

- 12.11.** Hybridoma cells immobilized on surfaces of Sephadex beads are used in a packed column for production of monoclonal antibodies (Mab). Hybridoma concentration is approximately $X = 5 \text{ g/l}$ in the bed. The flow rate of the synthetic medium and glucose concentration are $Q = 2 \text{ l/h}$ and $S_0 = 40 \text{ g/l}$, respectively. The rate constant for Mab formation is $k = 1 \text{ gX/l-d}$. Assume that there are no diffusion limitations and glucose is the rate limiting nutrient.
- Determine the volume and the height of the packed bed for 95% glucose conversion. Bed diameter is $D_0 = 0.2 \text{ m}$. Neglect the growth of the hybridomas and assume first order kinetics.
 - If $Y_{p/s}$ is 4 mg Mab/g glu, determine the effluent Mab concentration and the productivity of the system.