

	Standard Operating Procedure  PRG <small>pollution research group</small>	Effective Date:	Version:
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Standard Operation Procedure – Faecal Sludge Handling

1. Scope and Application

Excreta samples are obtained from several sources including (i) segregated faeces samples from individual donors, (ii) mixed excreta samples from community ablution blocks and (iii) mixed excreta samples from household urine diversion toilets.

Incoming samples should be named according to a standard naming system and basic characteristics recorded: mass, photo record and Bristol stool classification. This SOP describes the system used for samples obtained as part of the Reinvent the Toilet project.

Human excreta can potentially host significant levels of pathogens, and as such is classified as a biologically hazardous material. Suitable precautions must be taken when handling samples.

2. Principle

Samples are named according to their source and the sequence of samples obtained from that source.

Mass measurements of the complete sample are made using an appropriate electronic balance.

The Bristol stool scale is used to class faeces samples into one of seven categories, which may be approximately related to colon transit time.

A photo record of the sample is taken to allow later correlation of measured sample properties to its initial visual appearance.

3. Safety Precautions

General

The following general safety precautions should be taken:

- Cover any small open wounds with waterproof dressings – if large open wounds then do not carry out laboratory work.
- Always use gloves, laboratory coat and closed shoes while working in the laboratory.
- Wear a face-shield when disposing of samples down the sluice (risk of splashback).
- Dispose of samples as specified by the Faeces Sample Disposal SOP.
- Clean all soiled equipment thoroughly after use.
- Any equipment that will be taken out of the laboratory into a 'clean' environment (e.g. camera) should be handled only with clean gloves and disinfected using 70% ethanol spray after use.
- Dispose of the used gloves in the appropriate waste bin after sample handling and disposal and cleaning of equipment is complete.
- Clean hands using antiseptic soap.
- Disinfect hands after washing with soap.

Where mixed samples are being handled (i.e. those from field location sources such as community ablution blocks), additional care must be taken as sharps may be present in the faecal matter. Samples should not be handled directly with gloved hands, but rather with a spoon or spatula.

Maintain 'clean' and 'dirty' work areas

The basement laboratory where excreta samples are processed should be considered in its entirety a 'dirty' area, however within this 'clean zones' should be designated for any items that will later be taken out of the laboratory:

- Sample boxes and equipment used to handle samples should only be placed on wipe-clean surfaces - plastic or metal top workbenches or trays.
- Any 'clean' items that will be taken out of the laboratory – e.g. camera and paper forms used to record results – should be kept on a clean tray or segregated clean area of the workbench.
- 'Clean' items should only be handled whilst wearing clean gloves.

4. Materials and Equipment Required

- Analytical balance for single-donor samples

- Lower sensitivity balance for large mass samples
- Permanent marker
- Camera
- Pro forma sheet for recording basic sample data
- Pen
- Paper sheets for cleaning equipment and general working area
- 70% ethanol for disinfection of equipment, splashes and spills
- Wipe-clean trays

5. Procedure

Sample naming system

(i) Single-donor faeces samples

Each donor is assigned a unique 3-digit donor number on registration for the sample donation programme.

Sample numbers follow this format:

Donor number – Order of sample from that individual donor

e.g. the third sample received from donor number 001 would be named 001003.

(ii) Multiple-donor excreta samples from field locations

Each field location is assigned a 2-digit location number.

Each sampling point within that location is assigned a letter.

Sample numbers follow this format:

Location number – sampling point letter - Sample number from that sampling point

e.g. fourth sample received from pedestal B in the community ablution block with location number 002 would be named 02B004

Receipt of samples

Procedure for receipt and storage of samples:

- Assign correct name to sample and write on the container with permanent marker.
- Write time sample transferred to coldroom on sample container with permanent marker.
- Store samples in coldroom (refer to Sample storage SOP).

- Record sample names and dates and times donated and transferred to storage in the sample database.

Mass measurement of complete sample

- Prior to sampling, measure and record mass of empty sample containers (including lid) using analytical balance.
- Write mass of container (units g) on the sample container using permanent marker.
- Measure mass of full sample containers using (i) analytical balance for single-donor samples and (ii) lower sensitivity balance for multiple-donor samples from field locations.
- Record mass of sample on pro forma sheet.
- Transfer paper record to sample database on lab computer.
- Save the updated database in the correct network location with an updated filename.

Photo record

- Two persons should carry out the procedure – one to handle samples and the other to handle ‘clean’ items (camera).
- Retrieve samples from storage and transfer to suitable work area (a wipe-clean surface).
- Sample handler opens all lids of sample containers containing samples to be photographed, place alongside sample so that sample name and dates and times are visible (if dealing with a large number of samples, work in manageable batches for the work area available – e.g. five to ten samples at a time).
- Photographer uses camera to photograph each sample, including the lid with the record of name, date and time in each shot.
- Sample handler closes all sample containers and returns to storage.
- Use 70% ethanol spray (sparingly) to disinfect camera. Place in a clean location in the upstairs area of the laboratory.
- Dispose of dirty gloves and wash hands according to standard procedure before transferring camera to office area to retrieve photos.
- Name each photo with the sample number of the relevant sample and save in the correct network location.
- Note on the sample database that a photo record exists for that sample.
- Save the updated database in the correct network location with an updated filename.

Bristol stool classification

- Retrieve samples from storage and transfer to suitable work area (a wipe-clean surface).
- Open all lids of sample containers containing samples to be classified.
- Dispose of dirty gloves and replace with clean gloves.
- Classify each sample with reference to the Bristol stool chart. Record classification alongside sample number on the pro forma sheet.
- Replace pro forma sheet in 'clean' work area before handling samples again.
- Close all sample containers and return to storage.
- Dispose of dirty gloves and wash hands according to standard procedure before transferring paper records back to the office.
- Transfer data from the paper records to the sample database on lab computer.
- Save the updated database in the correct network location with an updated filename.

Updating the sample database

- Data should be transferred from paper records to the electronic sample database as soon as possible.
- The updated database should be saved in the following location: