96well Plate Membrane Adsorber Screening for Buffer and Salt Influence

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Introduction
Biopharmaceutical companies are constantly challenged to generate robust, scalable and cost-effective bioprocesses under accelerated development time lines while providing product of high purity. One approach to reduce process development time lines is to optimize process parameters by high throughput screening (HTS) techniques. Automated optimization of chromatographic steps by columns is already a standard procedure in industry1, 2. Conditions for chromatographic polishing steps can be evaluated with membranes too. Membrane adsorber 96 well plates in combination with a vacuum filtration unit are an ideal tool for fast screening of purification conditions for target proteins. Examples show the feasibility of an automated application of such a 96 plate with a vacuum unit.

Experimental
96 well membrane adsorbers
The plates are built up from 12 individual 8-well units, “strips” assembled into a 96 well frame (Fig.1). Maximum operating volumes for the membrane wells are 0.5 mL per load step. Collection wells can accommodate up to 2 mL of liquid, each.

Analysis
Protein concentration of the initial solutions and each fraction collected were measured by a plate reader (Tecan Safire, Tecan Group AG, Switzerland) at 280 nm for bovine serum albumin (BSA), Salmon Sperm DNA (300-700 bp) was determined with the PicoGreen dsDNS quanti-IT P7581 Reagent, Life Technologies, Carlsbad, USA. The sampling was performed by the liquid handling system, sample volume was 300 μL (PicoGreen dsDNA Quant-iT P7581 Reagent, Life Technologies, Carlsbad, USA). The grid in both figures marks the limit of 10 % breakthrough.

Effect of salt on protein binding

Two anion exchanger membranes (Sartobind Q, Sartobind STIC PA) were compared. The breakthrough of BSA for different concentrations and types of salt was determined. Contour plots visualize the results. The colour scheme differentiates results dependence on two parameters.

References

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