

Global Partnership of Laboratories for Faecal Sludge Analysis





Unlike wastewater, there are very few laboratories that specialize in faecal sludge analysis.

In addition, due to the lack of standard methods for sampling and analysing faecal sludge, standard methods from other fields, such as water, wastewater and soil science, are usually applied.

This is why the experts on faecal sludge analysis recently established the Global Partnership of Laboratories for Faecal Sludge Analysis to address these challenges and to work towards standardized methods for the characterization

and quantification of faecal sludge from onsite sanitation technologies, including sampling techniques and health and safety procedures for faecal sludge handling.

The Partnership also delivers on-campus courses and training and aims to improve communication between sanitation practitioners, provide a comparative faecal sludge database, and improve confidence in the methods and obtained results.

The Partnership currently consists of six laboratories in Durban, New Delhi, Bangalore, Bangkok, Zurich and Delft.

- Analysis
- Teaching
- Experimentation



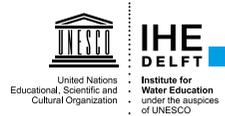
PARAMETERS

| | | | | | | |
|---|---|---|---|---|---|---|
| Helminths – number and viability | ■ | ■ | ■ | ■ | ■ | ■ |
| E. coli, total coliforms, coliforms | ■ | ■ | ■ | ■ | ■ | ■ |
| Organic matter (COD, BOD, TOC) | ■ | ■ | ■ | ■ | ■ | ■ |
| Solids (TS, VS, TSS, VSS, moisture) | ■ | ■ | ■ | ■ | ■ | ■ |
| Nutrients (nitrogen: total / nitrate / nitrite / ammonium) and phosphate: total / orthophosphate) | ■ | ■ | ■ | ■ | ■ | ■ |
| Ions (selective cations / anions) | ■ | ■ | ■ | ■ | ■ | ■ |
| Heavy metals | ■ | ■ | ■ | ■ | ■ | ■ |
| Osmotic pressure | ■ | | | | | |
| Respirometric tests | ■ | | | | | ■ |
| Calorific value | ■ | ■ | ■ | | ■ | ■ |
| Thermal conductivity | ■ | | | | | |
| Heat capacity | ■ | | | | | |
| VFA | ■ | | | ■ | | |
| Pyrolysis / combustion | ■ | | | | | ■ |
| Drying energy potential | ■ | | | | | ■ |
| Particle size distribution | ■ | | ■ | | | |
| Rheology properties (shear strength / viscosity) | ■ | | | | ■ | ■ |

EQUIPMENT

| | | | | | | |
|--|---|---|---|---|---|---|
| Specialist microbiology laboratory | ■ | ■ | ■ | ■ | | ■ |
| Rheometer | ■ | | | | ■ | ■ |
| Differential scanning calorimeter / thermogravimetric analysis | ■ | | | | | ■ |
| Calorimeter | ■ | ■ | ■ | | ■ | ■ |
| Spectrophotometer | ■ | ■ | ■ | ■ | ■ | ■ |
| Moisture balance and analyser | ■ | | ■ | | | |
| Penetrometer | ■ | | | | | |
| Particle size analyser | ■ | | ■ | | | |
| Thermal conductivity analyser | ■ | | | | | |
| Chloride analyser | ■ | | | | | |
| Osmometer | ■ | | | | | |
| Gas chromatograph | ■ | | | ■ | | ■ |
| Respirometer | ■ | | | | | ■ |
| Microwave plasma / atomic emission spectrometer | ■ | | | | | |

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The new Laboratory for Faecal Sludge Analysis was opened at IHE Delft on 19 November 2018. It was equipped using funds from the 'Global Sanitation Graduate School' grant, provided by the Bill & Melinda Gates Foundation (BMGF). In this facility sanitation professionals and academics from all over the world can analyse, research and learn about the characteristics, use and re-use of human excreta, for the benefit of improving people's health and quality of life. The lab, initiated in the framework of the new Master of Science in Sanitation program at IHE Delft, was designed for analytical work, teaching and training, as well as to support experimentation as part of research by master's and doctoral students. The laboratory is equipped with facilities for video recording and offers tailor-made training courses to third parties.

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Pollution Research Group



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The Pollution Research Group (PRG) operates a recently modernized and fully equipped reference sanitation laboratory, primarily used to investigate human excreta, faecal sludge from different on-site sanitation facilities, and wastewater. PRG also provides support to other sanitation laboratories in Africa and Asia for their set-up and improvement. It offers a range of facilities and activities to support research and education activities: access to different sanitation systems, mechanical workshops, field and laboratory testing and sampling, technology and prototype testing, specialized training, and sharing of data.

For more details visit <http://prg.ukzn.ac.za/laboratory-facilities>.

Eawag

Swiss Federal Institute of Aquatic Science and Technology

eawag
aquatic research o o o



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Eawag (the Swiss Federal Institute of Aquatic Science and Technology) started in 1936 as a water and wastewater treatment research institute, and is part of the ETH Domain (Swiss Federal Institutes of Technology). The mandate of the Sandec (Sanitation, Water, and Solid Waste for Development) Department at Eawag is to develop and test methods and technologies that help the world's poorest to access sustainable water and sanitation services. Sandec has been conducting research into faecal sludge management for 25 years. Faecal sludge analysis is conducted at the Eawag and ETH laboratories in Switzerland and at partner-institution laboratories in many countries throughout Asia and Africa. Numerous resources are available free of charge on the Sandec website www.sandec.ch/fsm_tools, including publications, books, online courses, workshops, newsletters and reference materials.

CSE

Centre for Science and Environment



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The Environment Monitoring Laboratory (EML) was established to support CSE's specific research activities and it now undertakes independent research in a variety of fields. The EML has partnered with BMGF to undertake research in the field of faecal sludge and septage management, which includes the collection and analysis of data related to wastewater and septage, and the assessment of novel technologies for treating human excreta. As a part of CSE, EML is committed to teaching and training stakeholders at their residential training facility, and disseminating knowledge and information through its outreach platforms.

Find out more about CSE's work on
www.cseindia.org.

Consortium for DEWATS Dissemination / Centre for Advanced Sanitation Solutions



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The CDD-CASS Analytical Laboratory was set up in 2010 as a water and wastewater-testing laboratory. As CDD's work extended into faecal sludge management, the laboratory was expanded in 2017 with the support of the BMGF to include faecal sludge testing capabilities. These include testing for heavy metals, calorific value, e-coli, helminth eggs etc. Primarily the laboratory provides BORDA-CDD researchers with testing services to support the monitoring of decentralised wastewater treatment systems (DEWATS) and faecal sludge treatment plants. It also supports research and development activities in this field.

Find out more about CDD-CASS's work at www.cddindia.org/CASS.

AIT

Asian Institute of Technology



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The Asian Institute of Technology (AIT) laboratory was established in 1964 in support of its postgraduate program in Sanitary Engineering. Supported by a number of donors, the laboratory has been upgraded and improved to comply with ISO17025 standards. As well as being an advanced analytical laboratory, the AIT laboratory offers facilities for lab- and pilot-scale experimentation and an environmental research station for field testing. The lab provides a platform for capacity building of postgraduate researchers, practitioners, and professionals in environmental-related fields including faecal sludge management and it is particularly equipped to support laboratory-, pilot- and field-scale research with an emphasis on faecal sludge and sanitation systems.

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The content is
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and knowledge.



Methods for Faecal Sludge Analysis

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Methods for Faecal Sludge Analysis

The importance and need for faecal sludge management has been recognized worldwide. One major gap in developing appropriate and adequate faecal sludge treatment and monitoring techniques is the ability to understand faecal sludge characteristics, and its quantification and correlation to the source population. Faecal sludge characteristics are highly variable, but as standard methods for sampling and analysis do not exist, results are not comparable and hence the actual variability is not yet fully understood.

Due to this lack of standard methods for sampling and analysis of faecal sludge, standard methods from other fields, such as water, wastewater and soil science, are usually applied. However, these methods are not necessarily the most suitable for faecal sludge, and have not been specifically adapted for that purpose. Characteristics of faecal sludge are typically different from these other matrices by orders of magnitude. The methods for faecal sludge sampling are also greatly complicated by the wide range of technologies in each local

context, and the heterogeneity within systems. Another gap in the existing knowledge is how to quantify faecal sludge on a city-wide scale, or scale relevant for the design of treatment technologies. Moreover, the lack of standardisation complicates the transfer of knowledge and data between different regions and institutions as the results are not comparable. This illustrates the urgent need to establish common methods and procedures for faecal sludge characterisation and quantification.

This book aims to address these challenges and provide a basis towards standardized methods for characterization and quantification of faecal sludge from onsite sanitation technologies, including sampling techniques and health and safety procedures for faecal sludge handling. It also aims at improved communication between sanitation practitioners, a comparative faecal sludge database, and improved confidence in the methods and obtained results. The book will be beneficial for researchers, laboratory technicians, academics, students and sanitation practitioners.

If you want to learn more about the Global Partnership of Laboratories of Faecal Sludge Analysis, you know a laboratory which would like to join the Partnership, or you need assistance in setting up a faecal sludge lab, feel free to contact me.

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<https://sanitationeducation.org/laboratories>

