E. coli Batch Fermentation using Online HPLC

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Short Description of the Experiment

Batch fermentation was monitored automatically using Online HPLC. Fermentation lasted almost 22 hours and samples where withdrawn out of bioreactor continuously. *E.coli* K12 MG1655 was cultivated. Glucose consumption and acetate production were monitored. Cultivation volume was 600 mL, pH 7 and temperature 37 °C.

Typical overflow metabolism in aerobic conditions can be seen (Figure 1.). There exists a nice correlation between glucose utilized and acetate synthesized; profiles of both metabolites correlate well with CO2 produced and oxygen consumed. After all glucose is used, the bacteria starts to use the prior overflow product - acetate - for energy metabolism, leading to another physiological state at lower level of CO2 production and oxygen consumption. After acetate has been "eaten" the dissolved oxygen level increases to near 100%, indication that metabolism has come to a standstill. It can be concluded that the use of OnLineHPLC together with gas analysis can give considerable insight to this "textbook example" fermentation.

Cultivation media:

- Glucose 5.5 g/L
- MgSO4*7 H2O 0.5 g/L
- NH4Cl 3.5 g/L
- K2HPO4 2 g/L
- Mineral Stock Solution 4 mL/L
- Antifoam 200 µL/L

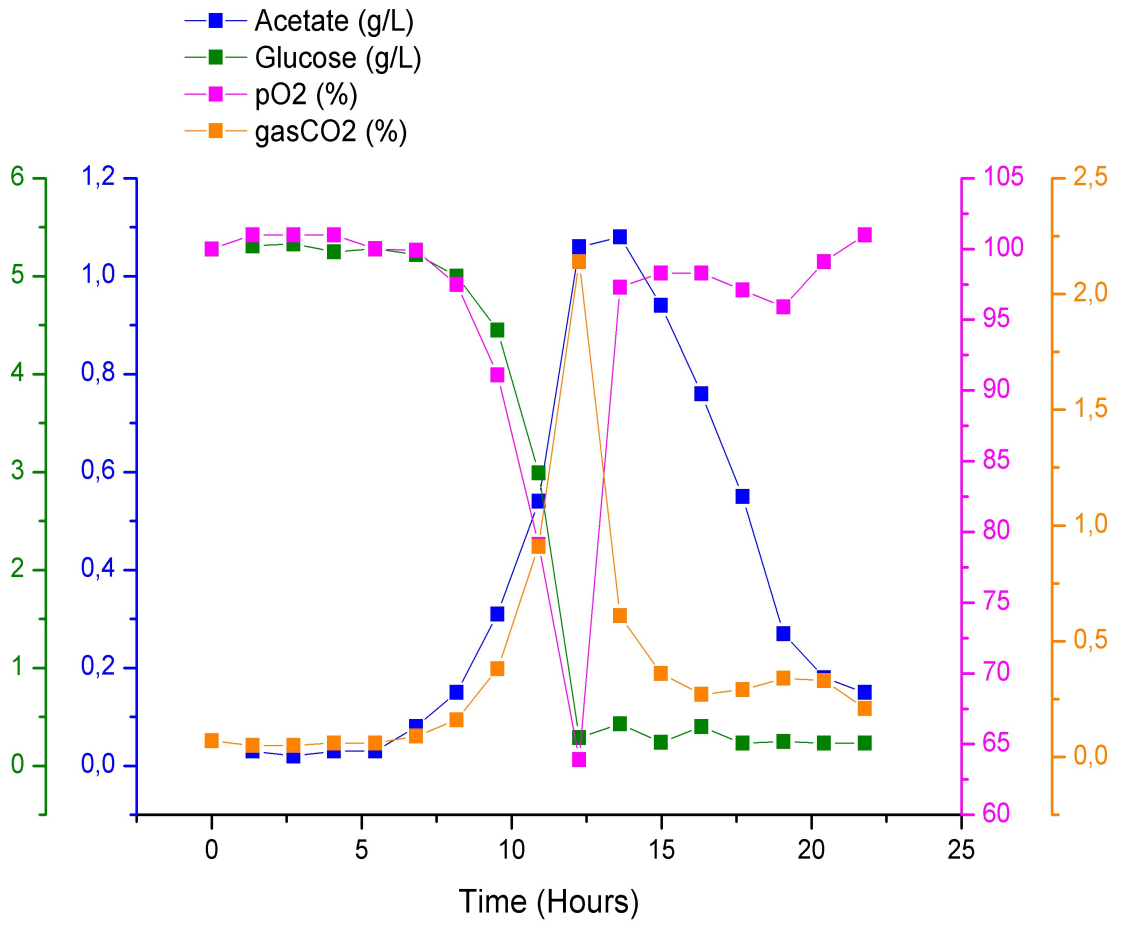

Figure 1. Online HPLC measurements (glucose and acetate) from E.coli – cultivation. Exhaustion gas (gasCO2) and dissolved oxygen (pO2) are also included in the figure.