

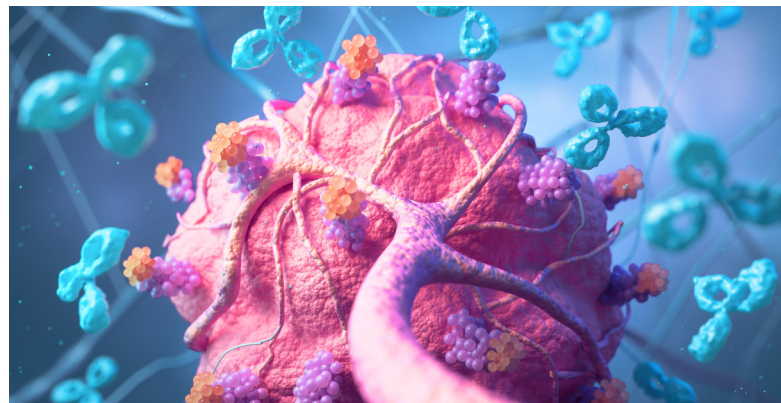
Single-Pass VMF: mAbs Concentration

Single-Pass, Continuous Concentration of mAbs Using Vibro® Membrane Filtration (VMF)

Single-Pass VMF outperforms conventional Single-Pass TFF in the concentration of mAbs, with minimal fouling, high concentration and conversion efficiency and gentle, stable operation. Its innovative anti-fouling mechanism enables true single-pass concentration in a single step – a breakthrough in continuous bioprocessing.

Downstream Process (DSP) Intensification With Single-Pass VMF

DSP remains a major cost driver in mAb production, accounting for up to 90% of total costs, with Protein A chromatography among the most expensive steps. Pre-concentration of the dilute clarified harvest pool can improve the Protein A step, productivity and



loading capacity while buffer consumption drops significantly. This study demonstrates the potential for **single-pass VMF to be used for inline protein concentration**, offering a continuous DSP intensification strategy that **cuts costs and simplifies operation**.

Significant Performance Boost Compared to Conventional TFF

One challenge in conventional SPTFF is that flux needs to be kept low to avoid fouling, yet high flux is required to achieve target concentrations.

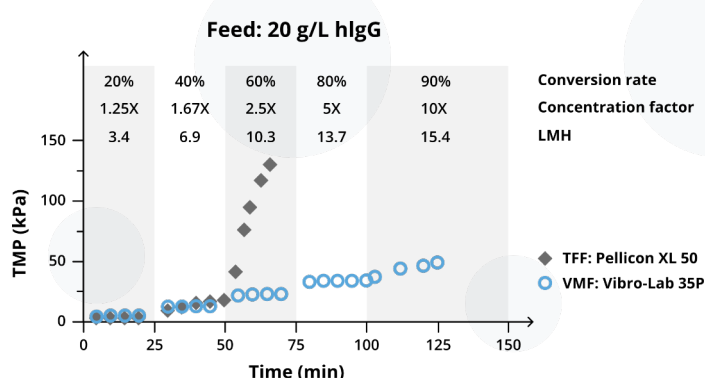
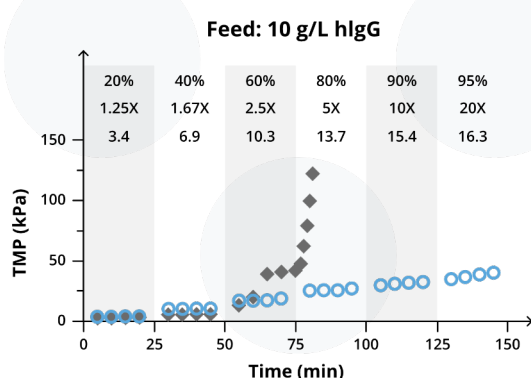
However, VMF utilizes vibrations to mitigate fouling, enabling it to handle much higher flux rates.

In this study, **single-pass VMF significantly outperformed single-pass TFF** in flux stepping experiments, achieving **much higher conversion**

rates as well as **6-8 times higher concentration** factors at approx. 60% higher flux.

VMF demonstrated:

- **10 g/L feed:** Up to 20x concentration with 16.3 LMH at a conversion rate of 95%
- **20 g/L feed:** Up to 10x concentration with 15.4 LMH at a conversion rate of 90%
- Stable and low TMP at high flux



Figures 1 and 2: In flux stepping experiments, Vibro® Membrane Filtration (VMF) significantly outperformed conventional TFF, achieving approx. 60% higher critical flux, much higher conversion rates and 6-8 times higher concentration factors.

Read the Article

Km Prottoy Shariar Piash, Claire MacElroy, Ziqiao Wang, Andrew L. Zydney: *Inline Protein Concentration by Vibratory Single Pass Tangential Flow Filtration*. Biotechnology Journal, Volume 20, Issue 9.



Sani Membranes A/S

www.sanimembranes.com
 CVR No: DK35821015
 Ryttermarken 8 | 3520 Farum | Denmark



Single-Pass VMF: mAbs Concentration

Stable, Long-Term Process Technology

Extended continuous runs (> 8 h) confirmed VMF's robustness and high efficiency:

- **10 g/L feed:** 8.3x concentration at 88% conversion
- **20 g/L feed:** 5x concentration at 80% conversion
- **Gentle processing:** No aggregation or fragmentation detected by dynamic light scattering

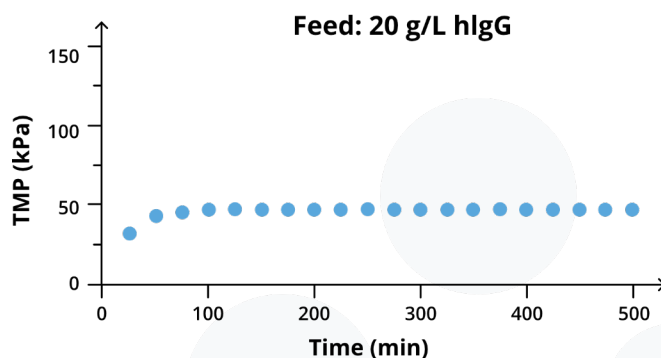


Figure 3: VMF showed robust long-term performance at stable transmembrane pressure (TMP).

DSP Intensification Through True Single-Pass, Single-Step Processing

Even optimized conventional TFF setups for single-pass operation often require multiple devices in series to reach target concentration. In contrast, this study demonstrates VMF's potential for **true single-**

pass, single-step processing – reaching target concentration over a single device. By eliminating the need for multi-stage configurations, VMF paves the way for continuous DSP intensification strategies.

Module	Membrane Material	Feed Concentration (g/L)	Filtrate Flux (L/m ² /h)	Number of Stages (Cassettes)	Concentration Factor
Vibro-Lab 35P	PES-30 kDa	10	16	1	8-20x
Pall Cadence	RC-30 kDa	10	16	7 (3-2-1-1)	11x
Pellicon Capsule	RC-30 kDa	5-15	< 1	2 (1-1)	≈ 7.5x
Vibro-Lab 35P	PES-30 kDa	20	14	1	5x
Pall Cadence	RC-30 kDa	20	15	7 (3-2-1-1)	4.5x
Pellicon 3	RC-30 kDa	20	15	2 (1-1)	1.8x
T-series cassette	RC-10 kDa	20	35	7 (3-2-1-1)	< 2x

Table 1: VMF achieved better overall results in a single step than comparable technologies did in previous research using multiple cassettes.

Read the Article

Km Prottoy Shariar Piash, Claire MacElroy, Ziqiao Wang, Andrew L. Zydney: *Inline Protein Concentration by Vibratory Single Pass Tangential Flow Filtration*. Biotechnology Journal, Volume 20, Issue 9.



Sani Membranes A/S

www.sanimembranes.com
 CVR No: DK35821015
 Ryttermarken 8 | 3520 Farum | Denmark

