

### Online Capacitance Sensor in a Fed-batch CHO Cell Culture

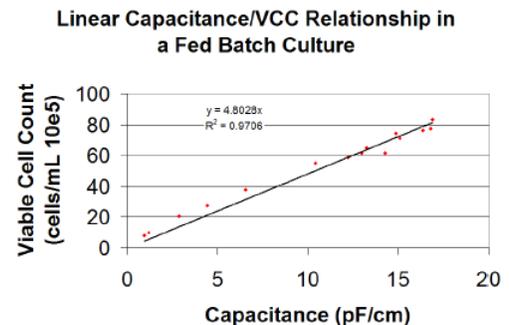
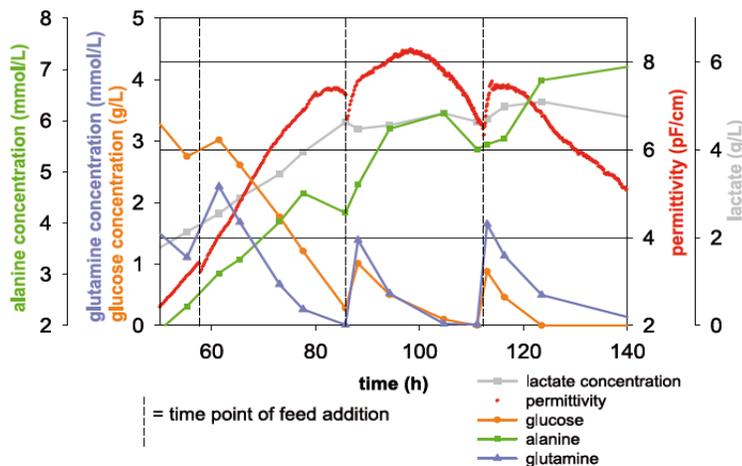
#### Benefits

- monitor cell growth, stationary and decline phases of the culture
- monitor nutrient limitations and improve feeding strategy; save time with automated control loops (e.g. triggering feeding pumps)
- less contamination risks and lab work; identify process deviations at early stage

#### Introduction/Background

The viable cell density is a critical parameter to monitor in a cell culture process as it is strongly linked to process productivity. It can be measured with a capacitance probe that offers a very reliable alternative to traditional offline measurements.

#### Examples



Left graph: When the cell culture medium reaches nutrient depletion (e.g. glucose, glutamine), the capacitance signal (red) decreases. This decrease in the capacitance signal indicates that the cells either shrink or die because of the lack of nutrients. The cell growth and culture productivity can be optimized with a feeding strategy based on the capacitance signal: feed addition should occur when the capacitance signal starts to slow down. Feeding pump can be triggered by the capacitance signal for an increased productivity of the process.

Right graph: this graph illustrates the reliability of the system for the online monitoring of the viable cell count during a fed-batch culture with a very good correlation between capacitance and offline VCC.

#### References

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- Online Measurement of Viable Cell Density in Animal Cell Culture Processes. Georg Schmid. CCE IX 2003 Poster.
- Evaluation of a Novel Capacitance Probe for On-Line Monitoring of Viable Cell Densities in Batch and Fed-Batch Animal Cell Culture Processes. Georg Schmid. ESACT 2003 Poster