Perturbation Experiments in Chemostats

David Gresham and Alex Ward June 2008

Aim:
The aim of this experiment is to transiently perturb a steady-state chemostat culture and follow the response over time by taking small samples. We use a 450mL working volume in order to minimize the effect of sampling on the culture.

Setup:

- Set up a chemostat vessel for 450mL. Set two mixing rotors accordingly: one at about 400mL and the other around 200mL using the outside of the vessel as a guide.
- Select appropriate probes: we monitor dissolved oxygen and pH
- In order to monitor dissolved oxygen at a more frequent rate change the parameters in the computer: lower LogDifference and LogRate
- Calibrate probes according to chemostat manual
- Inoculate with 1mL overnight culture
- Begin monitoring culture parameters via computer (see instructions in chemostat manual)
- Allow culture to come to a steady-state

Pulse:

- Determine how frequently to sample and prepare all tubes prior to starting
- Take a pre sample (time=0) before the pulse
- To ensure you only take 8-10mL of culture, lower the drop tube so that the tip just touches the top of the culture
- Open port to add perturbing agent. Reseal after addition.
- Begin the pulse noting the time
- Take appropriate samples noting the time.
- Once you have finished the pulse, turn off the computer prior to stopping the chemostat. Stopping the computer monitoring should result in the chemostat shutting down.
- Refer to chemostat manual for instructions on how to obtain dissolved oxygen and pH data