Use of ion exchange membranes for protein recovery from organic solvents

Tao Hu, Donna Petry and Kevin Seeley. Scientific and Laboratory Services, Pall Corporation, Port Washington, NY 11050. Email: kseeley@pall.com

Abstract
Protein recovery protocols require the separation of proteins by either chromatographic or electrophoretic means. In some cases, sample recovery involves the use of organic solvent extraction in order to denature proteins prior to further purification. A range of solvent extraction protocols has been developed to recover proteins from organic solvents for subsequent analysis. However, the methods can be time consuming and may not be suitable for automated extraction. This paper describes the recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Optimize IE Methods

Figure 1

Determination of an HPLC Protocol

A protocol was used to determine an optimal protocol that would achieve the highest recovery of proteins from organic solvents. The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 2

HPLC Methods

- A highly charged cationic protein can be used as a control for HPLC-based recovery protocols.
- Eluting solutions from high performance liquid chromatography (HPLC) can be used as the eluent for cation exchange.
- A buffer exchange is needed for the proteins following HPLC.

Figure 3

Proteomic Sample Prep

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 4

Conclusions

- The AcroPrep MX device is ideal for extracting proteins from organic solvents.
- The AcroPrep MX device is ideal for recovering proteins from organic solvents.
- The AcroPrep MX device is ideal for recovering proteins from organic solvents.
- The AcroPrep MX device is ideal for recovering proteins from organic solvents.

Figure 5

Automated Processing

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 6

Proteomic Analysis of Human Plasma

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 7

HPLC chromatography

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 8

Sample Recovery with Mustang G and Mustang Q Membranes

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 9

Sample Recovery with Mustang Q Membranes

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 10

Sample Recovery with Mustang Q Membranes

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 11

Sample Recovery with Mustang Q Membranes

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 12

Sample Recovery with Mustang Q Membranes

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 13

Sample Recovery with Mustang Q Membranes

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 14

Sample Recovery with Mustang Q Membranes

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.

Figure 15

Sample Recovery with Mustang Q Membranes

- A mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.
- The protocol was optimized for recovery of proteins from organic solvents using a mixed-bed AcroPrep device where alternating adsorption/elution cycles of cation exchange and anion exchange membranes are used to recover proteins from organic solvents.