

Three-Zone Simulated Moving Bed (SMB) for Purification of Immunoglobulin Yolk

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IgY (Immunoglobulin Yolk) which is a specific antibody in fresh egg yolk, protects human body from virus and antigen. To separate IgY, HPLC (High Performance Liquid Chromatography) and precipitation were used in a batch mode and SMB (Simulated Moving Bed) and simulation were adopted for continuous purification of yolk proteins. IgY and other proteins in yolk were separated by using three-zone SMB chromatography. Batch chromatography and PIM (pulse input method) were performed to find operation parameters and adsorption isotherms. In addition, Simulation was performed to compare its results with 3-zone SMB experiments. The $m_2 = 0.1$, $m_3 = 1.1$ and $\Delta t = 508$ s are the best conditions for the highest purity of IgY. The effects of raffinate flow rate, feed flow rate, and switching time were studied in terms of purity and desorbent consumption. The purity of IgY in raffinate stream increases with decreasing raffinate flow rate or feed flow rate. As switching time increases, the amount of other proteins in extract stream increases.