Semba Biosciences

The Octave™ Chromatography System

Prep LC Re-imagined…

…With the Octave continuous chromatography system –

an open purification platform

offering higher productivity and purity

for a broad range of compounds

from small organic molecules

to large biomolecules

The Octave™ Chromatography System

The Octave™ Chromatography System is an automated liquid chromatography platform designed for preparative-scale purification of chemical and biological compounds. This bench top eight-column system is capable of simulated moving bed chromatography (SMBC) and other continuous multicolumn protocols that increase productivity up to 20-fold vs. conventional single-column methods. Dramatic increases in solid phase utilization and solvent recovery are achieved through synchronous switching of input and output streams through the eight column positions. The system features a proprietary pneumatic valve design that minimizes dead volume, eliminates pressure surges, and maximizes flexibility for programming separation methods via the SembaPro™ software. Various system configurations are available for separations ranging from small organic compounds to large biomolecules at gram to kilogram scale. With its small footprint and modular design, the Octave System brings the high resolution and efficiency of SMBC to the bench top, packing more purification capability into this space than any other similar-size instrument.

SMB and Multicolumn Continuous Chromatography Benefits

- Higher recovery and purity
- Lower solvent consumption
- Higher productivity - up to 20-fold vs. batch systems
- Compatible with multiple separation chemistries
- Scalable from grams to kilograms of purified product

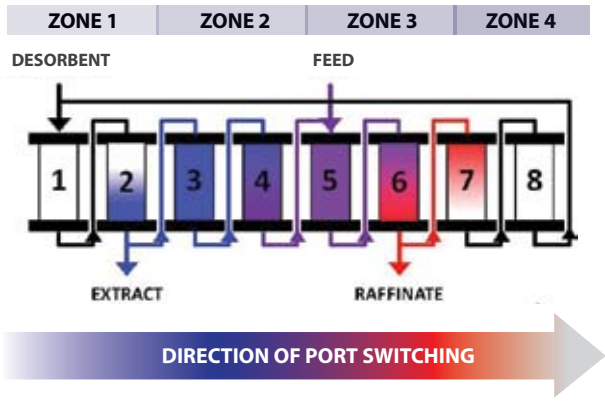
Flexibility for Batch/FPLC Processes

In addition to continuous chromatography, the Octave System can be programmed to run:

- Single column for method development
- Columns in tandem for multistep purification schemes requiring different chromatography media
- Columns in parallel for chromatography media scouting and process development

1 System ▸ 2 Core Continuous Operation Modes ▸ 100s Separation Processes

ISOCRATIC MODE



The solid phase is represented by individual columns connected in series, and the mobile phase by inlet streams of Feed and Desorbent and outlet streams of Raffinate and Extract. All four fluid streams are continuously fed into and withdrawn from the system. Streams are switched one column forward at each step of the cycle, timed to collect pure Extract (slower moving component) and Raffinate (faster moving component). The separation zone occupies 50-70% of the column material.

Compatible separation chemistries: ion exchange, chiral, normal phase, reverse phase, ion exclusion, size exclusion

Method Development

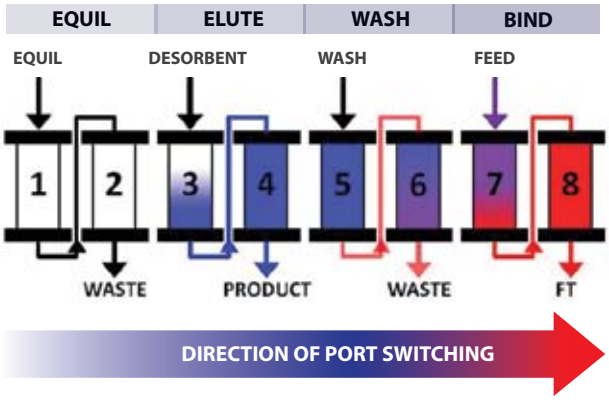
Select the optimal solid/mobile phase system using analytical column

Run single column separations using the same adsorbent as will be used for SMBC to determine:
- retention time of inert tracer (void fraction)
- analyte retention times at different concentrations
- selectivity

Deteremine SMBC switch time and pump flow rates using the on-line parameter calculator or ChromWorks™ Simulation Software

Program script in SembaPro™, run separation, and analyze results

STEP MODE



Step Mode uses multiple solvents and establishes independent zones to perform protocol steps analogous to conventional batch chromatography protocols but operated in a continuous cycle. At any given time, each zone performs one of the protocol steps resulting in simultaneous performance of multiple process steps. Programming flexibility enables users to create protocols employing up to eight Octave pumps in any combination to adjust flow rates, process times, and solvent compositions.

Compatible separation chemistries: affinity, ion exchange, mixed mode, other multistep processes including various SPE chemistries

Method Development

Select the optimal chromatography media, buffers/solvents, and process steps using a single column

Determine switch time and zone/pump flow rates based on the column binding capacity, resin flow properties, target molecule concentration in the feed, and buffer volumes in each process step

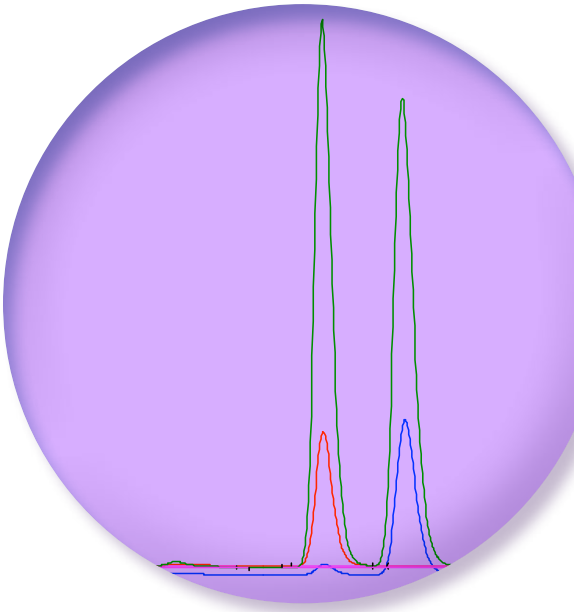
Program or select script in SembaPro™, run separation, and analyze results

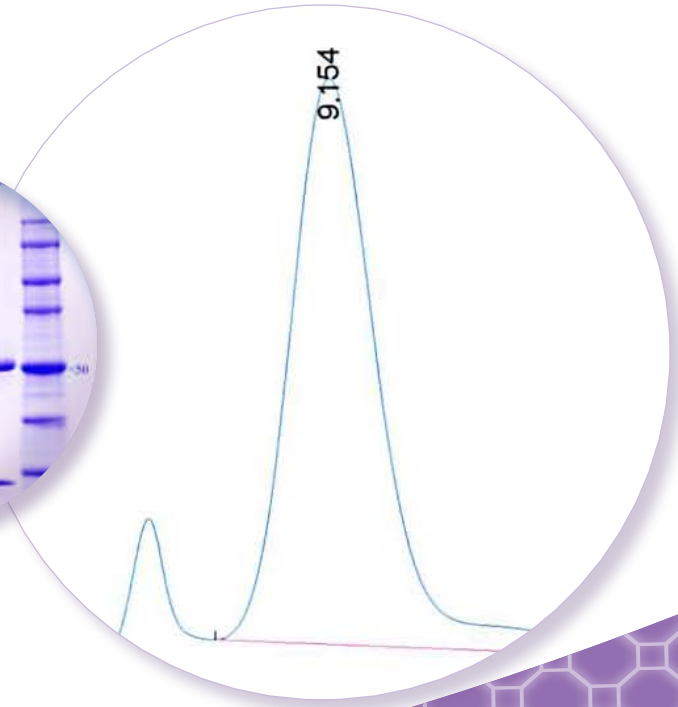
Applications

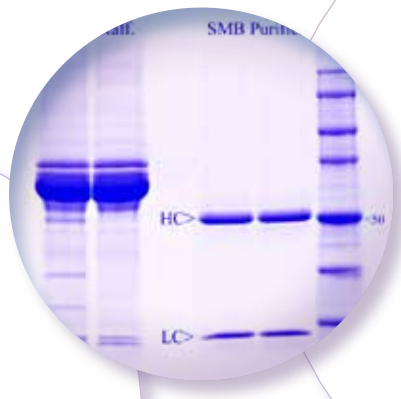
- Bulk separations
- End product purifications
- Impurity analysis
- Chiral separation
- Process development
- Desalting
- Group-specific separations
- High potency API production

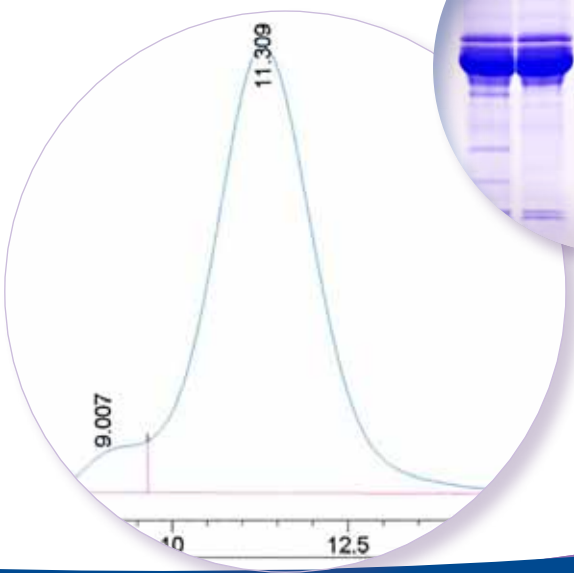
Targets

- mAbs, recombinant proteins
- Polymers
- Natural products
- Sugars, sugar alcohols, oligosaccharides
- Amino acids
- Organic acids
- Fatty acids
- Enantiomers



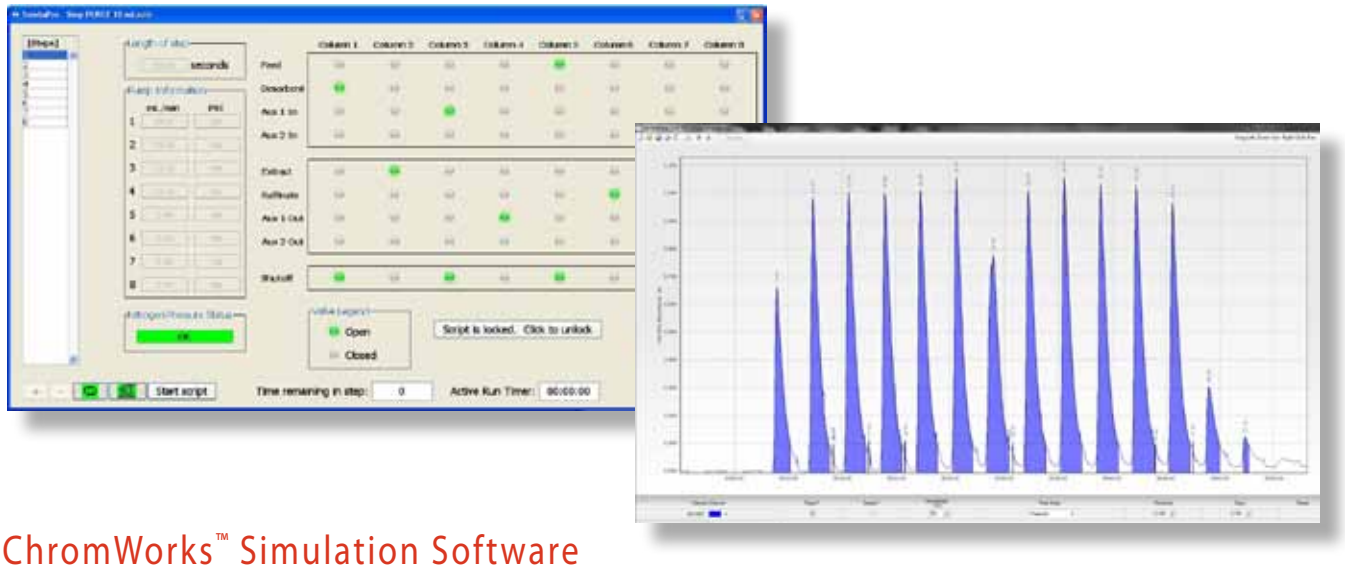






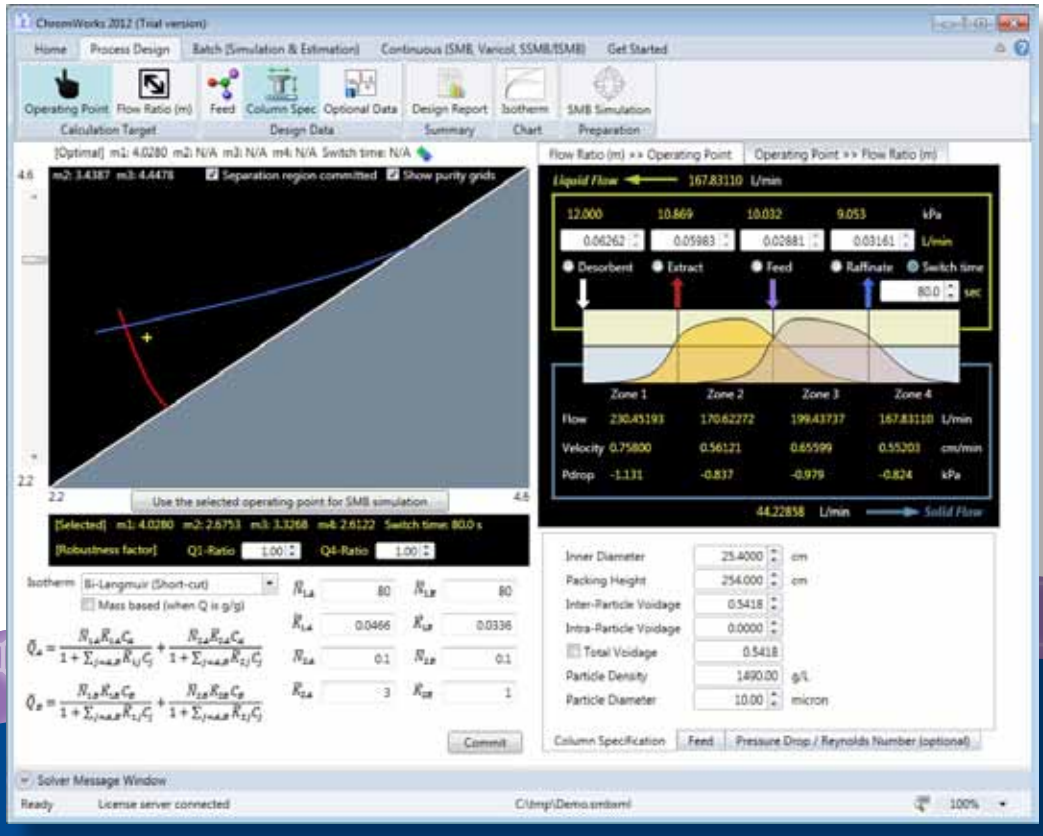
SembaPro™ and SembaView™ Software

- SembaPro application controls pneumatically-actuated valves and up to 8 pumps
- Supplied with pre-programmed scripts
- SembaView application controls output from up to two Octave™ 4X UV/VIS Detectors



ChromWorks™ Simulation Software

- Enables modeling of various continuous chromatography processes: 3- and 4-zone SMB, intermittent and sequential SMB, ternary separations and biochromatography
- Process design supported by Triangle Theory
- Isotherm parameter estimation and operation simulation
- One-year license provided with the Octave System purchase



Octave™ System Selection Guide and Ordering Information

Configuration	Maximum Pump Speed	Typical Column Size	Output per Day
Octave 10 System	12 ml/min	1–10 ml	1–30 g
Octave 100 System	100 ml/min	10–100 ml	Up to 300 g
Octave 300 System	300 ml/min	50–1,000 ml	Up to 1 kg

Options are available for non-metallic flow path, PEEK or stainless steel pump heads, and compatibility with harsh solvents. Please inquire for custom configurations.

Octave 10, 100, or 300 Chromatography System

Cat. No.

- Control Module: electronic control interface with valve status LED panel
- 4 Octave 12, 100, or 300 Pumps:
  precision dual-piston pump with PEEK heads and LED display, User Manual and accessories
- Octave Chromatography Module: includes valve block assemblies, pneumatic system, and accessories
- USB Serial Adapter or Powered USB Hub
- Reservoir Tray
- Octave Column Stand
- SembaPro software application
- Octave System User Manual
- ChromWorks Simulation Software

H1001K
H1002K
H1009K

Octave 10-HS, 100-HS, or 300-HS Chromatography System

Cat. No.

- Includes all components above, except Chromatography Module contains valve block assemblies with PCTFE fluid channels and ports. User may also specify Octave 12-S, 100-S, or 300-S Pumps containing stainless steel pump heads in place of PEEK heads.

H1014K
H1020K
H1031K

Columns for the Octave System

The Octave System is an "open platform" instrument permitting the use of a wide range of chromatography columns and media. The systems accommodate a variety of column sizes, from 1-ml disposable columns for protein and mAb purification to 50 mm I.D. x 500 mm L pack-to-order columns. Columns can be packed with a variety of chromatography media based on silica particles or any polymeric resin. Depending on the application, 15-600 micron particles are suitable for efficient performance on the Octave System. To learn more about the full range of column options and to order online :

- www.sembabio.com/products/smallmolecule.html
- www.sembabio.com/products/bioseparation.html

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