

Laboratory Analysis for Faecal Sludge Management

Chris Buckley

Pollution Research Group, University of KwaZulu-Natal
buckley@ukzn.ac.za

<http://prg.ukzn.ac.za/>

Background

- Faecal sludge management has been neglected
- Major effort to mainstream
- Need to have common understanding
- National programmes promoting faecal sludge management
- Bill & Melinda Gates Foundation raised international awareness'
- Standardisation processes
 - book on Faecal Sludge Management
 - Massive On-line Open Courses (MOOC)
 - towards
 - ISO standard for *Reinvented Toilets*
 - STeP programme to evaluate *Reinvented Toilets*
 - standardisation of laboratory analysis of faecal sludge

What is Faecal Sludge?

Non-networked systems

Decentralised

Different context; different properties

Wet / dry

Fresh/ decomposed

Mixed or separation of urine and faeces

Addition of non-faecal material

Why are measurements needed?

- Problem quantification
- Selection of process options
- Recycle / reuse options
- Plant design (detailed)
- Process control
- Compliance
- Environmental impact (Life Cycle Assessment)
- Risk Assessment (chemical, microbiological)

Sampling

Depends on the reason for analysis

- extraction
- homogenisation
- transport
- storage

Types of Analysis

Chemical

- pH, conductivity
- Solids, moisture, ash
- nutrients, sulphur, carbon
- metals
- protein , carbohydrate, lipids

Physical

- thermal (specific heat, conductivity, calorific value
- density
- Rheology
- particle size (screen, sieve, laser)
- Colligative (osmotic pressure, ionic strength, boiling point elevation, freezing point depression, vapour pressure)

Microbiological

- Ascaris
- standard bacteriological analyses

Reparation for off-site analysis

- preservation
- extraction
- concentration

Processes evaluated

Urine streams

- struvite precipitation
- nitrification
- evaporation
- membrane processes
- microbial fuel cell

Mixed sludges

- screening
- extrusion
- pumping
- drying
- anaerobic digestion
- biochar formation
- black soldier fly lava production

Laboratory services provided by PRG

Gates support till October 2017

Training of people in Durban (when lab refurbishment complete estimated Dec 2016)

Use of equipment in Durban on your samples or process

Training and assessment on your site

- People are at no cost; but not travel and accommodation

Analysis of samples

- Discounted charges see web page (prg.ukzn.ac.za)

Standard Operating Procedures

Advice on

- ethics approvals
- health and safety
- trans shipment of samples

Laboratories assisted

Asian Institute of Technology

Sanergy (Nairobi)

University of Botswana

Mzuzu University (Malawi)

University of Malawi

University of Dar es Salaam

CSE (New Delhi)

Borda (Bangalore)

Indian Institution of Technology Madras

COIMBATORE – Sanitation Technology Evaluation Platform [STeP]

Future Prospects

Expand our experience base through interaction

Expanded partners

Edit a collaborative text book ***Analysis of faecal sludge***

Extend range of analyses

- Pharmaceuticals
- Pathogens
- Process end products
- Effect of excreta / excreta products on plants, food, environment

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