

Fig. 6 Dynamic profile of cell, substrate and product concentration subject to substrate step change.

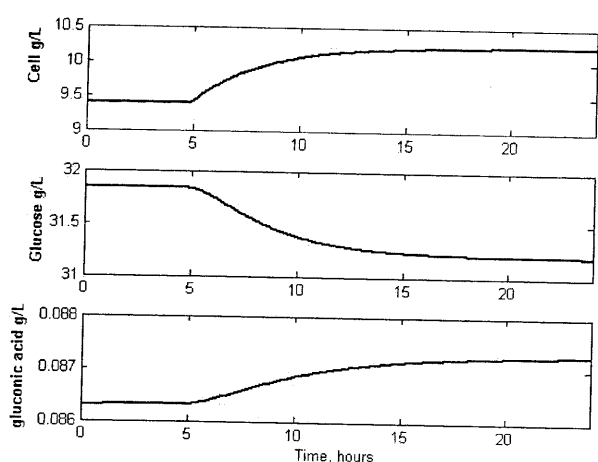


Fig. 7 Dynamic profile of continuous fermentation subject to cell step change.

the state parameters (cell, glucose and gluconic acid concentrations) simply follows first order Laplace transfer function when disturbed by changes in feed cell and substrate concentrations. If the value of gains and time constants of the first order transfer functions were determined, it would be possible to design control strategy for this process.

6. Conclusions

Batch fermentation of glucose to produce gluconic acid by *Aspergillus niger* has been conducted. The kinetic parameters have been obtained by fitting the *Contois* model to the experimental data. The *Contois* model was able to represent the batch fermentation process quite well. This enabled further investigation

on the behavior of steady state and dynamic fermentation in single fermenter which can be very useful in the process design (fermenter sizing) and bioprocess control. Future work may include fermentation system identification (i.e., obtaining its transfer functions and bioprocess control strategy for gluconic acid production).

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