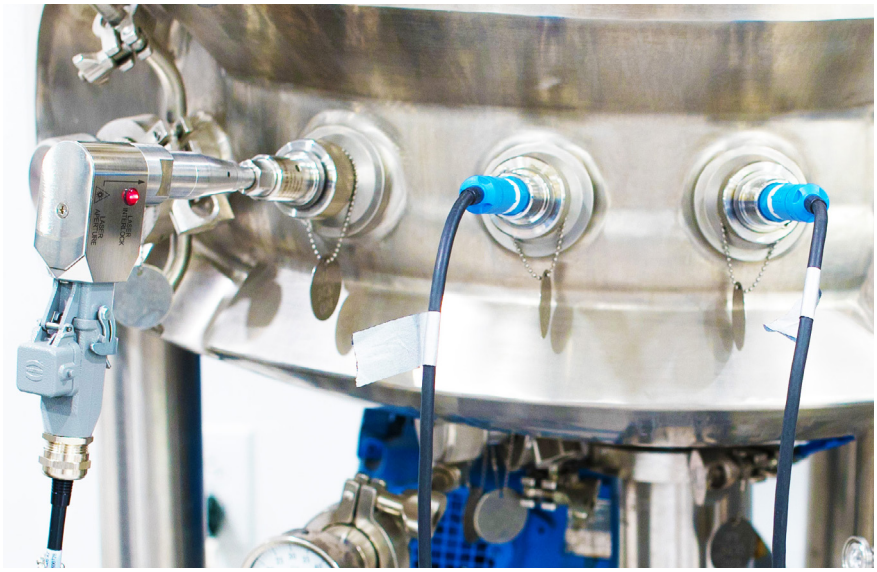
Advanced process and product control in fermentations

Raman spectroscopy for composition analysis in a lab or process

Benefits at a glance

- Measure multiple parameters on-line with a single probe around the clock
- Faster cycle times with reduced contamination risk
- Improved process understanding and control



The Rxn-45 probe for clean-in-place installations

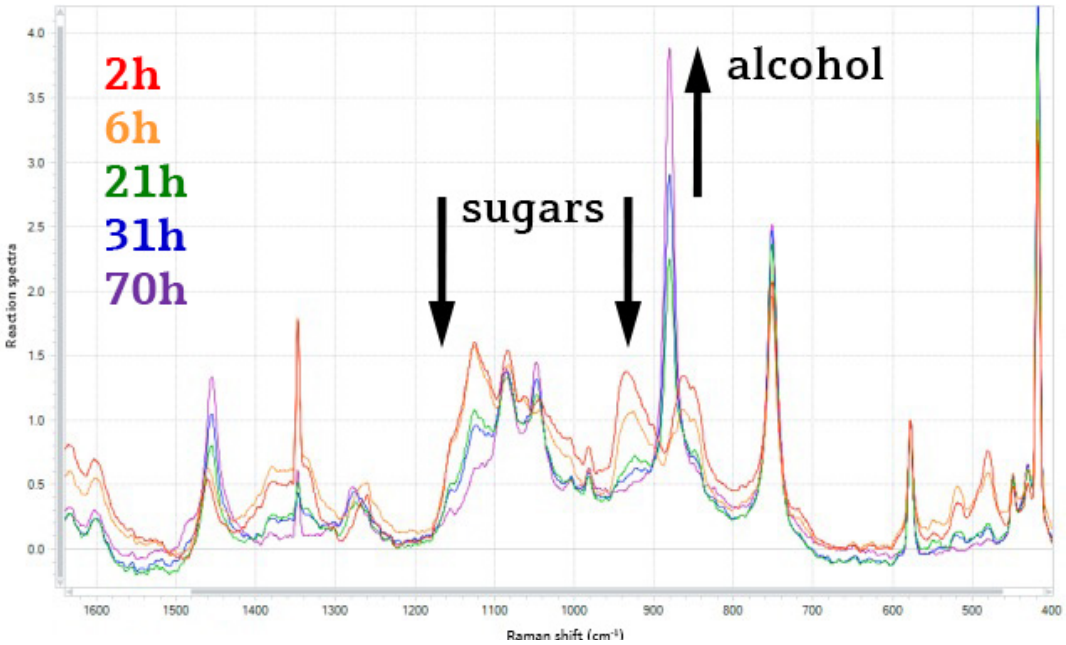
Biotechnology, the use of biological organisms to transform a material, has been used for thousands of years to preserve foods and beverages. Today, biotechnology encompasses fermentations and mammalian cell growth to preserve, functionalize, and create food and beverages. Modern biotechnology processes require new manufacturing approaches that include detailed scientific understanding, 24/7 process knowledge, and data-based control.

Endress+Hauser uses its decades of experience in biotechnology to bring leading solutions for product composition knowledge and statistical process control strategies based on Raman spectroscopy.

Our Raman systems help you to efficiently and consistently deliver a quality product with new capabilities in chemical analysis for the laboratory or process. Raman spectroscopy is a non-destructive and highly specific technique, delivering in situ, real-time analysis of multiple components with a single probe. Through this information, you can gain new understanding, monitor product quality, and adopt advanced process control strategies.

Endress+Hauser

People for Process Automation



Raman spectroscopy for in-line simultaneous monitoring of nutrients and metabolites during fermentations

About Endress+Hauser Raman spectroscopy

- Optical analysis technology providing highly specific measurements of chemistry and molecular structure
- Suitable for measurements in solids, liquids, gases, or turbid media
- Over 30 years of success in industrial laboratory and process environments
- Unified laboratory and process hardware to ensure seamless technology transfer from lab to process
- Chemically-defined ideal batch and quick identification of process deviations

Raman spectroscopy in alcoholic spirits production

Raman spectroscopy uses visible or near-infrared laser light to measure the composition and molecular structure of a material. The Raman spectrum provides a “molecular fingerprint” of the sample, enabling highly specific information about the chemical composition and molecular structure without off-line sampling or preparation. The specificity of Raman enables new capabilities in measuring starches, sugars, alcohol, and other components in the production of alcoholic spirits. Raman has been successfully applied to hydrolysis, blending, and fermentation processes.

Want to learn more about Raman spectroscopy in fermentation monitoring and control? Download our free literature!

Analysis of a corn mash fermentation process

Advanced bioprocess control

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