

# Effect of particle size on greywater biochar filter performance

## **Background:**

The lack of fresh water is predicted to become a considerable challenge in the future. One way of meeting this challenge is to reuse greywater in e.g. irrigation. Filters constructed of biomaterials such as charcoal and bark has shown promising results in initial trials. The mechanisms involved in the removal of contaminants and pathogens taking place in these filters are not well understood (Dalahmeh et al., 2012; Lalander et al., 2013). This project aims to better understand these mechanisms.

## **Aim:**

Evaluate the effect grain size have on the efficiency of removal of contaminants in artificial greywater.

Filter materials to test: Biochar.

Parameters to investigate: Particle size.

Chemical parameters to analyse: COD, N-tot, NH<sub>4</sub>, NO<sub>3</sub>, pH, EC, *E. coli*, *Enterococcus faecalis*.

## **Method:**

Three column filters are prepared for each particle size (in total 9 columns). The uniformity coefficient ( $D_{60}/D_{10}$ ) is to be kept constant, while the particle size is to go from large to medium and small (three different).

Synthetic greywater is passed through the filters and the concentration of the chemical parameters are determined prior to and following filtration.

The organic and hydraulic loading rates are kept constant throughout the experiment.

Analyses are conducted once a week for 10 weeks.

## **References/Further reading:**

Dalahmeh, S., Pell, M., Vinnerås, B., Hylander, L., Öborn, I., Jönsson, H. (2012) Efficiency of Bark, Activated Charcoal, Foam and Sand Filters in Reducing Pollutants from Greywater. *Water, Air, & Soil Pollution* 223, 3657-3671.

Lalander, C., Dalahmeh, S., Jönsson, H., Vinnerås, B. (2013) Hygienic quality of artificial greywater subjected to aerobic treatment: a comparison of three filter media at increasing organic loading rates. *Environmental Technology*, 1-6.