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SEPARATION SCIENCE & ENGINEERING

壳聚糖衍和膜脱除蛋白质溶液中的内毒素

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摘要 Affinity membrane was prepared with chitosan immobilized on the hydrophile- modified poly（vinylidene fluoride）（PVDF）membrane. Fourier transform infrared spectroscopy（FTIR）analysis indicated that the contents of-NH2 and -OH groups increased and fluoride decreased on the membrane surface after modification. Using this kind of affinity membrane, the effects of operation parameters such as pH, ionic strength and flow rate, on the amount of end otoxin removed were investigated. The results showed that the equilibrium adsorption capacity and the dissociation constant of the affinity membrane to endotoxin were 21.4 EU.mg^-1 membrane and 0.50 EU.ml^-1, respectively, at pH 7.0 and ionic strength 0.2 mol.L^-1. Adsorption appeared to follow a typical Langmuir adsorption isotherm. At pH 5.0, ionic strength of 0.2 mol.L^-1, the removal rate of endotoxin from BSA solution with the chitosan affinity membrane was up to 88.6%（11.50 EU.mg^-1 membrane）, and the recovery of BSA was 93.4%（0.187 mg.mg^-1 membrane）, while at pH 11.0, ionic strength of 0.2 mol.L^-1, the removal rate of endotoxin from lysozyme solution was 72.4%（9.92 EU.mg^-1 membrane）, and the recovery of lysozyme was 92.3%（0.104mg.mg^-1 membrane）.

关键词 蛋白质, 内毒素, 壳聚糖, 亲和膜, 脱除工艺, 热原物质.

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Removing Endotoxin from Protein Solution by Chitosan Modified Affinity Membrane

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Abstract Affinity membrane was prepared with chitosan immobilized on the hydrophile- modified poly（vinylidene fluoride）（PVDF）membrane. Fourier transform infrared spectroscopy（FTIR）analysis indicated that the contents of-NH2 and -OH groups increased and fluoride decreased on the membrane surface after modification. Using this kind of affinity membrane, the effects of operation parameters such as pH, ionic strength and flow rate, on the amount of end otoxin removed were investigated. The results showed that the equilibrium adsorption capacity and the dissociation constant of the affinity membrane to endotoxin were 21.4 EU.mg^-1 membrane and 0.50 EU.ml^-1, respectively, at pH 7.0 and ionic strength 0.2 mol.L^-1. Adsorption appeared to follow a typical Langmuir adsorption isotherm. At pH 5.0, ionic strength of 0.2 mol.L^-1, the removal rate of endotoxin from BSA solution with the chitosan affinity membrane was up to 88.6%（11.50 EU.mg^-1 membrane）, and the recovery of BSA was 93.4%（0.187 mg.mg^-1 membrane）, while at pH 11.0, ionic strength of 0.2 mol.L^-1, the removal rate of endotoxin from lysozyme solution was 72.4%（9.92 EU.mg^-1 membrane）, and the recovery of lysozyme was 92.3%（0.104mg.mg^-1 membrane）.

Key words chitosan; poly(vinylidene fluoride); endotoxin removal; affinity adsorption

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