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Optimization of a Bioreactor

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Optimization of a Bioreactor
Due: 12 October 2023

Purpose: The primary objective of this problem is to learn to work effectively as a team, and to design an experiment where optimization is essential.

Skills:

The purpose of this assignment is to help you practice the following skills that are essential to your success in this course / in school / in this field / in professional life beyond school:

- **Communication/Documentation:** Written and oral communication development, report writing, reporting results to clients.
- **Professional developments:** Place the experiment in the context of their future professional environments or scenarios.
- **Lab Protocol/Skills:** Develop specific techniques and skills of hands on experimental work, encounter concepts in a hands-on environment, or address safety issues. This category is only marked when the student is specific.
- **Team Skills:** Learn how to work effectively with others as part of a team.
- **Experimental Design:** Learn nature of designing experiments including the process of identifying the problem, designing the data collection method to address the problem, analyzing the results and making decisions. A low-level response to this simply identified experimental design as an outcome
- **Understanding/Critical thinking:** Develop ways that the experience they have in the laboratory is useful in a general sense, i.e., to other experiments and helps develop their higher level critical and creative thinking skills.

Knowledge:

This assignment will help you to learn the specific topics or content within that laboratory assignment or reinforce understanding of content learned in lecture classes, e.g., resin capacity in ion exchange.

Tasks:

Your team's task is to develop optimal operating conditions for pilot production or degradation in a yeast or bacterial bioreactor, respectively. The cell growth, production and degradation process, and measurements will be made via computer simulation in our Virtual bioreactor. You should develop operating conditions that maximize volumetric productivity in the bioreactor.

Criteria for Success:

Your success in this assignment will be evaluated using your report. The evaluation criteria will focus on your demonstration of the ability to design and conduct experiments; analyze and interpret data; identify, formulate, and solve engineering problems; function on multidisciplinary teams; communicate effectively; and use the techniques, skills, and modern engineering tools necessary for engineering practice.