

Protein Partitioning in Aqueous Two-Phase Systems Composed of a pH-Responsive Copolymer and Poly(ethylene glycol)

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ABSTRACT

The effect of pH and salt concn. on the partitioning behavior of bovine serum albumin (BSA) and cytochrome c in an aq. two-phase polymer system contg. a novel pH-responsive copolymer that mimics the structure of proteins and poly(ethylene glycol) (PEG) was investigated. The two-phase system has low viscosity. Depending on pH and salt concn., the cytochrome c was found to preferentially partition into the pH-responsive copolymer-rich (bottom) phase under all conditions of pH and salt concns. considered in the study. This was caused by the attraction between the pos. charged protein and neg. charged copolymer. BSA partitioning showed a more complex behavior and partitioned either to the PEG phase or copolymer phase depending on the pH and ionic strength. Extremely high partitioning levels (partition coeff. of 0.004) and very high sepn. ratios of the two proteins (up to 48) were recorded in the new systems. This was attributed to strong electrostatic interactions between the proteins and the charged copolymer.