Crossflow microfiltration of *E.Coli* cell lysate containing inclusion bodies of recombinant human growth hormone (Met-hGH)

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The production of recombinant protein therapeutics as inclusion bodies has the main advantage of high specific cellular yield. The desired protein, mainly in the inactive form (i.e. as inclusion bodies), has to be solubilized and refolded to high yields and activity and at high purity. Membrane-based separations namely, microfiltration and ultrafiltration, provide an attractive method for the recovery and concentration of inclusion bodies prior to subsequent refolding steps.

This work describes the comparison of a linear hollow fiber membrane module (a currently used technology) and a helical hollow fiber membrane module (representing the latest self-cleaning methodology based on Dean vortices) for cross flow microfiltration (MF) of an *E.Coli* cell lysate containing recombinant human growth hormone (Met-hGH) inclusion bodies. Polyethersulfone membranes (mean pore size 0.1 μm) were used for all experiments. Diafiltration experiments were conducted to study the effect of flux with number of diavolumes for the two modules. The helical module exhibited improved performance as compared with the linear module with regards to the permeation flux. As the cell lysate is a complex mixture of cell debris, soluble proteins and inclusion bodies, the back transport velocities of these various entities in the feed become important during filtration. Thus it is imperative to also study the effect of the wall shear rate on permeate flux. This would give a better understanding of the operating conditions needed to select for recovery of the Met-hGH inclusion bodies in high yield and purity.