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Stirred Bioreactor Heating: Temperature Experience of a Single Organism

Rapid heating of bioreactors is extensively used for the production of recombinant proteins. Such temperature-induced expression systems show high levels of recombinant protein productions and present important and convenient features for bioprocessing. The heating of a lab-scale stirred bioreactor is investigated, based on a two layer turbulence model. The wall temperature is assumed to be about 80 degree Centigrade.

We observed the occurrence of a narrow high temperature layer near the bioreactor wall. Bioorganisms entering the viscous hot layer usually stay there for a long time and this typically induces the their death. The simulation results show that a considerable part of the microorganism population is endangered by the high temperature near the bioreactor wall.