CLADE

clade.io

GMP ready

DESIGN AWARD 2023

CLADE™ MIRA Analyzer

BRING UNMATCHED EFFICIENCY TO YOUR ANALYTICS

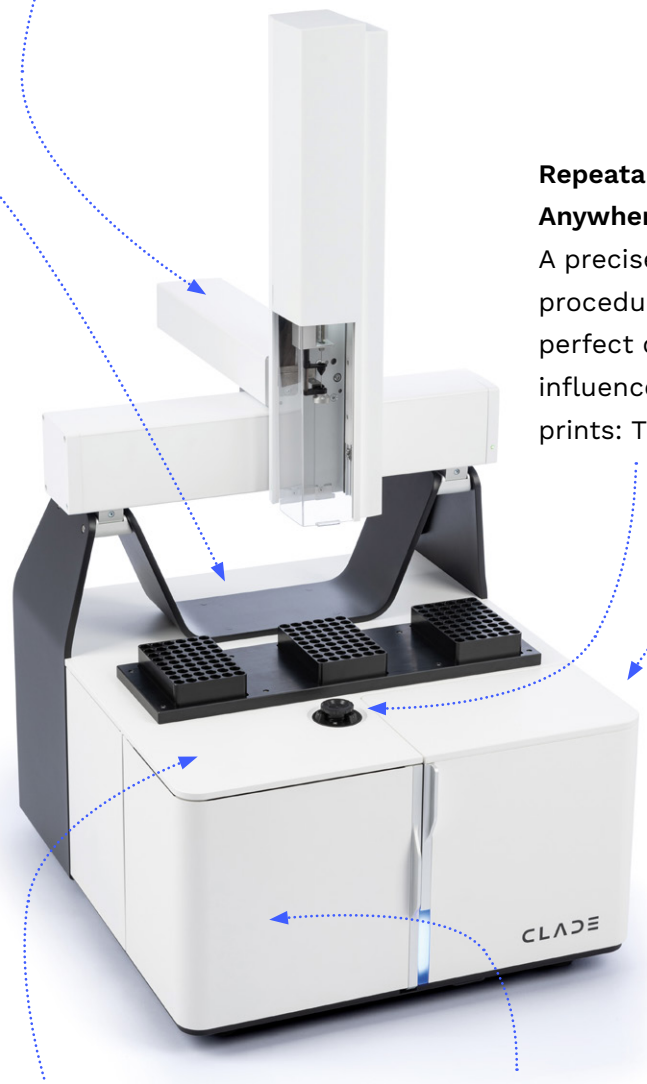
Digitize your Bioanalytics

It is our goal to build a reliable symbiosis of technology and data so you can focus on solutions that really matter. Bioanalytics is a highly complex and exacting process. We make sure it's no more complex than it needs to be. Which is why we have completely rethought biochemical analysis: the unique combination of state-of-the-art spectroscopic hardware CLADE™ MIRA and our chemometrics software CLADE™ Sphere (hereafter called Sphere) delivers higher efficiency through better quality results, faster. CLADE™ MIRA records a chemical fingerprint of a liquid sample, independent of device, time, user, and location and is thus truly digital and transferable. CLADE™ MIRA and CLADE™ Sphere enable you to build customized databases and use targeted algorithms to answer multiple analytical questions about quality control, especially during the development and manufacturing stages of your biologics. The CLADE approach leads to reduction of complexity, effort, and time as well as increase in efficiency and quality. CLADE's technology is market-proven and is already in use by key biopharma market leaders, throughout their development and manufacturing stages.

- ✔ CLADE™ MIRA records exceptionally precise mid-IR spectra of aqueous samples in transmission mode over the analytically relevant wavenumber range (3050 to 930 cm^{-1}).
- ✔ CLADE™ MIRA comes with automated sample and reference injection, automated correction of atmospheric influences, automated determination of optical path length, and automated cleaning and rinsing of the entire system.
- ✔ CLADE™ MIRA' s automated instrument test guarantees functionality of all critical components and thus secures superior data quality.
- ✔ With CLADE™ MIRA, device-, time-, user- and location-independent spectral databases can be built and used as a basis for a wide range of AI powered applications. Develop and validate methods once and make them available worldwide.

Automatic sample handling
The liquid handling robot enables you to free up your time for important tasks and reduces human error via fully automated injection of your samples.

User-friendly maintenance
All user touchpoints are optimized in terms of usability. It is easy to exchange filters, pump heads or dry cartridges with only a few minutes of hands-on time.



Repeatable Measurements: Anywhere, Anytime
A precisely orchestrated measuring procedure in combination with perfect correction of atmospheric influences creates true digital fingerprints: Transferable and reproducible.

AquaSpec™ inside
Our patented AquaSpec™ technology is part of the CLADE™ MIRA Analyzer. A 7µm flow cell enables MIR transmission spectroscopy.

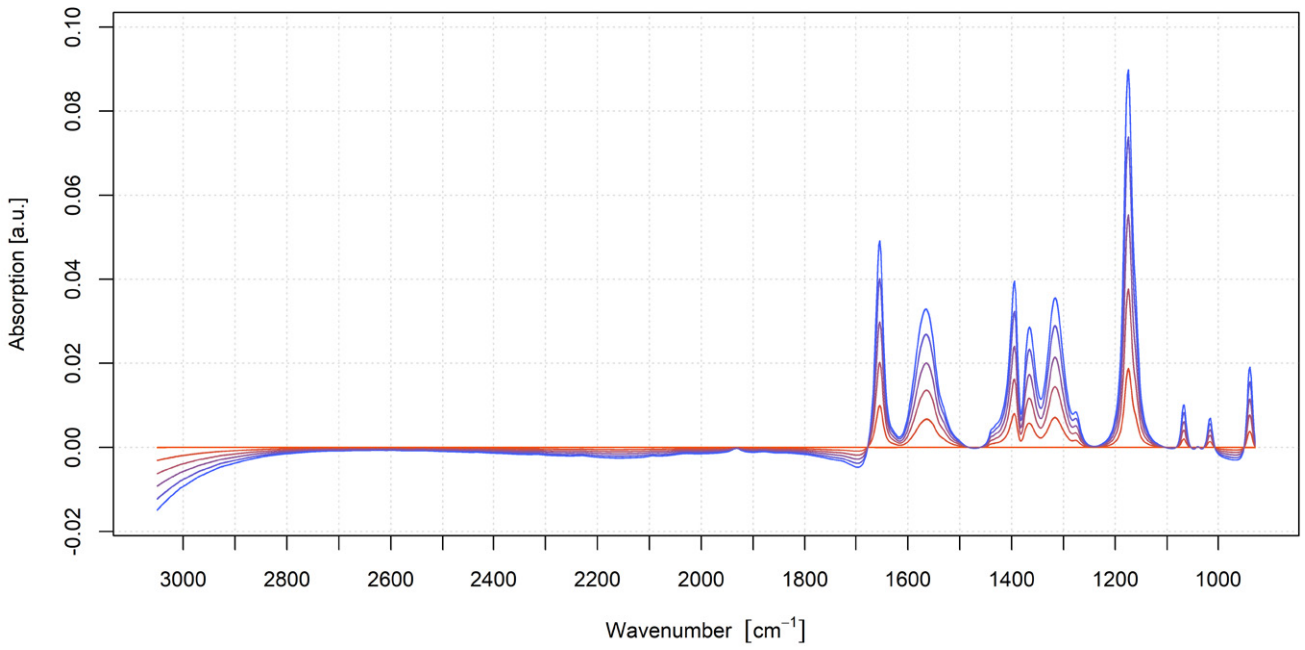
High-end detector
A sophisticated MCT-detector with maintenance-free thermo-mechanical cryo-cooling delivers an exceptional signal-to-noise ratio.

Comprehensive Instrument Test
Every day, CLADE™ MIRA performs an instrument test that makes sure that all components work flawlessly. Spectrometer, Fluidics, Flow Cell, Detector: All of them are tested to guarantee superior quality of your data.

Exceptionally high degree of Standardization

To demonstrate the analytical performance of the instrument, a series of measurements of glycerol in water in the concentration range from 0 g/l to 200 g/l was measured in equidistant 40 g/L steps with CLADE™ MIRA.

Very high dynamic range	$R^2 > 0.999$
Exceptional high spectral repeatability (single device)	RSD < 0.5 %
Outstanding signal-to-noise ratio	peak-to-peak signal-to-noise better than 10000:1
High resolution	4 cm^{-1}
Speed	4 min measurement time
Measurement range	3050 to 930 cm^{-1}



High model accuracy and robustness

The spectra were pre-processed with a Savitzky-Golay filter before being used for the PLS model calibration. A PLS model was generated with two factors. The optimal number of factors was determined via permutation. We have achieved a prediction accuracy of 0.34 g/L or 0.19%.

Exceptional high precision	CV < 0.2 %
High accuracy	RMSEC < 0.5 g/L or MAPE < 0.5 %

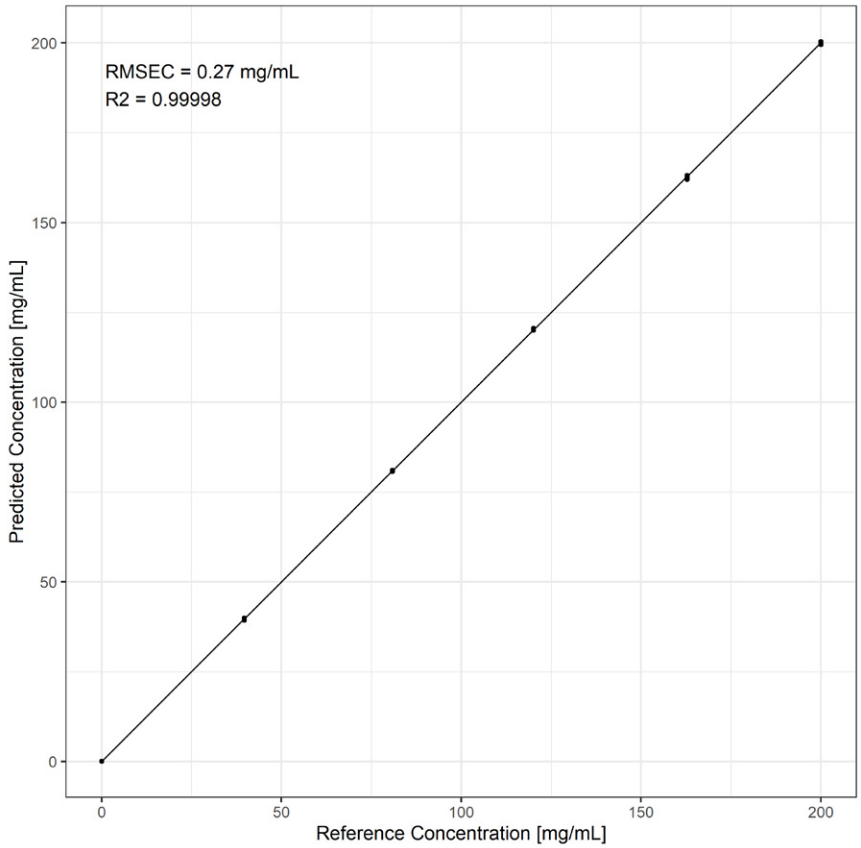


Figure 2: Predicted vs. measured plot of glycerol in water in the concentration range from 0 g/L to 200 g/L using a PLS calibration model to determine the prediction accuracy.

Contact us to learn more!

- ✔ https://clade.io/
- ✔ Tarun Mahto
  Sales Account Manager
  Email: sales@clade.io
  Tel: +49 176 126 67 006
- ✔ CLADE GmbH
  Schelztorstraße 54-56
  73728 Esslingen am Neckar
  Germany