Raman spectroscopy technologies enabling scalable process control in bioprocessing

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INTRODUCTION

Bioprocesses require automated process control to make quality products consistently and efficiently. Process analytical technology (PAT) to monitor bioreactor parameters is the first step toward automated bioprocess control and QbD (bottom). Raman spectroscopy is well suited as a bioprocess PAT. This poster presents Raman PAT solutions that enable process control with demonstrated cross-scale and cross-platform transferability.

As a PAT in bioprocessing, Raman spectroscopy provides in-line measurements of multiple components in real time using a single probe. [1] A Kaiser RamanRxnSystems analyzer was used to collect Raman spectra during cell culture or fermentation in a laboratory/process development (top left), in suite placement (top center) and manufacturing (top right) environment. In situ real-time bioprocess monitoring achieved in single-use, glass or stainless steel bioreactors using Kaiser probes for lab-scale/PD (bIO-LAB, bottom left) or manufacturing scale (bIO-PRO, bottom center) or single-use (single-use systems, bottom right).

RAMAN EQUIPMENT

In-line and real-time bioreactor analytics for process understanding and control
- Continuous measurements of key parameters
- Instant problem detection
- No sampling and low maintenance