Application of dye-ligands affinity adsorbent in capturing of rabbit immunoglobulin G

Abstract

The applicability of dye-ligands attached to an expanded bed chromatography quartz base matrix (Streamline™) for the affinity bioseparation of rabbit immunoglobulin G (IgG) was investigated. Reactive Green 5 (RG-5) immobilized onto adsorbent was selected for capturing of rabbit-IgG due to its higher binding capacity compared to other dye-ligands possessing similar ligand density. Adsorption parameters such as pH, temperature, ionic strength and initial rabbit-IgG concentration were optimized for the adsorption of rabbit-IgG on the RG-5-immobilized adsorbent. The highest rabbit-IgG adsorption was recorded in pH 7.0, while the maximum binding capacity for BSA was achieved at pH 4.0. The adsorption of rabbit-IgG on RG-5-immobilized adsorbent was declined as the increase of ionic strength. There is no significant influence of temperature against adsorption efficiency of RG-5-immobilized adsorbent for rabbit-IgG. The adsorption phenomenon of rabbit-IgG on RG-5-immobilized adsorbent appeared to follow the Langmuir–Freundlich adsorption isotherm model. The theoretically maximum binding capacity (qm) of RG-5-immobilized adsorbent estimated from this isotherm was 49.3 mg ml−1, which is very close to that obtained experimentally (49.0 mg ml−1). About 50% of bound BSA on RG-5-immobilized adsorbent in binary adsorption system was removed with washing buffer containing 1 M NaCl.

Keyword: Affinity; Bioseparation; Dye-ligand; Expanded bed chromatography; Immunoglobulin G purification; Adsorption