

# On-line targeted metabolomics for real-time monitoring of relevant compounds in fermentation processes

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## Abstract

Fermentation monitoring is a powerful tool for bioprocess development and optimisation. On-line metabolomics is a technology that is starting to gain attention as a bioprocess monitoring tool, allowing the direct measurement of many compounds in the fermentation broth at a very high time resolution. In this work, targeted on-line metabolomics was used to monitor 40 metabolites of interest during three *Escherichia coli* succinate production fermentation experiments every 5 minutes with a triple quadrupole mass spectrometer. This allowed capturing high time resolution biological data that can provide critical information for process optimisation. For 9 of these metabolites, simple univariate regression models were used to model compound concentration from their on-line mass spectrometry peak area. These on-line metabolomics univariate models performed comparably to vibrational spectroscopy multivariate PLS regressions models reported in the literature, which typically are much more complex and time consuming to build. In conclusion, this work shows how on-line metabolomics can be used to directly monitor many bioprocess compounds of interest and obtain rich biological and bioprocess data.

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