

## Recovery of Clavulanate and Removal of Chloride from Ion-Exchanged Solution

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### Abstract

In ion exchange chromatography for the recovery of potassium clavulanate from fermentation broth, a large amount of potassium chloride existed in the resulting solutions. In this study, nanofiltration (NF) was employed to retain potassium clavulanate while remove chloride from the solutions. The effects of flow rate (cross-flow velocity) [0.5 ~ 2.5 L/min] and temperature [4 ~ 25 °C] at various fluxes were investigated. Also the effects of feed composition (the ratio of clavulanate concentration to chloride concentration) were investigated. The solution flux, clavulanate and chloride rejections were not practically influenced by the cross-flow velocity in the tested range. The solution flux and clavulanate rejection increased while chloride rejection decreased with the temperature, enhancing clavulanate recovery yield, recovery rate and purity simultaneously. When the clavulanate concentration was increased from 2.5 to 10 mM with a fixed chloride concentration of 250, 500, or 1,000 mM, the solution flux decreased slightly and chloride rejection increased slightly. The clavulanate rejection showed no significant changes at about 97 % or over. When chloride concentration was increased with the fixed clavulanate concentration, the clavulanate rejection showed no significant differences. Both of the solution flux and chloride rejection decreased. Although the chloride rejection decreased, the absolute amount of chloride in the retentate increased, compromising the purity. When diafiltration of a solution containing 2.5 mM of potassium clavulanate and 1,000 mM of potassium chloride was carried out, almost complete removal of chloride was possible with no significant loss of clavulanate.