

The Autarky Toilet

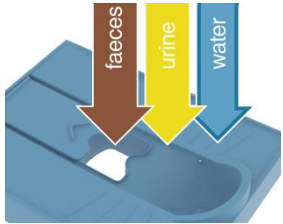
Sanitation off the grid



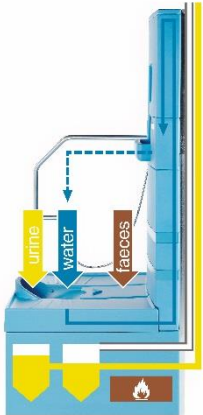
Rendering: EOOS

funded by:

The Autarky Toilet



Stream separation at the source



On-site treatment of water, urine and feces in the toilet

Off the grid: no connection to electricity, to water supply or to sewer systems



Resource recovery for fertilizer production

On-site treatment in the toilet

Water treatment

from handwashing, anal
cleansing & flushing



Safe running water 24/7

Approx. 6 users/
1 family

Household level



Urine treatment

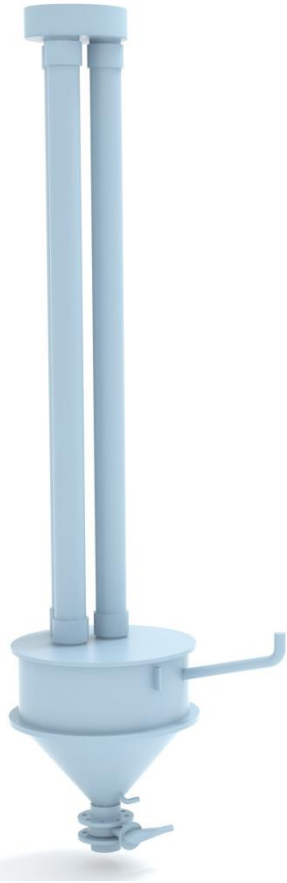
Stabilization &
evaporation

Feces treatment

Hydrothermal
Oxidation (HTO)

Rendering: EOOS

The modular concept



Urine treatment



Feces treatment



Water treatment



User interface

Renderings: EOOS

Water treatment



1. Bioreactor

Biological conversion of organic matter & ammonia by a biofilm

2. Membrane

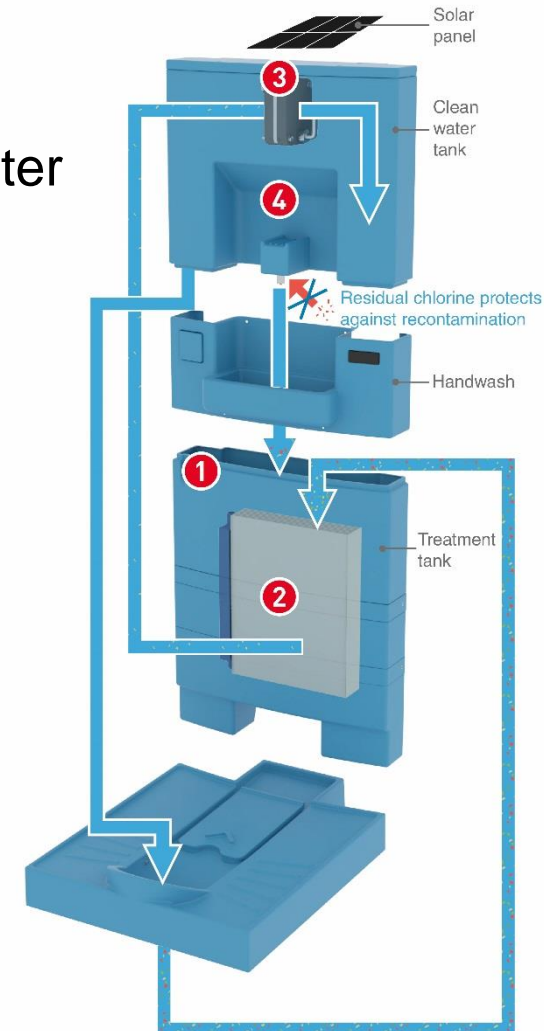
Retain of pathogenic organisms

3. Electrolysis

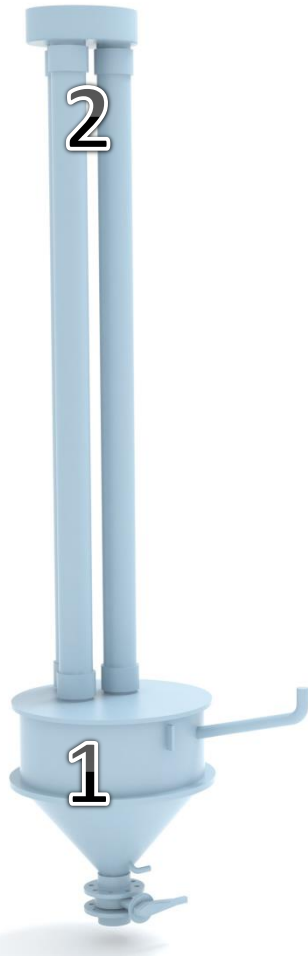
Converts traces of organic matter, ammonia and removes color

4. Residual chlorine

Residual disinfectant produced by electrolysis



Urine treatment

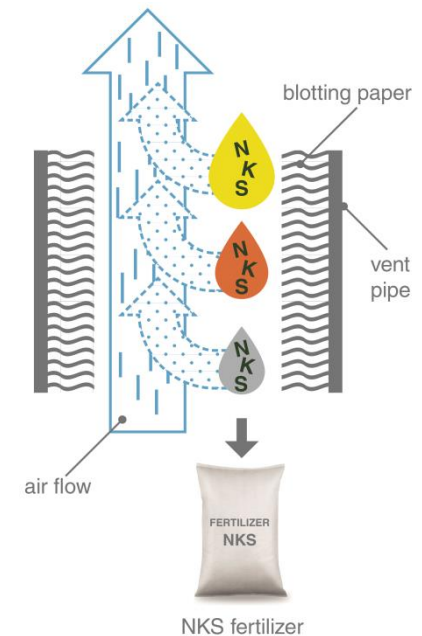
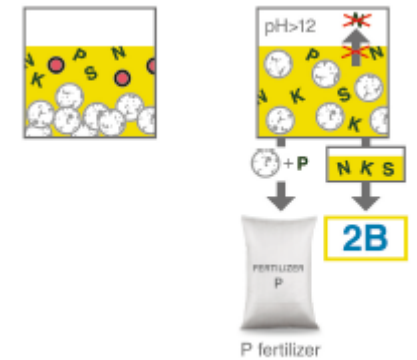


1. Stabilization of fresh urine

Addition of hydrated lime preserves urea and inactivates viruses and bacteria

2. Evaporation of stabilized urine

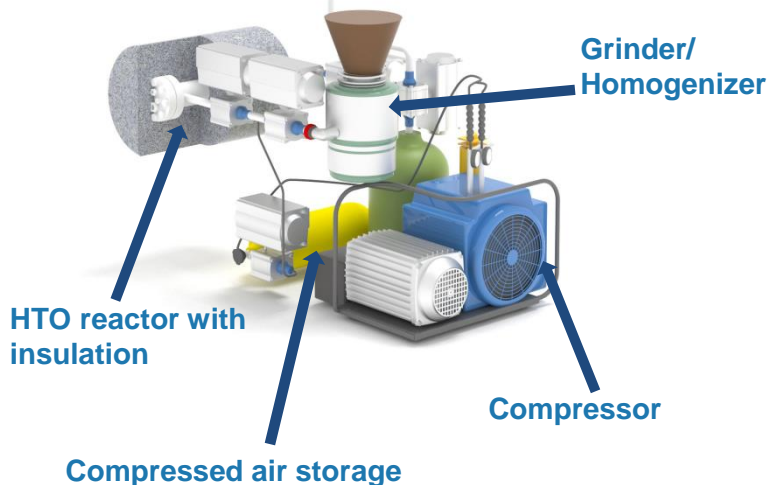
Excess water is evaporated, dried nutrients deposit on blotting paper



Feces treatment

Mineralization of feces

By mixing the feces with air and heating it above 400°C under high pressure, the sludge decomposes and is oxidized completely to carbon dioxide and water. This process is called «hydrothermal oxidation» (HTO).



Feces before and after
HTO treatment

User interface



Functional design of the user interface

An appealing and intuitive user interface promotes and ensures pleasant and hygienic toilet usage.



Rendering: EOOS

Adaption to existing superstructures



Picture: Max Grau (Eawag)



Rendering: EOOS

The project

Duration

January 2015 – April 2017

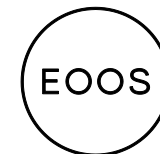
Funding

Bill & Melinda Gates Foundation within the «Reinvent the toilet challenge»

Partner



Fachhochschule
Nordwestschweiz



Contact

www.autarky.ch