



TOSOH

Uncover the Potential of Multi-Column Chromatography

Simpler Than You Think. More Powerful Than You Imagine.

What is Multi-Column Chromatography? The Next Step in Efficient Bioprocessing

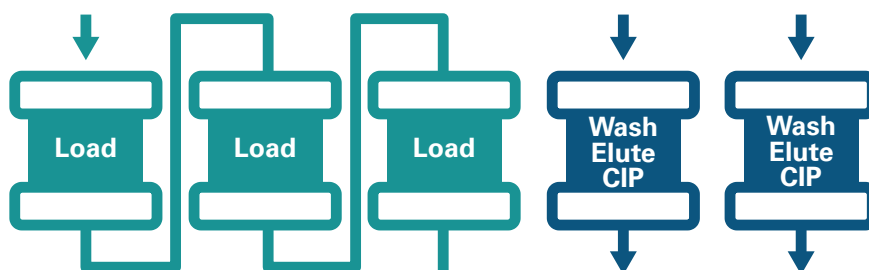
Traditional batch chromatography has been a fundamental purification method for decades, using a large single column to process biomolecules. However, this approach often faces prolonged cycle times, suboptimal resin usage, and significant material consumption, resulting in waste accumulation.

Multi-column chromatography (MCC) represents an advancement in separation and purification techniques, addressing challenges in batch chromatography. MCC employs multiple small chromatography columns in a synchronized, continuous cycle. Each column can be used in a different phase of the purification process, enabling simultaneous loading, washing, elution, and regeneration. This dynamic operation results in resin savings, reduced buffer usage, faster processing, and a significantly smaller equipment footprint than traditional systems.

The Science Behind MCC: Put Your Resin to Work!

MCC uses several small columns. At its core, the method divides the purification process into distinct zones — loading, separation, and regeneration — that operate simultaneously. By connecting columns during loading, MCC ensures that your resin is fully loaded before further processing.

Do you want to
learn more?
Check out our
playlist on
YouTube.



Join the movement toward
a smarter, more efficient
future in bioprocessing.

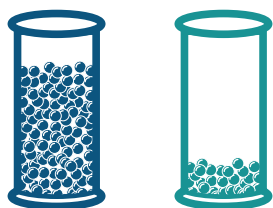
TOSOH BIOSCIENCE

**SEPARATION
& PURIFICATION**

CONNECTING MINDS.
TOUCHING LIVES.

The MCC Advantage: Redefining the Efficiency of Chromatography

>80% Less resin



Batch

MCC

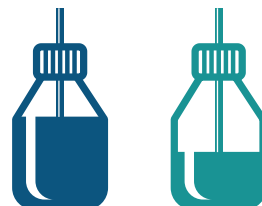
Enhanced Resin Utilization

- Batch: Utilizes a single large column, underutilizing resin capacity as the entire column must accommodate the feed, resulting in significant resin wastage.
- MCC: Employs smaller columns that operate sequentially. Resin capacity is maximized as columns are loaded to their full potential, reducing resin need by up to 90%.

Reduced Buffer Consumption

- Batch: Operating a large column through each process phase requires high buffer volumes.
- MCC: Optimized resin utilization results in up to 40% lower buffer demand.

>40% Less buffer



Batch

MCC

>3 Times faster (cycle time)

Batch



MCC



0 20 40 60 80 100 120 140 160 180 (min)

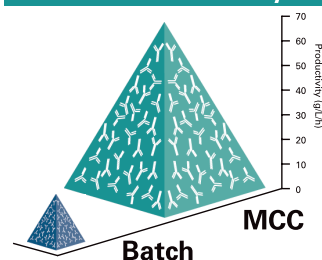
Shorter Processing Times

- Batch: Runs with low flow rates and requires sequential steps, leading to idle periods during column re-equilibration.
- MCC: Operates columns at high flow rates in parallel, allowing simultaneous loading, separation, elution, and regeneration, drastically reducing processing times.

Increased Productivity

- Batch: Limited by the size and capacity of a single column, resulting in a linear relationship between scale and productivity.
- MCC: By distributing the workload across multiple smaller columns, MCC achieves a huge increase in productivity, enabling higher throughput without larger equipment investments.

>300% Productivity



Batch

MCC

50% costs savings



Batch

MCC

Reduced Costs

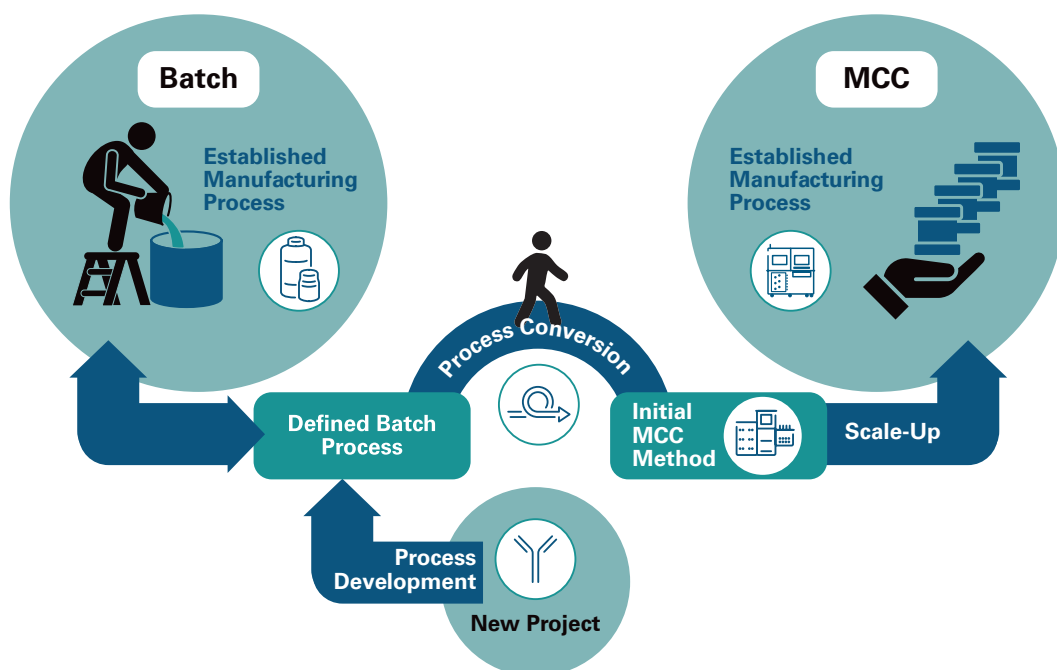
MCC allows considerable cost savings due to lower buffer and resin requirements.

* The cost reduction is a simulation, calculated from the amount of resin and buffer needed in both methods

And much more!

Get further details in the application note

Easier Than You Think: Process Development



To effectively implement MCC, you can either adapt an existing process or establish an entirely new one. This flexibility enables you to select the approach that closely aligns with your goals.

A benchtop system is used for development, while a larger, GMP-ready skid is employed for scaling up in a GMP-compliant environment. These systems should share the same architecture for scalable column numbers and pressure limits.

Whichever option you choose, following these simple steps will be sufficient:

1. Determine the basic process and parameters
2. Process conversion assisted by PROComposer software
3. Confirmation run, just like batch processes
4. Scale-up procedures (switching from a benchtop system to a skid system)

Handling, Redefined: MCC Systems and Consumables

Our MCC system includes the following key elements:

-  **Valve Block.** Directs flow between columns and allows seamless zone switching.
-  **Pumps.** Precisely control the flow of feed, buffers, and cleaning solutions to maintain process consistency.
-  **Sensors.** Measure critical parameters (UV, conductivity, pH) to monitor real-time performance.



Transitioning to MCC allows working with pre-packed columns and single-use technology!

Your Trusted Partner in Multi-Column Chromatography

Tosoh Bioscience is a leader in chromatographic innovation, offering comprehensive solutions to establish and optimize MCC technology.



"Partnering with Tosoh means gaining access to cutting-edge technology, expert guidance, and unwavering support to establish MCC as a cornerstone of your bioprocessing workflow"

A Holistic MCC Solution!

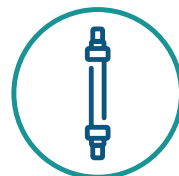
Tosoh combines cutting-edge products with unmatched technical support to help anyone unlock the full potential of MCC.



Octave™ BIO and PRO Systems. Designed for seamless scalability, the BIO process development and GMP-compliant manufacturing. Their flexible architecture accommodates up to eight columns, ensuring adaptability to various purification requirements.



SkillPak™ pre-packed columns. Pre-packed with TOYOPEARL™ or TSKgel™ resins, these columns are available in MCC column dimensions and can withstand MCC flowrates and pressures.



TOYOPEARL® affinity resins.



PROComposer™ Method Wizard & PROComposer™ Method Creator. Our unified PROComposer method-generating software facilitates a quick transition from batch to MCC and scale-up without a method rewrite.



Comprehensive Technical Support. Tosoh Bioscience understands the challenges of adopting new technologies and is dedicated to making the transition to MCC as smooth as possible.

Process Consultation

Tosoh experts work closely with clients to evaluate workflows and design tailored MCC solutions.

Training and Workshops

Hands-on training and educational resources to confidently operate MCC systems.

Seamless Integration

Tosoh's team assists with the transition from batch to MCC, including process optimization and scale-up strategies.

Dedicated Service

Exceptional service is provided making sure you are making good use of your equipment, resins, columns from Tosoh!