

The smallest, most affordable simulated moving bed chromatography system in the world.



The Semba Octave[™] Chromatography System

- Countercurrent process improves resolution, productivity
- Continuous unattended purification, milligrams to grams
- Compatible with chemical and biological samples

R/ H L

www.sembabio.com

ATATAT

The SMBC Process

Simulated moving bed chromatography (SMBC) is a powerful approach to chromatographic fractionation and has been well established for industrial scale production, including several top-selling pharmaceutical ingredients (1, 2). SMBC emulates countercurrent separation where the mobile phase flows in the opposite direction of the stationary phase. The stationary 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. Valves between the columns are systematically switched open or closed at timed intervals (switch time) to introduce the inlet streams and withdraw the outlet streams between the separation zones, simulating countercurrent movement of the columns. Separation occurs due to the differential interaction of the Feed mixture components for the column material. Components that interact more strongly with the column material are carried into the Extract, whereas weaker-interacting components move into the Raffinate. By adjusting the stream flow rates, the switch time, and the Desorbent composition, a cycle is established in which Feed and Desorbent are continuously added and highly purified products are continuously recovered.

Benefits of SMBC

The countercurrent flow created by SMBC enables extremely efficient utilization of stationary and mobile phases. In singlecolumn systems, separation actually occurs in a small fraction of the column at any one time, with the rest of the column performing no function other than occupying solvent and broadening bands. With SMBC, a series of small columns is used instead of one large column. Typically 50-70% of the solid phase is engaged in the separation zone, while the rest of the column material is being prepared for the next cycle of purification. Moreover, SMBC provides essentially an "infinite" column bed length without the costs associated with obtaining, operating, and maintaining large single columns.

- Higher productivity -- up to 20-fold vs. batch systems
- Higher recovery and purity
- Lower solvent consumption
- Larger stationary phase particles, lower pressures
- Scalable from milligrams to tons of purified product
- Ideal for chiral separations
- Continuous process



Copyright © 2009 Semba Biosciences, Inc.

Semba Octave™ System: The Power of SMBC On Your Bench

The same benefits SMBC brings to large scale chromatography are realized on a smaller scale with the Semba Octave System. The key to effectively scale down the process lies in the design of the valves needed to switch various inlet and outlet streams between the columns. Unlike the mechanical valves used in many systems, the Octave employs a unique pneumatic valve that contains no moving parts, occupies only 3 microliters, and responds in less than 100 milliseconds. Two valve blocks, each containing 36 valves connected through a series of microchannels, provide a robust and effective system for controlling the SMBC process. The valves are controlled by the intuitive SembaPro[™] software application, which can be used to program a wide variety of flow configurations with up to 8 columns for optimizing separation performance.

The Semba Octave countercurrent process allows continuous unattended purification of milligrams to grams of pure enantiomers from racemic mixtures, making it ideal to rapidly obtain sufficient amounts of single enantiomers required for the pre-clinical lead optimization stage of drug discovery research. In addition, the Semba Octave process can be employed for unattended purification of gram amounts of recombinant proteins and antibodies from biological samples.



Applications

- Enantiomer separations using chiral stationary phases
- Recombinant protein purification using IMAC cartridges
- Antibody purification using Protein A/G or IEX cartridges
- Many others including affinity, SEC, HIC, ion exclusion



Semba Octave[™] Chromatography System

Components

- Control Module: includes control interface, Valve LED Indicator Panel, reagent tray
- Pump Module: includes four precision piston pumps, flow rates 0.05-10 ml/min
- Chromatography Module: includes valve block assemblies, column holder, pneumatic system
- **Computer:** includes Mac Mini computer with pre-loaded SembaPro[™] application and scripts, LCD monitor, wireless mouse and keyboard



ARAAR

Contact Info: Semba Biosciences, Inc. 5520 Nobel Dr. Suite 150 Madison, WI 53711 p: 608.310.4457 f: 608.310.4456