

Waste Water Workshop
with Professor Pei Ying Hong, Water Desalination and Reuse Centre, KAUST

Introduction to water scarcity issues and promotion of wastewater reuse

This aim of this proposed workshop is to increase awareness about the country's water scarcity issues, and to promote water conservation and water reuse to address water scarcity issue.

Background: We hope to first introduce the fact that water resources are limited in the Kingdom. There is an increasing reliance on seawater desalination given our depleting non-renewable groundwater. Seawater desalination is an energy-intensive approach, and yet, it has been explored as an option to irrigate agricultural crops for food production. This would significantly drive up the energy costs associated with our food production. Therefore, it is important to utilize an alternative water source that is more sustainable for agricultural irrigation. This can come in the form of reusing treated municipal wastewater. We introduce the technologies that allow us to convert seawater to palatable drinking water, and wastewater to high-quality treated water suitable for agricultural irrigation.

Proposed plan

Three-days workshop that is catered for 15-20 students.

Day 1:

Activity 1:

- Seminar by faculty where the background and technologies are introduced to the students.
- Organize a trip to the wastewater treatment plant in KAUST and introduce the treatment steps of seawater reverse osmosis desalination plant, and our municipal wastewater treatment plant
- Students will help in collecting wastewater samples at different stages of the treatment train so as to perform small experiments in the laboratory.

Day 2:

Activity 1:

- Recap lecture to be given by Noor Zaouri and team. She will recap the concepts that was raised in the seminar by faculty, and to recap what the students saw at the treatment plant visit. Meant to be designed as an interactive session and will be conducted with more layman terms throughout the session.

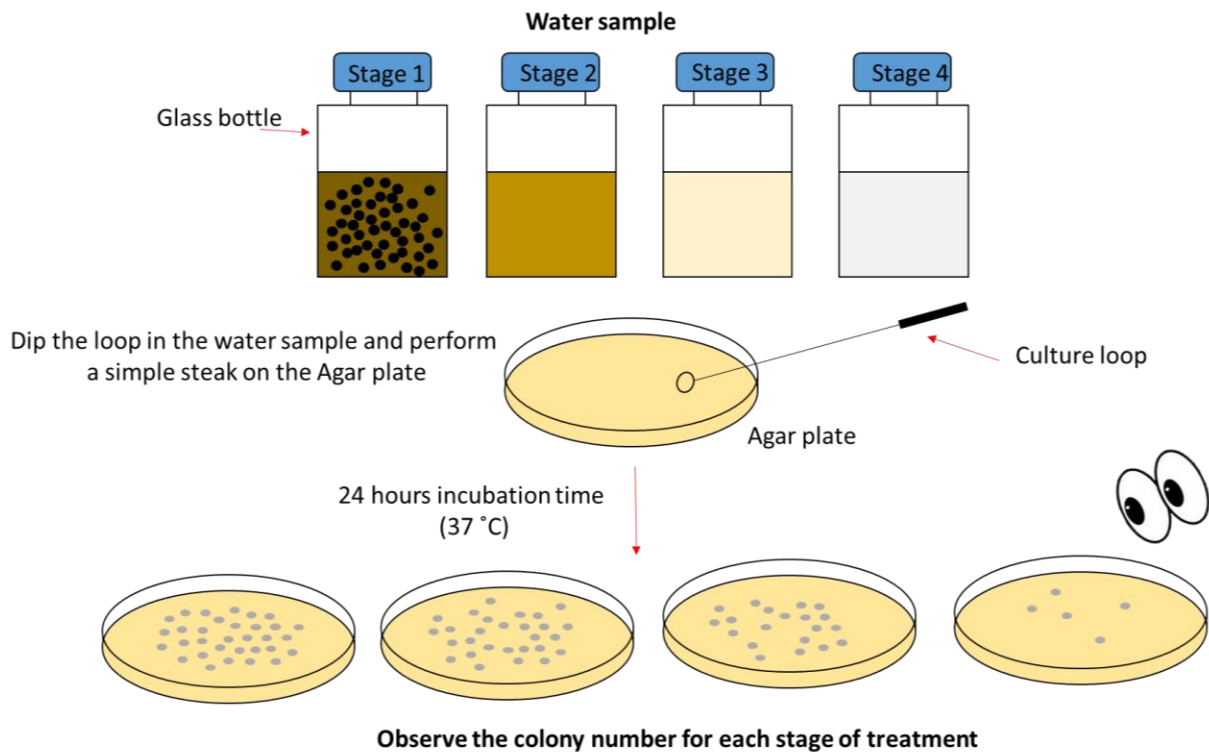
Activity 2:

- Perform experiments in the laboratory. Students will use common tools used in microbiology laboratory to assess water quality, and be asked to think about whether the treatment train is useful to reduce contaminants.
- Students will be asked to assess the number of microorganisms they can recover from the roots of plants irrigated with treated wastewater and tap water (We might use pre-planted crops to speed up the process for demonstration purpose).

Day 3 (this might have to be 2 days after the lab because microorganisms will take time to grow, and best that we be given time to collate data)

Activity 1:

- Laboratory session, observe and explain the results of the experiment done in day 2 in the laboratory.



A proposed Experiment design to perform with the municipal wastewater samples

The goal of this activity is for the student be familiar with the physical properties of the wastewater in each treatment stage. Also to give the students an idea on evaluating the water quality.