Adsorptive Cation Exchanger Mixed Matrix Membrane Chromatography for the Isolation of Lysozyme from Chicken Egg White

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ABSTRACT
Membrane chromatography, which uses an adsorptive membrane, is an alternative technology that overcomes the limitations of packed-bed column chromatography. Mixed matrix membrane (MMM) preparation is a simple method by which adsorptive membranes can be prepared. In the current study, several potential low-cost cation exchange (CEX) resins were screened for their ability to bind lysozyme (LYS) at various pH values prior to the preparation of CEX MMMs. The best binding was shown by Lewatit CNP105 at pH 7. A subsequently prepared Lewatit CNP105—CEX MMM followed the Langmuir adsorption isotherm, with a maximum binding capacity of 223 mg LYS/g membrane. In batch binding from a chicken egg white (CEW) solution at pH 7, both positively charged (LYS, pI 10.7) and negatively charged (conalbumin (CNL), pI 6.1; and ovalbumin (OVL), pI 4.5) proteins were bound onto the MMM. However, CNL and OVL were only loosely bound and were washed out during the washing step. Almost pure LYS was recovered during the elution step, as shown by SDS–PAGE gel analysis.

KEYWORDS: Membrane chromatography; Chicken egg white protein; Cation exchanger; Mixed matrix membrane; Lysozyme

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