

APPLICATION OF ALTERNATIVE CELL SEPARATION SYSTEMS FOR THE HARVEST OF MAMMALIAN CELL CULTURE PROCESSES IN A FULLY DISPOSABLE SINGLE-USE FACILITY

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In a fully disposable facility where the use of continuous disk-stack centrifuges are not preferred, harvest processes based on conventional depth filtration become more challenging with increasing single-use bioreactor (SUB) size and higher density culture. Lower filterability due to high volume and high cell density diminishes the efficiency of the depth filtration. In addition, the use of larger depth filtration systems is constrained by the facility footprint. To address the challenge described, several alternative single-use harvest technologies were evaluated.

A disposable centrifuge with a small foot print, low consumable cost, and ease of operation was tested. In a study using a 1kL SUB for harvest, the disposable centrifuge was compared to a continuous disk-stack centrifuge, both followed by conventional depth filtration. The best operating conditions, as well as the edges of failures, were found for the disposable centrifuge. When compared to the disk-stack centrifuge results showed that the operation can be performed in a wide range without impacting depth filtration area requirements and less depth filter area was needed.

In addition to testing a disposable centrifuge, flocculation was evaluated and compared, followed by the depth filtration. This was found to be another low-cost alternative process, while also occupying less facility space. The flocculation technology was tested with different cell lines and results showed significant improvement in filterability and reduction of depth filter area compared to full traditional depth filtration train.