

# Optimize your processes with Raman Spectroscopy

**Bio-processing has undergone tremendous development in the last 20 years and is now an integral part of the pharmaceutical, food and bio-renewables industries.**

Monitoring and control is often a challenge in processes. There are many parameters that influence the process and scaling up from lab to industrial scale is not easy. Complicating matter is that analysis of these parameters in the lab or at-line takes time.

## Higher yield

With Raman spectroscopy, in combination with machine learning, many of the critical parameters in cell culture and fermentation can be determined simultaneously and inline with a single probe. This makes real-time process monitoring, control and optimization possible. Real-time measurement of metabolites, nutrients and cell viability thus leads to higher yields and quality, reducing the waiting time for analysis and lowers the costs.

## Kaiser RAMAN Rxn

Raman spectroscopy has been embraced by many pharmaceutical companies as the technology for in-line monitoring, control and optimization of bio-processes. The use of Raman technology brings process, quality and economic advantages.

Labour-intensive sampling and preparation is no longer an issue, in fact sampling is not even necessary. Kaiser Raman RXN, used in a biofermenter, allows the real-time measurement of glucose, glutamine, glutamate, lactate and ammonium in combination with osmolality, viable cell density and total cell density. These data are of prime importance to improve process performance, especially since they are measured continuously and are available to be used for bioprocess control.



bIO-Optic connected to RamanRxn probe installed in a bioreactor

Raman Rxn Probe



Kaiser Optical Systems Inc. is a leader in the development of this technology and has been involved in all milestones of Raman spectroscopy development. From the first publication in 2010 on the industrial application of Raman in bioreactors to now.

The hardware is specifically designed for these applications: the Kaiser Raman Rxn analyser is designed for process applications and offers the stability and reliability needed for 24/7 use in a process environment but is also suitable for R&D. Applications developed in the lab can therefore be directly scaled up to a production environment.

The Kaiser Raman Rxn analysers are cGMP and IoT ready and integrate easily in process control and data management systems. The combination of a high throughput platform with Raman technology shortens application development and enables quality by design methodology. Use of the same technology in the laboratory and production environment simplifies scale-up to production and reduces risk.

Kaiser Optical is part of Endress+Hauser and has a complete portfolio for process analytical solutions.

## For more information

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