

Pulse Width Modulated Periodic Backflush

A method to prevent fluid filter fouling in dead-end filtration using periodic backflush

Georgia Tech researchers have developed a method to prevent filter fouling using an asymmetric pulse width modulated (PWM) periodic backflush of fluid flow rate, transmembrane pressure, or other flow modulators. The PWM periodic backflush is applied using a fluidic actuator, a mechanism to incite fluid movement, with variable duty cycles, which improves targeted recovery percentage and is found to interrupt cake formation. Additionally, the backflush reintegrates the fouling layer into the bulk of a sample, improving net particle flux for a fixed volume of sample by clearing the cake formation on the filter and restoring the rate of particle flux through the filter. This leads to a higher quality and yield for sample separation that may be useful in particle therapies, tissue engineering, or biological specimen analysis.

Summary Bullets

- **Cheaper** – Extends the usable lifespan of filters
- **More Efficient** – Improves recovery percentage by an average of 8.4-fold
- **Versatile** – Can be applied to both biological and non-biological systems

Solution Advantages

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Potential Commercial Applications

- Microsphere conjugation and manufacturing
- Disease diagnostics
- Blood filtration and isolation
- Regenerative tissue engineering

Background and More Information

Dead-end filters are filters that offer filtration where the solution to be filtered passes through the membrane surface orthogonally. These have been incorporated into the clinical setting for a variety of diagnostic and therapeutic applications ranging from tissue engineering to infectious agent identification to microparticle

purification. Unfortunately, dead-end processing is susceptible to membrane fouling, which reduces performance due to particle buildup and could potentially lead to filtration failure. Although dead-end filtration cell sorting offers many advantages, it falls short on the percentage of targeted particles recovered from the original filtered suspension.

Inventors

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IP Status

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Publications

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Images

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