

Protein–membrane interactions in forced-flow electrophoresis of protein solutions: Effect of initial pH and initial ionic strength

Abstract

The purpose of this paper is to determine the effect of initial pH buffer and initial ionic strength of phosphate buffer in forced-flow electrophoresis (FFE) of protein solutions. Two types of proteins, bovine serum albumin (BSA) and bovine γ -globulin (BGG) were used in these experiments. The flux profiles of FFE process were strongly influenced by electrokinetic effects in FFE process. The electrokinetic effects were electrophoresis, electro-osmosis and electrolysis. It was observed that the migration of electrolysis products (H^+) changed the pH of retentate which consequently influenced the permeate flux during the FFE process. The lowest permeate flux occurred at the isoelectric point (IEP) of both BSA (pH 4.9) and BGG (pH 5.86–6.70). It was found that the protein–membrane interactions played important role on the permeate flux profile due to electrostatic interaction/repulsion in the FFE process.

Keywords: Forced-flow electrophoresis; Protein–membrane interactions; Protein; Bovine serum albumin; Bovine γ -globulin