Comparison study on effect of common disinfectants in lab

Proposal

Objective:

In this class project, we want to know the efficiency of three different disinfectants (ethanol, bleach and hand soap) on sterilization for Ecoli pure culture and mixed environmental samples. Compare their capabilities for sterilization at different contact time under recommended concentration and their sterilization efficiency at the same concentration. We will also compare the DNA survival and viability ratio of the treated samples to investigate the disinfect mechanism of the agents. Finally, a DNA sequencing test will detect if there are any species have resistance to certain agent.

Hypothesis:

We assume that longer contact time and higher concentration of disinfectant lead to less ratio of bacterial viability. And the order of the disinfectant efficiency is ethanol, bleach and hand soup, when they are operated in the same concentration and contact time. Ethanol has a higher efficiency on DNA reducing and bleach has a higher efficiency on viability reducing. And there is no resistance to agents.

Method and Material

Material

Shaker table
Incubator
Batch reactor
Refrigerator
Nanodrop
PCR programmer
Centrifuge
DNA extract kit

Nutrient Agar plate X 80
300mL Flask X 4
Tubes, cylinder, scale

E. coli culture
Substrate solution
Mixed culture from Erin's reactor
Ethanol
Bleach
Antimicrobial Soap

Method

First week

Day 1

Culture E. coli in liquid medium by the shaker table

Day 3

Measure biomass concentration of pure and mixed cultures by plate counting

Put the original culture solutions into refrigerator to make sure the biomass not change significantly

Day 5

Equal the biomass concentration of two culture solutions by diluting

Operate the disinfect experiment with different agent different contact time in the batch reactor under the recommended concentration

Operate the disinfect experiment with same concentration same contact time and different agent

Do spread plate for each result solution and culture them in the incubator

Do DNA extraction for each result solution

Second week

Day 1

Plate counting

Day 2

Operate Nanodrop and PCR on each DNA extraction

Day 3

PCR result cloning

Day 4

DNA sequencing

Third week

Result analysis and paper writing

Fourth week

Presentation preparation