

Online Monitoring of Fermentations with ATR-IR vs. Raman and Near-Infrared: Challenges in aqueous solutions with current available PAT technologies.

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In the last 10 years several PAT techniques were studied extensively to monitor low level concentrations of ammonia, glucose, glutamate, lactate and other substrates to follow fermentation reactions over time. The time consuming off line analysis with HPLC or ELISA is very cost and labor intense and real-time monitoring is getting more attractive.

Several PAT techniques have been used already with different success. In this study there will be an overview about the challenges one can observe when using the main spectroscopic techniques such as Raman, Mid or Near-Infrared. While Mid-IR is limited in respect to the fibers to ca. 5 meters length and only liquid, suspensions or gas analysis can be done quantitatively, it is much more sensitive and the detection limit is typically 10-100 times lower which can be a huge advantage for low level concentration monitoring. Raman is also getting more and more important, but the fluorescence problems are not always easy to overcome and the right laser has to be chosen.