

MSQ – Field Laboratory

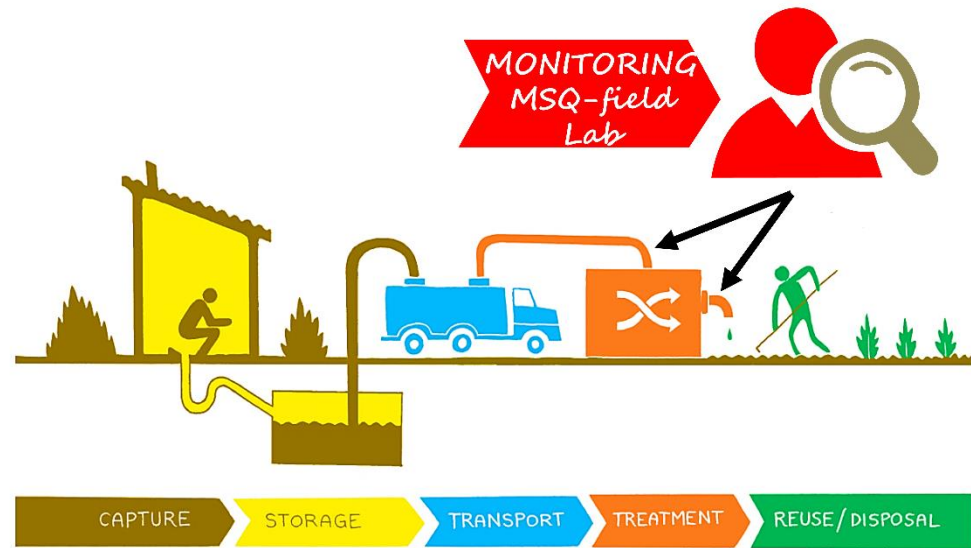
Field lab for fecal sludge treatment plants

For Humanitarian Aid Organisations in emergencies and utilities, plant-operators, NGOs & universities in developing countries

Reason: Often no opportunity to monitor the treatment processes, because laboratories are too far away and also expensive.

Design criteria

- Appropriateness comparable results with a standard lab
- Applicability must work in the field
- Affordability cheaper than standard lab
- Mobility must fit in a Toyota Landcruiser



Humanitarian innovation fund

elrha



Aus Liebe zum Menschen.



Contact Information:

Johannes.Bousek@boku.ac.at
Magdalena.baeuerl@roteskreuz.at

adam@butylproducts.co.uk
jspit@waste.nl

<http://www.elrha.org/map-location/microbialsludgequality-msq-field-test-kit-faecal-sludge-monitoring/>

Modular Field Laboratory

The full package allows the set-up and operation of a field lab. It is divided in modules, which allow the customer flexibility in the lab and adaptation to treatment processes and local conditions.

Principal Modules

Resupply Packages

Support kits

Module 1
"Public Health"



Support Kit 1
"Basic Lab Support"



Module 2
"Process Control"



Support Kit 2
"Personal Protection"



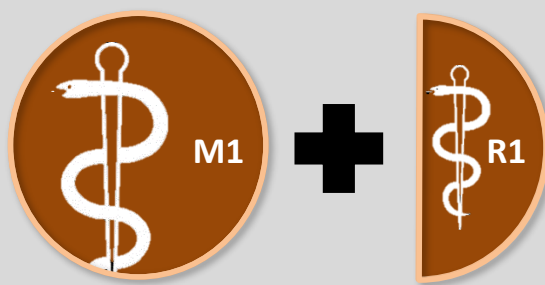
Module 3
"End Use"



Supplement 3
"Power supply"



Module 1 “Public Health”



Principal module price: **€ 2,500**

Resupply package: **€ 5,200**

(For 100 Samples)

Total module price: **€ 7,700**

Background:

Ensuring public health is of utmost importance in fecal sludge treatment, especially in emergencies. The “Public Health” module is considered as the core of the field lab. This module supplies equipment for the determination of degradation levels of indicator organisms throughout fecal sludge treatment plants.

Parameters:

- Bacteriology Total coliforms (*e.-Coli*), *Enterococcus*, *Salmonella*
- Helminth eggs *Ascaris lumbricoides* (others possible)

Methods:

- Bacteriology: Sample homogenization through stainless steel beads; membrane filtration using *Sartorius Nutrient Set Pads*; incubations in a field incubator; manual digital CFU counting
- Helminth eggs: Sample enrichment through centrifugation; microscopic counting using *Mini-FLOTAC* reading discs

Module 2 "Process Control"



Principal module price: **€ 3,100**

Resupply package: **€ 2,000**

(For 100 Samples)

Total module price: **€ 5,100**

Background: This module provides equipment for process monitoring of treatment plants. Different treatment processes are considered. In emergency aid operations, where the treatment cascade beforehand is often unknown, the full board of equipment should be included. In non-emergency cases, the supplied equipment/parameters is adjusted to the specific treatment cascade.

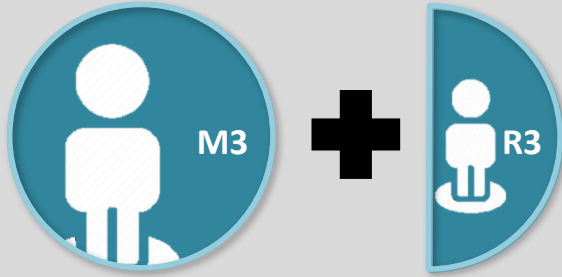
Considered treatment processes:

- Anaerobic digestion
- Aerobic wastewater treatment
- Lime treatment
- Urea/Ammonia treatment
- Lactic acid fermentation
- Vermicomposting
- Solar drying
- Thermal drying and palletization
- Black soldier fly treatment
- Mechanical FS treatment
- Imhoff tank
- Sludge incineration
- Co-treatment in waste stabilization ponds

Included parameters:

- pH- Value
- Temperature
- COD
- (Residual) Biogas potential
- Biogas composition
- Titration (VFA/Alk)
- Sludge volume
- Total Solids/Ash
- Soil moisture
- Ammonia
- Nitrate
- Potassium
- Total Nitrogen
- Total Phosphate
- Heavy Metals
- Conductivity

Module 3 "End Use"



Principal module price: **€ 200**

Resupply package: **€ 1,400**

(For 100 Samples)

Total module price: **€ 1,600**

Background: This module provides equipment for evaluation of treatment plant effluent streams for possible end use options. This module is not thought for emergency scenarios. In non-emergency cases, the supplied equipment/parameters is adjusted to the specific chosen end-use option. This module's equipment is balanced out with equipment from process control to avoid double purchase.

Considered treatment processes:

- Soil conditioner
- Irrigation
- Fodder (Protein)
- Fodder (Plants)
- Fish production
- Building materials
- Biogas
- Combustible

Included parameters:

- Biogas composition
- Soil moisture
- Ammonia
- Nitrate
- Potassium
- Phosphate
- Total Nitrogen
- Total Phosphate
- Heavy Metals (Chrome, Copper, Zinc)
- *Calorific value (discussions)*
- Conductivity



Support Kit 1 “Basic Lab Support”

Kit price: € 2,100

The Basic lab support will allow operation of the lab out of the box and includes everything needed to set up and operate a laboratory in the field or in a garage. The equipment ranges from a gas stove to pipettes, a fridge and a small scale water filtration system.



Support Kit 2 “Personal Protection”

Kit price: € 1,000

The Personal Protective Equipment (PPE) module supplies safety materials for lab technicians and includes the PPE needed to safely work in a laboratory and take samples from faecal sludge/waste water treatment plants. For some consumables (e.g. gloves), a starting package will be provided in this module.



Supplement 3 “Power supply”

Kit price: € 1,600

The power supply module enables the operation of the lab in an environment with unreliable power supply. The heart piece of the module is a power converter (incl. UPS), using car batteries. To allow (partial) independence from the grid, a solar panel and a wind turbine are used to recharge batteries.

Price of the full Field Lab: € 19,100
(all modules, all resupply packages and support kits)

The final price of the field lab depends on several factors.

- Emergency aid: **€ 17,500**
(Full lab minus “End Use” module)
- Non emergency setting: **Price depends on the process cascade**