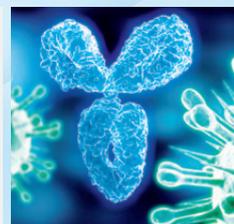
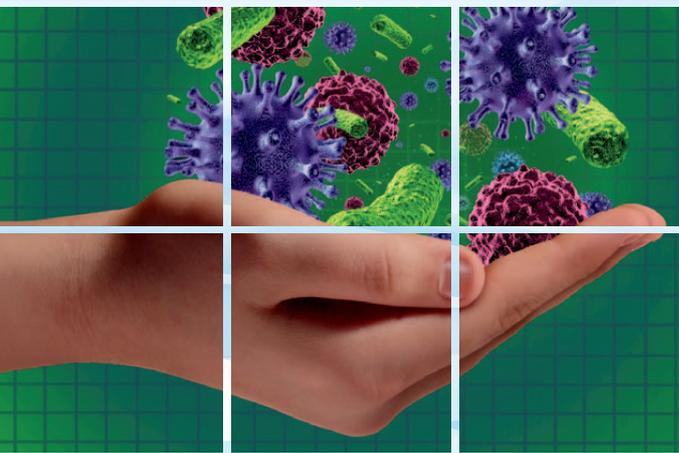


HPCE-S12

A Revolution in Capillary Electrophoresis



High Performance
Capillary Electrophoresis

HPCE-512

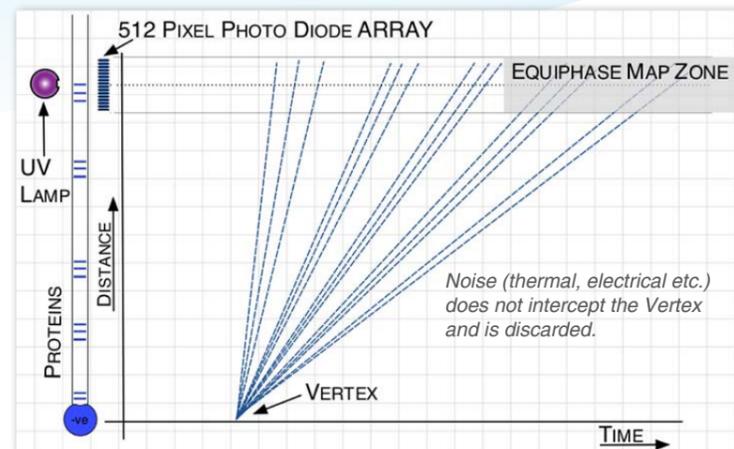
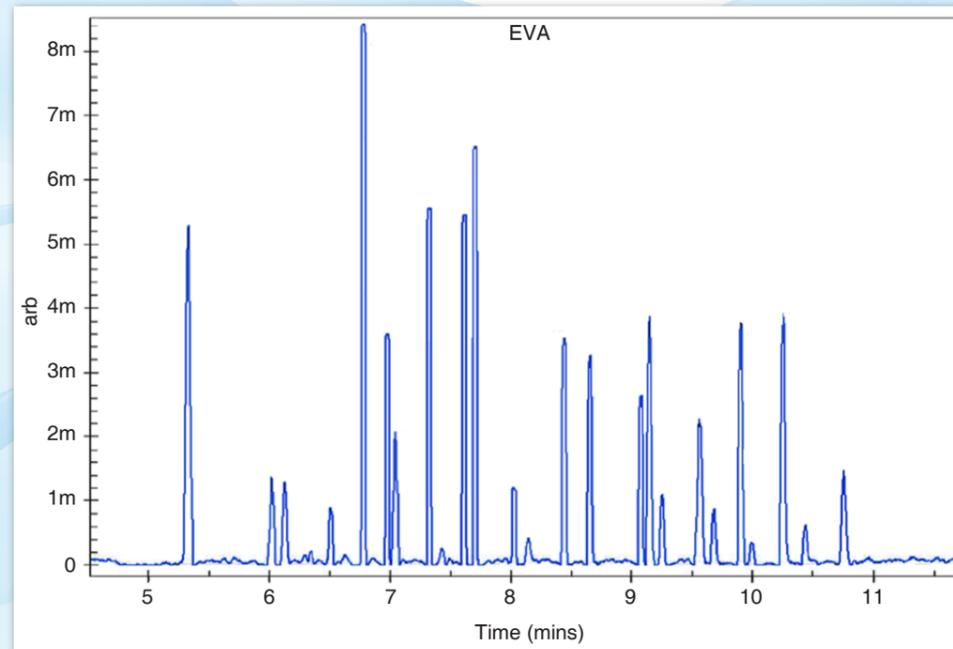
Revolutionary Performance

512 Times Better

The HPCE-512 combines innovative detector technology with sophisticated signal processing algorithms to provide demonstrably better data.

Conventional CE systems are built around single point detectors. By integrating a 512 pixel detector into the design, the HPCE-512 is able to track particles moving through the capillary in real time. Particle tracking algorithms are then able to filter out background noise from thermal or electrical sources, or identify problems in the buffer or capillary condition. The result is sample analysis with an ultra-low background.

And when the background is low, small perturbations in the signal are easy to identify, resulting in a technique with a sensitivity which outstrips other CE instruments on the market and, in many situations, beats other techniques such as liquid chromatography too.

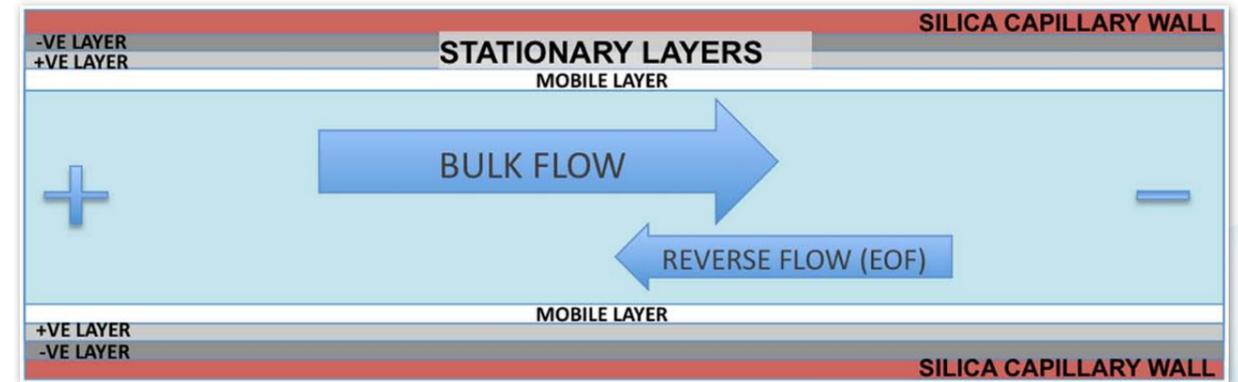


Label-Free

The improvement in sensitivity results in the ability to run many more samples without the costly and time-consuming task of adding fluorescent labels to samples.

By carefully tracking molecules as they pass across the length of the 512 pixel detector, their paths can be re-constructed and extrapolated back to a single injection point, "the vertex", no matter their size.

Continuous Monitoring of Capillary and Buffer Conditions

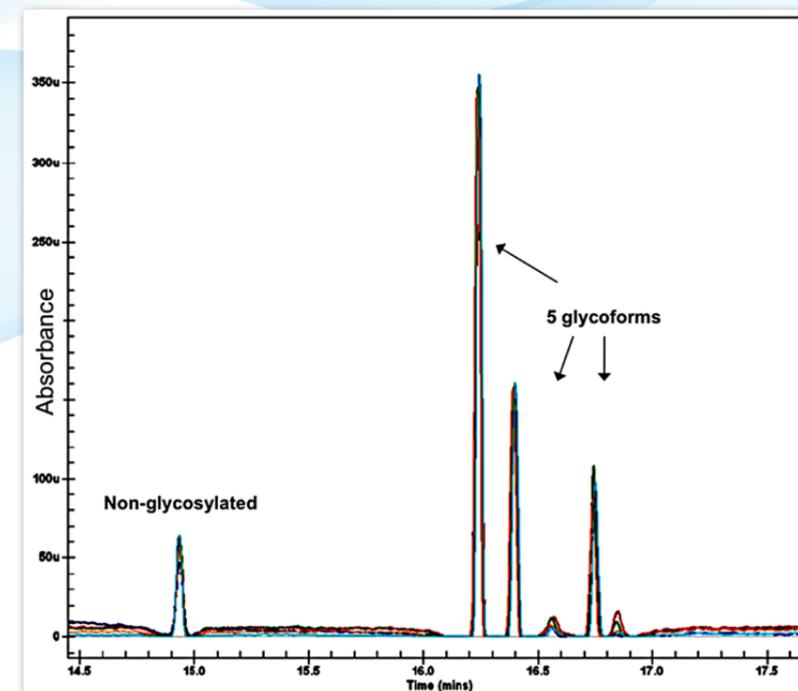


The schematic above shows the complex conditions in a typical Capillary Electrophoresis system.

The surface chemistry of the fused silica capillary introduces charge layers to the buffers which can induce different movements of the buffer, preventing the efficient, repeatable separation of the analysis. The HPCE-512 is able to monitor these effects, giving rapid feedback to the analyst on the success of a separation, allowing a unique internal quality control procedure. This is vital tool in QA/QC and diagnostics.

Robust & Highly Repeatable

The advanced algorithms used in the HPCE-512 constantly monitor the condition of the capillary, identifying deteriorating conditions and eliminating compromised data. As a result, repeated analyses have excellent precision and the days of collecting degraded, unusable data are over!



Unrivalled Resolution

Example - Ribonuclease B and its 5 glycoforms

The image shows the Capillary Gel Electrophoresis of this glycoprotein with resolutions of <200Da. The glycoforms differ by 1 Mannose unit (162Da). The 5 runs show highly repeatable data quality that is comparable to some forms of Mass Spectrometry.

Data to Exceed your Expectations

HPCE-512

Revolutionised Applications

The Perfect Solution for a Wide Range of Applications

The superior performance of HPCE technology makes it the perfect technique for a wide range of applications. From complex lysates and large proteins to peptides and viruses, HPCE can revolutionise your analysis. Here we describe a little more from just two of the many applications.

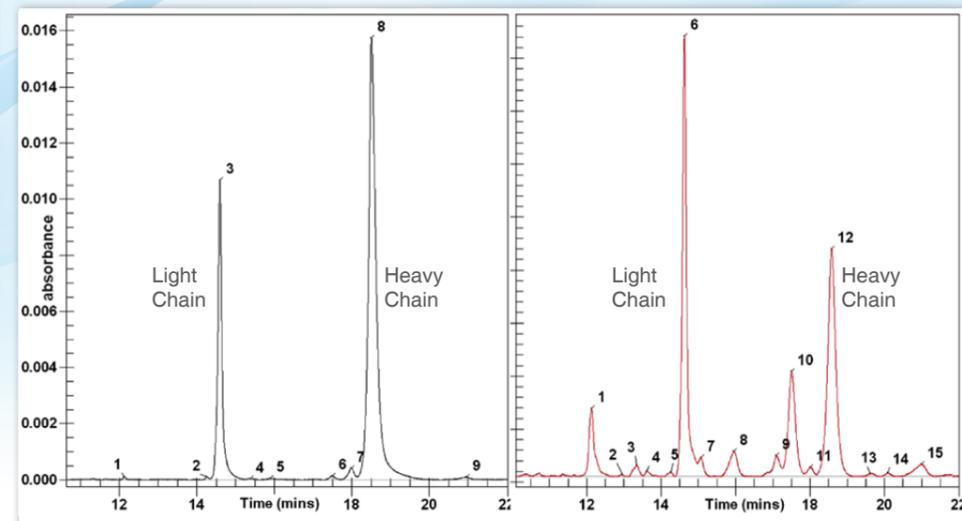
Monoclonal Antibodies (mAbs) Analysis

To assess the bioactivity and safety of recombinant monoclonal antibodies (mAbs) as biological drugs, it is important to fully characterise them. Not only is this information crucial for the assessment of the suitability of a potential biopharmaceutical product, it is also important for the optimisation and QA/QC of the manufacturing process, storage conditions and life-time assessment of the drug at the site of use.

In the analysis described below, HPCE analysis was successfully used on therapeutic monoclonal antibodies for the assessment of stability, fragmentation and charge heterogeneity. Quantifiable differences were observed in the samples before and after heat-stress. Excellent repeatability was also obtained with a peak area (non-reduced) Relative Standard Deviation (RSD) of 2.88% and a peak time RSD of 2.28%.

Capillary Gel Electrophoresis (CGE)

mAb samples from a stock supply were analysed on the HPCE-512 system. Under reducing conditions antibodies split into their main component parts of the two heavy and two light chains. For use in the patient the user has to be confident that the mAb has a low level of degradation or fragmentation. Clear differences can be seen when the mAb is forced degraded by elevated temperatures. The large number of extra peaks and the reduction of the light and heavy chain peaks can clearly be seen. The HPCE-512 software allows highly accurate quantification of each peak as it can resolve them due to the multipixel detection.

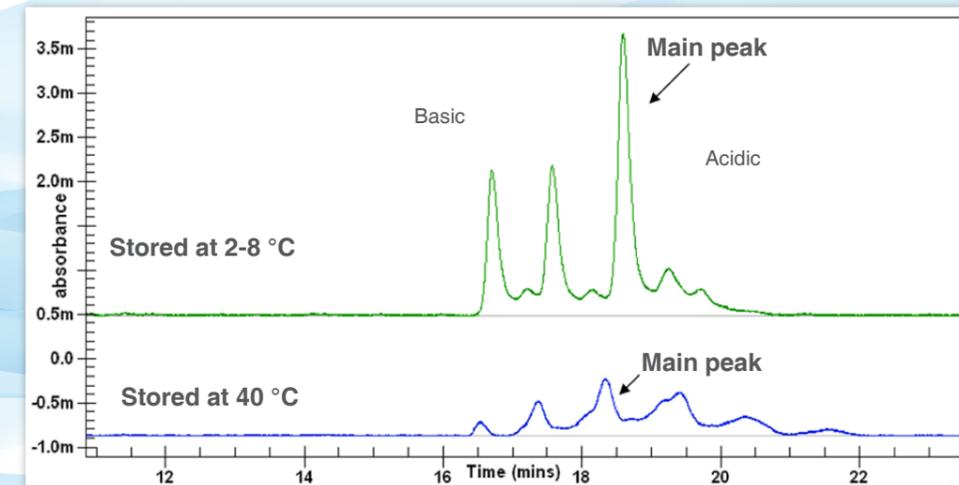


A monoclonal antibody analysed on the HPCE-512. Stock (left panel) and forced degraded (right panel) under reducing conditions. The software automatically finds each peak and calculates the area under it. This is tabulated so mAb integrity and repeatability metrics can be easily seen.

Capillary Zone Electrophoresis

Post-translational modification analysis by charge heterogeneity a monoclonal antibody

The differences in the profiles were assessed using a CZE protocol. Significant differences were observed between the control samples and the stressed samples at the temperature parameters tested. These changes could potentially lead to major differences in the efficacy of the drug product.



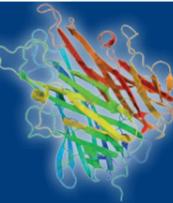
Capillary Electrophoresis Specifications

HPCE-512 - The highest CE Specifications for:

Resolution	• (CGE ~200Da, <10bp DNA)
Sensitivity	• (~1.0µg/ml protein - LoQ)
Repeatability	• (<4% RSD)
Linear Dynamic Range	• (5 orders concentration, 4 in MW)
Quantitation	• (<2% RSD for simple mixtures, 5% for complex Lysates)

Simplified and Improved Workflows

Proteins & Antibodies



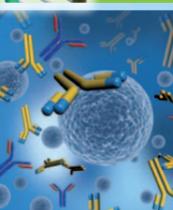
Amino Acids



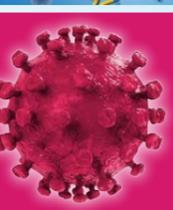
DNA & RNA



Peptides



Viruses



HPCE-512

Revolutionise your Laboratory

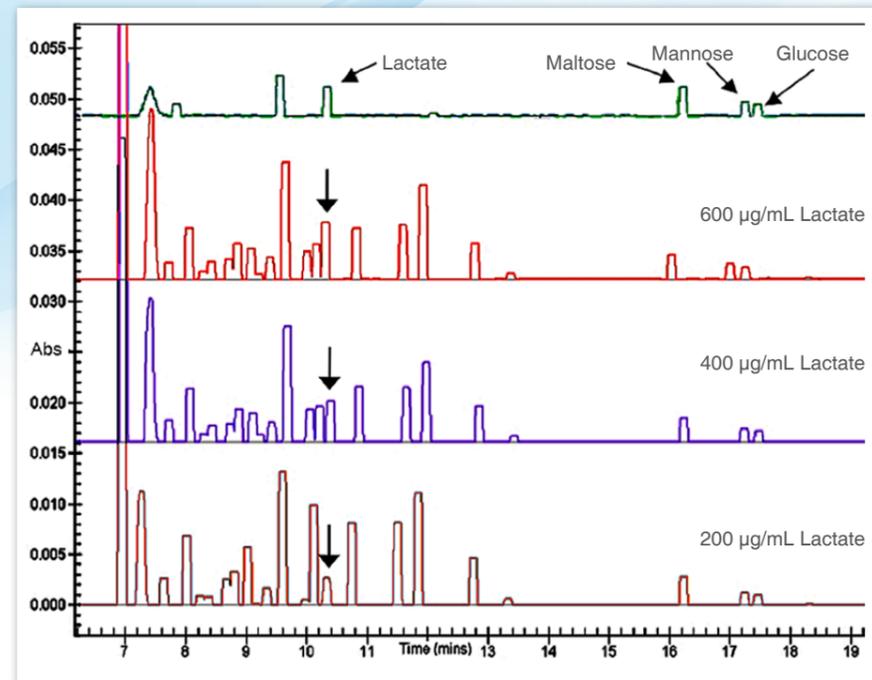
Amino Acids Analysis for Growth Media Optimisation

The formulation, optimisation and validation of media for bacterial and cell based expression systems need to have accurate, flexible and repeatable analytics. The uptake of specific amino acids is a major indicator of the efficiency of media in a range of applications. HPCE has excellent amino acid analysis capability that can be used to measure the uptake of amino acids in a cell culture allowing potential optimisation of the media to the expression system.

As part of the bioprocess, optimisation and monitoring of the uptake of amino acids in bacterial and mammalian cell lines can potentially be used to increase productivity and quality of the expressed product.

HPCE can be used to fully characterise relevant media and establish protocols to identify significant amino acids that will provide a fingerprint profile of the efficiency of the media and bioreactor conditions. This can then be used to optimise the efficiency of one particular protein production stream. It also allows analysis of carbohydrates and even vitamins. Potential contaminants can also be detected - either by indirect detection of lactate, or by use of other wavelengths.

Since the majority of amino acids have very little or no UV absorbance in the 200-300 nm spectral range, the HPCE-512 system utilises indirect UV measurements. This is achieved by deploying a background electrolyte (BGE) in the running buffer. The BGE typically used absorbs energy at 254nm thus, with the filter set at this wavelength, the capillary is totally opaque to the photodiode array. The separation of amino acids is achieved by capillary zone electrophoresis and the analytes displace the BGE allowing energy to be detected by the photodiode array. This method shows similar resolution and limit of detection to direct absorption techniques and can be used for a very wide variety of non-absorbing analytes such as lactate, carbohydrates, acids, metals and other ionic species.



Improve
Your
Data

Flexible
Analysis



Reduce
Time and
Costs

Simplify
Your
Workflow

Software

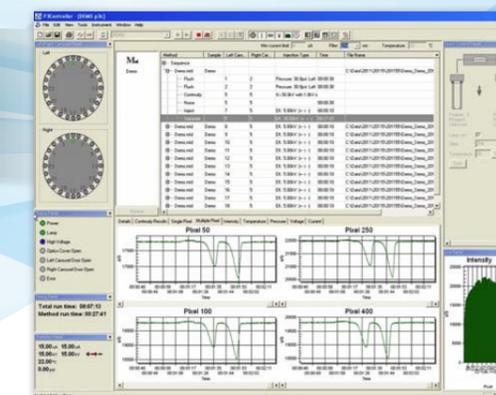
As you would expect for an instrument designed to revolutionise laboratory practices and maximise sample throughput, the software has been constructed with the analyst in mind. Intuitive to use with a clear graphical interface, the HPCE-512 software can be picked up in no time.

But the simplicity of the user interface of the HPCE-512 software belies the sophistication of the signal detection and subsequent data processing which power the HPCE-512 platform and enable it to produce superior analysis.

The 512 pixel photodiode detector facilitates the collection of an unprecedented amount of data about molecules as they pass the detector and about the analytical and buffer conditions. Powerful signal processing algorithms then reconstruct the paths of the molecules and strip out unwanted noise maximising the signal-to-noise ratio, giving the analyst accurate and robust data in seconds.

Simple reports and export options enable the analyst to process and store sample information where he or she likes in a format to suit.

The screen shot shows the P3EVA analysis software for the HPCE-512 system.



Top left: Displays the carousel positions and vial content.

Top central: Displays the workspace and method script.

Top right : Displays the lift position indicator.

Bottom right : Displays the lamp intensity across the 512-pixel photodiode array.

Bottom central: Displays single pixel data of an antibody light and heavy chains from 4 different positions on the photodiode array. The time differences of the peaks at the different pixels show how the multipixel detection acquires data in both space (position) and time.

Bottom left: Displays instrument status and experimental time.

Service & Support

HORIBA offers a range of flexible service packages to suit your needs. With experienced engineers around the country, and a focus on customer support, HORIBA is well-placed to deliver the level of service you would expect from a market-leading brand.

Dedicated applications scientists at deltaDOT are also available to help where your needs are sample dependent. With wide experience of method development, sample handling and contract analysis, they're ideally suited to help you ensure that the HPCE-512 delivers its full potential in your laboratory!

Discover the Label-Free Platform from HORIBA Scientific

Specifications

Physical Characteristics	
Width	<ul style="list-style-type: none">680 mm
Height	<ul style="list-style-type: none">398 mm
Depth	<ul style="list-style-type: none">735 mm
Weight	<ul style="list-style-type: none">< 70 kg
Sample Handling	<ul style="list-style-type: none">The system includes two carousels: - an input carousel and an output carousel.Analyses can be run either way.The number of tube positions is 24 per carousel.Sample injection can be electrokinetic or hydrodynamic.Temperature control is by Peltier cell cooling.
Electrical Requirements	
Maximum capillary voltage (bipolar)	<ul style="list-style-type: none">28 kV (-14 kV to +14 kV)
Filter wavelength range	<ul style="list-style-type: none">200 – 300 nm
Voltage requirements	<ul style="list-style-type: none">85 to 264 VAC 50/60 Hz
Power requirements	<ul style="list-style-type: none">< 750 Watts total
Operating Requirements	
Temperature	<ul style="list-style-type: none">14 °C to 30 °C
Humidity	<ul style="list-style-type: none">0 to 90% Non-condensing
Optional Extras	
Sample Cooling	<ul style="list-style-type: none">Between 10 °C and 40 °C

Sample Analysis & Application Support

We are always willing to arrange for analysis of your samples to demonstrate the superior data produced by the HPCE-512.

Please contact us for more information.

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