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Nanofiltration as an effective means to prevent virus contamination of cell culture processes

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While cell culture media is typically sterile filtered to remove bacteria and mycoplasma, many bioreactors remain unprotected from viral contamination. As awareness of the risk for viral contamination of cell culture processes grows, manufacturers are seeking virus barrier technologies to remove or inactivate viruses. Filtration is an ideal technology in terms of familiarity, ease of use and scalability. However, hurdles to its implementation remain, most notably, the high cost and large footprints required to implement filters designed for the downstream process and the concern that the small pore size of virus filters could impact cell culture performance. A filter specifically designed for cell culture media could help to overcome these hurdles.

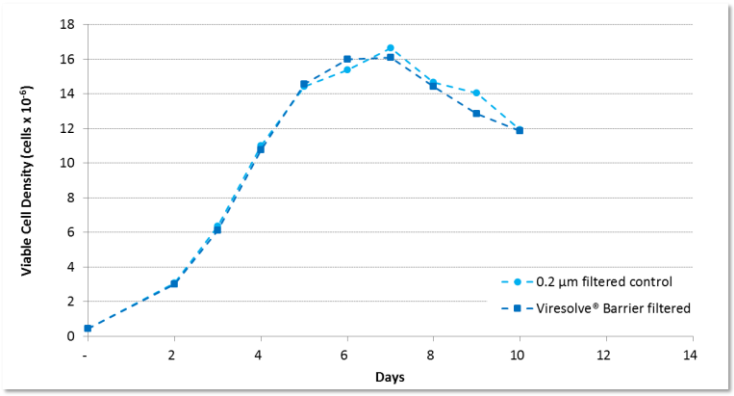

Figure 1 – Viable cell density in virus filtered vs. sterile filtered cell culture media

A novel virus filter has been designed for chemically defined cell culture media. In this presentation, we show that it has improved capacity over downstream virus filters, as well as high retention of a range of microorganisms, including bacteria, mycoplasma and viruses.

We also show that virus filtration has no impact on media composition or cell culture performance. Media was evaluated pre- and post-filtration using liquid chromatography-mass spectrometry, nuclear magnetic resonance and inductively coupled plasma-optical emission spectroscopy. Filtered media was also used in a mAb-producing CHO cell culture process, and cell culture performance was monitored. The resulting protein quality was also evaluated. In all of these evaluations, no significant differences were seen between virus-filtered media and sterile filtered controls, as the graph above exemplifies.

In summary, virus filtration has been shown to be a viable technology for reducing the risk of bioreactor virus contamination. By choosing filters designed for the upstream process, efficient and effective protection can be achieved without impacting cell culture performance.