

Modification of Nylon Membrane Used for Affinity Adsorption

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Abstract: Nylon membrane was modified by binding with polyhydroxyl-containing materials to increase its hydrophilicity and reduce its nonspecific interaction with proteins. The effect of binding hydrophilic materials on amount of ligand bound--Cibacron Blue F3GA (CBF) was investigated. Experimental data showed that the amount of CBF bound can be increased significantly after binding of hydrophilic materials.

Keywords: Nylon membrane, modification, hydrophilic materials, affinity adsorption.

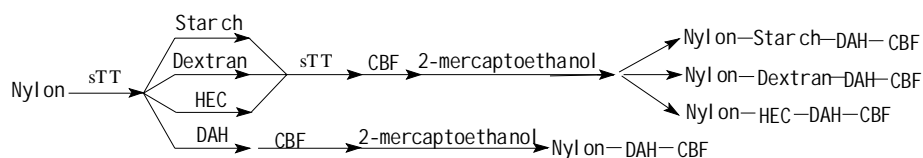
Using microporous affinity membrane in separation has advantages of large specific area, low backpressure and fast separation rate¹. This led to obtain high purity proteins in very short time and reduce the possibility of denaturation of biomolecules in largely simplified separation process. Nylon membrane offers narrow pore size distribution and good mechanical rigidity. However, nylon membrane has low concentration of primary amino group and nonspecific adsorption of protein². To solve these problems, polyhydroxyl-containing materials, such as hydroxyethyl cellulose, dextran T70 and starch, were bound onto nylon membrane through s-triazine trichloride activation method³ in this study. The effect of binding of hydrophilic materials on the amount of ligands bound was investigated also.

Materials and Equipment

Nylon membranes were obtained from Qingjiang Chemical Plant, China. s-Triazine trichloride (sTT) and Cibacron Blue F3GA (CBF) were bought from Sigma. Hydroxyethyl cellulose (HEC), dextran T70 and 2-mercaptoethanol were purchased from Fluka. All other reagents were bought from China and are of analytical purity. Model 752C UV-visible spectrophotometer was used for determining the concentration of protein in solution.

Methods

The following affinity membranes were prepared by using sTT as activator:



Results and Discussion

Table 1 shows the effect of different hydrophilic materials on the amount of ligand bound. It can be seen from **Table 1** that the amount of ligand bound was nearly the same, when different hydrophilic materials were used as modifiers. For determining nonspecific adsorption capacity of the matrix, 0.05 g starting membrane or modified membranes was shaken in 0.24 mg/ml BSA at room temperature for 24h. Nonspecific adsorption capacity of starting membrane was 1.51 mg/g and nonspecific interaction of modified nylon membranes with BSA could not be determined. In addition, after binding HEC the amount of CBF bound increased from 14.6 to 73.0 mg/g.

Table 1 The effect of different hydrophilic materials on the amount of ligand bound

Membranes	Hydrophilic materials	CBF bound (mg/g membrane)
Nylon-starch-HAD-CBF	Starch	72.8
Nylon-DextranT70-HAD-CBF	Dextran T70	73.1
Nylon-HEC-HAD-CBF	HEC	73.0

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