

## **446f Studying Hydraulic Deterioration of Large Scale Chromatography Columns**

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The design of large-scale preparative chromatography processes is influenced by many factors like column packing pressures, operating pressures and L/D ratios. In Biotech ion exchange processes, a major problem is the increased medium compression at production scale due to the lack of wall support. This is largely due to the fact that some resins are compressible. The results of the compression process are increased pressures, decreased flow rates, and a longer cycle time. The increase of cycle time in a capacity limited operation can result in the possibility that the chromatographic unit operation using a compressible resin could become the bottleneck step thereby limiting capacity of the plant. The presentation will outline the use of historical data analysis and fundamental engineering principles to identify a column hydraulic degradation problem and lab scale models developed to try and mimic the production scale issues. The primary objective of this presentation is to discuss a study performed to generate a simplified model to predict the critical pressure drop and flow rate of the production scale chromatographic column using a compressible resin and propose the optimum packing and operating pressure in order to minimize cycle time, reduce cycle time variability, and prevent the operation from becoming a bottleneck step.