

Design Project

A manufacturer of amoxicillin would like a preliminary design on the separation of *Penicillium* mold from the product-containing supernatant at a single bioreactor scale of 250,000 L. You may select any appropriate separation method (e.g., filtration, centrifugation, etc.).

Your assignment is to design a process to separate the mold to produce a clarified supernatant which will undergo further separation and purification. In addition to the primary separation unit, you should specify any pump(s), associated piping, valves and connectors that will need to be purchased. Assume that various tanks are available. The company wants not only the capital costs for the equipment, but also annual operating costs.

Things to keep in mind in this design:

1. The material will have to remain sterile.
2. You do not want to homogenize the mold.
3. You will need to make assumptions regarding many aspects of this design, and please provide some evidence (such as literature) to support any assumptions. For example,
 - material of construction
 - duration and conditions (T, P, pH, etc.) necessary for the separation process to prevent degradation of product
 - concentration of mold
 - compressibility of mold
 - physical properties of mold (density, viscosity, etc.)
4. The mold will be discarded after use.

Turn in by Wednesday, March 15 (typed, double-spaced):

- 1) An executive summary describing the key assumptions made and conclusions. (about 1 page)
- 2) The proposed design. If appropriate, you can additionally include any special “start up” instructions that will need to be addressed the first times the process is run. (a few pages)
- 3) A table listing all the costs (and vendors).
- 4) Your clear and understandable calculations.
- 5) Please see class website link “Preparation of written reports”:
<http://cmbe.engr.uga.edu/bche4520/writtenreports.pdf>