sedimentation
Tanks



So where do the diverted FS trunks that don't reach Bugolobi
treatment plant dispose of ????

Introduction Cont'd



Introduction Cont'd

- Composting has been proven to be a economically and technically feasible FS treatment technology with recovery of nutrients as added value.
- However, it is associated with both insufficient pathogen inactivation and longer inactivation periods (*especially helminth eggs*)
- Helminth eggs (esp. *Ascaris* eggs) are the best pathogenic indicators.
- Moreover, little is known about the fate of viable helminth eggs during composting of FS.
- This study assessed the effect of locally available organic waste types and their mixing ratios with FS on viable helminth eggs inactivation efficiency.

Methodology: Field trials _Composting facility



Methodology Cont'd: Collection of waste materials



Methodology Cont'd: Collection of waste materials



Methodology Cont'd: Collection of waste materials



Methodology Cont'd: Setting-up of Composting piles



- **SOS1**: **S**ludge: **O**rganic market waste: **S**awdust (1:2:1)
- **SOS2**: **S**ludge: **O**rganic market waste: **S**awdust (1:3:1)
- **SCS1**: **S**ludge: **C**hicken feather: **S**awdust (1:2:1)
- **SCS2**: **S**ludge: **C**hicken feather: **S**awdust (1:3:1)

Methodology Cont'd: Monitoring of composting piles



- Pile temperature: Top, middle, bottom and outer layers
- Pile aeration: -Manual Turning
- Moisture Content: 50 - 60%

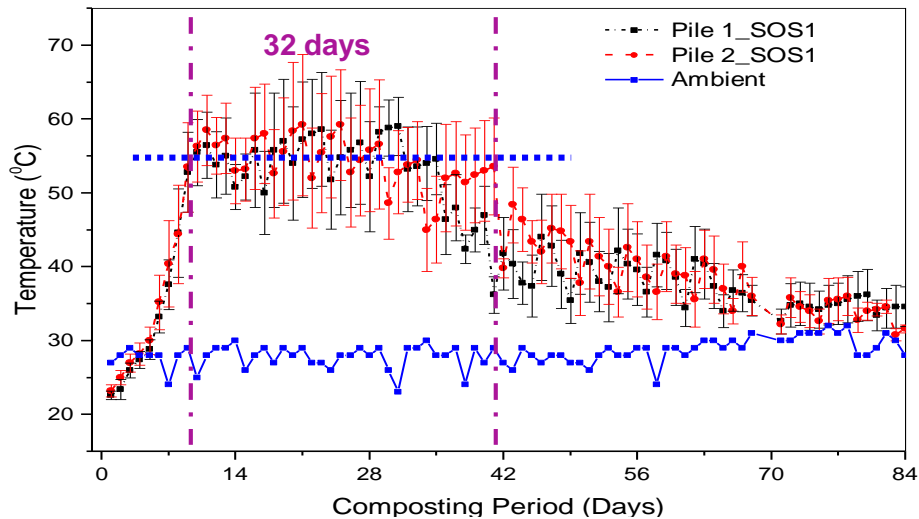
Methodology Cont'd: Monitoring of composting piles

- Analytical methods
 - ✓ Total Solids- (USEPA 2003)
 - ✓ Helminth eggs- (USEPA 2003)

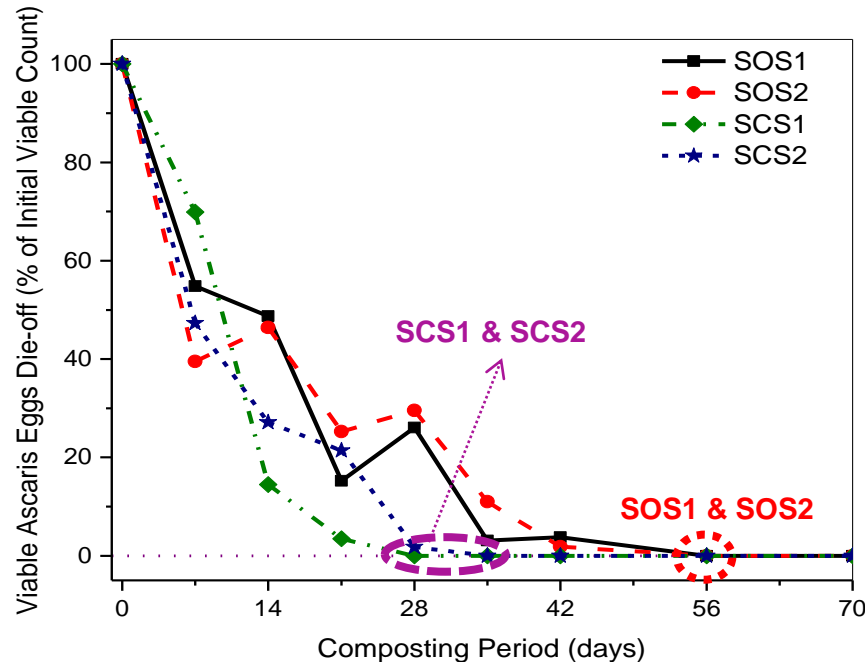


- Statistical Analysis
 - ✓ Friedman test, with 95% confidence level.
 - ✓ Spearman's rho test

Results and Discussion: Composting Temperatures



Results and Discussion: Pathogen Inactivation

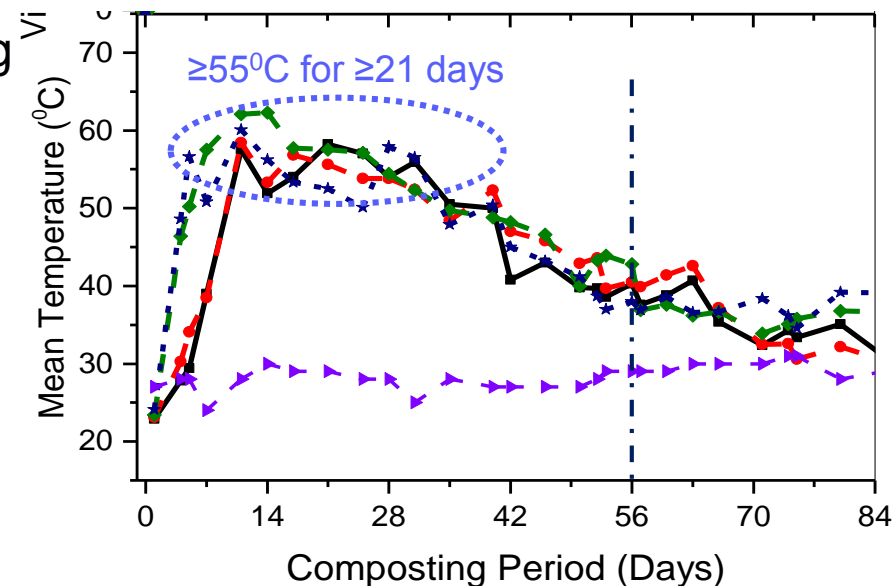


- Mixing ratios had little effect of helminth eggs inactivation periods

- Chicken feathers piles exhibiting a higher inactivation efficiency and shorter inactivation period than market waste piles.
- Composting of FS with chicken feathers reduces the helminth eggs inactivation period from 8 weeks to about 4-6 weeks, which represents approximately 42% reduction in the inactivation periods.

Results and Discussion: Temperature-Time Relationship Vs Helminth Inactivation

- All the composting piles met the USEPA (2003) criteria for pathogen inactivation.
- Helminth eggs inactivation efficiency was significantly different.
- Other mechanisms could have been responsible for pathogen inactivation during composting such as
 - ❖ antibiotic action induced by indigenous microorganisms
 - ❖ antagonistic effect between organisms
 - ❖ Toxic by-products (such as NH_3)



Conclusions

- The mixing ratios had little effect onto the pathogen inactivation efficiency, but 1:2:1 preferred to 1:3:1.
- Compost piles containing chicken feathers achieved the shortest pathogen survival period of 4 weeks compared to 6-8 weeks for market waste piles.
- Apart from the temperature-time relationship, other mechanisms were responsible for enhancing pathogen inactivation efficiency within the chicken feathers composting piles.
- All the composting piles attained 100% pathogen inactivation from faecal sludge
- Composting of faecal sludge with chicken feather can reduce pathogen inactivation periods by 42%, which may thus reduce the operational costs of faecal sludge treatment facility.

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THANK YOU!!!