

## Engineering Conferences International ECI Digital Archives

---

Integrated Continuous Biomanufacturing II

Proceedings

---

Fall 11-2-2015

# Alternating flow filtration as an alternative to internal spin filter based perfusion process: Impact on productivity and product quality

Guillermina Forno

*Universidad Nacional del Litoral*

Cristian Paillet

*Universidad Nacional del Litoral*

Laura Mauro

*Universidad Nacional del Litoral*

Ignacio Amadeo

*Universidad Nacional del Litoral*

Eduardo Orti

*Universidad Nacional del Litoral*

Follow this and additional works at: [http://dc.engconfintl.org/biomanufact\\_ii](http://dc.engconfintl.org/biomanufact_ii)



Part of the [Biomedical Engineering and Bioengineering Commons](#)

---

### Recommended Citation

Guillermina Forno, Cristian Paillet, Laura Mauro, Ignacio Amadeo, and Eduardo Orti, "Alternating flow filtration as an alternative to internal spin filter based perfusion process: Impact on productivity and product quality" in "Integrated Continuous Biomanufacturing II", Chetan Goudar, Amgen Inc. Suzanne Farid, University College London Christopher Hwang, Genzyme-Sanofi Karol Lacki, Novo Nordisk Eds, ECI Symposium Series, (2015). [http://dc.engconfintl.org/biomanufact\\_ii/138](http://dc.engconfintl.org/biomanufact_ii/138)

This Conference Proceeding is brought to you for free and open access by the Proceedings at ECI Digital Archives. It has been accepted for inclusion in Integrated Continuous Biomanufacturing II by an authorized administrator of ECI Digital Archives. For more information, please contact [franco@bepress.com](mailto:franco@bepress.com).

## **ALTERNATING FLOW FILTRATION AS AN ALTERNATIVE TO INTERNAL SPIN FILTER BASED PERFUSION PROCESS: IMPACT ON PRODUCTIVITY AND PRODUCT QUALITY**

Guillermina Forno<sup>1</sup>, Cristian Paillet<sup>2</sup>, Laura Mauro<sup>2</sup>, Ignacio Amadeo<sup>1</sup>, Eduardo Ortí<sup>2</sup>

<sup>1</sup> Laboratorio de Cultivos Celulares. Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral (3000) Santa Fe, Argentina

<sup>2</sup> Zelltek S.A. RN 168, Parque Tecnológico Litoral Centro, (3000) Santa Fe, Argentina

The application of an alternating flow filtration (ATF) system adapted to a stirred tank bioreactor as an alternative to internal spin filter was studied using CHO cells producing a fusion protein. As expected, it was possible to reach higher cell densities (maximum  $50 \times 10^6$  vs  $20 \times 10^6$  cells/ml) and achieve longer runs with the ATF device (50 days vs 30 days), since it is known that this cell retention device is less affected by fouling. Even though specific cell yield was similar for both systems; volumetric production of the reactor using the ATF was almost 70% higher than the production achieved using the internal spin filter due to higher cell density and a two fold increase in the perfusion rate. Taking into consideration that it was observed certain degree of retention of the product at the end of the run we assume that this difference in the volumetric production could be even higher working with a bigger pore size or changing the hollow fiber cartridge around day 35. The later can also have a positive impact on the length of the process increasing the average daily production and overall yield. Cell specific perfusion rate was optimized for both the internal spin filter and ATF. A lower rate was achieved for the ATF, resulting in a harvest with a higher product concentration, which supposes a benefit for downstream processing.

Several quality attributes were studied, including misfolded, clipped forms and product glycosylation profile. Differences between both systems were detected only for glycosylation profile, resulting in a decrease of fucosylated glycoforms.

These results constitute valuable data for the optimization of recombinant protein production in perfusion processes since a two fold increase in the chronological productivity of a production facility could be easily achieved as long as downstream scale up is possible.