

Hygienic Aspects of Decentralized Sanitation

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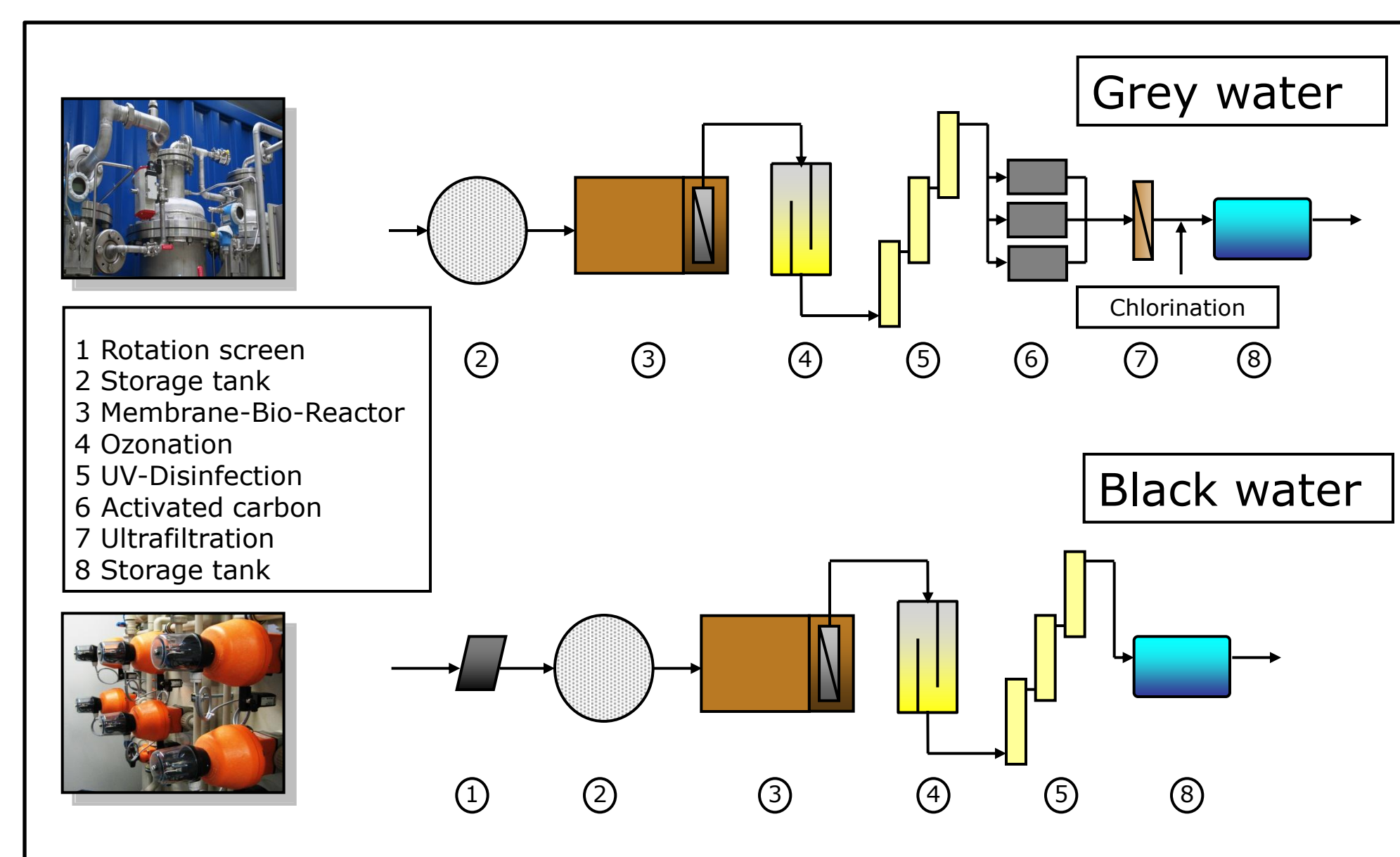


Water saving strategies of industrialized countries as well as environmental changes like water scarcity and population growth demand for new solutions in sanitation. Decentralized sanitation systems offer the possibility to support the extended need for reuse of wastewater, which is expected in the future. As wastewater contains many excreted pathogens, treatment plants must assure hygienic safety of the water before reuse.

In devolving countries decentralized sanitation systems, such as septic tanks and the wastewater reuse especially in agriculture is common. But, disposal of septage, operating and maintaining septic tanks are increasing problems in this countries. Septage is a major source of infectious pathogens, yet, the microbiological character of wastewater and septage is not well documented.



Sampling point in the waste water treatment



Scheme of the waste water treatment in a pilot plant developed in the KOMPLETT project



Emptying a septic tank in Vietnam



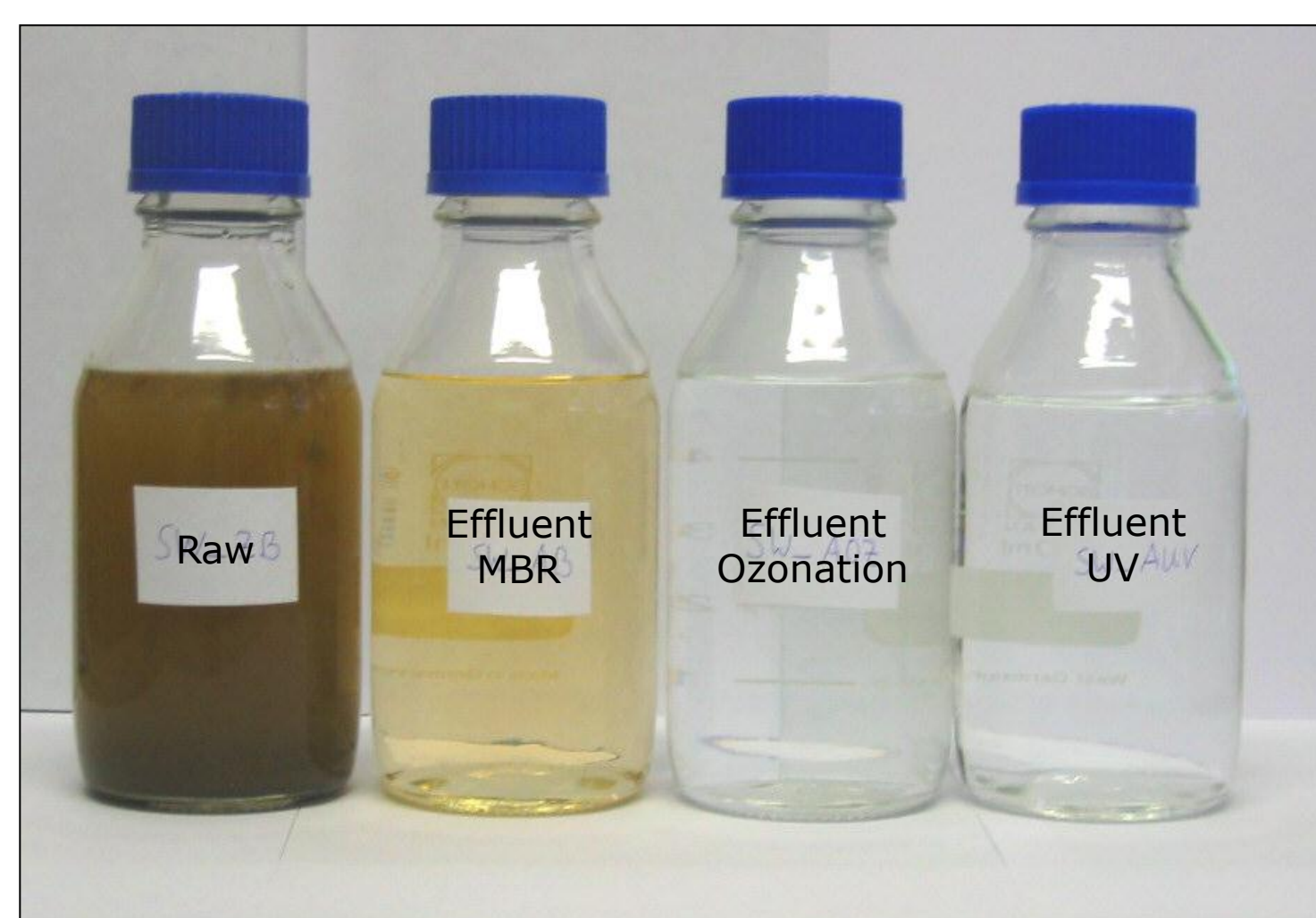
Disposal of untreated septage sludge into the environment

Results of the KOMPLETT project

- Treatment of waste water as a combination of a membrane bio reactor followed by ozonation is effective to eliminate viruses, bacteria and larger organisms.
- Further treatment steps might be necessary to meet chemical standards, e.g. removal of pesticides and pharmaceutical residuals
- Treated black water meets standards for irrigation water or toilet flushing water
- Treated grey water meets international drinking water standards
- One milliliter of finally treated sewage effluent contains the same or higher concentrations of faecal microorganismes than one gram of compost, derived from fecal material
- The awareness for health risks resulting from compost application is much higher than for the usage of sewage effluent receiving water courses
- Proper cleaning and disinfection schemes must exist
- Constructing and operating staff needs to be aware of microbiological contaminants

Analysis of sanitation management in Vietnam

- The pathogenic content and indicator organisms in septage were examined in Can Tho City, Southern Vietnam
- Septic tanks are in general only emptied when tank is full and untreated septage flows through the tank
- A large variety of helminth ova species can be found in high concentrations in septage, including hookworms and Ascaris.
- Septage leads to heavy microbial contamination of soils, vegetables and fish and also of surface water, which is a water source.
- Bathing in canals, drinking untreated surface water and eating raw spinach constitute chronic exposure scenarios. In a risk assessment all scenarios were found to exceed acceptable risk levels given in WHO guidelines.
- To decrease the risk of disease transmission the sludge emptied from the septic tank needs to be sanitized before it is disposed or reused in agriculture
- Complementing hygiene education of the population is assessed as necessary in line with changes in legal and policy frameworks



Visible water quality changes during black water treatment



Compost from toilet material



Plastic biogas plant for the treatment of animal waste



Typical housing situation at the river

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