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Process integration of expanded-bed adsorption with mixed-mode chromatography for protein separation

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Expanded-bed adsorption (EBA) was developed as an innovative technology to capture target proteins directly from unclarified feedstock. Mixed-mode chromatography (MMC) is a novel technology for bioproduct separation, which combines multiple binding modes to improve the adsorption selectivity. Two chromatographic techniques, EBA and MMC, can be integrated into one new unit, mixed-mode EBA, improving the process efficiency of protein capture and reducing the pretreatments on the feedstock, such as clarification, dilution and salt-adjustment. In the present work MMC ligands were coupled onto several matrices for EBA. The static adsorption, adsorption kinetics and dynamic binding were investigated, and the effects of pH and salt addition were evaluated. New technology was verified with two typical processes, monoclonal antibody (mAb) capture from CHO cell culture broth and recombinant human albumin serum (rHSA) isolation from *Pichia pastoris* fermentation broth. High separation efficiency was obtained. For biopharmaceuticals downstream processes require highly productive and robust technologies to improve the process efficiency. The combination of EBA and MMC has been demonstrated to be a promising new platform for protein capture with reduced feedstock pretreatments, high efficiency and relative low cost, which can be expanded to other bioproduct separation. This work was supported by the International Science & Technology Cooperation Program of China and National Natural Science Foundation of China.

Biography

Dong-Qiang Lin has completed his PhD in 1997 from Zhejiang University, China. Since 1998, he work for Zhejiang University, and became a professor in 2007. Now he is the director of the Institute of Bioengineering, Zhejiang University. He has published more than 100 peer-reviewed papers in international journals and three books, and was authorized 32 patents. In recent year he focused on novel bioseparation technology, separation materials, computer simulation and bioprocess design.

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