K5/2582 - Drying and pasteurization of faecal sludge using solar thermal energy

Funded by: Water Research Commission
April 2016 - December 2017

Project description

This project investigates the solar drying and pasteurization of faecal sludge. These will be performed by studying two different types of technologies, one based on sun power collection and the other on sun power concentration.

The treatment of feacal sludge is necessary in order to prevent public health complications and contamination of the environment, and for recovery of valuable resources as biofuels and agricultural products (among others). Drying is a process that can lead to the removal of moisture and deactivation of pathogens in the faecal matter, leading to a stable product which can be handled with more ease. However, the generation of heat for drying would require electricity or burning fuel, which could lead to considerable operating costs. Solar energy is a renewable energetic source that could be used for drying, reducing thus the operation costs, and making the technology more sustainable. The application of solar thermal energy for faecal sludge processing is not widespread, in despite of its great potential, and there is lack of fundamental data on this area. This project attempts to overcome this gap by generating and providing knowledge and data to researchers and practitioners in the sanitation field. For this, a solar drying experimental rig will setup in order to study the thermodynamics of the system through energy balances, to measure the kinetics, to determine the phenomenology and to develop models.

Expected outcomes and impacts

The lessons learnt and the data obtained in this project will evaluate the use of solar thermal energy for faecal sludge treatment, and will provide the basis for optimization of existing process and for further innovations. Based on the outcomes from this project, solar technologies for the treatment of faecal matter could be developed in eThekwini municipality, South Africa and worldwide. This project will also develop Human Capacity on the bridge between the sanitation and solar energy sectors. Moreover, this project is congruent with the national energy strategies of the South African government with respect to beneficiation from the solar thermal energy capacity in the country.

Relevant Publications and reports

Journal Papers

Posters

Conference Papers and Presentations

Reports and other