— BIOTECHNICA 2008 — Hall 9 — Stand F42 —

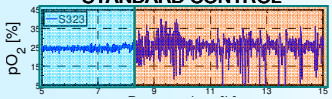
SIEMENS

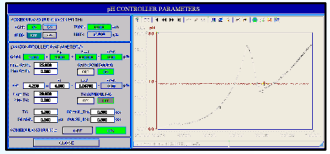
IMPROVED PROCESS QUALITY WITH THE ADVANCED PROCESS CONTROL FUNCTIONS IN SIEMENS DCS SIMATIC PCS 7

ADAPTIVE CONTROL

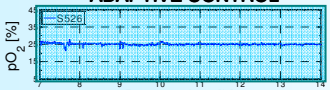
The PID controllers implemented in conventional automation systems are not accurate enough as the process dynamics during fermentation considerably changes with time. Straightforward new solutions for temperature-, pH- and pO2-control use gain scheduling methods to adjust the controller parameters properly.

STANDARD CONTROL





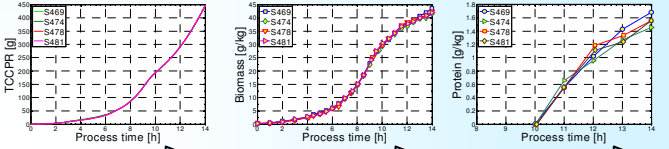
ADAPTIVE CONTROL



ADVANCED CONTROL

Controlling TCCPR (Total Cumulative Carbon Dioxide Production Rate) by varying the feed rate is a straightforward way to a sufficiently high batch-to-batch reproducibility. TCCPR is uniquely related to μ and biomass.

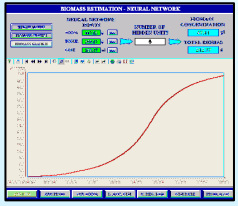
REPRODUCIBILITY



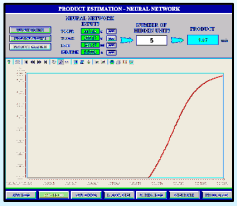
TCCPR → BIOMASS → PROTEIN

PROCESS MONITORING

Based on the offgas data, oxygen uptake rate (OUR) and the carbon dioxide production rate (CPR) can by computed online. Together with the cumulative base consumption rate (BCR), the biomass and protein concentration can easily be estimated. Most accurate values are obtained with artificial neural networks (ANN).



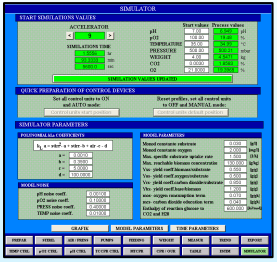
BIOMASS ESTIMATION



PROTEIN ESTIMATION

PROCESS SIMULATOR

Testing and tuning all controller options before applying them at the production process, the SIMATIC PCS7 automation system was extended by a process simulator.



- **PROCESS SIMULATION AND REAL PROCESS FERMENTATION WITH THE SAME PROGRAM**
- **PERSONNEL TRAINING WITH LOWER COST AND TIME**
- **TESTING CONFIGURED PARAMETERS BEFORE APPLICATION TO REAL FERMENTATION**
- **SETPOINT PROFILE TESTING**

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