

Selective removal of endotoxin from a DNA solution by cross-linked cyclodextrin beads

(架橋シクロデキストリンビーズによるDNA溶液からのエンドトキシン選択除去)

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The removal of lipopolysaccharide (LPS) from a contaminated DNA solution was achieved using cross-linked cyclodextrin (CyD polymer) beads as LPS adsorbents. The LPS-removing activity of the β - and γ -CyD polymer beads was compared with that of common cationic LPS adsorbents. The γ -CyD polymer beads selectively removed LPS from a DNA solution (50 mg ml⁻¹, pH 6, ionic strength $\mu = 0.2$) containing natural LPS (15 EU ml⁻¹), without the adsorption of DNA. The adsorptions of LPS and DNA were 85% and <1%, respectively.

Table 1 Characteristics of polymer adsorbents

Name of beads	Ligand	Matrix ^a	Pore size of matrix/ M _{lim} ^b	AEC ^c / meq g ⁻¹	SD ^d / wet-mL dry-g ⁻¹
β -CyD polymer	β -CyD	β -CyD/CMO=40/60 ^e	1 × 10 ⁴	<0.1	5.5
γ -CyD polymer	γ -CyD	γ -CyD/CMO=40/60	1 × 10 ⁴	<0.1	5.2
DEAE-Sepharose [®]	Diethylamino-ethanol	Sepharose CL-6B	3 × 10 ⁴	0.1	21.5
PL-Cellufine ^f	Poly(ϵ -lysine)	Cellufine-CPC [®]	4 × 10 ⁵	0.4	11.2

a. Spherical beads, diameter: 44-105 μ m.

b. Value (molecular-mass exclusion) deduced from the molecular weight of the polysaccharide by size-exclusion chromatography.

c. Anion-exchange capacity was quantified by pH titration and elemental analysis.

d. Swelling degree in water.

e. CMO ratio of 60 unit-mol% in the CyD/CMO suspension.

f. ETclean-L[®] (Chisso, Japan, commercial LPS adsorbent)

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